

**Appendix I:
Noise Study**

Fulton Mall Reconstruction Project

Noise Study

Fulton Mall, City of Fresno
Fresno County, California

Federal Project # TCSPL-5060(263)

Prepared By: Michael E. Houlihan, AICP Date: September 5, 2013
FirstCarbon Solutions | Michael Brandman Associates

Prepared For: California Department of Transportation

September 2013



Noise Study

Prepared For: Wilma Quan
City of Fresno

Prepared by: FirstCarbon Solutions | Michael Brandman Associates

Date: September 5, 2013

The purpose of this memorandum is to review and evaluate the potential short- and long-term noise and vibration impacts that may result from construction and implementation of the proposed Fulton Mall Project.

Proposed Project

The purpose of the proposed project is to improve parking and vehicle access to local businesses on Fulton Street in order to maximize sustainable development and economic productivity in conjunction with other downtown redevelopment projects. The proposed project is also intended to lower crime and improve safety for people walking between parking areas and businesses located on the Fulton Mall and for people who live in, work in, and visit the project area.

The City of Fresno proposes to reconstruct Fulton Mall as a complete street by reintroducing vehicle traffic lanes to the existing pedestrian mall. The Mall consists of 6 linear blocks that were open to traffic prior to 1964 but now do not allow public vehicle access. The Mall is bounded by Tuolumne Street to the north and Inyo Street to the south, and includes portions of three cross streets. The total length of the new roadways would be 0.74 mile.

The “Mall” refers specifically to the pedestrian areas between adjoining buildings located on the former City streets of Fulton, Mariposa, Merced, and Kern, which function as an integrated pedestrian Mall. Fresno Street and Tulare Street, which do allow vehicle traffic, run through the Mall and divide it into three roughly equal sections. Mall landscaping elements include fountains, planters, benches, sculptures, electrical systems, irrigation systems, and two “tot lots.” The Mall does not include the adjoining buildings or their façades.

Each Build Alternative proposes to reconstruct the Mall using “complete streets” design concepts. Complete streets are those designed to function as shared public space, or as “living streets”—for pedestrians, cyclists, outdoor businesses, and slow-moving, cautiously driven vehicles. Complete streets may include narrow roadways, corner bulb-outs, winding streets, and other traffic calming measures to lower driving speeds; street trees and other landscape elements; wide pedestrian sidewalks and crosswalks; and bicycle accommodations such as dedicated bicycle lanes or wide shoulders. The purpose of incorporating these design concepts into the proposed project is to retain portions of the historic fabric and character of the Mall, and maintain the key elements, feeling, and unique experience of a pedestrian mall in downtown Fresno.

The proposed project has three Alternatives, including two Build Alternatives and a No Build Alternative.

Alternative 1 consists of reopening the Mall with two-way streets, with one lane of vehicular traffic in each direction alongside bicycle, pedestrian, and potentially other travel modes. On-street vehicle parking spaces would be reintroduced along the length of the Mall (including cross streets), and construction of streetscape improvements would optimize the streets for the new blend of travel modes. One 11-foot vehicle travel lane would run in each direction, with a parallel parking lane of 9 feet included on both sides of the streets. A 20-foot sidewalk included on both sides of the streets would allow for walking and pedestrian-only seating, landscaping, lighting, and public art.

The existing 20 works of sculpture present on the Mall today would all remain, although some may be moved so as to be incorporated in sidewalk areas of the new streetscape. Only the 3 fountains found along the Kern Mall, west of Fulton, would remain. All of the planter beds and raised seating areas found along the Mall today would be removed in favor of wide sidewalks that incorporate artwork and seating areas. The two tot lots present, one located near the corner of Merced and Fulton, and the other located near the corner of Kern and Fulton, would be relocated and potentially combined into one larger tot lot on Kern Mall between Fulton Street and Home Run Alley, or near the corner of Mariposa and Fulton. Impacts to native earth during project construction are not anticipated.

Alternative 2 consists of reconnecting the street grid as in Alternative 1, but would include rebuilding distinctive elements of the Mall in five to six specific locations, known as “vignettes.” The vignettes would include many of the existing elements (sculptures, fountains, pavement pattern, trees, etc.). One 11-foot vehicle travel lane would run in each direction and would curve through the vignettes to avoid existing landscape features. Outside the vignette areas, the street would be straight, and the landscape would include a 9-foot parallel parking lane and pedestrian-only walking, seating, vegetation, and public art areas 20 feet wide on one or both sides of the street. Within the vignettes, the existing Mall landscape elements would be kept maximally intact. The remaining space on each side of the street would be dedicated to pedestrian travel, seating, vegetation, and artwork.

A total of 12 fountains—9 in vignettes and 3 on Kern Mall west of Fulton—would remain in place. The 12 fountains would be fully rebuilt or restored to working order. Fourteen of the 20 sculptures would remain in their current locations. The other 6 (along with the various tile mosaics benches on the Mall today) would be configured differently within the current right-of-way to accommodate the new streetscape. Street lighting outside the vignettes would be contemporary and pedestrian-oriented, but the original Mall fixtures would be rehabilitated within each vignette. The 2 tot lots present, 1 located near the corner of Merced and Fulton, and the other located near the corner of Kern and Fulton, would be relocated and potentially combined into one larger tot lot on Kern Mall between Fulton Street and Home Run Alley, or near the corner of Mariposa and Fulton. Impacts to native earth during project construction are not anticipated.

The third Alternative is the no-build Alternative. New streets would not be constructed and the Mall would remain as it now exists.

Environmental Setting

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit, which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by

discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies that are audible to the human ear.

Noise equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in dBA. The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour L_{eq} is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Sound Level (L_{dn}) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. While the Community Noise Equivalent Level (CNEL) is similar to the L_{dn} , except that it has another addition of 4.77 dB to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these times because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason the sound is perceived to be louder in the evening and nighttime hours and is weighted accordingly. Many cities rely on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

Noise measurements were taken to represent existing ambient noise levels at land uses that may be affected by the conversion of the existing pedestrian only streets into complete streets, thereby allowing vehicle access.

As shown in Figure 5-1 (see appendix), Noise Measurement 1 (NM1) was taken at the intersection of two streets that currently allow vehicle access (Broadway Street and Fresno Street). Further, the intersection of Highway 99 and Fresno Street is approximately 2,375 feet to the west of this location. There is also bus service along Fresno Street. Noise Measurements 2 and 5 were taken internal to the project site where vehicle access is currently not allowed. Noise Measurement 3 was taken near Van Ness Avenue near Kern Street that currently does not allow vehicle access. Measurement 4 was taken at the western corner of the intersection of Tuolumne Street and Fulton Street, where Fulton Street dead ends into the mall and becomes "Fulton Mall." Table 1 summarizes the results of the short-term noise monitoring conducted in the study area.

Table 1, Summary of Short-Term Measurements

Position	Land Uses	Start Time	Duration (minutes)	Measured L_{eq}
NM-1	Residential (Masten Towers)	6:24 p.m.	15	70.7
NM-2	Residential (Pacific Southwest Building) and Retail	4:30 p.m.	30	59.9
NM-3	Residential (Californian Hotel)	5:58 p.m.	15	65.7
NM-4	Office/Commercial	6:51 p.m.	15	62.5
NM-5	Office Commercial	5:09 p.m.	30	59.9

Regulatory Setting

Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves the three purposes listed below:

- Promulgating noise emission standards for interstate commerce.
- Assisting state and local abatement efforts.
- Promoting noise education and research.

The Federal Office of Noise Abatement and Control was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency limits noise exposure of workers to 90 dB L_{eq} or less for 8 continuous hours or 105 dB L_{eq} or less for 1 continuous hour.

The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration, while freeways that are part of the interstate highway system are regulated FHWA. Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, the City of Fresno is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control was instrumental in developing regulatory tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix,” which allows the local jurisdiction to delineate compatibility of sensitive uses with various incremental levels of noise (California Department of Health, Office of Noise Control 1976).

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) exterior noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise/land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable. The City of Fresno utilizes a version of these guidelines to evaluate potential noise/land use impacts.

Local Regulations

The City of Fresno is currently in the process of updating their General Plan. Draft versions of the Noise and Safety Element are available for viewing; however, they have not been adopted yet. Therefore, the 2002 General Plan standards still apply. However, the City proposes to raise the maximum noise level standards, and states the following within the General Plan Update draft-version of the Noise and Safety Element:

Major cities in California commonly consider maximum noise levels of 65 dB to be considered “normally acceptable” for unshielded residential development including outdoor space in an urban environment; suburban communities, by contrast, prefer a 60 dB threshold. Noise levels from 65 dB to 70 dB fall within the “conditionally unacceptable” range, and those in the 70 to 75 dB range are considered “normally unacceptable.”

The General Plan is consistent with noise control practice in urban areas, employing 65 dB as the beginning of the “normally acceptable” range. This policy supports the development of infill residential projects, as well as nonresidential infill projects by setting a realistic, achievable threshold of impact for new development.

Section 10-101 of City’s Municipal Code contains the City’s noise ordinance, which establishes exterior and interior noise level standards. Standards are set for ambient noise based on district type (residential, commercial, and industrial) and time of day.

The ambient noise levels in the Noise Ordinance will be updated to be consistent with the General Plan after adoption. This update will need to increase the threshold in residential districts to 65 decibels and also provide standards for mixed-use districts, civic and institutional uses, and parks and open space. It should also specify maximum hourly noise levels of outdoor activity areas and indoor spaces for specified land use types; measurement standards; required noise mitigation standards for new residential development in noise-impacted environments; uniform guidelines for acoustical studies based on current professional standards; and enforcement procedures.

The City of Fresno General Plan Noise Element (2002) contains goals and policies that address noise. The following General Plan goals and policies are applicable to the proposed project:

Goal 1. Enhance the quality of life for the citizens of Fresno and plan for the projected population within the moderately expanded Fresno urban boundary in a manner which will respect physical, environmental, fiscal, economic, and social issues.

Goal 14. Protect and improve public health and safety.

H-1-a. Policy. Noise-sensitive land uses impacted by existing or projected future transportation noise sources shall include mitigation measures so that resulting noise levels do not exceed the standards shown in Table 8 (Table 4.8-6 of this section) below:

Table 2, Maximum Allowable Noise Exposure for Noise Sensitive Land Uses (Table 8 of the City of Fresno General Plan Noise Element)

Land Use ⁴	Outdoor Activity Areas ¹ L _{dn} dB	Interior Spaces	
		L _{dn} dB	L _{eq} dB ²
Residential	60 ³	45	---
Transient Lodging	60 ³	45	---
Hospitals, Nursing Homes	60 ³	45	---
Theaters, Auditoriums, Music Halls	---	---	35
Churches, Meeting Halls	60 ³	---	45
Office Buildings	---	---	45
Schools, Libraries, Museums	---	---	45

Notes:
¹ Where the location of the outdoor activity area is unknown or is not applicable, the exterior noise level standard shall be applied to the property line of the receiving land use.
² As determined for a typical worst-case hour during periods of use.
³ Noise levels up to 65 dB L_{dn} adjacent to the Burlington Northern Santa Fe and Union Pacific mainline tracks may be allowed by the project approving authority when it is determined that it is not possible to achieve 60 dB L_{dn} in outdoor activity areas using a practical application of the best-available noise reduction technology, and when all feasible exterior noise reduction measures have been proposed.
⁴ The Planning and Development Director, on a case-by-case basis, may designate land uses other than those shown in this table to be noise-sensitive, and may require appropriate noise mitigation measures.
Source: City of Fresno General Plan Noise Element, February 2002: 163.

H-1-b. Policy. For purposes of city analyses of noise impacts, and for determining appropriate noise mitigation, a significant increase in ambient noise levels is assumed if the project causes ambient noise levels to exceed the following:

- The ambient noise level is less than 60 dB L_{dn} and the project increase noise levels by 5 dB or more.
- The ambient noise level is 60-65 dB L_{dn} and the project increases noise levels by 3 dB or more
- The ambient noise level is greater than 65 dB L_{dn} and the project increases noise levels by 1.5 dB or more.

H-1-c. Policy. The city shall review new public and private development proposals to determine conformance with the policies of this Noise Element.

H-1-d. Policy. The city shall require an acoustical analysis in those cases where a project potentially threatens to expose existing or proposed noise-sensitive land uses to excessive noise levels. The presumption of potentially excessive noise levels shall be based on the location of new noise-sensitive uses to known noise sources of staff's professional judgment that a potential for adverse noise impacts exists. Acoustical analyses shall be required early in the review process so that noise mitigation may be included in the project design. For development not subject to environmental review, the requirements for an acoustical analysis shall be implemented prior to the issuance of building permits. The requirements for the content of an acoustical analysis are established by the Planning and Development Department in conjunction with environmental health agencies.

H-1-e. Policy. The city shall develop and employ procedures to ensure that noise mitigation measures required pursuant to an acoustical analysis are implemented in the development review and building permit processes.

H-1-f. Policy. The city shall develop and employ procedures to monitor compliance with the policies of the Noise Element after completion of projects where noise mitigation measures have been required.

H-1-g. Policy. The city shall enforce the State Noise Insulation Standards (California Code of Regulations, Title 24) and Chapter 35 of the Unicom Building Code (UBC) concerning interior noise exposure for multi-family housing, hotels and motels.

H-1-h. Policy. The city shall request the California Highway Patrol, the Sheriffs, and Police Department to actively enforce the California Vehicle Code sections relating to adequate vehicle mufflers and modified exhaust systems, and sound systems in vehicles.

H-1-i. Policy. The city shall review and update the Noise Element and the Noise Ordinance to ensure that noise exposure information and specific policies and ordinances are consistent with changing conditions with the city and with noise control regulations or policies enacted after the adoption of this element.

H-1-j Policy. Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated so that resulting noise levels do not exceed the adopted standards at noise-sensitive land uses.

H-1-k. Policy. Noise-sensitive land uses impacted by stationary noise sources shall include mitigation measures so that resulting noise levels do not exceed the standards shown in Table 9 (Table 4.8-7 of this section) as follows:

Table 3: Maximum Allowable Noise Exposure-Stationary Noise Sources¹
(Table 9 of the City of Fresno General Plan Noise Element)

Noise Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly Equivalent Sound Level (L_{eq}), dB	50	45
Maximum Sound Level (L_{max}), dB	70	65
Notes: ¹ As determined at the outdoor activity areas. Where the location of outdoor activity areas is unknown or not applicable, the noise exposure standard shall be applied at the property line of the receiving land use. When ambient noise levels exceed or equal the levels in this table, mitigation shall only be required to limit noise to the ambient plus five (5) dB. Source: City of Fresno General Plan Noise Element, February 2002		

H-1-l. Policy. Noise created by new proposed stationary noise sources or existing stationary noise sources which undergo modifications that may increase noise levels shall be mitigated so as not to exceed the noise level standards of Table 9 (Table 4.8-7 of this section) at noise-sensitive land uses.

H-1-m Policy. As a guideline, noise barrier (wall, earth berms, or berm/wall combinations) shall not exceed 15 feet in height as measured from the elevation of the nearest building pad. The Planning Department Director, on a case-by-case basis, may allow noise barrier heights differing from this guideline. However, resulting noise levels must satisfy the maximum allowable noise exposure standards.

City of Fresno Municipal Code

Chapter 10, Regulations Regarding Public Nuisances and Real Property Conduct and Use, Article 1, Noise Regulations, of the Fresno Municipal Code establishes excessive noise guidelines and exemptions. The following portions of the Municipal Code are applicable to the proposed project:

SEC. 10-102. - Definitions.

- (b) Ambient Noise. "Ambient noise" is the all-encompassing noise associated with a given environment, being usually a composite of sounds from many sources near and far. For the purpose of this ordinance, ambient noise level is the level obtained when the noise level is averaged over a period of fifteen minutes, without inclusion of the offending noise, at the location and time of day at which a comparison with the offending noise is to be made. Where the ambient noise level is less than that designated in this section, however, the noise level specified herein shall be deemed to be the ambient noise level for that location.

Table 4, SEC. 10-102 of the Noise Ordinance of the City of Fresno

DISTRICT	TIME	SOUND LEVEL DECIBELS
Residential	10 pm to 7 am	50
Residential	7 pm to 10 pm	55
Residential	7 am to 7 pm	60
Commercial	10 pm to 7 am	60
Commercial	7 am to 10 pm	65
Industrial	anytime	70

SEC. 10-105. Excessive Noise Prohibited. No person shall make, cause, or suffer or permit to be made or caused upon any premises or upon any public street, alley, or place within the city, any sound or noise which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing or working in the area, unless such noise or sound is specifically authorized by or in accordance with this article. The provisions of this section shall apply to, but shall be limited to, the control, use, and operation of the following noise sources:

- (a) Radios, musical instruments, phonographs, television sets, or other machines or devices used for the amplification, production, or reproduction of sound or the human voice.
- (b) Animals or fowl creating, generating, or emitting any cry or behavioral sound.
- (c) Machinery or equipment, such as fans, pumps, air conditioning units, engines, turbines, compressors, generators, motors or similar devices, equipment, or apparatus.
- (d) Construction equipment or work, including the operation, use or employment of pile drivers, hammers, saws, drills, derricks, hoists, or similar construction equipment or tools. This subsection shall not apply to construction equipment or work within the area bounded by the Union Pacific tracks, from Ventura to Tulare; Tulare Street, from Union Pacific tracks to Fulton Mall; Fulton Mall/Street, from Tulare to Ventura; and Ventura Street, from Fulton Street to

Union Pacific tracks. This exception shall become null and void on June 1, 2003. (Orig. Ord. 1076; Rep. and Added Ord. 72-163, 1972; Am. Ord. 2001-41, § 1, 5-20-01).

SEC. 10-107 School, Hospitals, and Churches. No person shall create any noise on any street, sidewalk, or public place adjacent to any school, institution of learning, or church while the same is in use, or adjacent to any hospital, which noise unreasonably interferes with the workings of such institution or which disturbs or unduly annoys patients in the hospital, provided conspicuous signs are displayed in such street, sidewalk, or public place indicating the presence of a school, church, or hospital. (Orig. Ord. 3667; Rep. and Added Ord. 72-163, 1972).

SEC. 10-109 Exceptions. The provisions of this article shall not apply to:

- (a) Construction, repair or remodeling work accomplished pursuant to a building, electrical, plumbing, mechanical, or other construction permit issued by the city or other governmental agency, or to site preparation and grading, provided such work takes place between the hours of 7:00 a.m. and 10:00 p.m. on any day except Sunday.
- (b) Emergency work.
- (c) Any act or acts which are prohibited by any law of the State of California or the United States. (Added Ord. 72-163, 1972; Am. Ord. 80-171, § 74, eff. 12-26-80).

Thresholds of Significance

According to the City of Fresno, to determine whether impacts to noise are significant environmental effects, the following questions are analyzed and evaluated. Would the project result in:

- a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
- b) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
- c) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?
- d) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?

Potential Project Impacts

Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction

Construction noise varies depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week) and the duration of the construction work.

Table 5 summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. Construction equipment is expected to generate noise levels ranging from 70 to 90 dB at a distance of 50 feet, and noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance.

Table 5, Construction Equipment Noise

Equipment	Maximum Noise Level (dBA at 50 feet)
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Pneumatic Tools	85
Concrete Pump	82
Source: Federal Transit Administration 1995.	

Construction equipment used on the site may be mobile or stationary. Mobile equipment (e.g., loaders, graders, dozers) moves around a construction site performing tasks in a recurring manner. Stationary equipment (e.g., air compressor, generator, concrete saw) operates in a given location for an extended period of time to perform continuous or periodic operations. Operational characteristics of heavy construction equipment are additionally typified by short periods of full power operation followed by extended periods of operation at lower power, idling, or powered-off conditions.

Site preparation involves demolition, grading, compacting, and excavating. Equipment and vehicles that may be used during site preparation would include backhoes, bulldozers, loaders, excavation equipment (e.g., graders and scrapers), pile drivers and compaction equipment. Finishing activities may include the use of pneumatic hand tools, scrapers, concrete trucks, vibrators, and haul trucks.

During construction of the project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. As the project will be subject to Caltrans requirements and review, construction noise will also be regulated by Caltrans 2010 Standard Specification Section (14-8.02 Noise Control) which states that noise levels generated during construction shall comply with applicable local, state, and federal regulations, and that all equipment shall be fitted with adequate mufflers according to the manufacturers' specifications.

No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with Caltrans 2010 Standard Specification Section (14-8.02 Noise Control) and applicable local noise standards. Construction noise would be short-term and intermittent. Further, construction activities would only occur between the hours of 7:00 a.m. and 10:00 p.m. Monday through Saturdays and therefore, be exempt from the City of Fresno Noise Ordinance standards. However, to ensure construction noise impacts are minimized, mitigation measures MM NOI-1 through 4 (given below under the heading Mitigation Measures) will be incorporated.

Operation

Potential noise impacts associated with the operations of the proposed project are a result of project-generated vehicular traffic on the project vicinity roadways and from stationary noise sources associated with the proposed project.

According to the traffic study prepared for the proposed project (Fehr & Peers 2013), neither build alternative would result in an increase greater than 0.03 percent over baseline on any road segment with the exception of Fulton Street. Considering that a doubling of the existing traffic volumes would be required to achieve a 3 dB increase in ambient noise levels, implementation of the proposed project would not result in substantial increases in ambient noise levels along study area road segments, therefore, impacts to these road segments are not discussed further in this analysis. Impact analysis will be focused on the pedestrian only road segments that are proposed to be converted to “complete streets”

The proposed project would result in 210 ADT on Fulton Street between Tuolumne Street and Inyo Street at project completion and up to 2,310 ADT under cumulative plus project conditions. None of the other road segments that will be converted from pedestrian use are through streets and would only service the immediate area. Therefore, traffic volumes along these segments would be less than those projected for Fulton Street. Considering this, traffic noise modeling was only conducted for Fulton Street, as it represents the worst-case scenario.

At buildout, vehicle traffic noise along Fulton Street under Build Alternative 1 would reach up to 52.9 dBA L_{eq} (h) and 53.1 dBA CNEL respectively. Buildout noise levels under Alternative 2 would be 50.1 dBA L_{eq} (h) and 51.1 dBA CNEL respectively. Existing ambient noise levels are substantially louder than the projected existing plus project ambient noise levels (59.9-70.7 dBA L_{eq}). The greatest increase in ambient noise levels under cumulative plus project conditions would be 1 dB at the quietest location.

Modeling results (as shown in the Appendix [Table B-1 and Table C-1]) indicate that project generated traffic under both Build Alternatives would result in negligible increases in ambient noise levels and would not cause ambient noise to exceed 60 dBA at sensitive receptor locations.

Parking Lot Areas

Sources of noise from parking lots are primarily from engine and tire noise, slamming of doors, and pedestrians. A parking lot is not considered to be a serene environment and the traffic noise from the adjacent streets will provide a masking effect over the short-term, single event noise occurrences common to parking lots.

Rooftop Mechanical Equipment

As details were not available pertaining to rooftop forced air units, a reference noise level for a rooftop unit was used. Noise impacts from rooftop mechanical equipment are anticipated to be at a level of 59.5 dBA L_{eq} at a distance of 10 feet. As there are no sensitive receptors within 20 feet of the proposed buildings, impacts from noise generated by rooftop forced air units are considered to be less than significant.

Tot Lot Area

The Fulton Mall includes two tot lots — one near the corner of Fulton and Merced, the other near Fulton and Kern — that were part of the Mall’s original design. In 2008, the City of Fresno used funding from State Proposition 40 and the Federal Land and Water Conservation Fund (LWCF) to improve these tot lots. The City removed the original play structures, which were in extreme disrepair, and installed new, brightly colored play equipment and a soft-fall surface in a portion of each tot lot area.

The proposed Fulton Mall Reconstruction Project involves the reintroduction of a roadway in the right-of-way on Fulton and its cross-malls, and it will not be possible to retain the Mall's tot lots in their present locations. The tot lot would be relocated to an area adjacent to Congo Alley and approximately 72 feet from the right-of-way (ROW) of Mariposa Mall (Street). The traffic noise impact to the relocated tot lot is expected to be less than 60 dBA. Mariposa Street would have less traffic volume than Fulton Street, and Fulton Street was shown to have a maximum noise level of 53.1 dBA CNEL at the building facade adjacent to the roadway. The relocated tot lot will be an additional 72 feet back from the road ROW, which would reduce noise levels further. Traffic noise impacts to the relocated tot lot would be less than significant.

A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

As previously described in above, increases in noise levels related to the proposed project would not substantially increase the existing noise environment. Similarly, noise from project-related traffic along local roadways would not significantly increase noise levels in the project area and would likewise not result in a significant impact. Therefore, impacts associated with a substantial permanent increase in ambient noise levels in the project vicinity would be less than significant.

A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

As stated above, the City's Municipal Code Section 10-109 exempts construction noise from noise standards provided that " Construction, repair or remodeling work accomplished pursuant to a building, electrical, plumbing, mechanical, or other construction permit issued by the city or other governmental agency, or to site preparation and grading, provided such work takes place between the hours of 7:00 a.m. and 10:00 p.m. on any day except Sunday. (Added Ord. 72-163, 1972; Am. Ord. 80-171, § 74, eff. 12-26-80)." However to reduce construction-related noise impacts, mitigation measures MM NOI-1 through shall be implemented. Impacts are considered to be less than significant.

**Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?
Construction**

The Federal Transit Administration Report¹ outlines guidelines for assessing the impact of vibration from construction activities on nearby buildings. The guidelines determine impact threshold levels that should be considered based on the age and/or condition of the structures and the level of vibration that could potentially cause damage to the structural integrity of those structures. Based on the age and/or condition of the buildings, the recommended damage thresholds range from 0.2 inches/second peak particle velocity at non-engineered timber and masonry structures to 0.5 inches/second peak particle velocity for reinforced-concrete, steel, or timber structures containing no plaster. Thus, for the purposes of this analysis, the following significance thresholds are applied to analyze the potential vibration impacts from Project construction:

- Project construction activities would cause a ground-borne vibration level to exceed 0.2 inches/second peak particle velocity at non-engineered timber and masonry structures;
- Project construction activities would cause a ground-borne vibration level to exceed 0.3 inches/second peak particle velocity at engineered concrete and masonry (no plaster) buildings;
- Project construction activities would cause a ground-borne vibration level to exceed 0.12 inches/second peak particle velocity at buildings extremely susceptible to vibration damage, such as historic buildings; or

¹ U.S. Department of Transportation, Federal Transit Administration, "Transit Noise and Vibration Impact Assessment," May 2006.

- Project construction activities would cause a ground-borne vibration level to exceed 0.5 inches/second peak particle velocity at reinforced-concrete, steel, or timber (no plaster) structures.

While long-term project operation would not include uses or activities that typically generate excessive groundborne vibration or groundborne noise levels, short-term project construction could introduce groundborne vibration to the project site and the surrounding area.

Offsite sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible groundborne noise or vibration (Table 7).

Table 6: Vibration Levels Generated by Construction Equipment

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level (L_v) at 25 feet
Pile driver (impact)	1.518 (upper range) 0.644 (typical)	112 104
Pile driver (sonic)	0.734 upper range 0.170 typical	105 93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall)	0.008 in soil 0.017 in rock	66 75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58
Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.		

The primary source of vibration during project construction would likely be from a bulldozer (tractor), which would generate 0.089 inch per second PPV at 25 feet with an approximate vibration level of 87 VdB. Vibration from the bulldozer would be intermittent and not a source of continual vibration. At less than 0.1 inch/second, the bulldozer would not create vibration that would affect even the most fragile of structures. Therefore, impacts from construction vibration are considered to be less than significant.

Operation

The proposed project consists of the reconstruction of Fulton Mall as a complete street by reintroducing vehicle traffic lanes to the existing pedestrian mall. The project does not include any sources of operational vibration; no impacts are anticipated.

Mitigation Measures

The following measures would further minimize noise associated with project construction.

- MM NOI 1.** The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise sensitive receptors nearest the project site during all project construction.
- MM NOI 2.** The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site, to the degree possible.
- MM NOI 3.** The project proponent shall mandate that the construction contractor prohibit the use of personal or commercial music or sound amplification on the project site during construction.
- MM NOI 4.** The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment. To the extent feasible, haul routes shall not pass sensitive land uses or residential dwellings.

References

City of Fresno General Plan 2002.

City of Fresno Municipal Code

Appendices

Appendix A Noise Measurement Data

Appendix B Tables, Tables B-1 and C-1 from NSR for Fulton Mall

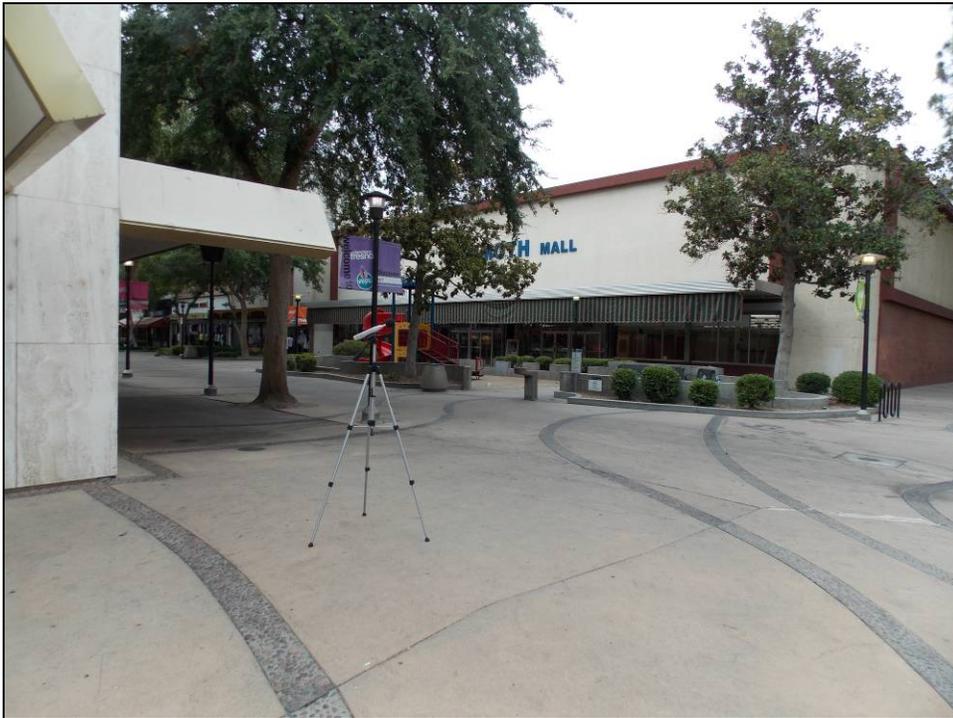
Appendix C New Parcel Map

Noise Measurement Data

Noise Measurement 1	Noise Measurement 4
Date Time=07/10/13 18:24:00	Date Time=07/10/13 18:51:00
Duration: 15 minutes	Duration: 15 minutes
Sampling Time=1	Sampling Time=1
Record Num= 900	Record Num= 900
Leq Value=70.7	Leq Value=62.5
SEL Value=100.3	SEL Value=92.0
MAX Value=78.5	MAX Value=82.7
MIN Value=69.0	MIN Value=50.8
Freq Weighting=A Time Weighting=Slow	Freq Weighting=A Time Weighting=Slow
	Noise Measurement 5
Noise Measurement 2	Date Time=07/10/13 16:30:00
Date Time=07/10/13 16:30:00	Duration: 30 minutes
Duration: 30 minutes	Sampling Time=1
Sampling Time=1	Record Num= 1800
Record Num= 1800	Leq Value=59.9
Leq Value=59.9	SEL Value=92.5
SEL Value=92.5	MAX Value=74.4
MAX Value=74.4	MIN Value=54.8
MIN Value=54.8	Freq Weighting=A Time Weighting=Slow
Freq Weighting=A Time Weighting=Slow	
Noise Measurement 3	
Date Time=07/10/13 17:58:00	
Sampling Time=1	
Duration: 15 minutes	
Record Num= 900	
Leq Value=65.7	
SEL Value=95.2	
MAX Value=81.0	
MIN Value=60.1	
Freq Weighting=A Time Weighting=Slow	



Fulton Mall noise measuring location 2; L_{eq} 59.9.



Fulton Mall noise metering location 5; L_{eq} 61.3. Meter ran for 31.5 minutes; major noise source from adjacent baseball field which was active and had amplified music playing.

Appendix B Tables

Daily Roadway Segment Traffic Volumes - Baseline Plus Project Conditions

Roadway Segment	Average Daily Traffic Volumes (ADT)			Percent Increase Over Baseline	Cumulate Project Plus Project Mall Open to Traffic (ADT)
	Baseline Conditions ¹	Baseline + Project: Mall Open to Traffic	Net Change		
1. Broadway: North of Stanislaus St.	2,588	2,580	-8	0.00	13,810
2. Fulton Street: North of Stanislaus St.	2,731	2,800	69	0.03	6,360
3. Van Ness Avenue: North of Stanislaus St.	6,339	6,270	-69	-0.01	11,710
4. Fulton Street: Tuolumne St. to Inyo St. ²	N/A	210	210	N/A	2,310
5. Van Ness Avenue: Fresno St. to Tulare St.	9,991	10,020	29	0.00	13,950
6. Van Ness Avenue: Tulare St. to Inyo St.	9,728	9,740	12	0.00	13,950
7. Van Ness Avenue: Inyo St. to Ventura Ave.	7,586	7,580	-6	0.00	13,640
8. Stanislaus Street: M Street to Van Ness Ave.	4,360	4,340	-20	0.00	14,030
9. Stanislaus Street: Broadway to E Street	6,996	7,010	14	0.00	22,010
10. Tuolumne Street: E Street to Broadway	5,586	5,600	14	0.00	5,990
11. Tuolumne Street: Van Ness Ave. to M Street	4,299	4,290	-9	0.00	5,210
12. Fresno Street: Broadway to Van Ness Ave.	14,444	14,380	-64	0.00	18,480
13. Fresno Street: Van Ness Ave. to M Street	12,150	12,080	-70	-0.01	20,050
14. Tulare Street: H Street to Van Ness Ave.	9,304	9,280	-24	0.00	18,980
15. Inyo Street: H Street to Van Ness Ave.	3,301	3,300	-1	0.00	6,120
16. Ventura Avenue: Van Ness Ave. to M Street	11,838	11,910	72	0.01	24,570

Source: Fehr & Peers, 2013.

Notes: ¹Baseline Plus Project: Pedestrian Mall alternative would have the same traffic volumes as Baseline Conditions.

²Fulton Street is a pedestrian mall between Tuolumne St. and Inyo St. under Baseline Conditions and Baseline Plus Project: Pedestrian Mall alternative.

Predicted Future Noise and Barrier Analysis

Land Use Category (See Figure 5-1)	Representative Ambient Noise Measurement Location (see Figure 5-1)	Location of Sensitive Receptors (See Figure 5-1)	Baseline Noise Level (L _{eq} (h), dBA) (Measured) See Table 6-1	Baseline Plus Project Noise Level L _{eq} (h), dBA (Modeled)	Cumulative Plus Project L _{eq} (h), dBA (Modeled)	Activity Category (NAC)	Impact Type	Noise Prediction with Barrier, Barrier Insertion Loss (I.L.), and Number of Benefited Receivers (NBR) ³																	
								6 Feet			8 Feet			10 Feet			12 Feet			14 Feet			16 Feet		
								L _{eq} (h)	I.L.	NBR	L _{eq} (h)	I.L.	NBR	L _{eq} (h)	I.L.	NBR	L _{eq} (h)	I.L.	NBR	L _{eq} (h)	I.L.	NBR	L _{eq} (h)	I.L.	NBR
Build Alternative 1																									
B	NM1	High Density Residential at the N. corner of the intersection of Fresno Street and Broadway Pl.	70.7	n/m ⁴	n/m	67 Exterior	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
B	NM2	High Density Residential E. Corner of Fulton Mall and Mariposa Mall	59.9	42.5	52.9	67 Exterior	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
B	NM3	S. corner of Tulare St and Fresno Mall	65.7	n/m	n/m	67 Exterior	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
C	NM1	Church Approx. 300 North of NM1	70.7	42.5	52.9	67 Exterior	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
B	NM3	S. corner of the intersection of Kern Street and Van Ness Avenue	65.7	n/m	n/m	67 Exterior	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
C	NM2	Barber School Approx. 350' of NM1	59.9	42.5	52.9	67 Exterior	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
C	NM1	Stadium	70.7	n/m	n/m	67 Exterior	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
C	NM2	Outdoor Eating Area	59.9	42.5	52.9	67 Exterior	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
D	NM1	Church Approx. 300 North of NM1	70.1	n/m	n/m	52 Interior ¹	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

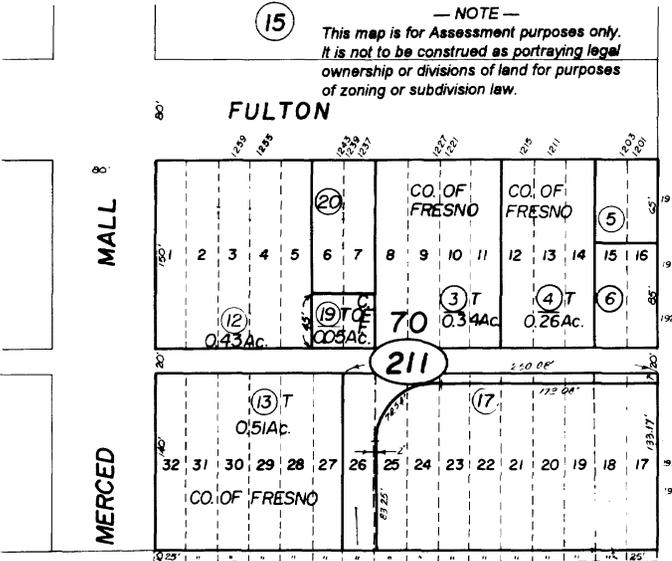
- 1 Typical construction provides at least 15 dB of exterior to interior noise reduction with window open.
- 2 Please note that baseline plus project and Cumulative Plus Project Scenarios will not exceed the NAC therefore, no barriers are required.
- 3 n/m = Not Modeled. The project would not add an acoustically significant number of vehicle trips on Van Ness Avenue, Fresno Street or Broadway Place.

Appendix C Parcel Map

FRESNO CITY BLOCKS

15

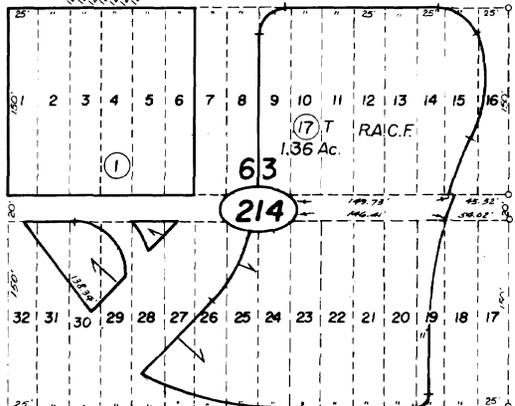
— NOTE —
This map is for Assessment purposes only.
It is not to be construed as portraying legal
ownership or divisions of land for purposes
of zoning or subdivision law.



20



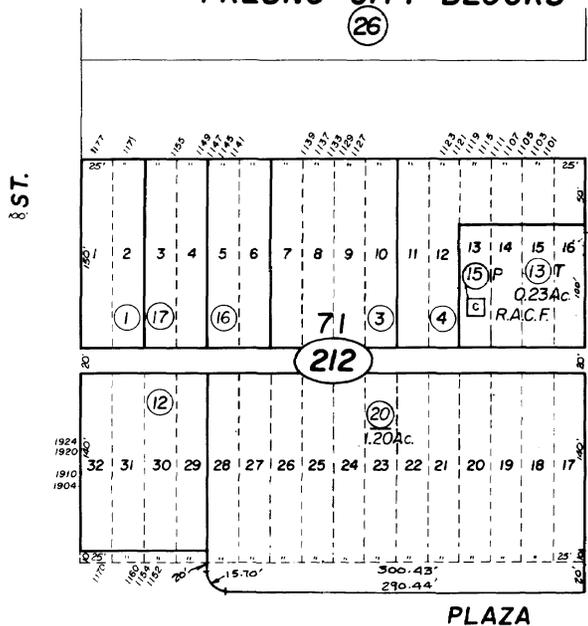
15 T CITY OF FRESNO
BROADWAY 0.18 Ac.



H

SOUTHERN PACIFIC
Parcel Map No. 69 - 21 - Bk. 1, Pg. 73
Parcel Map No. 79 - 90 - Bk. 36, Pg. 50 & 51

26



FRESNO

PLAZA

Bk. 467

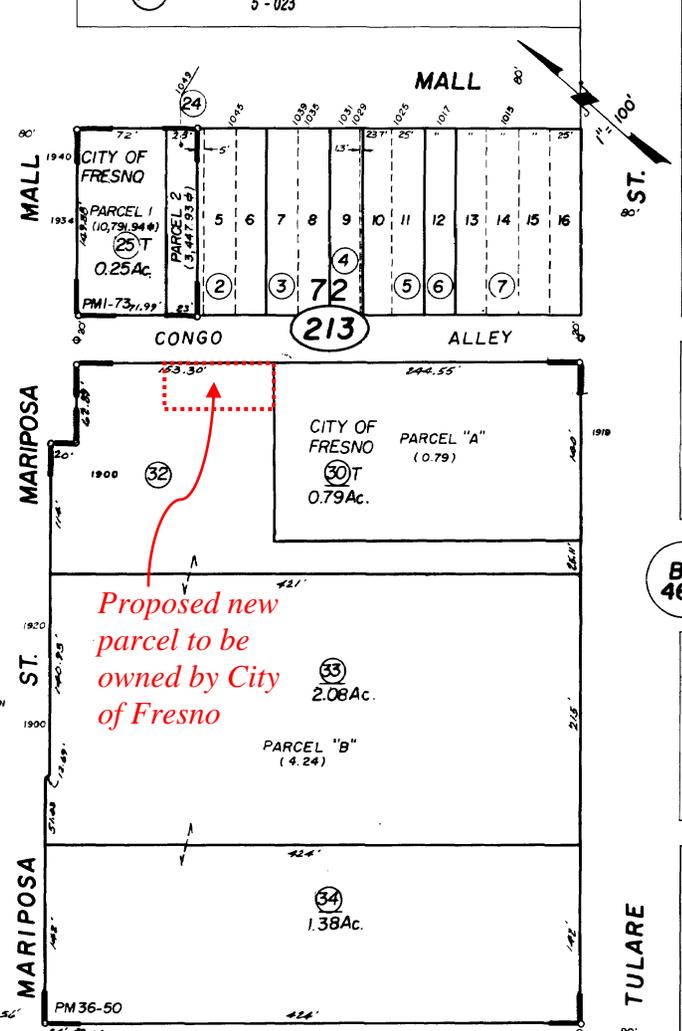
NOTE - R.A.C.F. = Redevelopment Agency of the City of Fresno

NOTE - Assessor's Block Numbers Shown in Ellipses.
Assessor's Parcel Numbers Shown in Circles.

17

Tax Area
5 - 005
5 - 023

466-21



MARIPOSA

MARIPOSA

Bk. 468

Proposed new
parcel to be
owned by City
of Fresno

R. R. Assessor's Map Bk. 466 - Pg. 21
County of Fresno, Calif.

MERCED ST.
1960