

CITY OF FRESNO Trail Design Guidelines JUNE 2017



for public comment TABLE OF CONTENTS

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CHAPTER 1: INTRODUCTION

How to Use These Guidelines

These guidelines are structured so that each subject section can be used alone, but are also formatted to support and build upon each other. For example, all topic sections have an even number of pages to facilitate printing or exporting individual sections as needed.

Review the table of contents for the needed topic and click directly on it. Alternatively, each topic section and subsection can be accessed via the document bookmarks, where topic subsections are grouped under the main topic sections.

SCOPE OF GUIDELINES

These guidelines provide direction for developing Class I paved trails as part of the City of Fresno's transportation system to accommodate multiple user types. The term "shared use path" is widely used in governmental guidance to describe paved trails, in recognition that virtually all such facilities are shared by bicyclists, pedestrians and other modes legally defined as pedestrians: persons with disabilities, joggers, skaters, parents with baby strollers, people walking their dogs, as well as people riding non-motorized scooters and skateboarders. The terms "trail" and "path" are used interchangeably.

The City's definition of a Class I trail is a 12 foot wide asphalt path with concrete curbs as shown in *City of Fresno Standard Drawing P-58*. Full concrete trails or trails less than 12 feet wide will only be allowed in exceptional circumstances, such as existing areas with insufficient right-of-way, filling gaps within an existing concrete trail, etc.

The City's trail system design features will include associated amenities such as trail heads, surface treatments, landscaping, bridges, fencing and signage, for examples. Within these guidelines, specific standards are also cited that must be adhered to.

The following map illustrates Fresno's planned paved trail and on-street bikeway system. These guidelines specifically address the paved off-street trail system referred to on the map as "Class I Bicycle/Pedestrian Path" shown in red. "Class I" refers to the official California Department of Transportation (Caltrans) designation for multi-use paved pathways that meet its minimum requirements for width and other design specifics.



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Setting

The City of Fresno covers approximately 112 square miles within Fresno County near the center of California's San Joaquin Valley which, together with the Sacramento Valley to the north, form the Great Central Valley, one of California's distinct physical regions and the nation's prime agricultural production zone. Fresno lies 328 feet above sea level and its terrain is relatively flat. Area climate is semi-arid, with mild, moist winters and hot, dry summers. Spring and fall are the most pleasant seasons.

Temperatures

December and January are the coldest months with temperatures averaging around 56°F, with freezing lows occurring an average of 14 nights annually and the coldest night of the year typically dropping to near 29°F. July is the warmest month, averaging 96°F. There are generally 32 days of 100°F highs and 106 days of 90°F or more. In July and August, there are only three or four days where the high does not reach 90°F.

The typical windows for 100°F, 90°F, and freezing temperatures are June 1 thru September 13, April 26 thru October 9, and December 10 thru January 28, respectively. Fresno's official record high temperature is 115°F, set on July 8, 1905, while the official record low is 17°F, set on January 6, 1913.

Sunshine

Fresno experiences sunny summers, with July peaking at 97 percent of total possible sunlight hours. Conversely, January is the lowest with only 46 percent of daylight time in sunlight due primarily to thick tule fog. Overall, typical years average 81 percent of possible sunshine, for a total of 3,550 hours annually.

Precipitation

Measurable precipitation falls on an average of 48 days a year with an average annual total of 11.5 inches, which, by definition, classifies the area as semidesert. Annual rainfall has ranged from 23.57 inches in the "rain year" from July 1982 to June 1983 down to 4.43 inches from July 1933 to June 1934. The most rainfall in one month was 9.54 inches in November 1885 and the most rainfall in 24 hours was 3.55 inches on November 18 of that year. Snow is rare, with a heaviest recorded snowfall of 2.2 inches in 1962.

Winds

Winds blow primarily from the northwest, moving southeast along the Central Valley axis. Winds periodically shift to the southeast in December, January and February.

for public comment GAINING A COMMUNITY COMFORT LEVEL FOR CYCLING

Portland, Oregon is referenced in this document because it is the American city most advanced in bicycle planning and facility design and has published numerous papers and studies on this topic. According to the City of Portland:

"...the number one reason people do not ride bicycles is because they are afraid to be in the roadway on a bicycle. They are generally not afraid of other cyclists, or pedestrians, or of injuring themselves in a bicycle-only crash. When they say they are "afraid," it is a fear of people driving automobiles. This has been documented and reported in transportation literature from studies, surveys and conversations across the US, Canada and Europe."

While encouragement and education programs and policies can help potential cyclists feel more comfortable, physical improvements are the most visible evidence of a community's commitment to active transportation, especially cycling. Surveys consistently show that most people prefer to ride on "low-stress" comfortable facilities separated from vehicle traffic, and particularly facilities offset from major roadways. A route's perceived safety can impact a pedestrian's or bicyclist's comfort level and can heavily influence whether they will choose to travel that route. This preference for a more comfortable riding environment is one of the most important factors in encouraging more non-riders to consider travel by bicycle. Off-street paved trails rank as one of the highest when compared to other bicycle facility types.

Shared use paths increase comfort by physically buffering nonmotorized users from vehicular traffic. This can be especially true along high volume corridors where right-of-way space is available. Buffering and separation from vehicle traffic also encourages a wider variety of user types to use the trail system.

Shared use paths can benefit a variety of settings and at many different scales. In urban areas, shared use paths can provide valuable short-distance connections between desirable destinations. In more suburban settings, long-distance shared use paths can connect homes to places of employment, or even provide off-street links between cities.

In terms of comfort, paths are sometimes the only facilities where novice or inexperienced cyclists feel comfortable riding. Providing these facilities ensures a comfortable, low-stress trip by foot or bike when compared to sharing the road with vehicle traffic. Shared use paths can help accomplish many of the desired goal of developing connected pedestrian and bicycle networks.

Route fronting commercial development

The Fresno Council of Governments provides a bikeway map with informative "rules of the road" on the

The Fresno Council of Governments provides a bikeway map with informative "rules of the road" on the reverse side. The map can be accessed online via the following link:

http://www.fresnocog.org/sites/default/files/publications/Bikeway_and_Trails/2014_Fresno-Clovis_ Bikeways_Map_Final.pdf

Fresno Clovis Bikeways - Rules of the Road

CVC 21650.1

CVC 21202 (a)(3), CVC 21656

Fresno is a League of American Bicyclists (LAB) Bicycle Friendly Community. The League can assist with encouragement and education program suggestions to support trail system use (http://www.bikeleague.org/bfa).

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for public comment COMMUNITY ENGAGEMENT AND INVOLVEMENT

A cadre of dedicated volunteers can save the City money by allowing City staff to concentrate on addressing appropriate maintenance and management issues. For example, volunteers can help maintain trails through personal trash pickup or tree planting.

City-sponsored trail publicity events can be held to generate interest and participation in trail use and events. The involvement of elected officials in these events reinforces the City's commitment to a viable trail system. Every new segment opening is a good reason for celebration.

An adopt-a-trail program can be implemented with businesses, community groups and schools by adopting segments to voluntarily maintain. They would perform tasks such as litter pick-up, vegetation trimming and graffiti abatement.

A trails advisory committee can be invaluable in implementing and managing a trail system. Dedicated trail advocates can help organize events and coordinate volunteer efforts related to trail management and maintenance, such as the suggested adopt-a-trail program.

Community-based mapping, also known as participatory mapping, has been used across various disciplines including natural disaster alerts, traffic updates, and more recently, urban planning. Community-based mapping supports local participation through web-based cartography tools that allow anyone with access to a smartphone to report trail issues like storm damage or debris, graffiti, or trail surface and signage repair needs.

Adopt-a-Trail sign

Fresno has such an app, called FresGo, that allows citizens to be the community's "eyes and ears." The community-based mapping link can be widely distributed through publicity notices and on trail signage using quick response or "QR" tags. The following QR tag links to the FresGo app:

An interactive trails system information website can complement the community-based mapping appli-

An interactive trails system information website can complement the community-based mapping application by providing an information exchange portal available to all interested parties. Some cities provide updates on planned system improvements and extensions. Such a website can be a valuable tool for public input as the system develops. For an example, see the following: http://hikebiketemecula.org

Finally, a coordinated media campaign to promote the trails information website has been shown to significantly increase trail use independent of other factors like lighting, landscaping and trail length. In other words, publicity is often a key factor in trail system success.

HikeBikeTemecula web page

TRAIL LAND USE CONNECTIVITY

Urban trail systems typically connect diverse land uses such as residential, transit, commercial, office, institutional, educational and recreational. Research has shown that higher population densities, easy neighborhood access, connections with other trails, and longer trails are all associated with greater use. This means that for a trail system to be viable, it must be comprehensive and easily accessible to potential users. Trails routed through multiple land uses allow trail users to more readily take advantage of commercial, cultural, or other areas of interest to them, and to do so without having to drive.

At the site-specific level, this shall include high quality access as noted previously under "Gaining a Community Comfort Level for Cycling." Shared use paths can be an important link in the overall transportation system that allows for more direct pedestrian and bicycle travel and a greater likelihood of success. Trails can particularly benefit disadvantaged communities where personal vehicle ownership is low. To support such connections, the City could create incentive policies, such as allowing an increase in dwelling units per acre if a developer dedicates a certain amount of land for trails or trails access, such as a trail head and/or parking area. Fresno Citywide Development Code Section 15-1204-D addresses public plaza space requirements and Section 15-1204-E addresses pedestrian access.

Trail location plays a part in system viability. Visibility is a key issue for many potential users. Trails readily visible to a passerby will generate more interest and potential use than those out of view. Trails shall be integral with adjacent developments. Shopping centers do not necessarily need to front onto a trail, but shall provide access to and from the trail with the facing elevation treated as a frontage, instead of an alley or blank wall. Residential units shall face the trail or trail connection to help provide "eyes on the trail."

Trails accessing commercial and residential land uses will provide a welcoming gateway including amenities such as enhanced landscaping, lighting and seating. Welcoming trail users in this way will make them more likely to consider traveling to the shopping center by trail rather than automatically reaching for their car keys, especially when the overall trail system provides a similarly encouraging environment.

Trail amenities fronting commercial development

Trail amenities behind commercial development

Commercial development connection with City trail

COOPERATION AND WORKING WITH OTHER AGENCIES

The City of Fresno will need to work with several other agencies to successfully implement its planned trail system, such as Caltrans, PG&E, Fresno County, the Fresno Irrigation District (FID), the Fresno Metropolitan Flood Control District (FMFCD), as well as private landowners. Trails may be constructed adjacent to FID canals, FM-FCD drainage basins (some with recreational facilities), the airport, schools, through County islands, and across Caltrans facilities. Agencies can work together for the benefit of the community.

The City of Fresno will need to coordinate inter-departmental communication as projects are planned, designed and implemented. Discussion at Development Review Committee (DRC) meetings will be important to ensure the appropriate agencies are made aware of planned projects within their jurisdiction in a timely manner.

TRAIL BENEFITS

Among trail systems' benefits are increased sales and patronage of nearby businesses, increases in adjacent residential property values and improved public health and individual well-being.

Measuring trails' business impact requires estimating the number of visitors and visitor spending, then analyzing this data using economic models. Business impact studies generally measure the total business revenue, jobs and income attributable to a trail. Such studies have shown that economic impact is highest when a trail is connected to local businesses that cater to trail

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Santa Ana River Trail and Parkway

The Santa Ana River Trail and Parkway is a multi-use path that will run from the Pacific Ocean at Hun tington Beach, through Orange and Riverside Counties to the Cleveland National Forest in San Ber nardino County. When completed, it will be the longest multi-use trail in southern California at over 110 miles. Construction is approximately 60 percent complete with plans to finish the remaining portions over the next five years.

In July 2006, the three counties, the Santa Ana Watershed Project Authority and the Wildlands Con servancy signed an MOU to form the SAR Trail and Parkway Partnership. A decision-making body made up of local elected officials was formed as the Policy Advisory Group, which meets regularly to address jurisdictional issues. A Technical Advisory Group addresses ongoing trail design and con struction issues.

Trail alignment takes it through the jurisdictions of the three counties' flood control districts, transportation agencies and parks departments, as well as 15 cities, the Santa Ana Watershed Project Authority, the Califor nia Department of Fish and Wildlife, California State Parks, the State Water Resources Control Board, Orange County Public Works, and the US Army Corps of Engineers. All three counties are working collectively and closely with the U.S. Army Corps of Engineers to design and construct the remaining project segments.

The Partnership's goal has been clear and focused from the beginning: To build and manage the trail and parkway. Prop 84 funding has been secured to complete the trail and the project has been recog nized by the California State Senate, Assembly and U.S. Congress as model best practice.

user needs, including restaurants, grocery and outdoor equipment stores. This connection can occur directly through trail spurs that link to commercial centers, as well as through signs at trail heads.

On a local level, retail centers directly connected to the trail network can benefit by not having to provide as much vehicular parking since more patrons can arrive on foot or by bicycle.

Studies have also shown that the benefits to property owners who live adjacent to trails, including access to recreation and connection with the neighborhood, far outweigh the negative effects of living adjacent to a trail. Negative effects like trespassing and less privacy are not widely reported and have generally been mitigated through trail design. Also, home values along trails are often higher than those of homes not near trails. The increased value affects not just homes immediately adjacent to trails, but for all homes in the surrounding neighborhoods, with value decreasing by distance from the trail.

Living near a trail system directly affects individual health by providing easy access to outdoor

recreation and as a recreation venue itself. Also, a comprehensive trail system that connects multiple land uses makes it more likely to offset vehicular trips, potentially easing roadway congestion and reducing greenhouse gas emissions. A well-connected system can therefore be both an important recreation and transportation venue that directly supports individual and community health.

Trails can serve as critical links in the transportation network providing pedestrian access to commercial districts, schools, businesses, government offices and recreation areas. Because trails provide such fundamental public services, they shall be designed to meet the needs of the maximum number of potential users. Applying universal design to trails facilitates participation, freedom of choice and community integration. Providing access helps to encourage everyone to participate on an equal footing in community activities that many may take for granted. If their needs are addressed in facility planning and design, the needs of many other users are also better satisfied, such as the very young and the elderly. The entire community benefits from accessible trails. For example:

- Strollers are easier to push on trails with accessible surfaces
- Young children can use curb ramps when riding their bicycles
- Children, parents, and school systems benefit from trail networks with visible pedestrian crossings and other safety features
- Children learn independence by having safer travel routes

for public comment • A paved trail system may allow older persons

- who no longer drive to walk to services and socialize in their community, supporting continued independence
- Non-recreational users can employ trails for transportation
- Trails can be gathering neighborhoods places, and a place for families and friends to socialize

ACCEPTABLE USE OF TRAILS

Fresno's paved trail system is intended to be used primarily by pedestrians and bicyclists, as well as other non-motorized users.

UNIVERSAL ACCESS

The City of Fresno is committed to ensuring accessibility for all. Applicable *Americans with Disabilities Act* (ADA) and *Proposed Guidelines for Public Rights-of-Way (PROWAG)* standards must be incorporated into all projects, including the paved trails addressed by these guidelines. Development applicants must address the accessibility requirements of California Building Code Chapters 11a and 11b. To help ensure compliance, the City of Fresno's ADA Coordinator shall be consulted early in project planning.

Most guidance documents discussed in this section refer to the paved paths or trails addressed by these guidelines as "shared use paths." For example, the Architectural and Transportation Barriers Compliance Board (Access Board) defines shared use paths as "...multi-use paths designed primarily for use by bicyclists and pedestrians, including pedestrians with disabilities, for transportation and recreation purposes. Shared use paths are physically separated from motor vehicle traffic

Socializing and Exercising

Recent research found that most trail users report ed that a new paved trail made it easier for them to find time to exercise, allowed them to get more ex ercise than before it was available, increased their enjoyment of doing physical activity and left them feeling like they were in a better state of health and/or physical ability than they were before they started using the trail. Women reported those out comes more frequently than men.

Unexpectedly, researchers also discovered the im portance, particularly for women, of the trail as a place to socialize and be with others. "Socializing with friends" was the second-most important rea son cited for using the trail, after "getting exercise." Follow-up interviews indicated that the trail sup ports social relationships in a variety of ways, rang ing from sustaining already existing relationships to fostering new connections and a sense of commu nity among fellow trail users.

This study's results suggest that the opportunity to be with other people on trails contributes to better self-reported health outcomes. Interviews con firmed that men and women alike valued their time with other people on the trail and gave credit to the trail for helping them on their journey to health. The study's findings suggest that facilities designed to promote socializing along trails (such as pocket parks, playgrounds and basketball courts) encour age community building, with benefits not only for health, but also for civic engagement.

The take-home message is that trails, and parks in general, contribute to health in multiple ways. Trail experiences play a role in combating stress and building strong community relationships, both crit ical public health elements.

by an open space or barrier, and are either within the highway right-of-way or within an independent right-of-way."

The federal accessibility guidelines for sidewalks, street crossings and other elements of the public rights-of-way are contained in the Proposed Guidelines for Public Rights-of-Way (PROWAG) and are available at https://www.access-board.gov/ guidelines-and-standards/streets-sidewalks/ public-rights-of-way/proposed-rights-of-wayguidelines.

Pathways and access points leading to the shared use path need to provide access for people with disabilities. For example:

- Trail head parking and bathrooms shall conform to Americans with Disabilities Act Accessi*bility Guidelines* (ADAAG)
- Elements such as picnic areas must be connected by a pathway to the trail that meets the accessible design recommendations for shared use paths
- Signage needs to conform to ADAAG requirements for font size, type and contrast

Shared use path surface quality is particularly important for people using mobility devices and is defined by factors such as material, firmness, stability, slip-resistance, level changes, and the size and design of surface openings.

Level changes along paths may include uneven transitions between the path and bridges or adjacent trails, cracks caused by subsurface shrink/ swell, or a change in natural ground level (such as by seismic activity or tree roots). The following requirements shall be followed:

• Vertical level changes may not be incorporat-

- ed in new construction
- If unavoidable, small level changes up to a guarter inch may remain without edge treatment
- Beveled surface with maximum 50 percent slope shall be added to small level changes between a quarter and a half inch
- Level changes exceeding half an inch shall be reconstructed to comply with the most current version of the California Building Code or removed

Openings such as drainage grates shall be located outside the path tread. When placing openings in the path cannot be avoided, employ the following specifications:

- Opening size shall not permit a half inch diameter sphere to pass through
- If a wider gap is unavoidable because of existing design constraints, width may be expanded to maximum of three quarters of an inch.
- Axis of elongated openings must be oriented perpendicular to travel direction

In general, paved paths grades shall not exceed 5 percent and the most gradual slope possible shall be used. If steeper segments are needed, the following shall be applicable:

- 8.3 percent for a maximum of 200 feet
- 10 percent for a maximum of 30 feet
- 12.5 percent for a maximum of 10 feet

Rest intervals should be provided within 25 feet of the top and bottom of a maximum grade segment. Rest intervals should ideally be located adjacent to the path and have the following characteristics:

- Grade not exceeding 5 percent
- Cross slopes not exceeding 2 percent
- Firm and stable surface
- Width equal to or greater than the width of the adjacent path segment
- Minimum length of 60 inches

Cross slope can be a barrier to persons with disabilities, but is necessary for proper drainage. A minimum cross slope of 2 percent shall be used for paved paths.

Shared use path tread shall be 12 feet wide with adjacent 2 foot wide graded areas on either side and path width increased to 14 feet where heavy use is likely. "Heavy use" is generally considered to be when users begin to have to change their path of travel or slow down to avoid other users.

Objects protruding into the pathway can be hazardous, especially for people with visual impairments. Clearance must be maintained to comply with the most current highway design manual, Chapter 1000 and accessibility regulations.

SPECIAL EVENTS

The City of Fresno requires permits for certain uses, including those that may occur on its trails system available through the Parks, After School, Recreation and Community Services Department. The department shall be consulted concerning permit requirements such as the event approval process and applicable fees, as well as allowable closures, cleanup, damage, security, special use and fundraising requirements: https://www.fresno.gov/parks/

for public comment

ENCROACHMENT INTO TRAIL EASEMENTS, RIGHTS-OF-WAY, OR CITY OWNED PROPERTY

City Development Code makes no provision for private encroachments within trail easements, rights-of-way, or City-owned property. Therefore, no private encroachments will be allowed as part of any trail project.

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CHAPTER 2: for public comment TRAIL CROSS-SECTION AND DESIGN

STANDARD

Standard trails will be constructed in a minimum of a half mile uninterrupted segment. Interruptions include streets crossing the trail, or access points that would cause trail users to stop or slow down. Anywhere this cannot be achieved will require a special review by the City.

Most new Class I multi-use paths are being built wider than the Caltrans standard, which is reflected in the *City of Fresno's Standard Drawings* as 12 feet wide with concrete edges. These drawings address cross-sections and plans for paved trails:

- P-58: Asphalt Multi-Purpose Trail (Preferred trail type)
- P-59: Concrete Multi-Purpose Trail (To be used only when circumstances require this type of trail, such as locations subject to periodic inundation)
- P-60: Trail Details

Drawings P-58 and P-59 address the required construction characteristics for asphalt or concrete trails respectively, while Drawing P-60 addresses the dimensional variations allowed in specific situations, such as whether a trail is planned along a roadway or a canal. The configurations shown in these drawings must be adhered to.

Drawing P-60's cross-sections are portrayed as three-dimensional models on the following pages, but this is intended solely to aid legibility. Prior to commencing design, the *Standard Drawings* shall be consulted for guidance: https://www.fresno.gov/NR/rdonlyres/8DD1EF92-E9BA-450D-9AC2-9271608328C8/0/4711 CollectionSystemCityofFresnoStandardDrawings.pdf

Additional bikeway planning and design guidance is available at: http://www.dot.ca.gov/hq/oppd/hdm/pdf/english/chp1000.pdf.

CHAPTER 2: TRAIL CROSS-SECTION AND DESIGN

for public comment

CHAPTER 2: TRAIL CROSS-SECTION AND DESIGN

Goodsectorcross-section of Fresno's typical easement minimum dimensions for designated trails away from streets

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26' Trail Easement

for public comment

Open Space Trail

12'

The City's design standards are compliant with Caltrans standards for Class I multi-use paths, per the Caltrans *Highway Design Manual* (HDM), including facilities immediately parallel and adjacent to roadways with separation from vehicle traffic by a 5 foot horizontal separation or a 2 foot separation with an appropriate barrier: http://www.dot.ca.gov/hq/oppd/hdm/hdmtoc.htm.

The following list of City of Fresno Standard Details has been identified as having a potential relation to trails and can be accessed via the City of Fresno website.

- P-24 through P-31: Curb Ramps
- P-61: Trail-Street Intersection Typical Plan
- *P-74 and P-75: Expressway Barrier Fence* (For expressway use only)
- P-82: High Visibility Crosswalk
- *E-1 through E-12 and P-29 through P-33: Street Light Standard Details* (For reference only not intended for trail use)

NON-STANDARD

While City standards are to be applied to multiuse path design, under certain special circumstances the City may consider exceptions to the design standards, such as where desired right-ofway is not available. Since most trails will occur along major arterials, the following provisions may be considered to address non-standard locations along such roadways:

for public comment

- Align trails to provide trees on south and west sides for shade from afternoon sun where landscaping exists only on one side
- Reduce adjacent street lane widths with Traffic Engineer approval
- Alter adjacent street bicycle lane and/or curb, if existing, and narrow street accordingly

Desired trail width may be restricted at other locations away from roadways, such as where existing encroaching bridge abutments or canal width limit available space. Per the California HDM, a minimum 2 foot horizontal clearance from the paved path edge to any obstructions must be provided. HDM Chapter 1000 provides specific pavement marking guidance to help address locations where pathway width cannot meet the standard, specifically *Section 9C.06 – Pavement Markings for Obstructions* and *Figure 9C-8 on California Manual of Uniform Traffic Control Devices* (CAMUTCD) page 1394: http://www.dot. ca.gov/trafficops/camutcd/docs/CAMUTCD2014-Chap9C.pdf.

The use of sign type W5-4a "PATH NARROWS" is highly recommended prior to the obstruction, as well as sign type OM3, a series of reflective vertical markers on the obstruction itself.

Where space permits, a natural surface shoulder 5 feet wide shall be provided on one side, especially where higher use levels and multiple user types are expected, particularly joggers.

Limited ROW condition

Paved trail and adjacent natural surface path

Advance stop bar

Advance yield markings

for public comment CROSSINGS AT INTERSECTIONS

At intersections, trail crossings should occur in conjunction with pedestrian crossings, where drivers generally expect to encounter people crossing. Where crossing is not located at a controlled intersection, high-visibility crossing markings are required per *City Standard Drawing P-82*, because they are more visible to approaching drivers and have been shown to improve yielding behavior. They also help to reinforce drivers yielding while turning during a green signal phase. This is important because most collisions at intersections involve a driver turning.

The standard 12 foot wide striping will ensure crossings are as wide or wider than the trail they connect. This will ensure that two groups meeting in the crossing can comfortably pass one another. Crossings shall be aligned as closely as possible with the trail through route.

An advanced stop bar or yield markings shall be located as directed by the City Traffic Engineer in advance of crossings to reinforce yielding to trail users. Stop bars or yield markings shall be perpendicular to the travel lane, not parallel to the adjacent street or crossing.

Accessible curb ramps are required at all crossings. Dual curb ramps are preferred where possible and at all uncontrolled crossing locations. Street lighting shall be provided at all intersections, with additional care and emphasis taken at and near trail crossings.

Trail crossing distances shall be made as short as possible using features like tighter corner radii and curb extensions when conditions allow.

Right-turn-on-red restrictions to reduce conflicts between vehicles and trail users could also be applied where trail crossings occur, and signed appropriately.

Crossing pavement markings delineating separate bicycle and pedestrian alignments are recommended specifically for trail crossings at intersections to help distinguish them from typical crossings defined by *Standard Drawing P-82*.

Reduced corner radii with dual curb ramps

Curb extensions

MID-BLOCK CROSSINGS

Mid-block crossings are marked signalized or unsignalized locations between intersections. They create a more visible and direct route without requiring trail users to divert to the nearest intersection. In general, if it takes more than three minutes to walk to an intersection, wait to cross, and then resume the journey, trail users may decide to cross along a more direct or unprotected route. Providing mid-block crossings simply acknowledges that trail users will prefer to travel without detouring out of their path of travel more than necessary. Mid-block crossings shall be in accordance with City of Fresno policy.

Mid-block crossings that span multiple lanes, as described in the Uncontrolled Crossings section on page 28, may be a challenge for trail users. Medians and curb extensions have been shown to be effective countermeasures, as well as reduce the distance trail users must cross at once. However, until a trail system is well established, drivers may not expect to see trail users crossing mid-block making it important to provide adequate lighting and signage to alert drivers well in advance.

Visually impaired people may find mid-block crossings difficult to negotiate because they may not be able to detect traffic gaps or whether all vehicles have stopped because an idling car can mask the sound of others approaching. On the other hand, at signalized crossings, they may not be able to determine when to cross because the surge of traffic noise on the parallel roadway that is their customary cue at intersections is not present. In most cases, an audible indicator that provides timing information can address this issue.

Mid-block crossings will be considered on a caseby-case basis and must be approved by the City Traffic Engineer. At minimum, mid-block crossings should reflect *City of Fresno Standard Drawing P-61: Trail-Street Intersection Typical Plan.* An existing example is shown in the accompanying photo. The roadway being crossed shall be clearly identified at mid-block crossings.

Typical pedestrian crossing

Typical mid-block crossings

Crossing Design

Mid-block crossings need to accommodate multiple user types likely moving at different speeds. Crossing width shall match that of the pathway it serves and pavement markings shall be provided clearly delineating separate bicycle and pedestrian movement. On the roadway approaches, sign types W11-15 and W11-15P "TRAIL X-ING" are recommended in advance of mid-block crossing. See CAMUTCD Chapter 3B: Figure 3B-17, Examples of Yield Lines at Unsignalized Midblock Crosswalks and Chapter 9B: Figure 9B-7, Examples of Signing and Markings for a Shared-Use Path Crossing.

On the pathway approaches to mid-block location crossings, right-of-way shall be designated by "YIELD" or "STOP" and "CROSS TRAFFIC DOES NOT STOP" signs. To avoid confusion, signs intended for pathway users need to be shielded from approaching motor vehicle traffic.

Ramps must be installed in curbs and shall be at least the same width as the paths. Curb cuts and ramps must provide a smooth transition between the trail and the roadway.

There are many more potential features that can be employed to enhance mid-block crossings. The Federal Highway Administration (FHWA) suggests various crossing recommendations depending on roadway classification. On roadways with low traffic volume and speeds up to 30 mph, mid-block crossings can be simple and do not require signals or other special traffic control devices. However, as the distance between intersections increases, as well as speed and traffic volume, mid-block crossings may require the use of other control devices. The following is a list of widely use mid-block crossing features, followed by additional detailed guidance for:

- Crossing/countdown signals
- Curb extensions
- Raised crossing
- In-pavement illumination
- Other enhancements (special stencils, raised platforms, or special signage)

Signals

On four lane roadways, traffic signals shall be considered, with the final decision being made by the City Traffic Engineer. The FHWA suggests traffic signals at mid-block crossings are helpful or essential under the following conditions:

- On higher volume roadways
- Where gaps are infrequent
- In school zones
- Where elderly or persons with disabilities cross
- Where speeds are high

On roadways with six or more lanes, signalization is necessary because their width make it difficult for trail users to cross. Devices used to alert drivers must also be increased, such as overhead signs, flashing beacons, or curb extensions to reduce roadway crossing distance, and even flashing overhead signs.

Passive and Active Sensors

Electronic technologies can be used to help trail users cross at mid-block, including active and passive sensors. Active sensors require the trail user to push a button and work best when sensors are nearly immediate. Where the signal does not change quickly, trail users may cross when traffic allows, without waiting for the signal to change. Then when the signal does finally change, drivers stopped at the crossing may become frustrated and disrespectful of it when no trail users are visible. A slow sensor response can also cause trail users to avoid using a crossing altogether.

Passive sensors employ detectors to determine the presence of trail users in the crossing zone without requiring them to push a button to activate the signal. If trail users are detected in the crossing, the sensors can extend crossing time. Passive signals have an advantage over active signals by ensuring that the signal will be activated by all trail users, even those who are unable or unwilling to push the button. However, they may contribute to an unwarranted sense of complacency. Passive sensors are considered an enhancement to be installed at the City's discretion.

The CAMUTCD specifies that mid-block crossings are not to be signalized when located within 300 feet of the nearest traffic control signal, unless the proposed signal will not restrict traffic movement. Also, a mid-block crossing location shall not be controlled by a signal if the crossing is located within 100 feet of side streets or driveways controlled by "STOP" or "YIELD" signs. An engineering study shall be conducted to determine the need for a signal at a mid-block crossing.

for public comment

Warning Lighting

Appropriate lighting helps to warn oncoming drivers of trail users crossing the roadway at mid-block locations and helps to guide trail users across at night. Several lighting methods are available for use at mid-block crossings, from the simple to the high-tech:

Overhead: This system provides trail users with light to cross the roadway at night and warns oncoming drivers to be aware. Overhead lighting can be activated passively or by pushing a button.

Rectangular rapid flashing beacon (RRFB): RRFBs operate similarly to the overhead lighting system, but provide an LED sign that warns drivers that a trail user is crossing. RRFBs can be used in conjunction with overhead lighting for increased nighttime visibility.

Pedestrian hybrid beacon (PEB): This signal employs both traditional traffic and pedestrian signal heads, but in a configuration that includes signage instructing drivers to "STOP ON RED" and "PEDESTRIAN CROSSING." Whether passively or actively activated, an overhead signal begins flashing yellow and then solid yellow, advising drivers to prepare to stop. It then switches to solid red and displays a "WALK" indication for the trail user. Finally, it displays a flashing red signal allowing drivers to proceed after coming to a complete stop while the trail user sees a flashing "DON'T WALK" sign indicating the number of seconds left to cross. PEB sensors can also be set to release traffic on the side of the roadway the trail user has already crossed, which can significantly reduce drivers' wait times at multi-lane locations.

Mid-block crossing with curb extensions

Pedestrian Hybrid Beacon (PHB)

Siting Criteria

The following criteria shall be used to help determine whether to construct a mid-block crossing versus redirecting trail users to the nearest traffic signal, in the order shown:

- Maximum daily traffic volume of 12,000
- Maximum of 6 travel lanes
- Nearest signalized crossing over 200 feet away
- At least 100 feet from nearest side street or driveway
- Adequate trail user and driver sight distances

Roadway characteristics like traffic volumes, speed limits, number of lanes and overall width may justify additional design treatments to promote more convenient crossing by path users. For examples, crossings of expressways and arterials are likely to require more substantial treatment than crossing collectors or minor arterials, while crossing local streets may require minimal improvements.

The accompanying table lists roadway and trail treatments that may be employed by roadway type. For example, at higher volume or wider roadways, user-activated traffic signals, such as pedestrian hybrid beacons (PHBs) or rectangular rapid flashing beacons (RRFBs) may be appropriate. In all cases, final design must be approved by the City Traffic Engineer.

	Mid Block		Ro	ad	wa	iy T	Treatments Trail Crossing Treatments																																
Mid-Block Crossings		s s	Signage/ Signalling Physical Layout					Crossing Features				Physical Layout					Signage and Signalling									Lighting and Visibility			; /										
	Roadway Types*	Deformable yield signage in roadway	Zigzag striping on roadway approaching trail crossing	Optical bars on roadway approaching trail crossing	Reduced speed limit	Pinchpoint/choker/chicane/mini-roundabout	Curb extensions	Raised median/pedestrian refuge	Raised splitter island	Speed humps/lumps/bumps	Speed table	Width as wide as approaching path	High visibility crossings (ladder/zebra/continental) style	Trail crossing aligned perpendicular to existing roadway	Off-trail queuing space	Raised crossing	Bicycle/pedestrian bridge or underpass	Curb extensions	Raised median/pedestrian refuge	At-grade splitter island/mini-roundabout on trail	Reflective materials on curbs, crossings and in roadway	Zigzag striping on trail approaching roadway crossing	Trail chicane approaching roadway crossing	Jug handle (transition from roadway to trail on opposite side)	User-activated signal	Bicycle signal heads	Stop or yield signage on trail approaching roadway crossing	Pedestrian hybrid beacon (PHB) signals at multi-lane crossings	Rectangular rapid flash beacons (RRFB) at single lane crossings	Automated trail user detection at crossings (infrared, microwave or video)	Pre-crossing safety information (illuminated push buttons/advisory signage)	Automated "walk" clearance phase extension for slower crossers	Equip signalized crossings with Accessible Pedestrian Signals (APS)	Informational and wayfinding signage highlighting trail system	Architectural elements/landscape/branding highlighting trail system	Crossing lighting	Adaptive pedestrian-scale pathway lighting approaching crossing **	Maintain sight distance triangle	Prohibit vehicle parking within vicinity of crossing
	Freeway																\checkmark																	~		\checkmark	\checkmark		
	Expressway											~	~	~	~		~				\checkmark	~	\checkmark		\checkmark	~	\checkmark				~	~	\checkmark	~	\checkmark	\checkmark	\checkmark	~	~
	Superarterial			\checkmark	~			~				~	~	~	~		~	~	\checkmark		\checkmark	~	\checkmark	~	\checkmark	~	\checkmark	~		\checkmark	~	\checkmark	\checkmark	~	\checkmark	\checkmark	\checkmark	~	~
	Arterial		~	~	~	~	~	~	~	~		~	~	~	~	~		~	~	~	~	~	\checkmark	~	~	✓	√	~		~	~	~	~	~	~	\checkmark	~	~	~
	Collector	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~		~	\checkmark	~	~	~	\checkmark		~		\checkmark	~	\checkmark	~	~	~	~	~	\checkmark	\checkmark	~	~	~
	Local	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~		~	~	~	~	~	\checkmark				~		~				\checkmark	~	\checkmark	\checkmark	~	~	~
	Drive	\checkmark										\checkmark	\checkmark	\checkmark							\checkmark						\checkmark											\checkmark	\checkmark

*Source: City of Fresno Mobility and Transportation Element **Activated via motion sensors upon pedestrian or cyclist approach

CHAPTER 2: TRAIL CROSS-SECTION AND DESIGN

Potential mid-block crossing elements

Uncontrolled Crossings

The following criteria will be used by the City Traffic Engineer when evaluating whether a location is appropriate for a marked crosswalk at an uncontrolled location:

- Pedestrian demand
- Vehicular traffic volumes along the roadway
- Posted speed limit along the roadway
- Number of vehicle travel lanes
- Roadway width
- Presence (or absence) of sidewalks
- Visibility/Street lighting
- Distance from a controlled crossing
- Surrounding land uses
- Engineering judgment

Based on the above criteria, the City Traffic Engineer may determine a marked crosswalk may not be an appropriate treatment without additional enhancements. The following table provides guidance regarding additional enhancements that may be necessary at a marked crosswalk location.

DeeducerTure	Ve	hicle A ≤9,000	DT	Ve >9,00	hicle A 00 to 12	DT 2,000	Ve >12,0	hicle A 00 to 1	DT 5,000	Vehicle ADT ≥15,000					
коадway туре	≤30 mph	35 mph	40 mph	≤30 mph	35 mph	40 mph	≤30 mph	35 mph	40 mph	≤30 mph	35 mph	40 mph			
2 Lanes	А	А	В	А	А	В	А	А	С	А	В	С			
3 Lanes	А	А	В	А	В	В	В	В	С	В	С	С			
4 Lanes with Raised Median	А	А	С	А	В	С	В	В	С	С	С	С			
4 Lanes without Raised Median	А	В	С	В	В	С	С	С	С	С	С	С			

A = High visibility crosswalk, signs and pavement word markings

B = Rectangular rapid flashing beacons (RRFB), high visibility crosswalk, signs and pavement word markings

C = Pedestrian hybrid beacon (PHB) or pedestrian signal, high visibility crosswalk, signs and pavement markings

CHAPTER 3:

Fresno's reputation is that of a city that appreciates the value of trees, and is a Tree City USA award recipient. From the City website:

"Trees are powerful assets to the City of Fresno and can benefit everyone in many ways. Better air quality, increased property value, lower temperatures, a better community image, and overall a better quality of life."

This is exemplified by the existing landscaping along its trails, which consist primarily of shade trees, valued for the effective cooling they provide to combat summer's high temperatures. To maintain this standard, trees are required to be placed along both sides of all trails.

The City requires landscape materials that thrive on low to moderate irrigation using water wise systems.

Low groundcover plantings shall be used at roadway crossings and within roundabouts. The more colorful species should be considered for these areas to help draw the attention of both passersby and potential trail users to the trail crossings and the overall trail system.

City standard trail tree planting

STANDARD

Trees are the primary shading method and are required on both sides of all trails. Tree species must be selected from the approved plant palette (see Page 32) and spaced as determined by the City where space permits.

City trail design standards require 2 to 5 foot cleared and graded areas adjacent to trails within which no structures, including signs and fences, may be installed or maintained.

In addition, where applicable to trails, no exposed utility boxes, transformers, meters, piping (excepting backflow prevention devices), are allowed in the natural areas or setbacks of building street frontage. Transformers, backflow devices and other equipment must be screened by landscaping or other means, as approved by the City.

*No signs, fences or aboveground utilities, pull boxes, vault lids, etc. within this zone
NON-STANDARD

Additional landscaping may be provided where a maintenance agreement is in place between the City and adjacent landowner. Where this is applicable, shrub plantings shall be maintained to keep them trimmed back at least 2 feet from the trail paved surface and not exceeding 3 feet in height within 20 feet of the trail, unless they are specifically serving a visual screening purpose, such as blocking views of parking lots or providing privacy for adjacent residences.



Landscaping connecting residential development and City trail

PLANT PALETTE

The following list of approved trees, shrubs and grasses provides the choices available when selecting plants for trail projects. Any deviation must be approved by the City of Fresno.

Trees	
Arbutus unedo 'Marina'	Strawberry Tree
Cedrus deodara	Deodar Cedar
Celtis sinensis	Chinese Hackberry
Cercis Canadensis 'Oklahoma'	Oklahoma Redbud
Chilopsis linearis	Desert Willow
Elaeocarpus decipiens	Japanese Blueberry Tree
Koelreuteria paniculata	Goldenrain Tree
Lagerstroemia indica "Indian varietals'	Crape Myrtle
Laurus nobilis 'Saratoga'	Bay Laurel
Parkinsonia 'Desert Museum'	Palo Verde
<i>Photinia</i> x fraseri	Photinia
Pinus canariensis	Canary Island Pine
Pinus eldarica 'Mondell'	Mondell Pine
Pistacia chinensis	Chinese Pistache
<i>Platanus x acerifolia</i> 'Columbia'	Columbia Sycamore
Platanus mexicana	Mexican Sycamore
Platanus racemosa	California Sycamore
Prosopis 'Maverick' or 'Phoenix'	Thornless Mesquite
Quercus agrifolia	Coast Live Oak
Quercus lobata	Valley Oak
Quercus virginiana	Southern Live Oak
Quercus wislizenii	Interior Live Oak
Vitex agnus-castus	Vitex
Zelkova serrata	Sawleaf Zelkova (and varietals)

Shrubs

Caesalpinia gilliesii Calllistemon 'Little John' Cercis occidentalis Cistus x pulverulentus 'Sunset' Cotoneaster horizontalis Heteromeles arbutifolia Lantana sp. Lavandula sp. Leucophyllum frutescens Myrtus communis 'Compacta' Nerium oleander 'Petite Pink' Nerium oleander 'Petite Red' Pyracantha 'Tiny Tim' Raphiolepis indica Rhamnus alaternus Rosa 'Meidiland' Rosa 'Floral Carpet' Rosmarinus officinalis Tagetes lucida

Yellow Bird of Paradise Dwarf Bottlebrush Western redbud Rockrose Rock Cotoneaster Toyon Lantana Lavender Texas Ranger Dwarf Myrtle Dwarf Oleander Dwarf Oleander Pyracantha Indian Hawthorne Italian Buckthorn Groundcover Rose Landscape Rose Rosemary Mexican Marigold

Grasses

Buchloe dactyloides Calamagrotis 'Karl Foerster' Muhlenbergia capillaris Mulenbergia rigens Stipa tenuissima UC Verde Buffalo Grass Feather Reed Grass Pink Muhly Deer Grass Mexican Feather Grass

(Note: Where a trail runs through a park or adjacent to a park, the park turf may be extended to the trail edge.)

for public comment



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CHAPTER 4: FENCING AND RAILINGS

Fencing along Fresno's trail system will vary depending on the location and agreements with adjacent landowners. Fencing will typically be used to address safety, security, trespass prevention, environmental impacts and privacy. The fence types shown in this section can be applied to various scenarios. All fencing types shall be approved by the City prior to installation. No one type is presumed for use throughout the trail system, but visual continuity is recommended.

Fences will be used when required by either the City of Fresno or the adjacent landowner. When a fence is required, it will be located at the rightof-way edge. A minimum of 2 feet from the outermost edge of the trail shall be kept clean and clear. Where a fence is appropriate within the right-of-way or trail easement for safety purposes, a minimum of 2 feet from the outermost edge of the trail shall be kept clear. The trail fence's specific location will be determined during preliminary design and finalized in the construction documents for each implementation phase of the project.

Fencing should be used conservatively because it can be costly and long-term maintenance will affect life-cycle costs. Unnecessary fencing can also adversely affect neighborhood connectivity. Where physical barriers are necessary to protect sensitive adjacent resources, installing fencing can draw attention to an otherwise concealed resource. If the expressed intent is to keep users on the trail, other methods may be more effective, especially careful site design that maximizes users' trail experience, which fencing can potentially degrade. Landscaping can often be manipulated to limit visual access and even to direct views away from sensitive resources. Where right-ofway permits, a landscaped buffer shall be provided instead of fencing. Fencing along trails shall be in accordance with the *City Development Code*.

Specific locations and conditions will require more substantial access control and/or visual screening. Fencing may be required at the City's discretion. For example, fencing along expressways is specifically addressed by *City of Fresno Standard Drawings P-74 and 75: Expressway Barrier Fencing*. Where it is determined that fencing is needed along trails, materials and construction shall be resilient and require minimal maintenance.

FENCING TYPES

Fencing types may include tube steel, wood composite, concrete masonry units, wrought iron or other suitable materials. Chain link is not allowed. The following describes the types of fencing appropriate for various locations and needs.



City standard barrier fence

for public comment

Low Security

This level of fencing provides a minimal level of access control and is intended to blend with its surroundings in an aesthetic manner. It should be used in areas where trespass is not likely, but where adjacent uses would benefit from some assurance from disturbance. This fence type has a more rustic character than the other types, relatively open visibility, but is visible enough itself for effective boundary delineation.

This fencing type may be concrete or wood rail, galvanized cable with wood or galvanized posts, or welded steel pipe rail throughout. It shall be 48 inches high if adjacent to trails.

Medium Security

This fencing would be used for more stringent access control, such as immediately adjacent to sensitive private properties or other land uses where more positive access control is desired, but where preserving visibility is desired. This fencing should be smooth wire 54 inches high with concrete or metal posts and designed to exclude humans and dogs. If a less conspicuous appearance is desired, a dark matte finish is the least visually prominent.



Low security fence (Concrete)



Medium security fence

High Security

Where a high level of security is required, 6 foot tall, powder-coated, welded wire fencing with integrated metal posts is recommended. Conventional picket fencing may also be appropriate if of the same height and does not have horizontal members.

This fence type's high trespass prevention and security is accomplished through heavy gauge wire so closely spaced that they eliminate the need for horizontal members that could provide hand or toe holds and make it difficult to insert cutting tools like bolt cutters.

Some visual screening can be provided with evergreen vine plantings. This fence type is relatively costly and should be used only where necessary, such as adjacent to sensitive land uses or hazards from which trail users must be restricted.

Privacy Fence

A 6 foot concrete or concrete masonry privacy fence shall be provided where visual screening is necessary. This fence type provides trespass prevention, security and privacy for adjacent landowners. While relatively costly, concrete construction increases fence lifespan and reduces long-term maintenance costs. They also block noise very well.



High security fence



Privacy fence

Where space permits, other barrier types between trails and adjacent private property may be used, such as ditches, berms and/or landscaping. Ditch or berm slopes should not exceed 2:1 or be greater than 10 feet in depth or height. Slopes of 3:1 are recommended if planted with grasses that will require regular mowing. Recommended vegetation shall be selected from the City-approved plant palette.

Fencing finishes shall be low maintenance and robust. For instance, except for factory-applied finishes like powder-coating, metal fencing and components shall be galvanized and treated with reactive staining to make them a less visually obtrusive rust brown color that never needs re-coating. Concrete fencing may be formed and treated to look like wood. Privacy fencing that may be a vandalism target shall be treated with graffiti-resistant coating.

Removable

Removable or moveable barriers (such as gates and bollards) that allow for emergency and maintenance access may be installed where necessary, but they must leave a flush surface when the barrier is removed. Folding barriers are therefore not recommended because they can be a hazard. For this reason, Caltrans does not allow them within the traveled way of paved trails.

for public comment

Decorative fencing can add visual interest to a trail and could be used at gateways, trail heads or adjacent to neighborhoods. Fencing could be designed as needed to address specific privacy needs by fine-tuning height and opacity.

Such fencing could serve as either a unifying design element throughout the trail system or a component of a public art program. For large scale installations, laser and water jet cutting and fabricating can enliven virtually any two-dimensional surface. Due to cost, such embellishment should be confined to major trail heads where they can help draw attention to the trail system.

VEHICLE GATES

When a physical barrier is needed to control unauthorized vehicle access onto a trail, the preferred configuration is a single non-removable, flexible post on the path centerline with a separate gate for emergency/maintenance vehicle access next to the path. The gate shall be designed to swing away from the path, where possible.

City of Fresno Standard Drawing P-99: Access Ramp Gates shall be referenced for design of gates to control vehicle access, such as for canal maintenance access, but its design is appropriate to control unauthorized vehicle access onto a trail only if it is placed adjacent to the trail and not directly across it.







Example decorative fences

BOLLARDS

The best way to discourage unauthorized motor vehicle encroachment is through design. Installing bollards or other barrier treatments should be considered a last resort and only if there is a documented encroachment problem. Caltrans proposes a three-step approach to prevent unauthorized vehicle entry:

- Post signs identifying the entry as a path with regulatory signs prohibiting motor vehicle entry where roads and paths cross and at other path entry points (with an associated fine for violations).
- Design the path entry so it does not look like a vehicle access and makes intentional access by unauthorized users more difficult. Dividing a path into two one-way paths prior to the intersection, separated by low plantings or other features not conducive to motor vehicle use, can discourage drivers from entering and reduce driver error. For example, the path could be split with a small scale roundabout not far from the roadway, which would not only prevent motor vehicle entry, but encourage bicyclists to slow as they approach the roadway intersection.
- Assess whether signing and path entry design prevents or minimizes unauthorized entry to tolerable levels. If there are documented issues caused by unauthorized motor vehicle entry, and other methods have proven ineffective, assess whether the issues posed by unauthorized vehicle entry exceed the crash risks and access issues posed by bollards.

for public comment If bollards are determined to be necessary to re-

strict motorized vehicles, design and placement must be addressed. Bollards, plantings or similar obstacles shall, at a minimum, be:

- Yielding to minimize injury to bicyclists and pedestrians who may strike them
- Illuminated or reflectorized for nighttime visibility and painted, coated, or manufactured of material in a bright color to enhance daytime visibility
- Spaced to leave a minimum of 5 feet of clearance of paved area between obstacles (measured from bollard to face of adjacent obstacle)
- Positioned symmetrically about center line of path, to help mark and separate the travel directions
- Positioned so even number of travel lanes are created, with minimum of two paths of travel. (Odd number of openings increase risk of head-on collisions if traffic in both directions tries to use same opening)
- Placement includes advance warning signs or painted pavement markings where sight distance is limited
- Placed 10 to 30 feet back from an intersection, and 5 to 10 feet from a bridge, so bicyclists approach obstacle straight-on and maintenance vehicles can be pulled off road
- Placed beyond clear zone on crossing highway, otherwise breakaway
- Not be used to force bicyclists to slow down, stop or dismount



Bollard centered between lanes



Bollards at mid-block pedestrian crossing and bikeway

for public comment

High quality removable bollards are available and designed to maintain a flush trail surface when not in use. They generally employ an encasing socket embedded into the path surface, into which the bollard is placed and locked when in use. The socket has a locking hinged metal cover, so that when the bollard is removed, this cover closes over the socket top completely flush with the path surface. Some covers are also lockable. These bollards do result in a small metal plate in the path surface, but this is far safer than leaving an open socket or an exposed hinge assembly.

RAILINGS

Railings may be appropriate physical barriers along trails as an alternative to other methods such as dense landscaping, especially where space is limited and safety is a concern.

Typical railing locations include adjacent to parallel roadways less than 5 feet from edge of the trail's shoulder and between the edge of the trail pavement and top of an adjacent slope. Protective railings shall be provided to barricade trail use adjacent to slopes steeper than 2:1 within 5 feet of the pavement (or natural surface sidepaths, if provided), as well as along drop-offs or canals.

Railings can be hazards in themselves because trail users, particularly bicyclists, may "shy away" from the vertical obstructions like railings and can collide with other users. To avoid this, railings should be placed on the outside of the graded shoulder offset from the pavement to avoid reducing the trail's effective width.





Removable bollards with flush covers



Railing along regional trail

Edge protection lower than a 42 inch railing is considered potentially dangerous for bicyclists so railings shall therefore be at least 42 inches high with at least one intermediate rail at 21 inches, with all horizontal and vertical members in-line. In some situations, it may also be beneficial to provide a gripping surface for pedestrian use in addition to the protective railing. If such a handrail is included as part of the railing design, it must meet ADAAG requirements.

The City requires that the clear width of a bicycle path on structures between railings shall be not less than 12 feet.

For stability, vertical members should be no more than 8 feet apart, and preferably 5 feet. If fabricated from metal pipe, footings shall be a minimum of 18 inches deep and 6 inches wide.

To maintain visual continuity throughout trail system infrastructure, a decorative standard design may be developed that meets these guidelines.

for public comment

Railing Height

A railing's primary purpose is to protect trail users from a hazard on the other side and railing height is primarily an issue for bicyclists, the fastest user group. The railing height to keep a bicyclist from falling over it will depend on site-specific conditions such as travel speed, travel direction relative to the railing and collision angle. Because Caltrans and AASHTO had different minimum railing height standards, Caltrans and National Cooperative Highway Research Program (NCHRP) conducted research to de termine appropriate railing heights for bicycles. Both studies concluded that locations on curves where bicyclists can attain high speeds need higher railings than straight locations where bicyclists are traveling parallel to the railing.

Caltrans design guidance documents now recommend a 42 inch railings for locations where the combination of high speeds and high impact angles are not likely. For site conditions where this combination is likely, a minimum height of 48 inches is recommended. NCHRP guidance for when to consider a 48 inch rail height includes locations where bicyclists require protection from a severe hazard, such as the outside edge of highway bridges, between a path and highway bridge travel lanes, trail bridges with drops of two feet or more and along paths where railings protect from a cliff, water body or other such hazard.

for public comment



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CHAPTER 5: FURNISHINGS

The following amenities would generally be provided at trail heads and at some rest areas away from any trail heads. Specific locations and associated amenities will be determined through consultation with the City as part of project planning and design. New trail heads and rest areas at or near existing adjacent parks with furnishings should be evaluated for the need for new facilities if they are already present and in good condition.

Seating such as benches shall be clustered with trash receptacles and other furnishing elements. All site furnishings shall be metal and be selected from the City's approved list. Benches and trash receptacles shall be placed at a minimum of half mile intervals. Furnishings must be durable and secured to their locations to help prevent theft and vandalism.

SEATING

Seating at trail heads, rest areas and viewpoints supports trail use by people of all ages and abilities, as well as opportunities for memorial donations or service projects.

Seating shall be provided at trail heads, and at rest areas a minimum of every half a mile along the trail system. At trail heads, multiple benches may be interspersed or grouped, such as at popular viewpoints. Single benches shall be provided at rest areas. Observed need shall guide placement and frequency as determined by the City. Seating needs to be located adjacent to and on the north side of a tree or group of trees so that it is shaded in summer. Every seating area shall also be illuminated.

All seating needs to be on an accessible paved surface offset a minimum of 3 feet from the trail, but contiguous with the trail or trail head's paving. Seating area paving needs to include adequate space adjacent to the seating for people who use wheelchairs to be able to rest next to their companions.

Seating may be situated away from the trail if part of a paved interpretive station or other special activity area, or to take advantage of views, but all seating needs to be accessible via paved connecting path.

Seating shall be located where surveillance is readily available, such as near trail entrances.

Seating shall consist of benches with backs and at least one armrest to allow all users to more easily support themselves as they sit and stand. Other alternatives to fabricated benches could include the use of large boulders for seating in more rural or natural settings if accessible seating is also provided.

Trail system visual continuity and branding will benefit from consistent bench design that relates to other system furnishings.



City standard bench (6 and 8 foot surface mount with back and arms)

EMERGENCY PHONE STATIONS

Emergency phone stations may be provided for trail locations considered to be remote or highrisk. Models are available with wireless, solar and surveillance options. They typically employ vandal-resistant emergency phone faceplates and always-lit blue beacons mounted on the top. The blue light remains on at night to assist locating it and then flashes when the emergency phone is activated to attract attention to the location. Installation requirements will be as determined by the City on a case-by-case basis

TRASH RECEPTACLES

Trash receptacles shall be provided at all trail heads, rest areas and anywhere seating is provided. Trash receptacles should be placed near seating areas, but a least 20 feet away to reduce odor impacts. Design, color and style shall be consistent throughout the trail system. Receptacles shall be durable and secured to their locations to help prevent theft and vandalism.

Pet waste bag dispensers shall be provided in conjunction with trash can locations on stand-alone mounting posts. Stations shall also be equipped with signs stating that all dogs in Fresno County must be on a leash or under the immediate control of a responsible person and that owners are responsible for cleaning up after their pet.



Emergency phone station



City standard trash can (Jackson Collection Waste Receptacle: JK-36FT)



City standard dog waste bag dispenser (DEPOT-023)

BICYCLE PARKING

Secure bicycle parking at likely destinations is an integral part of an overall bikeway network, including the paved trail system. The potential for bicycle theft and lack of secure parking are often cited as reasons people hesitate to ride a bicycle. The same consideration shall be given to bicyclists as to vehicle drivers, who expect convenient and secure parking at their destinations. Bicycle parking shall be given a balanced level of importance when considering car parking improvements or development.

Bicycle parking shall be in well-lit locations, no further from the trail entrance than the closest vehicle parking space and shall not interfere with pedestrian movement.

Trail system visual continuity will benefit from racks whose design relates to other system furnishings, if the racks provide adequate security.

Racks need to support the bicycle at two points and enable proper locking, allowing users to secure a typical U-lock around the frame and one wheel to the locking area of the rack. Example shown below is a standard "inverted-U" rack with custom artwork. See the Association of Pedestrian and Bicycle Professionals (APBP) Bike Parking Guidelines for information on bicycle parking design and placement.

Recreational riders generally do not carry a lock because they do not want to be hampered by its weight. At peak periods, groups of riders can overwhelm available bicycle parking, particularly cluttering the area around restrooms with bicycles leaned against any vertical object. for public comment A new type of rack, based on the temporary racks

provided at bicycle races and triathlons, is becoming more prevalent, especially at trail heads served by restrooms. These "triathlon style racks" allow groups of riders to temporarily store their bicycles in a convenient, space-efficient manner. This rack type provides a means to hang the bicycle by the saddle from a support beam without locking it in place. It is intended to serve users passing through an area who are not likely to carry a U-lock and are not intending to leave their bicycles unattended. These users tend to ride with friends or in groups, allowing them to take turns watching each other's bicycles while gearing up, using the restroom or re-filling their water bottles.



Inverted-U bicycle rack



"Triathlon" style short-term bicycle rack concept

for public comment

REPAIR STATIONS

Repair stations are comprised of a bicycle stand, tools and an air pump provided for self-service repairs or adjustments. They shall be provided at intervals across the trail system, particularly at trail heads where the highest use volumes are expected. They shall be placed well off the trail head paving or trail itself on a solid surface, and with enough room to allow the user to move around the bicycle. Covered or shaded installations are desirable for user comfort. Most manufacturers provide installation guidelines.

Virtually all repair stations incorporate turn-key repair stands with the tools necessary to make simple adjustments and repairs. However, these installations shall also be modified to address the needs of skateboarders. wheelchair users and other wheeled users, as well as bicyclists. This could be done by including the relatively simple but specific set of tools they generally need to tighten their wheel bearings and deck fasteners, for example. Because skateboard tools are generally imperial and not metric like the tools generally provided with turn-key bicycle repair stations, it is recommended that the following specific tools be included as part of any repair station installation and marked as such: 3/8", 1/2" and 9/16" sockets, and 7/32" and 1/8" Allen wrenches.

Another potential amenity related to repair stations are bicycle parts vending machines. Most are available from the same companies that make repair stations and are used primarily to provide basic small items like tubes, patch kits, water bottles, energy bars and chain lube. The most sophisticated vending machines also supply maps, a message board and a video kiosk with instructions on how to perform various repairs.



Repair station

Identifying Repair Stations

How repair stations are identified must reflect that they are intended to serve all wheeled users, such as those who use skateboards, skooters or wheelchairs. The terms "fix-it sta tion" and "repair station" are widely recog nized and therefore recommended. Brand ing could also reflect this wider user base.



Repair station tool selection

for public comment

DRINKING FOUNTAINS

Drinking fountains shall be a standard component of all trail heads, as well as provided at rest areas where water supply is available. Accessible designs shall be selected that include high and low spigots and basins, a ground-level bowl for pets and the ability to fill bottles. They should be installed at regularly used locations to reduce the possibility of water stagnation.

Drinking fountains shall be positioned away from the trail's flow of traffic, but easily visible from the adjoining trail or trail head entrance. Drinking fountain design, color and style shall be consistent throughout the trail system. Kiosk maps shall identify drinking fountain locations so users know where to find them.

New trail heads or rest areas immediately adjacent to parks that provide drinking fountains may not require fountains. If so, signage shall direct trails users to them.

Drinking fountains shall be durable and secured to their locations to help prevent theft and vandalism. Similar wall-mounted units are acceptable at trail heads, such as on the outside of restroom buildings. Overhead sprayers shall be installed at locations identified by the City.



City standard drinking fountain (Elkay LK4420DB)

FITNESS STATIONS

Most fitness stations are locations in parks or along trails equipped with exercise equipment specifically designed for outdoor use. They may be distributed along the length of a trail or clustered in specific exercise areas, installed as outdoor gyms, and often at trail heads. Clustering fitness equipment at trail heads improves system visibility, encourages socialization, and allows several people to use it at one time with an instructor. Specific locations will be determined in consultation with the City.

Most fitness stations employ mechanical equipment designed to provide similar physical challenges for all user types that address specific exercises or muscle groups, including stations that incorporate ADA compliance within the same locations. Fitness stations can also consist of natural features such climbable rocks, trees and embankments.

Fitness station equipment shall be selected, designed and placed in an accessible manner to permit participation by persons with disabilities and the elderly, and easily visible to passing users, such as cyclists, runners, skaters and walkers. Space shall be provided around each station sufficient to encourage access, such as by trail users who use wheelchairs. Shading is also recommended.

Recycled rubber surfacing that meets the same safety standards as school playgrounds is recommended, particularly if facilities will be freely available to children. Depending on the choice of equipment and potential fall heights, various for public comment thicknesses and colors are available from rubber

thicknesses and colors are available from rubber surface manufacturers. Surfacing shall be sufficiently resilient to fully support persons in wheelchairs. Besides its safety benefits, appropriate surfacing also extends fitness system capabilities by supporting many additional exercises that can be performed on the resilient surface, such as stretching and calisthenics.



Accessible fitness equipment

CHAPTER 6: PUBLIC ART

Art can make trails more interesting, pleasing and intriguing, which can help to elevate a trail system from practical infrastructure to a valued community asset. Art can both encourage public engagement and stewardship, as well as identify the trail system and the communities through which it travels.

Public art installations must be mindful of overhead clearances and protrusions. Ways to achieve this include placing artwork in planters or behind a raised curb or positioning artwork on a cane detectable solid pad. Artwork shall be placed off the trail, but wherever possible, artwork with interesting tactile qualities should be within reach of most users.

OPPORTUNITIES FOR ART

Many opportunities exist for art along trails. For examples, seating, drinking fountains, sculpture, earthworks, bridges, trail heads and other infrastructure can benefit from an artistic perspective. Highlighting these features can also make the trail system more visible to those passing by who might otherwise not be aware of it. Trail heads can be especially important functional and symbolic places because they are the trail system's public portals where trail users will be likely to gather, meet and rest, but they can also be synonymous with the trail system's visual identity. Site-specific artworks that explore narratives through interesting materials, color and form can be used to mark each trail head to help create a sense of welcome and discovery.

Adjacent infrastructure can become trail amenities and part of the overall trail system experience. For example, artistic markings can be incorporated into intersections and where trails cross roadways. Transitions like roadway crossings, turns or landscape changes can be illustrated with artistic trail markers.

Most art is visually or mentally stimulating, but some art is intended to animate other senses as well. Public art along trails can incorporate sensory features like aromatic or seasonally changing plantings, wildlife attractors such as water features, or outdoor musical instruments. Away from sensitive adjacent land uses, lighting can also be an artistic component of trail systems, including new possibilities like luminescent paving technologies.



Accessible art installation



Kinetic sculpture along regional trail

for public comment

COMMUNITY IDENTITY

Overall trail system identity can be established through continuity in the design of benches, drinking fountains, signage, ramps, railings, sculptures or other features to "brand" the trail system. Signage and markers can incorporate branding specific to each neighborhood to highlight their individual attributes (see Signage chapter).

Inviting artists to embellish trails with artwork of all kinds can challenge landscape architects, engineers, architects, city planners and government officials to think outside the box.

Some public art programs invite artists to work as part of an engineering/landscape architectural project team, along with the community and other partners, to incorporate thematic elements into the artwork and design of infrastructure like bridges, gateways and trail heads. Other programs solicit stand-alone artworks for placement along the trails that can help make the trail system a continuous experience by incorporating site narratives. These programs can involve local and regional artists in an evolving and renewable format, or a local artist competition could also be held to design the overall trail system graphic language, as well as individual neighborhood graphics.

Trail systems can be great venues for artistic events that help form partnerships among art, conservation and community groups, and introduce visitors to the trail system. Artistic events can also cultivate a common vision to focus a public art program.



Trail system gateway artwork and decorative fencing



Public art and lighting integrated into trail bridge



Luminescent trail pavement



Trail pavement markings and interactive light sculpture





Trail system artwork highlighting adjacent river habitat

PUBLIC ART PROGRAM MANAGEMENT

Public art programs require thoughtful management like any other public infrastructure, including addressing ownership and design, site selection and placement and safety, maintenance and durability, safety and preventing offensive content.

Ownership

Typically, designated public art placed on a development site is owned by the developer, who is obligated to maintain it. Ownership of artwork placed in public right-of-way can be transferred to the agency. A public artwork's maintenance usually becomes the responsibility of the agency that houses it, but it can make an agreement with the provider to maintain the artwork or to provide in-lieu maintenance funding.

Design Criteria

In most cases, a selection committee made up of agency and other selected representatives and stakeholders reviews submitted public art project proposals. Part of the committee's role is to adopt specific criteria for proposed public art project review, such as the following:

- Relevance of the piece to the trail system
- Suitability of the work for outdoor display, including its maintenance requirements
- Relationship of the work to the site and the community
- How it will activate or enhance the trail system
- Appropriateness of the artwork's scale
- How closely the proposed artwork meets the community's envisioned goals

• Prohibiting nudity or symbols which could be

 Prohibiting nudity or symbols which could be offensive and/or other potentially offensive material as determined by the City of Fresno, whose decision is final

Site Selection

To ensure public art is equitably distributed throughout the trail system, as well as sited to enhance and activate it, sites where public art is to be displayed shall, at a minimum:

- Currently or be likely to experience high levels of trail traffic
- Be easily visible and accessible to the public
- Serve to anchor and activate the overall site
- Enhance the overall public environment and trail experience
- Establish landmarks and neighborhood gateways

Placement

Following site selection, placement criteria shall be employed, such as ensuring the artwork will:

- Not obstruct normal pedestrian circulation (unless such alteration is specifically a part of the experience or artwork design while addressing ADA requirements)
- Be either immediately visible or where it will be visible by the most people
- Not be overwhelmed by nor competing with the scale of the site or adjacent architecture, large retail signage, billboards, etc.
- Enhance its surroundings or at least not detract from it (creating a "blind" spot where illegal activity can take place).
- Create a place of congregation or in a location that experiences high levels of pedestrian traffic and activity

- Effectively enhance and activate the trail experience
- Be publicly accessible always, or if sited in a setting such as a park, be accessible during the site's normal operating hours
- Be sited where landscaping and maintenance requirements can be met

Maintenance

It is especially important that public art policies spell out procedures, responsibilities and ongoing funding for maintenance. This will help prevent artworks from falling into disrepair, becoming dirty, damaged, or even to disappear. Some works of art require painstaking maintenance and expense. This can be avoided by having the artist and agency or client work out the proposed artwork's fabrication methods and materials so maintenance requirements can be contractually agreed upon to ensure that the piece will remain in good condition for many years to come.

for public comment



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CHAPTER 7: SIGNAGE

Trail signage is fundamental to establishing a functional and comprehensive trail network. Signage provides trail users with pertinent information throughout the network regarding distance, destinations and appropriate travel modes. Commercial signs are prohibited within trail rights-of-way. Signs identifying adopt-a-trail or similar programs are exempt.

MILEAGE (DISTANCE) MARKERS

Mileage markers appropriately installed at regular intervals along the trail communicate to users their distance traveled between access points, as well as help orient first responders and maintenance crews to address specific needs.

Mileage markers shall be measured in miles and be installed at quarter mile intervals on the asphalt or concrete surface. Markers shall be designed to quickly and effectively communicate information. Short and concise text, high contrast between text and background colors, and any existing trail branding shall all be considered when designing trail markers.



Example mileage markers





INTERPRETIVE/EDUCATIONAL

Interpretive signs enhance trail users' experience by providing unique information about the region's history, culture, geology, geography, and other relevant topics. Signs may feature local and regional ecology, people, environmental issues and other educational information. Interpretive signs can be designed and installed in a variety of styles such as textual messages, plaques, markers, panels and kiosks.

Interpretive signs may be placed almost anywhere throughout the trail network. Their placement may coincide with a point of public interest, at scenic view areas, or in relation to the specific elements being interpreted. Often, signs are placed at trail heads and vista points where users are more likely to spend time off the actual trail resting or enjoying the view. Because interpretive signs need to relate directly to the needs of a site, no specific guidelines have been established for their format. However, interpretive signs shall be concise and include the trails system's branding.



Interpretive kiosk with trail system maps

Technological Trends

Interpretive signs may also include supple mentary information via QR tags or other trending digital communications platforms such as augmented reality (AR) applications.





Interpretive/educational signs

WARNING

Providing trail users a safe and comfortable experience is critical. Warning signs communicate important information that will help keep them safe on and off the trail. Warning signs may caution trail users about approaching intersections, off-limits private properties, environmental and ecological risks or a trail's difficulty level. Warning signs shall convey information in a concise, bold and easily understood manner.



Warning signs



WAYFINDING

Wayfinding signage functions best as a part of a system linked with area maps. FresnoCOG's bikeway map is an example:

http://www.fresnocog.org/sites/default/files/publications/Bikeway_and_Trails/2014_Fresno-Clovis_ Bikeways_Map_Final.pdf

A comprehensive and effective wayfinding signage program provides trail users helpful distance, destination and location information in a clear and concise manner. For instance, the roadway being crossed shall be clearly identified at mid-block crossings, as well as whether there are alternate crossing options. Wayfinding signage can improve the experience for people already using the trails, as well as to help encourage others to begin using the trails. Signage helps current and future trail users to:

- Identify their location
- Assure that they are traveling in the desired direction
- Navigate junctions and other decision-making points
- Identify their destination upon arrival

Wayfinding guides users to destinations along a trail system. Destinations noted on wayfinding signage shall be immediately recognizable and meaningful to most users. Every sign shall present a set of destinations accessible from that point and shall direct the person directly to their destination. Wayfinding signage also serves the broader role of providing trail users a general understanding of the route they are currently travelling, the areas it serves and its terminus. Users can use signage to approximate their path to their own destinations or discover new destinations within their region such as parks, shopping, public transit and other local destinations.

Information Hierarchy

Because humans tend to scan information in a top-to-bottom and left-to-right manner, wayfinding signs shall be designed so that the information displayed matches this behavior. The most important information shall be near the top and left and displayed in the largest size, followed by information of lesser importance located toward the right and bottom portions of the sign in smaller font size.



Example hierarchical information

CHAPTER 7: SIGNAGE

ADMINISTRATIVE DRAFT for public comment

Wayfinding Sign Types

There are four basic wayfinding sign types: confirmation, decision, turn and off-route. Each type has a unique purpose, location and message. The first three sign types move users along a designated trail network. The fourth sign type, off-route, directs them onto the trail network from adjacent streets.

Confirmation:

- Indicate to trail users which designated trail they are on (may include the City's existing signage due to limited space)
- Include destinations and distance/time, without arrows
- May be stand-alone or combined with decision signs

Decision:

- Marks trail junctions
- Informs trail users of designated route to access desired destinations
- Display both destinations and arrows
- Intended to be used in sets or combined with confirmation signs
- Decision signs shall be mounted in order of distance from destinations listed, with the closest first
- When combined, confirmation signs shall be mounted above decision signs

Turn:

 Indicates where a trail turns, either from one route onto another route or through a difficult or confusing area (may include existing trail markers)

Off-route:

• Inform users not on a designated trail that one exists nearby

A large key map that displays all trails in the network can also be implemented. The map can be combined with "You Are Here" labels to help users orient themselves or help them decide on a new destination. These maps can be located at major intersections, where two or more trails meet, or at popular local destinations such as community centers and parks.



Multiple pole-mounted wayfinding signs



Ground-mounted wayfinding sign



Predictability and Redundancy

Consistently repeating signs' position, shape, color and font helps trail users become familiar with these features, which helps them anticipate where signs will be placed and the information the signs will convey. Trail naming and branding can be consistently applied across the trail network's signage system. All of this supports better cognitive understanding, which helps relieves anxiety and stress.

Sign Mounting and Placement

Wayfinding signage can be installed at access points and major trail intersections such as trail heads, periodically along system trails, and anywhere users may conveniently intersect the trail system. The trail network shall be signed in tandem with other alternative transportation routes, such as bicycle routes in neighboring jurisdictions, historic and/or cultural walking tours, and wherever possible, local transit systems.

As a rule, signs shall be mounted in consistent, conspicuous locations. Clear sightlines, free of vegetation and other obstructions, need to be maintained between the path of travel and the signs. Along roadways, best practice is to mount wayfinding signs on their own poles. Signs shall not be mounted to traffic signals, lighting, utility or transit stop poles. The bottom of pole-mounted signs shall be at least 7 feet above the ground.



Informational sign

for public comment

Designing for Human Scale

Signs need to be designed for immediate legibility from the perspective of a person riding a bicycle or walking and the main design consideration is user speed. Based on guidance from Portland, Oregon, people riding bicycles should be able to see an upcoming sign from about 100 feet away. Bicyclists should not have to stop to read a sign, so signs must clearly convey their message, ideally within a seven second envelope. Signage should establish font and color consistency and present a uniform character to promote the trails as a unified system. Informational text on signs shall use sans-serif fonts. High contrast between the text and background color is also highly recommended. The following principles help to achieve legibility:

Text

- Signs should be visible from roughly 100 feet away (capital letters shall be a minimum of 2 inches tall)
- Signs shall be mixed-case (not all upper case)
- Minimize number of text lines (5 maximum recommended)

Contrast and Proximity

- Provide high contrast between text and background colors
- Related pieces of information shall be grouped and assigned similar sizes and shapes

Consistency and Repetition

- Maintain a consistent color, font and iconographic scheme
- Position signs at consistent heights and locations on standard mounting devices

Simplicity and Legibility

- Use shortest, most concise phrasing whenever possible
- Consider using icons to supplement text for people not fluent in English
- Distance Measurements
- Confirmation, decision and off-route signs shall convey distances measured spatially (miles) or temporally (minutes), or both

IMPLEMENTATION

- Define trail network to be signed, as well as trail names
- Establish a master list of destinations and assign each to hierarchical level, if needed
- Establish signage design and placement guidelines
- Display destinations and trail network together on maps
- Divide trails into segments bookended by major destinations (These destinations will be used as control locations (termini) when creating signs)
- Identify junctions, turns and other decision points where turn or decision signs will be necessary
- Prepare signage plan, including placement and content of individual signs
- Ideally, create a GIS database to manage content and location details for each sign, and to support future system management
- Prioritize implementation
- Implement signs





Directional sign panel

for public comment

TRAIL NAMING AND SYSTEM BRANDING

Naming trails simplifies navigation and enhances the sense of place. Trails that follow only one street can be named after the street, but trails that contain many turns often require a broader name. A common approach is to name trails based on key attributes such as level of difficulty or its destination.

An adopt-a-trail program will be considered, allowing businesses or organization to adopt a trail segment in exchange for their logo on segment signs.

COMMUNITY OWNERSHIP

Naming trails can help support community identification and pride by highlighting local landmarks or people deserving of recognition. However the trails are named, community identity shall be part of the signage program. For instance, while the wayfinding signage program employs a consistent overall theme throughout the trail system, a portion of each sign could be set aside for each community's identity or logo. This is particularly effective if all community logos are consistent in shape and legibility so that they fit at an equal scale within the directional sign format. Part of the identity could also be specific colors defining each community. Designing these logos could be accomplished through a local art competition.







Community trail loop branding

CHAPTER 8:

BICYCLE/PEDESTRIAN BRIDGES

Bridges create opportunities for trail connections, as well as can provide maintenance and emergency service access where necessary. Likely potential users, cost-effectiveness and physical constraints will drive location selection. The following conceptual bridge guidelines will steer potential trail bridge development. ADA compliance is assumed.

BRIDGE TYPE

Wood

Wood trail bridges may provide a cost-effective solution while supporting local trail character. Bridges shall be level and avoid a step-up. Since wood's life span is relatively limited, composite lumber may be considered as an alternative deck material, especially if heavy use is anticipated. If fall distance is greater than 30 inches, guard rails shall be at least 42 inches higher than the bridge surface. Spans greater than 10 feet should generally be engineered and may require site-specific geotechnical work. It should be noted that long span wood construction has similar requirements for abutments and foundation supports as steel bridges.

Steel Truss

Prefabricated steel truss bridges are commonly used in parks and trail environments to cross longer spans. They can be engineered to clear spans of over 100 feet, with virtually unlimited spans possible with intervening supports. However, designing spans greater than 60 feet usually requires abutment design special consideration to address superstructure movement due to temperature fluctuations. A concrete grade beam foundation shall be a minimum abutment requirement for steel truss bridges. Timber sills or gabions are not allowed.

Single span prefabricated steel truss bridges are most economical where construction access to planned abutments is readily available, including clearance for crane operations. Constructing longer, multiple spans may require intermediate, in-stream bents or shoring.

Prefabricated steel truss bridges are available in a variety of design styles and truss types to accommodate project aesthetic and clearance requirements. Design considerations include selecting finishes such as weathered (Cor-Ten) steel, paint or galvanizing, as well as deck options such as cast-in-place reinforced concrete, precast planks, open grating or composite or wood decking.



Steel bridge with wood decking and concrete piers



Laminated wood bridge with concrete abutments

Fiberglass Reinforced Polymer

Another bridge technology is fiberglass reinforced polymer (FRP). Smaller bridges are available fully prefabricated from FRP, and FRP is widely used for decking for larger bridges. FRP's advantages include superior strength and corrosion resistance with much less weight than concrete. These attributes make it a popular for bridge deck retrofit since replacement with FRP does not require structural modifications. Typical expected working life is 75 years.

DECK SURFACE

Unlike most vehicular bridges, the wearing surface for smaller bicycle and pedestrian bridges may be a structural element intended to last for a considerable length of time. Modular decking, such as wood or composite planking, shall extend across the full width of the bridge surface to avoid butt joints that could adversely affect bicyclists and wheelchair users.

LENGTH

Typically, the most cost-effective structures are those with horizontal alignments constructed perpendicular to the crossing resulting in the shortest bridge spans. However, bridge length may be defined by some of the siting constraints mentioned above.



Steel bridge with wood decking and rub rails



FRP bridge module installation

WIDTH

All proposed bridges will be typical of those commonly used for trails and will be a minimum of 12 feet wide. When a wider multi-purpose bridge is desired to accommodate high expected use levels, or to support maintenance or patrol vehicles, it shall be a minimum of 20 feet wide and constructed to the required vehicle load rating.

RAILING

AASHTO specifies that minimum pedestrian bridge railing height be 42 inches high. Bridges designed to accommodate bicycle traffic shall be equipped with bicycle railings. If deemed necessary, rub-rails attached to the rail to prevent snagging shall be deep enough to protect a wide range of bicycle handlebar heights. Vertical balusters are not recommended for railings designed to provide protection for bicycles since snagging of bicycle pedals or handlebars may occur.

SITING

Bridge siting will be determined by abutment constraints such as geomorphology, elevation differences and horizontal and vertical alignments. A geotechnical investigation is recommended for potential bridge crossing locations. Abutments and decks shall be located above potential flows. Areas of environmental concern, such as wetlands or sensitive species, shall be identified as part of the bridge siting process. Prefabricated bridges generally create less environmental impacts than site-constructed types.

SMALL DRAINAGE CROSSINGS

The trail system may require the design and construction of drainage crossing structures smaller than bridges. To minimize potential impacts, trail design needs to consider ponding and preventing erosive fill from blocking existing drainage patterns. Drainage structures may require review and permitting from agencies such as the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers and the Regional Water Quality Control Board.

Culverts

A culvert is a drain or pipe that allows water to flow under a road, railroad, trail or similar obstruction typically surrounded by soil. Culverts are generally smaller than bridges, ranging from small pipes to large reinforced concrete structures. A culvert can be a cost-effective solution in bridging a minor drainage crossing. In some situations, multiple culverts can be ganged and covered to provide a crossing in lieu of building a bridge.

Consideration shall be given to providing design provisions such as rock edge and energy dissipaters to prevent downstream erosion due to the culvert clogging with debris and associated damage if flows overtop the trail. Culverts shall be provided at appropriate intervals and shall be sized to convey appropriate drainage flows.

for public comment

Causeways are raised portions of trails in poorly drained soils or where seeps moisten soil tread. Trail tread is elevated above wet ground using a permeable fill material as a base. Trail edges may incorporate small boulders or rock rip-rap to contain the permeable fill. Adding rock and elevating the trail allows water to drain to the side and help prevent widening when users walk or ride at the edge of damp areas.

Design criteria for causeways shall meet AASH-TO and Caltrans design recommendations when designing for paved shared-use paths. Construction and detailing depends on water table and site surface flows. A stable paving base must be established while allowing for water flow under the path. Base materials shall be designed so as not to be compromised by future water flows. Fill must be mineral coarse-grained or granular material, or small, well-graded angular rocks. Causeways are not intended for use to cross wetlands.

Boardwalks

Boardwalk construction may be used to span sensitive areas such as riparian zones, unavoidable wet areas, depressions and in areas of steep slopes. They can also be used to provide trail access in areas where grading and filling may harm tree roots or create trail surfaces that wildlife will not cross. Boardwalks should be considered in relation to environmental impacts, available budget, potential user needs, operations and management issues.

Materials

For boardwalk deck construction, wood lumber is typical, but composite lumber provides a longer useful life compared to wood, is a heavier weight material to reduce floating in flood prone sites and the pronounced texture can reduce slippery surfaces. While composite lumber typically costs more than wood, its durability can make it more cost-effective over the life of the structure.

Height from Ground

Boardwalk height shall be set to allow for small animal movement under the structure, a minimum of 6 inches above grade. Footings will vary depending on soil conditions and geotechnical investigation may be advisable.

Width

Boardwalk preferred width is 12 feet. Additional width may be provided in areas with high anticipated or shared use.

Railings

Boardwalks less than 30 inches above grade may not require a railing according to current building standards, but surface-mounted curb rails at the edges are highly recommended. Boardwalks higher than 30 inches above grade require a 42 inch high railing. AASHTO recommends railings of this height on any structure or path more than 30 inches above adjacent grade.

for public comment



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CHAPTER 9: RAMPS

Ramps are an important trail system component to provide access to the system's trails from connecting roadways and sidewalks, from adjacent areas at higher or lower elevations, and in some cases for connecting trail facilities.

VEHICLE ACCESS RAMPS

Maintenance, patrol and emergency vehicle access shall be provided at reasonable intervals on all paved trail system facilities. *City of Fresno Standard Drawing P-61: Trail-Street Intersection Typical Plan* addresses mid-block crossings that can provide vehicular access to the trail system. Where occasional access is likely to be needed some distance from a trail mid-block crossing of a roadway, a minimum 10 foot wide curb ramp is required, with associated parking restrictions.

City of Fresno Standard Drawing P-6: Driveway Opening and Clearance Requirements may apply in locations away from mid-block crossings, with mandated minimums of 15 feet for a local street, one-way entrance, for example. The City shall be consulted concerning vehicle access ramp provision as part of project planning and design.

Vehicle access ramps shall not be considered access points for people who use wheelchairs or other mobility devices. Instead, curb ramps shall meet applicable accessibility standards.

CURB RAMPS

Trail connections at roadways shall include curb ramps at least the same width as the trail with a smooth and accessible transition between the trail and the roadway. All ramps shall be constructed to meet accessibility standards, including dimensional, detectable warning, grade, rail and resting place requirements. Refer to *City of Fresno Standard Drawings P-24 through P-32* for curb ramp design details.

CANAL RAMPS

Many planned trails will parallel canals and share the route with canal maintenance vehicles. Canal ramps shall be clearly marked with sufficient level maintenance vehicle pull-off space so drivers can temporarily park their vehicles completely off the trails while opening and closing access ramp gates. Gates should open away from the trail and be designed according to *City of Fresno Standard Drawings P-99: Access Ramp Gate*.



Trail driveway opening



Trail connection with roadway

for public comment



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CHAPTER 10:

RETAINING WALLS

Retaining walls are often necessary when constructing a trail segment through uneven terrain or within a limited width corridor. They are frequently used to support turning platforms on switchbacks, shore up trails across side slopes, or to reinforce the outer edge of a bench-cut trail.

Trails shall, where possible, be offset from the face of any retaining walls at least 2 feet, and more if available. Landscaping immediately in front of retaining walls can effectively reduce their perceived height and mass. Railings shall be placed between trails and any retaining walls and adjoining drop-off on the downhill side.

Graffiti protection may be needed, depending upon consultation with the City.

SEGMENTAL

Segmental retaining walls are made up of modular blocks and are used primarily for vertical or near-vertical grade changes. The walls are designed and constructed as either conventional gravity retaining walls or reinforced soil retaining walls. The block units placed are stacked without mortar and rely on their unit-to-unit interface and their combined mass to resist overturning and sliding. Segmental wall systems may also employ soil reinforcement that extends into the backfill that allows for significant height walls that could not be accomplished with the segmental units alone. Some systems also rely on shear pins between the segment layers to resist lateral movement. Segmental retaining walls are considered flexible structures, so the footing does not need to be placed below the frost line, provided sufficient foundation bearing capacity.

GABION

Gabion walls are retaining walls made of rectangular containers fabricated of heavy gauge galvanized wire. These "baskets" are filled with stone and stacked on one another, usually in tiers that step back with the slope to stabilize them. Gabion baskets can be stacked in various shapes to resist moving water and to drain freely. Gabion walls are often the wall of choice along waterways, especially where significant flows are likely. Their strength and effectiveness can increase with time as silt and vegetation fill the voids between the stones and reinforce the structure.



Segmental pinned retaining wall under construction



Gabion retaining wall

CRIBBING

Crib walls can be used to support trails along steep side slopes. In poorly drained areas, trail cribbing can be designed to allow drainage to occur. On steep side hill cuts, cribbing can stabilize both the upper or lower slopes along the trail.

Cribbing with rock is at least as durable as concrete and a more aesthetically pleasing technique, but requires careful and potentially costly construction.

Crib walls can be planted and irrigated.

POURED-IN-PLACE

Poured-in-place retaining walls are generally the costliest wall type due to required precise construction methods, but offer enormous design flexibility. Poured concrete retaining walls can be colored, textured or accented with embedded objects. When installed properly, concrete offers much more room for customization than any other retaining wall material.

SOLDIER PILE

Soldier pile retaining walls provide an effective solution to addressing deep, vertical cuts in elevation, such as where the available trail corridor is limited to a steep side slope. Because they involve minimal soil displacement, cut and fill requirements are reduced. Pre-cast concrete, steel or wood panels are often used as lagging to hold back the soil, but for long-term durability, concrete is recommended.

Depending on wall geometry and soil conditions, builders may install tiebacks to provide soil and load lateral resistance.



Planted crib retaining wall



Poured-in-place retaining wall



Soldier pile retaining wall

CHAPTER 11: for public comment LIGHTING AND UTILITIES

Appropriate signage and after-dark policies can support nighttime trail use, but lighting most effectively enables such use. Well placed, properly installed and maintained lighting will improve visibility, increase overall trail access and convenience and give trail users a sense of security.

Lighting raises awareness about potential trail and intersection conflicts. It allows users to see changes in path direction, any surface deformities and unevenness, reduces the possibility of user collisions with an object or each other and allows trail users to recognize potential threats to their security. Lighting is strongly perceived to deter criminal activity.

Especially during Fresno's hot summers, existing trails get heavy use in the evenings and early mornings by those wanting to exercise when it is somewhat more comfortable than during the heat of the day. In the winter months, when the sun rises late and sets early, residents still want to use the trail. Trail lighting is therefore important throughout the year.

Trail systems have often been regarded as if they were linear parks, open during daylight hours and closed at night, and therefore not needing to be lit. However, current thinking addresses trail systems' increasing nighttime and early morning utilitarian use primarily by people who commute by bicycle and the likelihood that they will be riding during nighttime hours. Paved trails are therefore now rarely closed at night, and low-level security lighting is recommended at trail heads and parking lots to discourage loitering, and to allow passersby and law enforcement to observe any site activity.

Lighting shall be in conformance with the City's Standards or approved lists.



Trail lighting

for public comment

Lighting shall be provided anywhere nighttime use is not prohibited, including at the following locations:

- Roadway crossings
- Trail intersections with another trail or sidewalk
- Trail entrances
- Trail heads
- On signage
- Bridge entrances and exits
- Through tunnels and underpasses (Day and night)
- Where nighttime security may be an issue
- At unauthorized vehicle entry barriers
- Where significant bicycle commuting is expected

Average maintained horizontal illumination levels of one half to 2 foot-candles shall be provided. Where special security problems may exist, higher illumination levels shall be considered. Light standards (poles) shall meet the recommended horizontal and vertical clearances. Luminaires and standards shall be at a trail appropriate scale. Trail lighting fixtures will therefore be shorter and closer together than typical streetlamps to provide the same light intensity.

Lighted bollards minimize spillover onto adjacent sensitive land uses but, in general, bollards are less efficient than overhead fixtures because more bollard fixtures are needed to light the same linear distance or to provide the same light level. Bollards are therefore only to be used as location markers or to warn of surface changes.

Light output color should also be considered, since consistent color illumination will visually enhance and link the trail system at night. All light sources shall provide a warm white color light.



Trail lighting

In special circumstances, the City may allow adaptive technology that activates only when users come within range of integrated motion sensors. This could be applied to all trail system lighting to reduce electric power use, maintenance and light spillover into adjacent sensitive land uses. Solar-powered light fixtures may be utilized where approved by the City.

Matching or complementing light fixture style and types with other site furnishings will strengthen the overall trail system "brand." There are a wide variety of lighting options to choose from in terms of style and material selection, as well as energy efficiency. Lighting fixtures shall be consistent along facilities or by brand. The American Association of State Highway and Transportation Officials' (AASHTO) *Guide for the Development of Bicycle Facilities* includes shared use path lighting guidance, but a qualified lighting expert shall be consulted before making any lighting design decisions. Doing so can reduce up-front fixed costs and long-term energy costs.

As appropriate, dark sky-compliant lighting shall be selected to minimize light pollution cast into the sky while maximizing light cast onto the trail.



City standard light fixture (Sun Valley Lighting CS-4049)

for public comment

LED lamps will be specified for lighting improvements due to their efficiency and longevity, even more energy savings are now possible with "adaptive control" technology that automatically increas es lighting levels only when needed. Adaptive lighting allows for different light levels during the night, based on activity. Operating profiles can dim or completely turn off fixtures when facility usage is re duced. By dimming or turning the system off when light is not needed, energy is conserved and light levels during peak hours can be maximized. This allows for brighter illumination, smaller system size and lower system cost.

Simpler systems rely on motion sensors, but some systems employ centralized wireless networks. In most systems, a motion detector in each fixture wirelessly triggers it to raise its light level to maxi mum as a user approaches. In more sophisticated systems, a signal is sent to other fixtures in line on the path. Using a patented direction-of travel function, light level is progressively brought up ahead of the user moving along the path. As adjustable time delays elapse behind the user and if no other motion is detected, lighting drops back to standby levels, which can be either low or completely off.

The more sophisticated systems also compare sensor data across the wireless network, allowing them to accurately predict individual user speed and path-of travel to light the way forward.

Lighting schedules can be easily adjusted to meet changing needs, or even to guide users along pre ferred routes. Based on logs of specific location use rates, facilities personnel can further increase en ergy savings by fine tuning light levels. The system also automatically alerts maintenance personnel when problems are detected, which saves crew time and improves user safety.

Preliminary data indicate that the adaptive aspect of such new "smart" lighting systems have achieved energy savings of 60 percent, on average, than that of a conventional static system.

Taking these technologies a step further, LED lighting is particularly suited to adaptive control since it does not appreciably degrade with repeated on-off cycling or dimming. Finally, combining adap tive control with self-contained solar, battery-equipped fixtures would be a substantial sustainability upgrade since it would not require power cable installation. It would also extend nightly operating windows by reducing stored energy consumption because adaptive control allows fixtures to be dimmed or even extinguished between trigger events, or to shut off completely after a specified time. CITY OF FRESNO TRAIL DESIGN GUIDELINES

ADMINISTRATIVE DRAFT for public comment

UTILITY ISSUES

New utilities shall be placed within the street right-of-way between the adjacent roadway's curb and 5 to 10 feet out from that curb. Above-ground utility components (vaults, cabinets, etc.) must be offset 5 feet minimum from the edge of the paved trails, including in-ground vaults. New linear underground utilities may be allowed under the trail as approved by the City, and placed to maximize tree planting options. Landscaping shall be incorporated to screen above-ground utilities. Trail designs shall attempt to locate utilities in alignments and locations that will not affect or limit tree planting. Any deviation from these requirements must be approved by the City.



Utility vault adjacent to trail

for public comment

CHAPTER 12: TRAIL HEADS/REST AREAS

TRAIL HEADS

Trail heads are neighborhood access points via which surrounding communities can access the trail system that can also function as rest and orientation points, especially where two or more trails meet. Users can find essential facilities, orientation and informational signage to guide trail use. Trail heads shall be provided at easy-to-find locations that offer safe and convenient access, especially near major roadways and transit stops. At a minimum, trail heads shall provide the following elements:

- Identifying entry feature
- Shade (trees)
- Seating (benches, boulders, etc.)
- Picnic tables
- Bicycle parking (standard and "triathlon" racks)
- Information kiosk (trail system map, notice board, etc.)
- Water for hikers, cyclists and pets
- Directional signage
- Trash and recycling receptacles
- Restrooms
- Landscaping
- Fencing and gates (as needed)
- Entry drive
- Off-street vehicles parking spaces (including accessible)

Seating can be particularly important for people with disabilities, who may have difficulty lowering themselves to seat height or getting up from a seated position. Seating shall therefore have backrests and at least one armrest to provide support to help people with disabilities sit and resume a standing position. Accessible seating shall also provide the same benefits as seating for users without disabilities. For example, providing space for a wheelchair user without shading is not appropriate.

Trail Head Enhancements

The following enhancements may be components of trail heads, depending on location, and perceived need. For example, a constructed shelter may be needed if a trail head does not have mature trees.

- Shade shelter
- Playground
- Public art
- Interpretive signage
- Outdoor classroom
- Food and bicycle support vending services
- Food concession kiosk or food truck parking (weekends)
- Bike shop/station rentals (weekends)
- E-bike charging station
- Security lighting and cameras



Copper River Trail head



Trail head monument signage

REST AREAS

Rest areas provide places for users to move off the trail, instead of having to remain on it to stop and rest. Periodic rest areas are beneficial for all trail users, particularly for people with mobility impairments who typically expend more effort to walk than other users, as well as for the elderly and small children. Having rest areas on both sides of the trail is preferred, especially on segments with higher volumes or higher traffic speeds. This reduces trail users' need to have to cross in front of other users when they want to stop at a rest area. However, where rest areas will occur on one side only, they shall be on the side with the most shade.

Rest area frequency can vary depending on the terrain and intended use, but should be provided at a maximum of every quarter to half a mile. At a minimum, rest areas shall have the following design characteristics:

- Width at least that of the trail and length of 8 feet
- Minimal grade and cross slope connecting rest area with trail
- Seating (single bench or two facing benches)
- Shade (trees)
- Trash and recycling receptacles (optional)
- Drinking fountain (where water source exists)
- Wayfinding signage

for public comment Combined Bus Stop/Rest Area

Because most trails in Fresno's system will be along major roadways, many will be abutted by bus stops. These stops may be able to accommodate additional rest areas along the trail system by combining them with bus stops. They can provide shade and seating, but care shall be taken to provide trail user seating separate from waiting passenger seating so bus drivers do not needlessly stop, assuming the trail users are waiting for the bus. Instead, trail user seating could be installed on the trail side of the combined stop shelters, and screened from the view of approaching drivers, but be otherwise open for security.



Combined bus stop/trail rest stop concept

INTERSECTING TRAILS

Trail intersecting at trail heads are an opportunity to further "brand" the trail system using consistent wayfinding and informational signage. Public art can be a landmark to make an intersection stand out and make it more memorable to aid wayfinding. An art piece could be unique to that community and help distinguish the location within the trail system.

Particularly where two or more popular trails intersect at a trail head, roundabouts have proven an effective method to direct and manage trail users, especially bicyclists.

LANDSCAPING AND PUBLIC SAFETY

Landscaping at trail heads shall employ the City plant palette species and varieties. Like other trail system attributes, maintaining consistency in plant types, density and maintenance will help solidify the system "brand" throughout the City. Trail head landscaping has a particularly powerful ability to put a positive face on the trail system, making it something citizens are proud of and willing to support.

Parking lots should be screened, but Crime Prevention Through Environmental Design (CPTED) principles advise limited shrub plantings and open views between 2 and 6 feet above the ground. Besides maintaining open views throughout the site below the tree canopy for safety and security, trail head site design emphasis shall be on creating and maintaining a dense tree canopy, an oasis where trail users can consistently expect to find welcoming shade when they stop for a break or finish their day on the trails.



Trail roundabout

for public comment



for public comment

CHAPTER 13: TRAIL USER PARKING

Away From Trail Heads

While some users will live close enough to access the trail system on foot or by bicycle, other users will be traveling there by car. The following guidelines address locations where trail system access is available from an adjacent street, but not at a trail head location.

Where on-street parking is readily available along the trail system at a location likely to be used as an entry point, an accessible ramp shall be provided where there is a curb, as well as an accessible route connecting the parking with the trail. Parking shall be provided in accordance with City standards and ADA requirements.

Parking may be provided at other locations, such as at civic facilities and nearby commercial centers through joint-use agreements with property owners. Ideally, specific spaces should be dedicated for trail users, but this is not always necessary because peak times and days for commercial activity are generally not the same as for trail use.

At Trail Heads

At trail head locations near readily available onstreet parking, the guidelines above should suffice to address trail user needs.

For trail head locations where limited or no onstreet parking is available, vehicle parking shall be provided at or near the trail head as part of standard design, including required accommodation for people with disabilities. In areas with limited space for vehicle parking, accommodating trail users with disabilities shall be the priority. At such locations, the able-bodied will necessarily need to park elsewhere to access the trail system.

Trail heads that provide visitor parking may employ treatments to keep motor vehicles from entering the trail, such as regulatory signage and appropriate barriers, including landscaping or bollards. However, this shall be determined in cosultaton with the City on the perceived basis of need at the specific location, rather than as a standard across the trail system.



Trail head parking

for public comment



CHAPTER 14: PICNIC AREAS

Picnic areas provide trail users a comfortable gathering space to rest, eat or prepare for their trip and can range from one accessible table to a large grouping of them.

Picnic areas can be located along popular, heavily-used trails as part of trail head development, or as stand-alone facilities along the trail system. Locating them at trail heads or adjacent to parks has the advantage of providing users access to nearby restrooms. Consult the City for specific locations and amenities.

Picnic areas shall be in highly visible, open areas. Safety and comfort shall be a top priority, so picnic areas should be located adjacent to popular trails, preferably near a parking lot or a popular trail head. Shade shall be provided by trees, where possible.

All picnic areas shall be universally accessible from adjacent trails, with ample space between tables and other amenities for individuals to easily navigate. Picnic area amenities must meet applicable accessibility standards that include space for individuals who use wheelchairs or other assistive devices. Tables, for example, have specific design features to allow wheelchair users to easily share them with other users. Refer to ADA standards for more information regarding surface materials and spacing requirements.



Picnic area

for public comment



CHAPTER 15: RESTROOMS

Restrooms shall be provided at major trail heads, and at other trailside locations with City approval. Existing facilities at Woodward Park and along the Lewis Eaton Trail shall serve as models (see accompanying photos). For example, the Woodward Park location includes parking space for four bicycles.

Where provided, restroom facilities must comply with the *California Building Code* and be designed to reflect the best practices described in the International Code Council (ICC) *G3-2011 Global Guideline for Practical Public Toilet Design*. These comprehensive guidelines allow for considerable design flexibility.

Portable toilets may be provided as an interim facility during trail head development with City approval and may also be set up temporarily to serve special events, subject to Parks, After School, Recreation and Community Services Department (PARCS) permit requirements.





Restrooms along Lewis Eaton Trail system



for public comment



CHAPTER 16: GRADE SEPARATIONS

Grade separations can encourage more trail use by providing users the option of going under wide or high volume roadways instead of having to contend with vehicle traffic. However, they must be carefully designed so that users will perceive them as viable alternatives. The following grade separation requirements are intended to address common trail user concerns. Grade separation design shall:

- Accommodate 2 bicyclists riding side-by-side or in opposite directions (Minimum 12 feet wide)
- Include slopes into and out of crossing to meet ADA standards
- Accommodate all drainage that flows into them
- Shall maintain end-to-end line-of-sight (Limit curvature so that users can see opposite end upon entry)
- Provide lighting along approaches, at each entrance and consistently through the tunnel



Fresno-Clovis Rail-Trail under Shepard Avenue

for public comment

