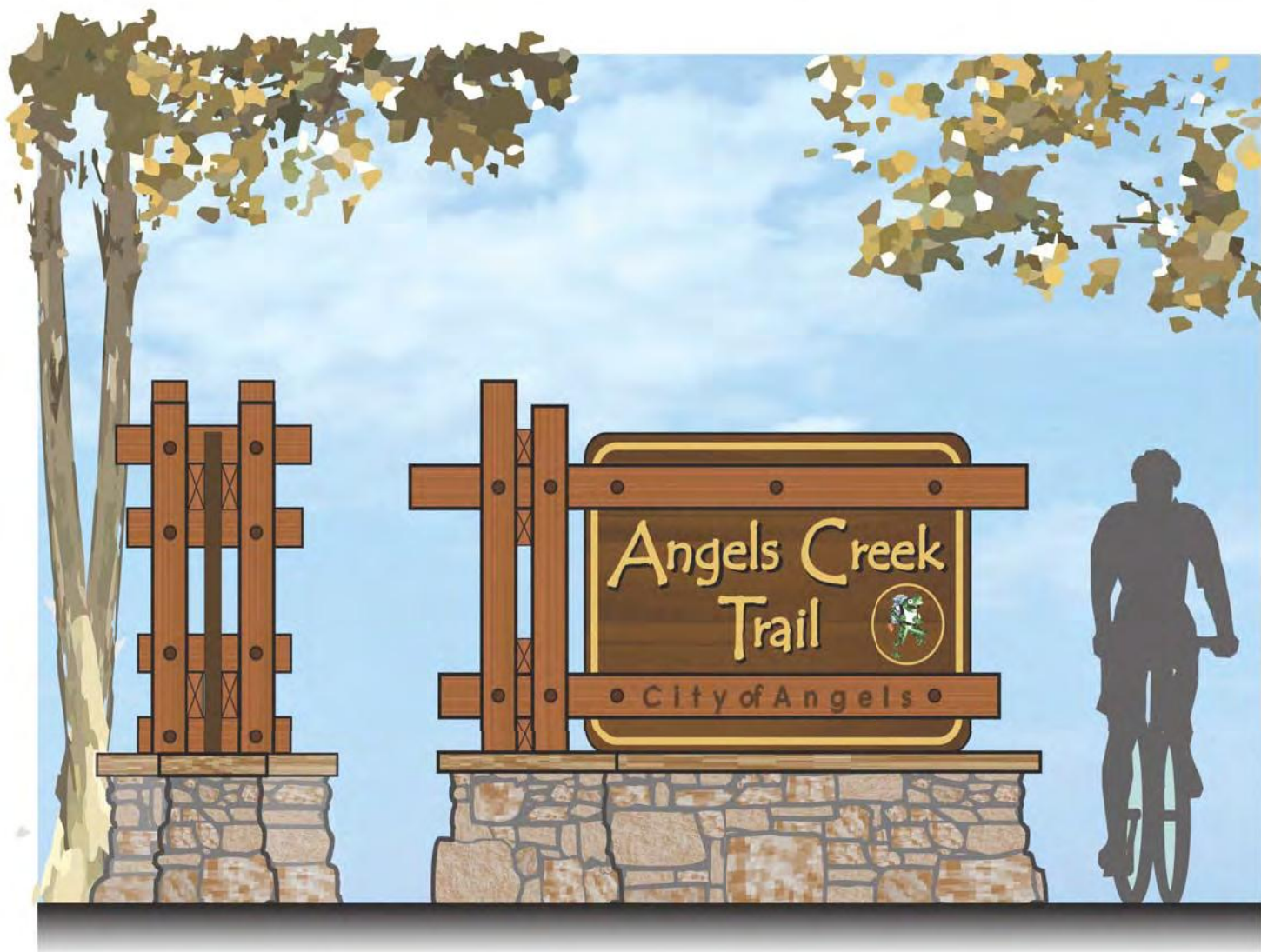




Angels Creek Master Plan and Trail

January 2012



Acknowledgments

The Angels Creek Bicycle Master Plan and Trail is a result of a collective effort on the part of the community, the City of Angels, and RRM Design Group. We appreciate the opportunity to help create a plan that describes the steps to implement a well balanced and beneficial Bicycle system throughout the city.

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Executive Summary

The Angels Creek Master Plan and Trail establishes the framework for a bicycle and pedestrian trail along Angels Creek within the City of Angels. The proposed trail is approximately 5.1 miles in length starting at the intersection of Murphys Grade Road and Hwy 4 Bypass and extending south to New Melones Reservoir.

The Angels Creek Master Plan and Trail was identified in the 2020 General Plan as an Implementation Program. The Master Plan was funded by the Calaveras Council of Governments' Overall Work Program (OWP).

The Master Plan defines the proposed trail alignment and trail types. Trail support facilities are identified including parking, restrooms, benches, shade structures, and drinking fountains. Project phasing strategies and potential funding sources are addressed.

Management guidelines including trail maintenance and law enforcement are outlined. Educational opportunities and signage are addressed to help guide the trail sign theme.

The community was involved in the preparation of the Master Plan in several ways including: Visioning Workshops, Key Stakeholder Meetings, Comments, and

the Technical Advisory Committee. The community provided direction on the location of the trail.

The trail will be implemented as development occurs and as grants are obtained. The Master Plan can be utilized in the applications for grants.

Chapter Contents

INTRODUCTION

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INTRODUCTION

Background

The City of Angels incorporated in 1912 as a General Law City and is located at the intersection of Highways 4 and 49 in Calaveras County approximately 50 miles east of Stockton. The latest Census report indicates a population of approximately 3,600 residents.

The Angels Camp 2020 General Plan defines the Angels Creek Master Plan and Trail project. Conservation and Open Space Implementation Program 4.D.c “Draft a Creek Corridor Preservation & Management Plan for Angels Creek” called for “A trail along the creek through the city limits (with potential future links to trails extending along the creek beyond the city limits)”.

The proposed trail extends from the Highway 4 Bypass in the north to New Melones Reservoir in the South, approximately 5.1 miles in length. The proposed trail is broken into three phases prioritizing construction. The three phases are North, Central, and South. The phases are further divided into preferred and alternate alignments.

The City of Angels has developed a new brand for itself which has identified it as a Mountain Sports Base Camp. With this effort

the City and local businesses are looking to capitalize on outdoor recreation and tourism to bolster the City’s sales tax and transient occupancy tax revenues. The City has formed a Brand Leadership Team comprised of City and business leaders responsible for guiding and implementing the brand. Part of the branding effort included a Branding, Development, and Marketing Action Plan. The plan identified bicycling as the top outdoor sport in the United States. The Angels Creek Trail complements this effort by connecting the City to local and regional recreation lands and the existing United States Bureau of Reclamation (USBR) trails around New Melones Reservoir.

Benefits of the Trail to the Community

Trails and Greenways have proven time and again to be of measurable benefits to both local and regional communities. Trails by their very nature of linear connection, create a more livable community by way of improving economic, cultural, natural, and physical opportunities. Studies continue to show the economic benefits through tourism, civic improvements, and alternative transportation choices for the local community. Trails provide greater access to city parks, schools, neighborhoods, commercial and retail areas, and transit systems. These connection opportunities grow with time and create additional prospects to add on to the existing

and proposed trail networks within the City and eventually connecting to adjacent towns, transportation systems, and parkland trail systems.

Cities that preserve their natural resources create sustainable places people want to live. Trails often become the ambassador resource for citizen's involvement and interest in the preservation and restoration of public open space. Trail systems are often the key funding mechanism to open space restoration efforts and create the avenue for stewardship. And finally, trails lead the way to providing healthy communities by supporting cost-free physical activity and outdoor exercise, improving fitness and mental health.

Purpose

As described in the General Plan, this Master Plan: defines the trail alignment, defines access points, identifies creek crossings, defines trailheads, specifies maintenance, describes design guidelines, and proposes interpretive features. A map of the trail is a part of the Master Plan.

The Master Plan is a roadmap for future projects that will construct individual segments of the trail system. The Master Plan defines phasing and approximate costs of implementation. The Master Plan will be a tool utilized by the City to obtain funding for this project



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Chapter Contents

GOALS, OBJECTIVES AND POLICY FRAMEWORK

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MASTER PLAN GOALS AND OBJECTIVE

Existing Conditions

The downtown area of the City of Angels was developed before the advent of the automobile and thus many of the streets are narrow with little to no parking and no pedestrian or bike facilities. Many of the streets have very steep grades.

The only existing bicycle facility in the City of Angels is a Class II Bicycle Lane (a striped lane for one-way bike travel on a street or highway) on Stanislaus Avenue. The City of Angels currently does not have any Class I trails (completely separated trail for the exclusive use of bicycles and pedestrians with crossflow by motorists minimized)

Angels Creek is a perennial stream with a floodplain defined by FEMA. Several existing bridges cross the creek which has a top width of approximately 20 feet. The creek contains native and developed sections. The native sections are typical of foothill streams with a mix of native trees and plants. Vegetation varies from sparse to extremely dense.

Developed sections of the creek include retaining walls at the water’s edge and other man made improvements to confine the creek.

Angels Creek empties into New Melones Reservoir. The reservoir is operated by the United States Bureau of Reclamation (USBR) which has developed a system of soft surface trails around the reservoir. USBR has indicated an interest in connecting the Angels Creek Trail to their existing trail system at the Glory Hole Recreation Area. USBR has also indicated a willingness to partner on trail maintenance activities.

A trail connection from the City of Angels to New Melones Reservoir would allow citizens direct access to the reservoir from the heart of Angels Camp. The trail connection would provide access to the lake with the opportunities for hiking, biking, boating, swimming, bird watching, and fishing.

The Utica Power Authority (UPA) operates a hydro-electric power plant on the west bank of Angels Creek adjacent to Veterans Park. UPA operates under a Joint Powers Authority (JPA)

Table 1: Bike Trail Classifications

Class I Bikeway (Bike Path)	Provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians
Class II Bikeway (Bike Path)	Provides a striped lane for one-way bike lane on a street
Class III Bikeway (Bike Path)	Provides for shared use with pedestrian or motor vehicle

comprised of the City of Angels and Union Public Utility District. UPA has indicated an interest in the Angels Creek Trail and is willing to donate electricity to power any pedestrian lights along the trail.

Opportunities and Constraints

An opportunities and constraints analysis was conducted using aerial photography, parcel linework, and contour data provided by the City of Angels. Potential opportunities were identified including existing right-of-ways, trails, parks, scenic vistas, parking lots, schools, commercial districts, and bridges. Potential constraints were identified including private ownership, steep terrain, dense vegetation, and utility conflicts.

The opportunities and constraints were plotted on aerial photography along with parcel lines and contour data. Field visits were made to confirm the opportunities and constraints analysis and make adjustments for items visually observed.

In the northern section of the project area the opportunities are sierra vistas, existing underpasses to cross the Highway 4 Bypass, and a connection to the High School. The main constraints in the northern section are private property ownership and lack of public right-of-ways.

The central section of the project offers connectivity to existing parks, neighborhoods, and historic downtown. The constraints are limited right-of-way, creek crossings, private property ownership, and roadway crossings.

In the southern section of the project area, the opportunities are views of New Melones Reservoir, Angels Creek, seclusion, and public property. The constraints are terrain, creek crossings, private property, and land management.

Public Outreach

The public was invited to participate through Visioning Workshops with public notice, Technical Advisory Committee meetings, and Key Stake Holder meetings. Two Visioning Workshops were conducted on April 26, 2010 and June 28, 2010 at the City of Angels Firehouse. Technical Advisory meetings were held on April 27, 2010 and July 7, 2010. Key Stakeholder meetings were held June 7, 2010 at the City of Angels Firehouse. Additionally comments were received thru comment Forms and via email.

The two Visioning Workshops were a forum to notify the public of the project; its history, goals, funding, timeline, and to solicit input. Both Visioning Workshops had over thirty attendees and the citizens engaged in lively



discussion regarding the trail, its alignment, private property rights, future expansion of the trail system, and other related issues.

The Technical Advisory Committee (TAC) was comprised of property owners, the United States Bureau of Reclamation, a City Council Member, and City Staff. The TAC met following each Visioning Workshop to disseminate the input received during the Visioning Workshops and provide direction for the Master Plan.

Some of the key concerns identified were: property acquisition, construction costs, and management of the trail. Because of the public input the trail system was terminated south of the New Highway 4 bypass to avoid encroachment on private property. Other reaches of the trail were re-routed to avoid private property, steep slopes, and encroachment on existing structures based on public comment.



Exhibit 2.A: Public Outreach Workshop #1

Chapter Contents

TRAIL FACILITY NETWORK

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North Reach: Alternate Alignment N2 3-2

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TRAIL ALIGNMENT SEGMENTS

The Angel Creek Trail has been divided into three trail reaches based on field analysis, public input and geographical opportunities and constraints. The trail has been separated into The North Reach, Central Reach, and the South Reach. The preferred alignment segments are numbered 1 with the number 2 designating alternative routes within the reach. Each segment will be labeled with a letter and a number to help describe each alignment option. For example, the preferred alignment in the north reach will be labeled N1 and so on through the segment descriptions. Description and exhibits for each reach are presented in the following chapter.

North Reach: Preferred Alignment N1

The approximate length of Alignment N1 is 1.4 miles from the Valcito Road/Roller Bypass Road intersection to Bret Harte High School on Murphys Grade Road (See Figure 1).

Segment N1 connecting the trail to the north utilizes the Old Roller Bypass Road running adjacent to the south boundary of the newly completed Hwy 4 Bypass road. This reach will be located on an existing asphalt paved road and follows the existing grade of Roller Bypass Road (See Exhibit 4.B). The trail then parallels the Hwy 4 Bypass, crossing the aqueduct and heads south on the east side of Murphys Grade Road to Bret Harte High

School.

North Reach: Alternate Alignment N2

The approximate length of Alignment N2 is 0.6 miles from Kurt Drive at Angels Creek to the Hwy 4 Bypass bridge east of Murphys Grade Road (See Figure 1).

Segment N2 would be a Class I path along the future the Kurt Drive connecting to the new Hwy 4 Bypass Bridge east of Murphys Grade Road. This trail segment would be dependent on future development of the current ranch land north of town eventually connecting both existing and future neighborhoods to downtown via Veteran's Park. These new and existing neighborhoods would have future connects to Bret Harte High School via the Murphys Grade Road Right-of-Way.

Central Reach: Preferred Alignment C1

The approximate length of Alignment C1 is 0.6 miles from Kurt Drive along Hwy 4 and Hwy 49 intersection to downtown. The Central Reach is depicted in Figure 2.

Segment C1 primarily runs along Angels Creek connecting downtown to residential areas to the northeast. This segment will be a Class I paved trail. The trail crosses the creek south of Veteran's Park. This segment has several areas which are constrained by the Velcito Road Right-of-Way and the creek (See Exhibit 4.C). There are two bridge crossings

and one stretch that will require elevated trail segments to accommodate the narrow corridor. Exhibit 4.D depicts an elevated trail bridge.

Central Reach: Alternate Alignment C2

Segment C2 is an alternate Class I route which stays along the west edge of Valecito Road. The approximate length of Alignment C2 is 0.1 miles (See Figure 2).

South Reach: Preferred Alignment S1

Alignment segment S1 is the longest trail segment in the project. The approximate length of Alignment S1 is 2.9 miles from downtown to the Bureau of Land Reclamation trail system at New Melones Reservoir. The South Reach is depicted in Figures 3 and 4.

From Downtown, South Reach Trail Segment S1 will follow Finnegan Lane. The trail will be a Class III bike route along Finnegan Lane due to the creek channel being constrained by existing development.

The Class III Bike Route would be marked with “sharrows” along this stretch of Finnegan Lane. Sharrows would be painted on the pavement (See Exhibit 3.A) along with the appropriate signage to help identify the shared use bike path.

The trail would exit Finnegan Lane and cross

Angels Creek with a bridge just north of the City’s Waste Water Treatment Plant. Segment S1 would continue around the east side of the treatment plant with a soft surface trail (See Exhibit 4.E) and allow for a spur to connect to Hwy 49 (See Figure 3: South Reach, Segment S1).

Continuing along the south side of the treatment plant, Alignment S1 links back to Angels Creek and continues south along the meadows and oak wooded slopes on the east bank side of the creek.

South of the treatment plant the trail will become a narrower natural surface trail (See Exhibit 4.F) connecting to the New Melones Recreation area trail network. This section is typified by steeper and more rugged terrain.

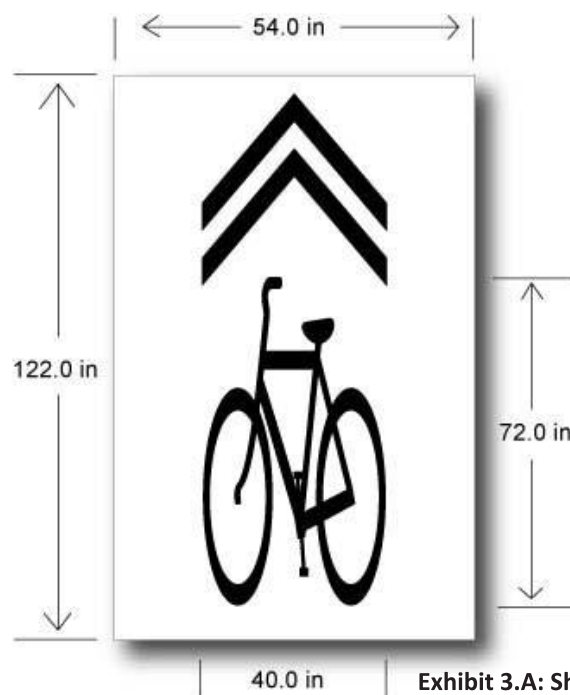


Exhibit 3.A: Sharrow Example

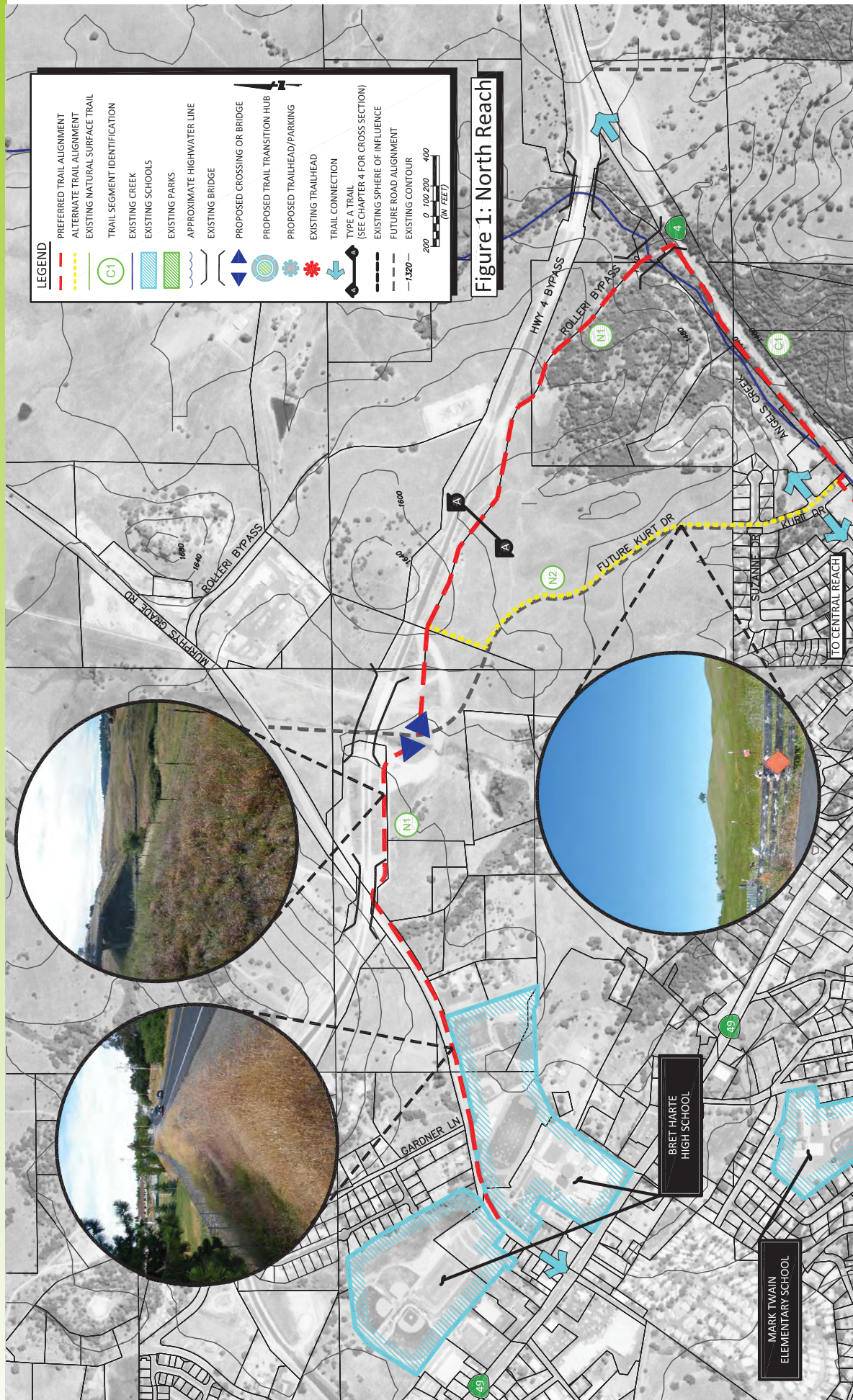


South Reach: Alternate Alignment S2

Alignment S2 is an alternative trail alignment that could also serve as a loop trail. The trail is located entirely on City owned property that is currently used for applying wastewater effluent. Coordinating with the City's utility department will be required. The trail would be a natural surface trail (See Figure 4).

South Reach: Alternate Alignment S3

Alignment S3 is an alternate alignment connecting to Greenhorn Creek Road. The trail is anticipated to be constructed with the extension from Greenhorn Road to Highway 49. The trail will be Class I.



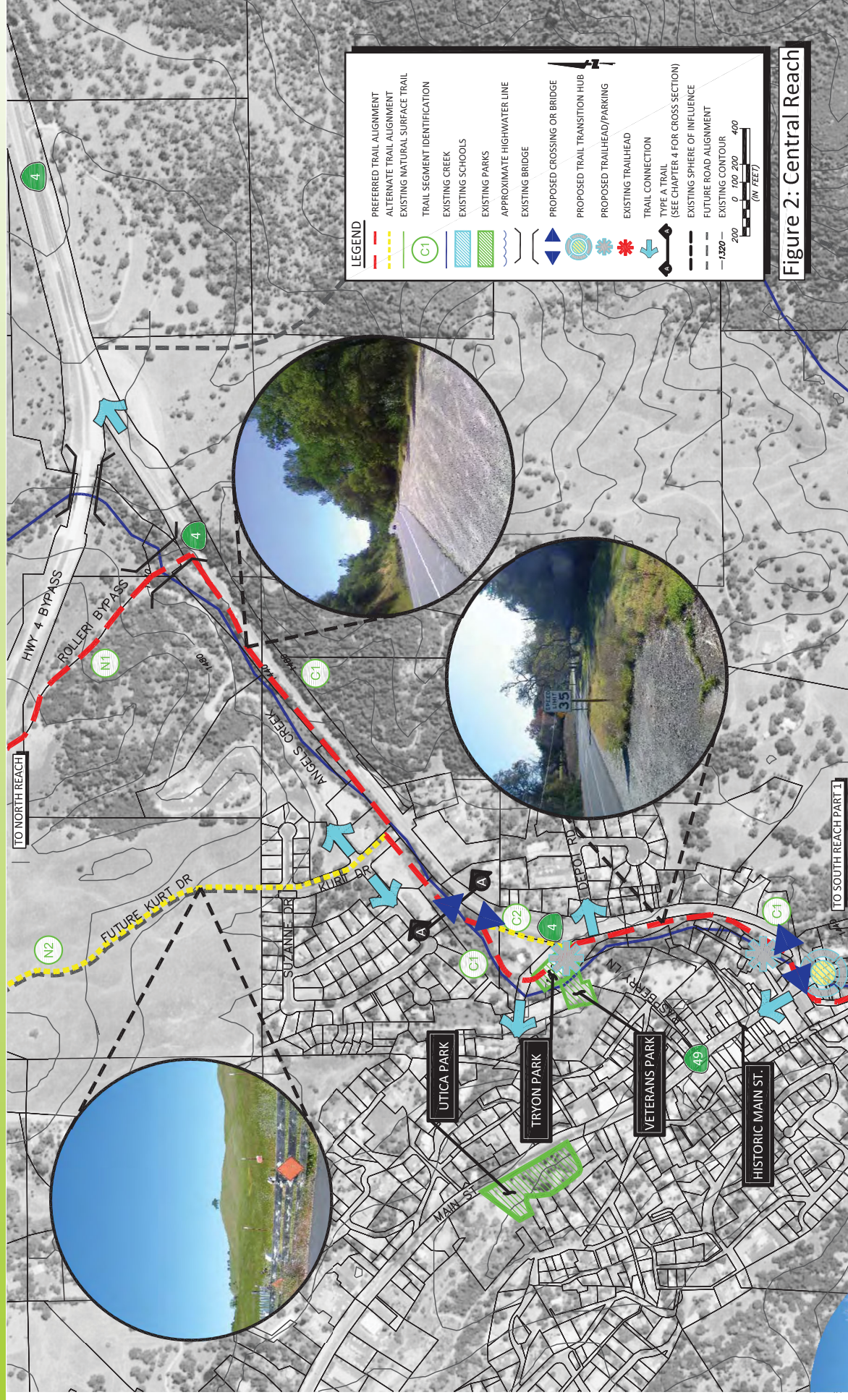
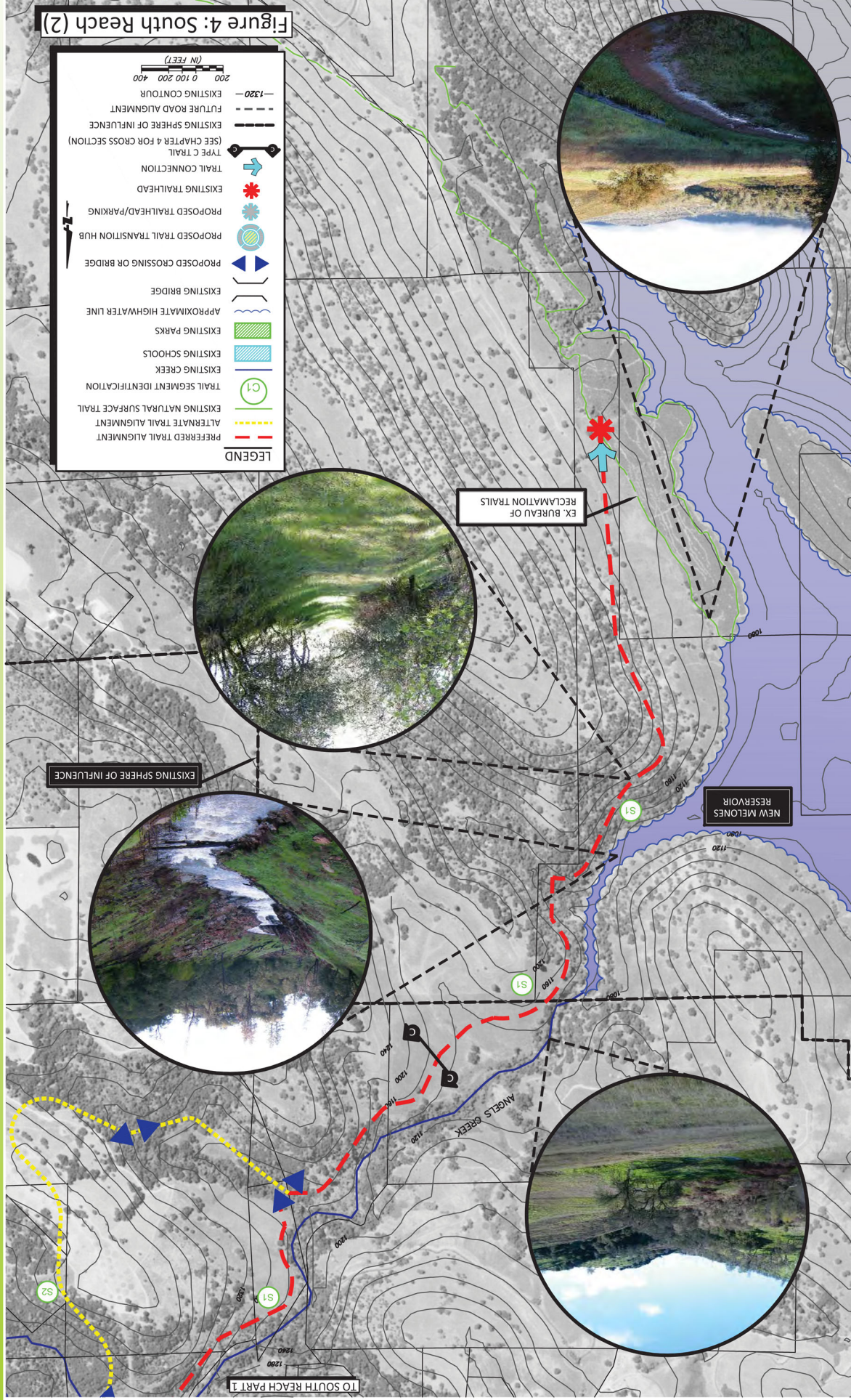




Figure 3: South Reach (1)



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TRAIL SUPPORT FACILITIES

The Angels Creek Master Plan and Trail provides for a non-motorized multi-use trail primarily for pedestrian and bicycle use. Various facilities and amenities are necessary to support the use and function of the trail. The support facilities may include, trailhead parking, restrooms, trash receptacles, picnic tables, signs, bridges, and interpretive sites. The need for trail facilities or amenities may vary throughout the corridor and may be satisfied by shared use of other facilities such as existing or proposed developed recreation areas or co-managing agency public lands. These support facilities shall be determined on a case-by-case basis as the trail system is developed through its three phases.

Accessibility

“Accessibility” or “Universal Access” shall be considered in the decision-making processes including planning, design, construction, and management of the Angels Creek Trail. At a minimum, current State and Federal regulations concerning the Americans with Disabilities Act (ADA) shall be applied to provide access to a wide range of user capabilities where it is deemed appropriate and reasonable.

Trail Design Elements

A trail is designed by its use and the local terrain. There are several factors which effect

how a trail is designed and maintained. The final physical location of the trail is governed by site constraints such as slope, vegetation, geological terrain and feasible water crossings. The following are brief descriptions of these components.

Trail Tread

The width of a trail or its “tread” is determined by the type of trail use, field conditions such as topography, and the presence of impact-sensitive resources. Trail tread width is also determined by the volume of trail users. Trail treads tend to be wider closer to populated areas and the first $\frac{1}{4}$ mile of the trailhead. See Figure 4.A for illustration of trail tread.

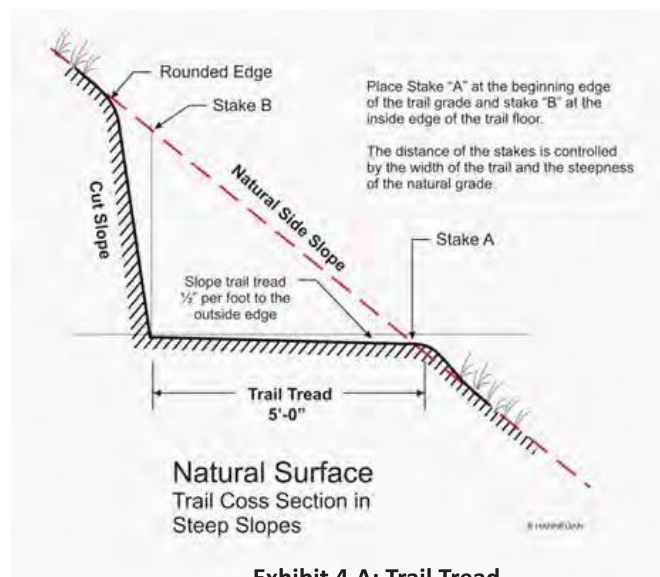


Exhibit 4.A: Trail Tread

Grade

The grade of a trail is the degree or steepness to which it rises or falls over a linear distance. Trail grades are heavily influenced by the

topography of the site. It is an important factor in determining trail length, level of difficulty, appropriate use, and long term maintenance requirements. Varying trail grades are acceptable, but excessive steep grades should be minimized. Trail designs should comply with current drainage and storm water pollution Best Management Practices (BMP's). Trail grades 10% or less help to avoid excessive erosion, minimize runoff pollution, and lower maintenance requirements.

Cross Slope

The cross slope (the slope of the tread surface perpendicular to the longitudinal slope) is also a critical factor in the design, construction, and maintenance of trails. Cross slope allows surface water to drain across the trail rather than along the longitudinal slope. The three primary types of cross slopes are: out-slope, in-slope, and crowned. Out-slope and in-slope surfaces typically occur on trails that traverse the side slope of a hill. Crowned surfaces are typically found on trails across relatively flat ground or wet areas. Cross slopes no greater than 2% will help drain the trail tread and make it comfortable to hike and bike.

Surface Material

Trail surfaces should permit a variety of recreational uses and be easily maintained. Trail surfaces shall be constructed from materials that provide a firm, smooth surface and comply with ADA guidelines where applicable. Some examples of trail surfaces:

HARD SURFACE

Concrete
Asphalt
Flagstone or Pavers

SOFT SURFACE

Decomposed Granite (DG)

NATURAL SURFACE

Native Soil
Native Soil with Soil Stabilizers

Horizontal and Vertical Clearance

Horizontal and vertical clearance is necessary for a safe travel way for trail users. Horizontal trail clearance should be no less than 2' from the trail edge. Vertical clearance for a trail should be no less than 10' and consistent throughout the trail corridor. When branches need to be removed, they should be cut as close to the main trunk as possible, without cutting into the branch collar. Chemical sealants should not be applied to native trees. Plants that must be completely removed should be cut as close to the ground surface as possible. Dispose of all removed vegetation in areas not clearly visible from the trail. Visible evidence of trail construction should be confined to the horizontal vegetation clearance limit.



Trail Type Definition

The Angels Creek Trail will wind its way through a variety of land uses, vegetation, roadways, and terrain. The north and central segments of the trail is planned around a more urban setting with many connections to streets, neighborhoods and parks.

Some of the trail segments are part of a Class I bike route where it becomes a shared use with neighborhood streets whereas other segments are along more rural and backcountry areas where the grades are steep and the use is less intensified. This document provides a guide to build each of the trail segments to fit the character of the local surroundings.

The trail types have been broken down to three categories, Type A, Type B, and Type C trails.

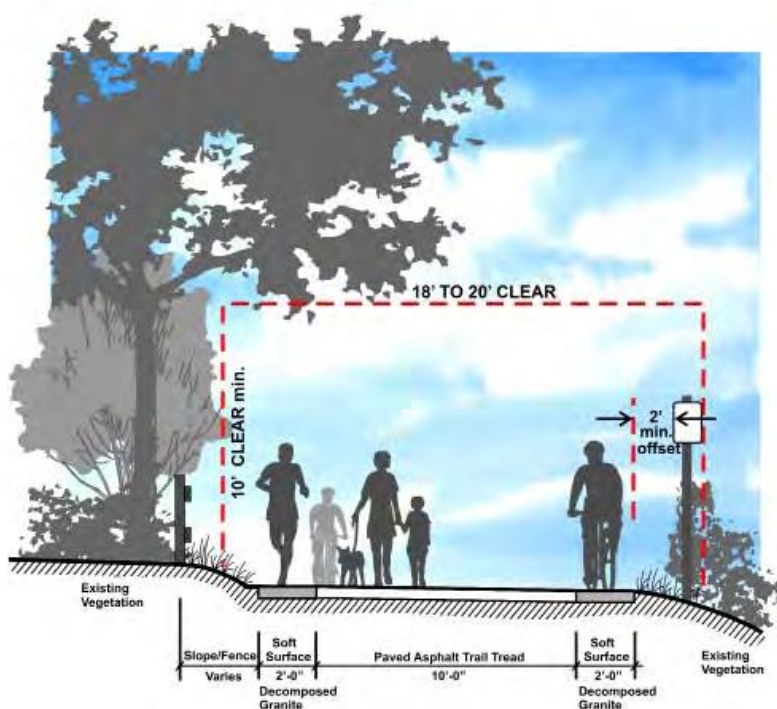


Exhibit 4.B: Type A Trail (Asphalt Paved Surface)

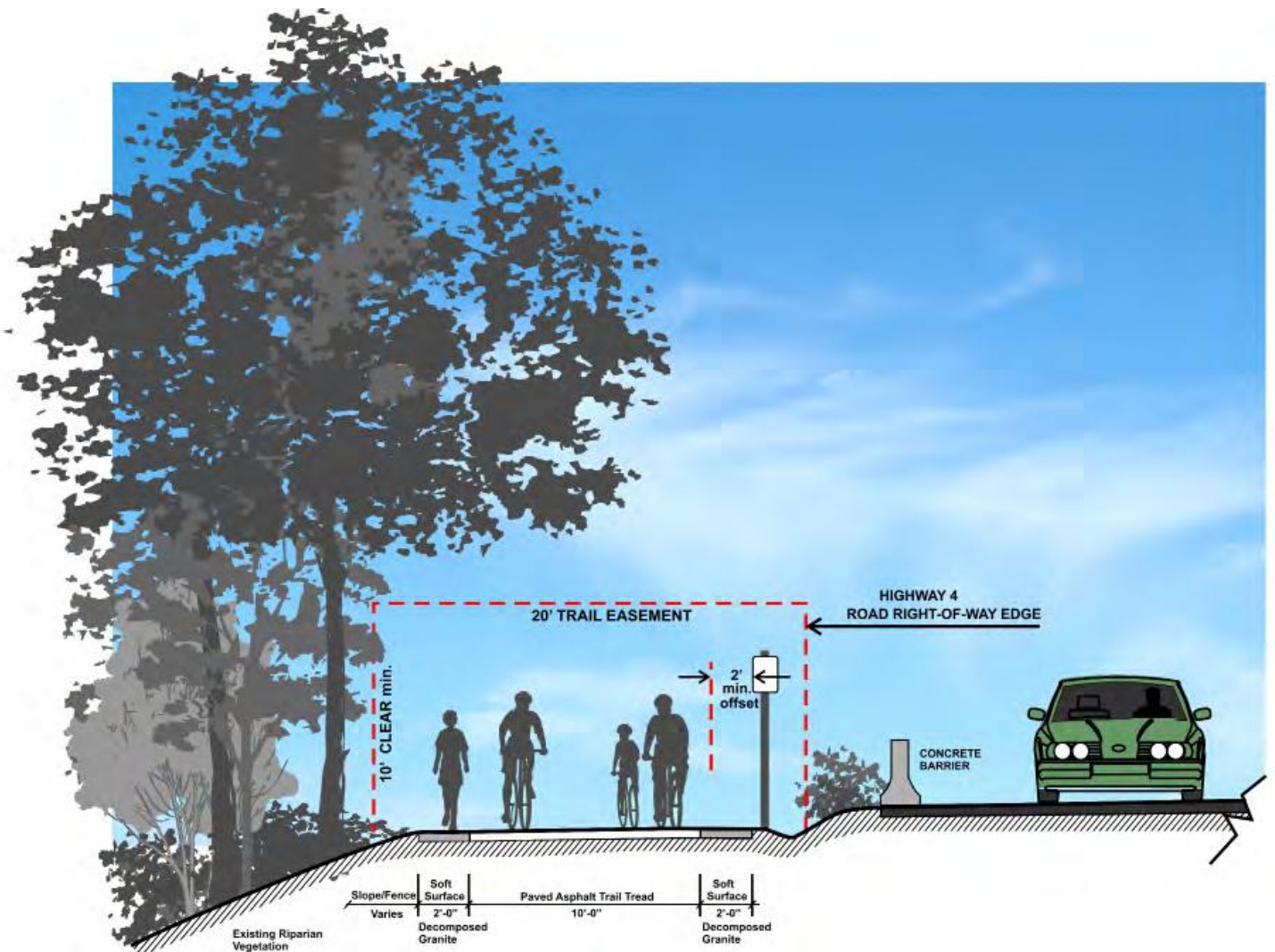


Exhibit 4.C: Type A Trail (Asphalt Paved Class 1 Path Next to Hwy 4)

Type A Trail (Asphalt Paved Surface)

Type A Trails have the widest right-of-way and are in areas where the amount of use is greater. The Type A Trail is a hard paved surface of asphalt or concrete no less than 10 feet wide. The edge of the paved surface is lined with a 2' wide compacted soft surface of decomposed granite (DG) or crushed fines. The trail alignment will require fencing in some areas to protect wildlife habitat and or private ownership from trespassing. (See Exhibits 4.B, 4.C, 4.D)

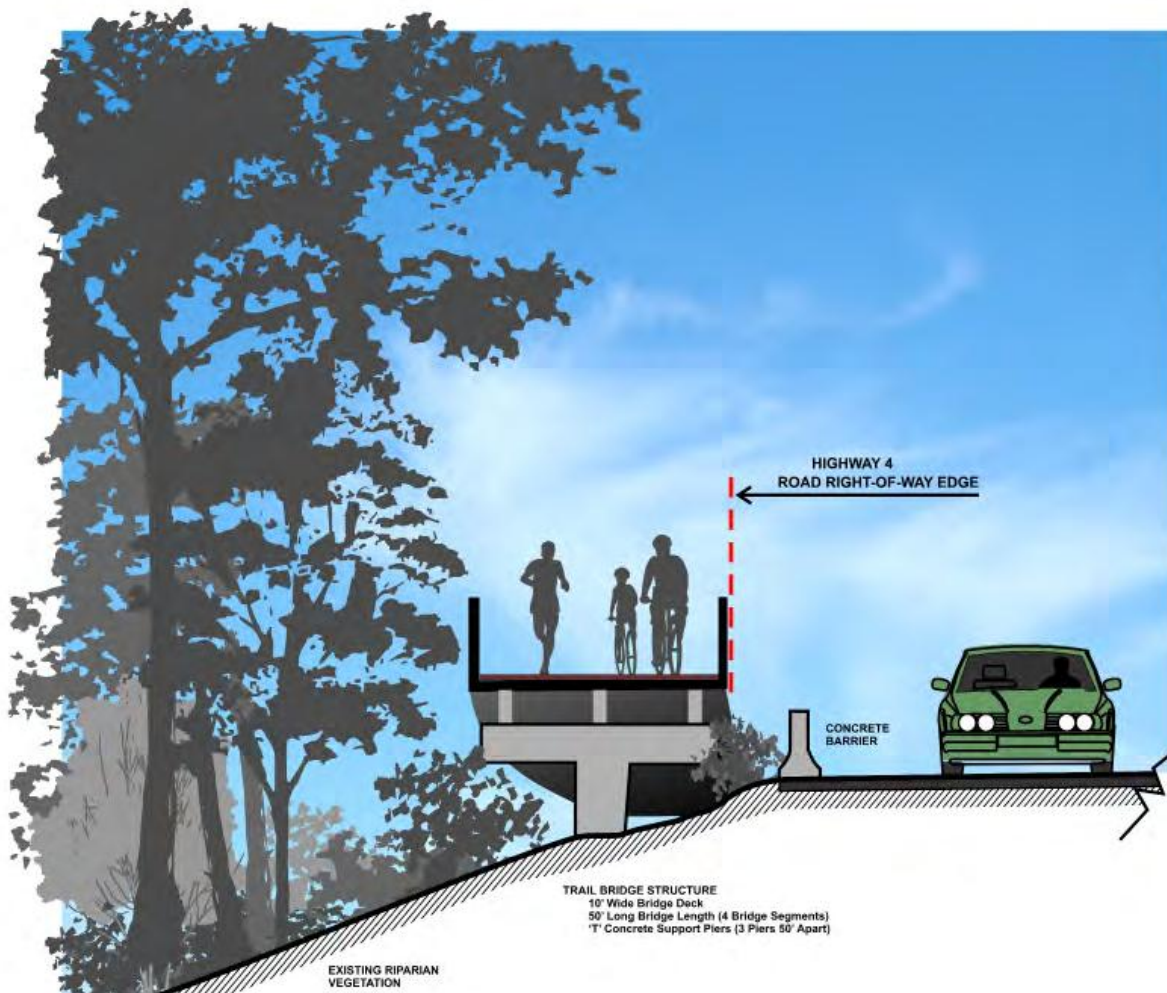


Exhibit 4.D: Type A Trail (Trail Bridge Structure Adjacent to Hwy 4)

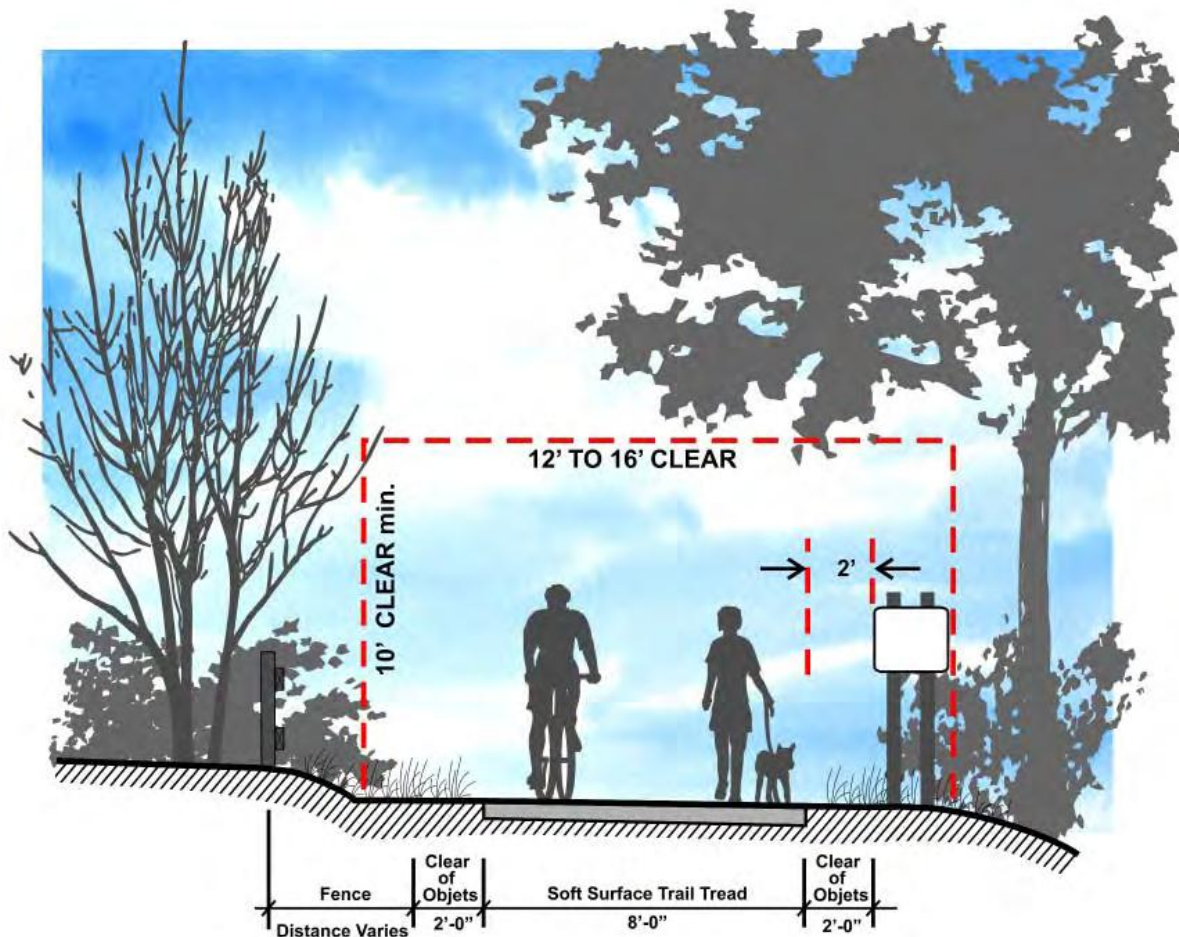


Exhibit 4.E: Type B Trail (Soft Surface Trail)

Type B Trail (Decomposed Granite)

Type B Trails are located in areas where the path is in a more rural and park-like settings. Type B Trails will consist of an 8' wide DG Path 6" to 8" deep on a Class II base material. The Type B Trails may also require fencing where applicable (See Exhibit 4.E).

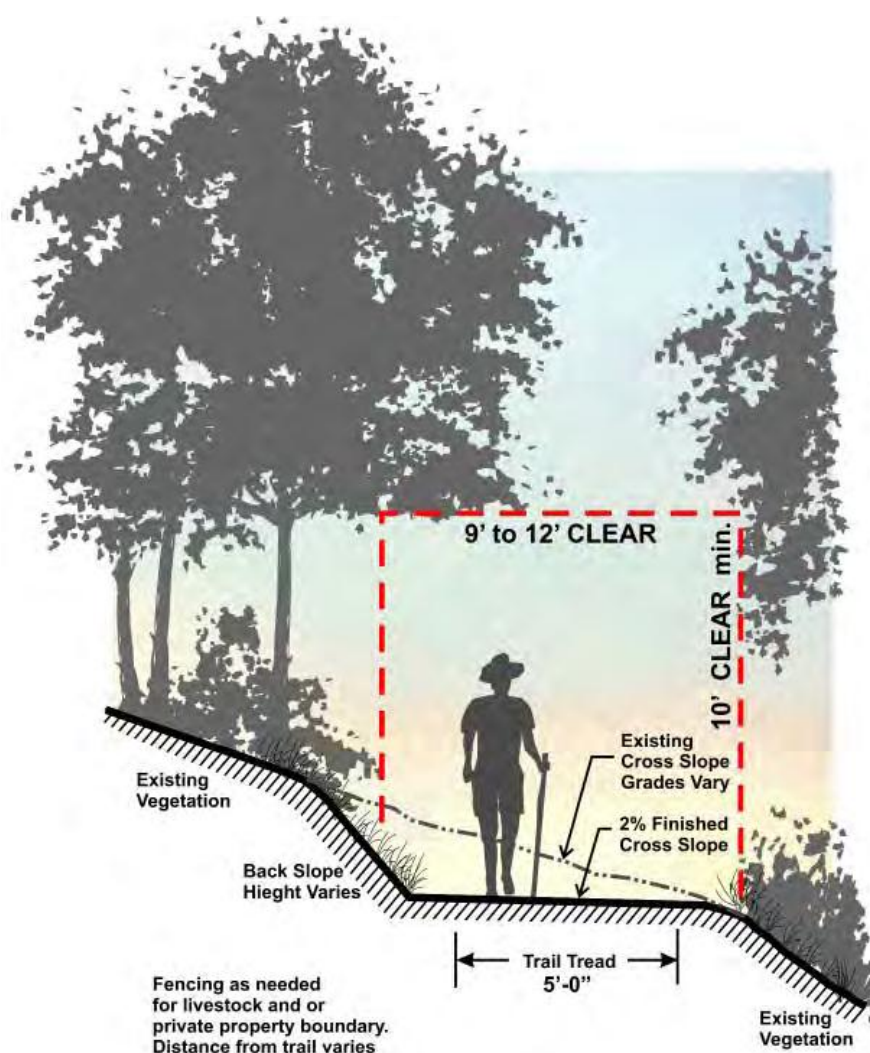


Exhibit 4.F: Type C Trail (Natural Surface Trail)

Type C Trail (Natural Surface Trail)

Type C Trails are located in the more remote areas of the corridor. These types of trails occur in the South Reach of the project and connect to the existing trails at New Melones Reservoir. Type C Trails are natural surface trails only 5' to 6' wide through steeper terrain and wooded areas (See Exhibit 4.F). To keep the trail as maintenance free as possible, these trails are designed to avoid exceeding grades greater than 12% when possible. Type C Trails require some hand tooled segments with drainage crossings, native stone walls, and some switchbacks. It's important that these trails blend with the sites character and slopes as much as possible.

Trail Layout

The proposed trail alignment crosses many types of terrain, slopes, land uses, drainage areas, and vegetation as well as private and public property. This presents opportunities and constraints when selecting trail tread location. The following guidelines balance a quality user-experience with protection of natural and cultural resources. At a minimum these guidelines shall be considered during each phase of the planning, design and construction of trail system. These reflect other resource management plan guidelines. Their application will help minimize future maintenance, operation problems, user conflicts, and impacts to cultural and natural resources. The guidelines are as follows:

- Use existing access roads or existing foot paths whenever possible.
- Avoid or minimize development on erosion-prone soils, especially on steep slopes.
- Avoid endangered or sensitive plant species and wildlife breeding habitats if possible.
- Consider alternative surface materials for erosion control including: gravel, fiber matting, polymer-based compounds, and mulching with native materials.
- Minimize erosion from construction of trails as follows:
 - Construct trails parallel to slope contours with the cross slope toward downhill.
 - Utilize additional drainage features and techniques.
- Trails and maintenance/emergency roads shall not be paved unless otherwise specified.
- Avoid concentrating and directing storm water runoff from parking areas into Angels Creek.
- Minimize paving when possible.
- Landscaping shall not include invasive exotic species. Use local native plant species for landscaping or to replace vegetation.
- Optimum trail widths and other conditions shall be determined on a case-by-case basis.
- Curvilinear trail alignments or drain dips are preferred over switchback alignments when climbing steep grades.



Trail Experience

Sight distance, views and the overall visual quality of the surrounding environment are important to the human experience as well as the more practical applications for safety and environmental protection. An attempt shall be made to consider the following guidelines concerning sight distances and views when developing trails and trail systems:

- Design trails to blend in with the surrounding environment, utilizing existing trees and shrub massing to screen the trail as much as possible.
- Screen views of the trail from adjacent landowners who may not want to view the trail from their property when feasible and appropriate.
- Align trails across the face of open hillsides just below the ridge line.
- Avoid ridge top trail alignments to keep from silhouetting trail users on the ridge
- Excessive cuts in slopes should be avoided.
- Use native soils and plant seeds for restoring areas disturbed by trail construction
- Align trails on cross-slopes of less than 45 percent when possible



Exhibit 4.G: Trail Example (Design and construct the trail to fit the local landscape)

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TRAIL STRUCTURES

Trail Drainage Structures

For natural surface trails in steep and remote locations, erosion from surface runoff combined with foot traffic are the two biggest challenges to the longevity of the trail tread. Good trail design and layout are key to a successful sustainable trail. Below are a few alternative design approaches to dealing with water and erosion.

Grade Dips

Grade dips reverse the grade to force water off the trail without requiring additional structures. There are several types, including terrain dips and rolling grade dip. Most grade dips function best when installed during the layout of the trail.

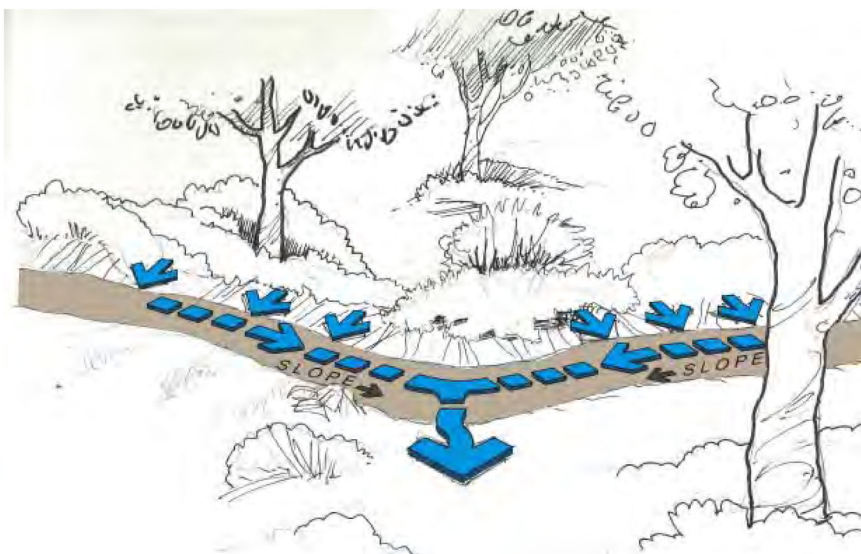


Exhibit 5.A: Grade Dips

Turnpikes

Turnpikes elevate the trail above wet ground. The technique uses fill material from side ditches or off-site to raise the trail base higher than the water table. Practical up to a 10% trail grade, turnpikes can provide a stable trail base in areas of high water table and fair- to well-drained soils.

Turnpike

1. 6" to 8" compacted DG or native soil
2. 10" to 12" diameter log
3. Geotextile fabric optional
4. Coarse gravel or cobble

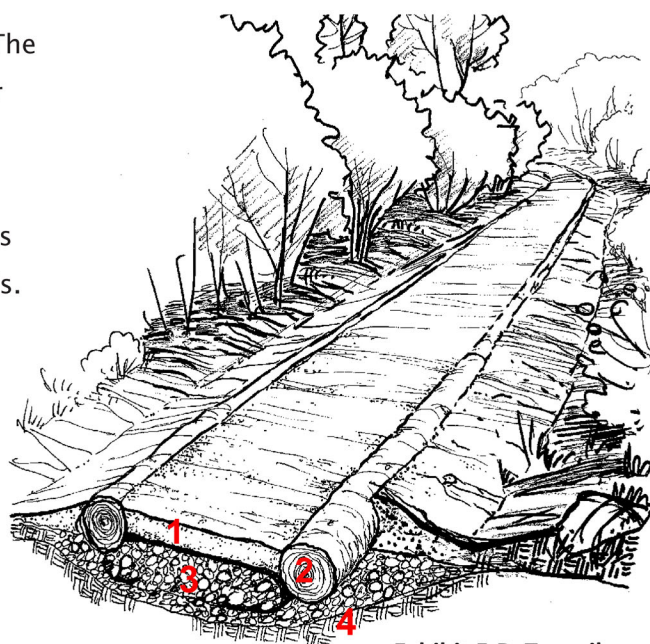


Exhibit 5.B: Turnpikes

Switchbacks

A switchback is a reversal in trail direction with a relatively level constructed landing. It is used on hillsides steeper than 15-20% to gain elevation. If possible it's best to stretch out the switchbacks to avoid users shortcutting to the other trail tread.

Rocks placed on the inside turn prevent users from shortcutting the switchback.



Exhibit 5.C: Switchbacks

Water-Bars

Water-bars direct the flow of surface water off the bottom edge of a trail. They are typically anchored to the trail tread and extend above it, usually at a 45-degree angle to the flow of traffic. Water-bars are obstacles, and tend to create interference, especially with bicyclists. Rubber belting waterbars can be used in place of wood or rock. Rubber belting waterbars are better for trails with bicycle use.

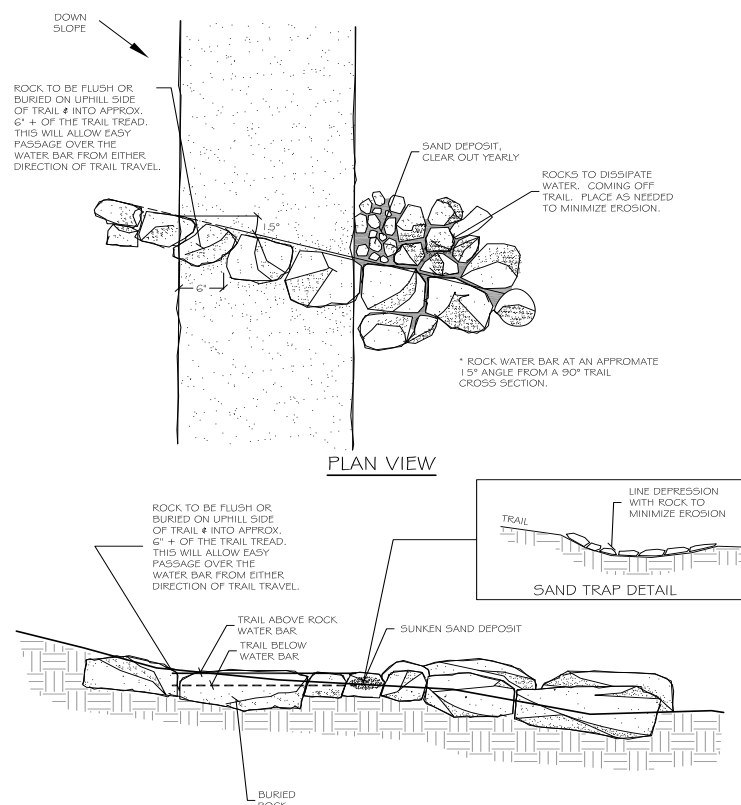


Exhibit 5.D: Rock Waterbar



Trailheads and Local Access Point

Trailhead areas are designed for trail users accessible by car. Trailhead areas may occur at existing parks connected to the trail corridor or new proposed publicly owned land accessible from a public roadway. Local access points are areas where the local community can access the trail by walking or bicycling. These access points can occur along the trail corridor where there are adjacent neighborhoods, streets, public open space, sidewalks, or other trail networks connecting to the trail corridor. Though local access points do not include a parking area, vehicle parking may be possible if the access point is adjacent to a city roadway and on street parking is allowed.

Trailhead facilities may include:

- Parking spaces for 5 to 15 cars
- Bicycle racks
- Gates and fencing
- Entry monuments and Signage
- Trailhead Kiosk
- Trash receptacles
- Restrooms
- Picnic shelters and tables
- Interpretive signs
- Drinking fountain

Trailhead parking may be paved or unpaved, but should utilize materials that reduce dust including, but not limited to the addition of a binding agent to the paving material.

Local Access Point facilities may include:

- Bollards and fencing
- Entry Signage
- Trash receptacles
- Small kiosk with map, rules and regulations

Parking Areas

The parking areas should allow access for maintenance, emergency and security functions as well as for trailhead and recreational use. These facilities should be conveniently sited to serve the visitor, but without detracting from the landscape, the views, and the physical space required for recreation. The use of crushed gravel and minimal signage is encouraged at all trailheads and access points.

Parking areas will be designed for the smaller interpretive areas, viewpoints and trailheads and serve 15 cars or less. Parking should be laid out to provide pedestrians a separate travel route once they get out of the car or provide a route that minimizes the amount of times a pedestrian has to cross the automobile path. Trees should be provided on the perimeter of the parking area to reduce glare and heat. Ideally trees should be protected by fencing or curbs. The parking lots can be stabilized decomposed granite or they can be paved or a combination of the two types. The concrete or granite paving should blend with the color of the surrounding soil. Landscape timber, recycled 8"x8" plastic timbers, or railroad ties can be used for wheel stops.

Basic Parking Design

- Parking spaces and circulation shall be organized in a logical and space-saving manner
- Parking plans shall be different and customized for each site. There are various parking area layouts that provide efficient vehicle and pedestrian flow, from simple roadside parking to a full parking area. A one-way loop road with diagonal parking is one of the best layouts for circulation.
- In organizing parking spaces, non-verbal cues such as wheel stops, traffic islands, and painted lines can minimize the use of signs.
- The walk from the car to the trail facilities shall be unobstructed so that users are not tempted to take a shortcut across landscaped areas.
- Run off from parking areas should be captured in landscaped areas and avoid draining directly to the creek corridor.



Exhibit 5.E: Typical Trailhead Layout

Accessible Parking Spaces

All parking areas will provide accessible parking per the American Disabilities Act (ADA) guidelines and Title 24. Parking lots that are constructed of crushed gravel will provide the required accessible parking on a hard surface such as concrete, asphalt, or stabilized soft surface material. Signage, ramps and wheel stops will be provided per the ADA guidelines and Title 24.



Restrooms

Restroom structures are expensive and require daily maintenance needs. These facilities need to be located at strategic sites and should only be considered at existing parks, proposed park sites, and major trailhead parking areas. Restroom can be flush systems connected to the city sewer source or non-flush system pit toilet systems or



Exhibit 5.F: Example Restroom Structure

composting units. Restroom structures at minimum should consist of a two unit facility. The restroom units should be signed as uni-sex to maximize the restroom use for the visitor. For safety and security, wash sinks should be located on the front exterior on the building and the toilet room doors should lock from the inside only when they are in the closed position. These facilities can include solar lighting and additional solar panels can be provided for other electrical needs at the park or trailhead.

Water

Potable drinking water should be made available at parks and primary trailhead locations. Drinking fountains can be provided at picnic shelter and or restroom buildings. All drinking fountains should be universally accessible.

Picnic Sites

Picnic areas may be strategically located along the trail system for ease of access by the user and maintenance staff. Locations can include both trailheads and local access points. They should include at a minimum; trash receptacles, benches and tables. The larger sites may include restrooms, picnic shelters, and other amenities as determined by use and demand.

Bear proof trash receptacles should be provided at trailheads and primary access points along the trail corridor.



Exhibit 5.G: Trash Receptacle

Bridges and Crossings

Trail segments crossing the creek or other streams and drainage may require a bridge or dip sections, but these should be kept to a minimum and carefully designed to avoid habitat impacts. Approaches to bridges should be level and straight. Bridge widths should correspond to the trail's tread width. On multi-use trails, crossings should be structurally suitable to support pickup truck maintenance vehicles. Bridges should be designed to accommodate all trail user groups. When bridge railings are required they should meet current jurisdictional standards. Bridge footings should be constructed outside the top of the stream bank.

There are two main types of bridges: truss and beam. Truss bridges have a structure mostly above the deck and are capable of spanning great distances. A beam bridge has a lower profile, for use in areas where the emphasis is on the beauty of the landscape. The superstructure of the bridge (wood or steel beams) is under the deck surface. The most economical means to acquiring a bridge is through a pre-fabricated bridge manufacturer. Many pre-fabricated bridges can be customized to fit the architectural preferences of the owner agency.



Exhibit 5.H: Standard Pre-Fabricated Bridge Crossing



The following provides a basis for comparing bridge designs given the site and situation:

Drainage Way Characteristics

The drainage way characteristics may dictate the structural design of the bridge. When crossing a channel subject to flooding, the bridge shall be designed to be above the 100-year flood level. When crossing channels not subject to flooding, it may still be desirable to determine whether the bridge's superstructure should be above or below the deck based on clearance underneath.

Bridge Length

Wood bridge clear spans of over 50' feet are generally difficult without specially-fabricated structural members or mid-span piers. Steel beam bridges can span greater distances, but the beam depth will increase with proportion to the span. Steel truss bridges can span up to 200 feet without additional piers.

Bridge Placement

Bridges shall be aligned along the path to avoid perpendicular or sharp turns at the bridge approach. If the bridge is at the bottom of a grade exceeding 4%, a short, flat transition area is needed to meet the bridge deck grade.

Live Load

Bridges, which will allow for small vehicles and machinery for maintenance and emergency purposes, should be designed to carry a minimum eight-ton live load.

Bridge Aesthetics

The proposed bridge materials should reinforce the theme of the local area, and may include steel, wood with stone masonry abutments.

Culverts

Culverts can be used in seasonal drainage ways or seeps along gullies and swales. Culverts should be sized to handle the high flow during seasonal rains. The culverts can consist of plastic or metal corrugated pipe. Be sure to design trail approach at a straight 90 degree angle. Culvert crossing width should match the trail approach width on both sides. Conceal culvert faces with native stone and protect channel downstream of culvert with rip-rap.



Exhibit 5.I: Culverts

Culvert crossings can be designed using native stone and soil to cover the culvert pipe and blend the crossing into the landscape.

Fences and Gates

Fencing should be provided adjacent to private property to define the trail right-of-way and keep users from encroaching on private property. In portions of the trail where active cattle grazing occurs automatic closing and latching gates should be used.

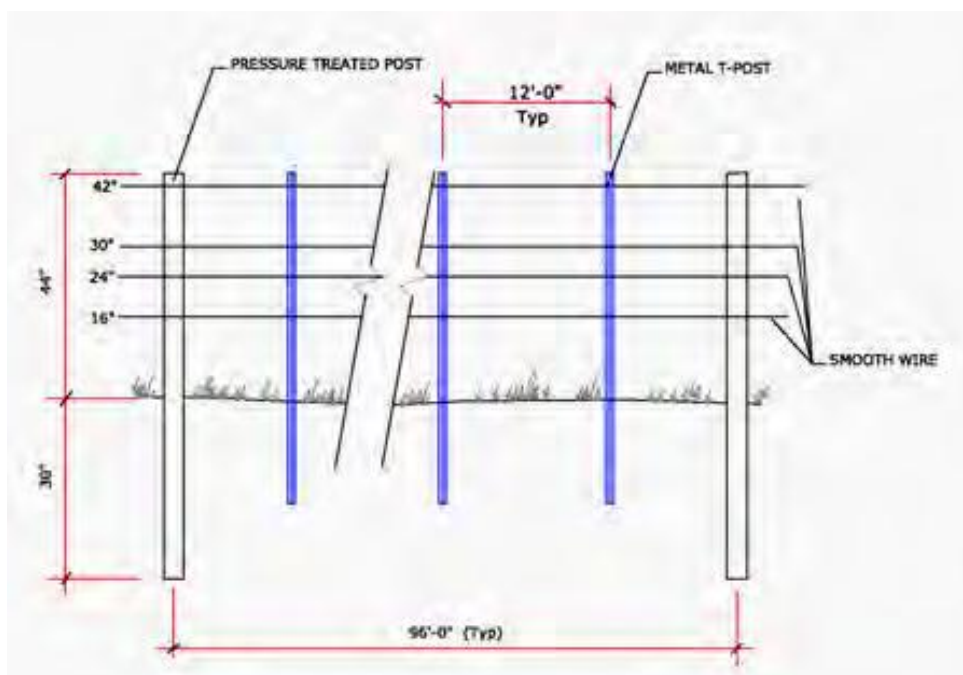


Exhibit 5.J: Four Strand Smooth-Wire Fence (Wildlife Friendly Fence)



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Chapter Contents

TRAIL SIGNS AND WAYFINDING

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Trail Signs and Wayfinding

Signs provide valuable information to visitors about the trail, safety tips, and expectations while recreating along the trail. The information will include rules and regulations, trail maps, trail names, locations, and distances for orientation and interpretation, as well as city department contact information.

Signs will be placed appropriately and strategically to minimize sign pollution along the trail corridor. Generally, the greater number of signs occurs within the first $\frac{1}{4}$ mile of the trail.

Signs can be grouped into four major categories;

- Regulatory
- Directional (wayfinding)
- Informational
- Interpretive (educational)

Regulatory

Most regulatory signs already have an industry standard shape and color. Regulatory signs will be used according to the Manual on Uniform Traffic Control Devices (MUTCD) signs standards and are typically aluminum signs with vinyl lettering.

Examples of typical regulation signs would be:

- Stop signs
- Yield signs
- Bike Route signs

Traffic signals, signs, and pavement marking on the street may also regulate users and vehicular traffic where the trail comes in contact with the street network.

Other Regulatory Signs

Park and trail rules and regulation signs are created by the managing agency and the local law enforcement group. These signs are often enforceable by law and are listed at all trailhead and access locations. See Law Enforcement chapter for possible rules and regulations list.



Exhibit 6.A: Trail Xing Sign (posted at roadway intersections and street crossings)



Exhibit 6.B: Class III Bike Route Signs



Directional Signs

Trail Access Point Kiosk map

Trail Access Point Entry Sign

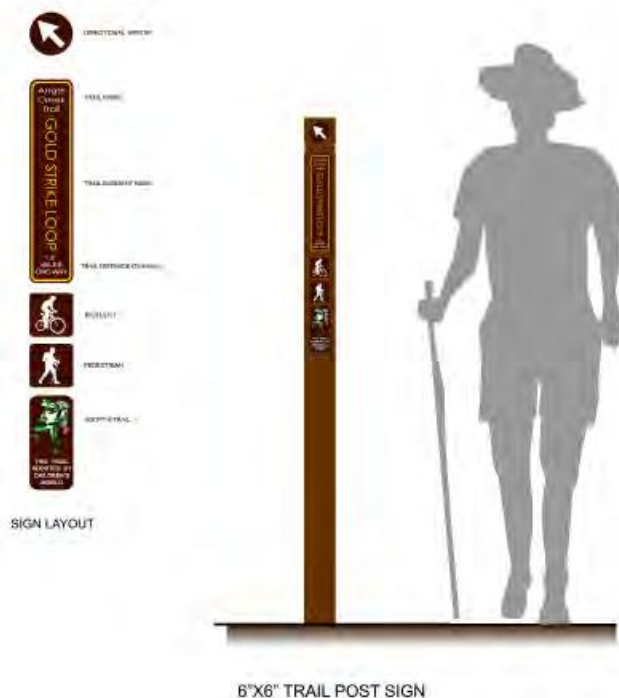
Exhibit 6.C: Signs

Directional (wayfinding)

Directional signs vary in their style, materials and content. These signs tend to be more customized by the managing agency and are designed to create continuity through the trail experience. These signs are used to identify location, direction, distance and places of interest for trail users. Trail markers should be placed at intervals of one-half mile to 1 mile or at strategic areas such as intersections, viewing spots, and rest areas.

Directional sign example:

- Entry Monuments
- Directional arrow signs
- Trail Name Signs
- Designation and length



6"X6" TRAIL POST SIGN

Exhibit 6.D: Trail Post Sign Examples



Entry Monuments

There are two entry sign concepts designed to be located at primary trailhead parking lots and key pedestrian access points at neighborhoods or park connected to the trail.

The trailhead parking entry monument signs are used as identification markers to be seen from an approaching vehicle from a roadway. These roadway entry monuments serve to create the sense of arrival and are the larger of the two signs. The material for entry monument signs will be high density foam sign with router surface, supported by a native stone base veneer, 6x6 wood posts, and 2x6 wood cross beams.



SIDE VIEW

Exhibit 6.E: Entry Monuments

The smaller entry sign, located at primary pedestrian and bike access points along the trail, will include the high-density foam sign with wood post. This sign will be a scaled down version of the larger entry monument sign to set the overall character of the trail sign theme. Each of these signs will include the name of the trail, the City name and branding logo.

Trails cover great distances, like a linear park, and it's important that the signs and trail facilities share some unifying features for the visitor to identify where they are. Directional signs help orient and direct the trail user to a destination. These signs should be clear and concise with some reference to the park architectural theme. Themed signs and park facilities are another way to help visitors know they are on the same trail system from the beginning to the end of the experience. Using color, materials, text, and design, also helps the trail user to know they are still in a designated recreation area. This is important as a reminder that the trail rules and regulation apply even if the visitor is at the farthest reaches of the trail system.

Informational

Informational signs should reflect the character of the region and be harmonious with elements in the trail corridor by selecting native materials and colors. To insure efficiency in managing and maintaining the signs in the trail system, the materials and construction of the signs should have consistency in their style, materials, color and design.

Recreational Yield and Right-of-Way

Signs clearly indicating user right-of-way and yielding protocol will be posted to minimize user conflicts. Bikes must yield to pedestrians. This system of yielding is based on the degree of control trail user has over their mode of travel and is not intended to favor any particular user group.

Interpretive Signs

Interpretive signs differ most in their appearance and character. The important element to interpretive signs is the way they are displayed to provide universal access so they serve the majority of trail visitors. Interpretive signs identify and educate about topics such as natural and cultural resources. They should be placed in strategic locations such as trailheads, parks, overlooks and other features of interest. For example:

- Identification Native Plant Species including habitat and use by wildlife and humans
- Creek and Riparian Ecosystem
- Hydro-Electric Power Generation
- Gold Mining and Early Settlement
- Native American and other historic and cultural events
- Resource Preservation/degradation (over grazing, urban runoff, exotic plant invasion, overuse, trash, etc.).
- Three dimensional displays of animal tracks, local fish, large scale insects, or animal droppings as part of an interpretive display.
- Wildlife behavior such as foraging and hunting



Exhibit 6.F: Trail Post Signs

Trail post sign with trail name, mile marker, and directional arrows. Posted at key intersections and directional changes in trail alignment. Sign posts can be made with recycled plastic and wood composite, 4"x 4" post with aluminum sign face.

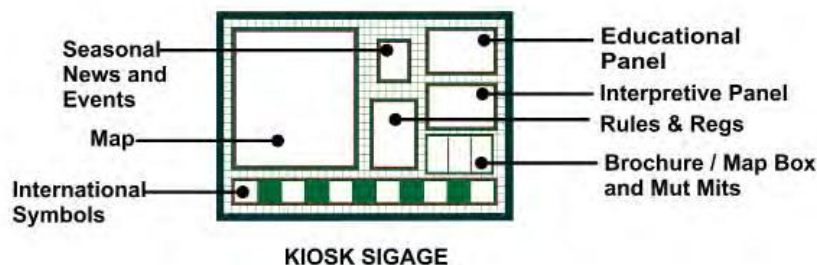


Exhibit 6.G: Interpretive Signs



Kiosk and Interpretive Signs

Trailhead information kiosks provide trail users with their first bit of information about the trail and their immediate location within the corridor.



The kiosk is designed with a trail map, rules and regulations, brochure boxes, and interpretive information. The architecture of this structure carries through from the entry sign to strengthen the theme and identity of the trail.



Exhibit 6.H: Trailhead Kiosk Example

Large kiosks will be located at Regional Trailheads and smaller kiosk signs will be located at major trail access points.

Branding

The City of Angels spent some time over the past few years to create a branding idea for the City and has recently settled on this frog as both a mascot and local character to represent some of the cultural heritage of the City's history. The hiking frog was developed as a way to promote recreational activities in the area and this copyrighted frog, Monty, is proposed as a key element of wayfinding along the trail. This symbol will be used on directional signage, kiosks, and entry signs as a way to create unity throughout the trail corridor.



Exhibit 6.I: Frog Mascot, Monty

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TRAIL IMPLEMENTATION AND PHASING

The Angels Creek Master Plan and Trail will be implemented over time. Funding is a major constraint of implementation along with acquisition of right-of-way in some areas. The Master Plan divides the trail into three phases for implementation.

Phase 1 encompasses the downtown and extends from Highway 49 to Kurt Drive. Phase 1 is the Central Reach (Preferred Alignment C1). The Central Reach was selected for Phase 1 because it links to the historic downtown and would create immediate opportunities for residents and visitors.

Phase 2 extends from Kurt Drive north and west to Bret Harte High School. Phase 2 is the North Reach (Preferred Alternate N1). Phase 2 will provide recreational opportunities and a safe route to the high school. Phase 2 was selected because it provides opportunities to a large number of residents and involves a limited number of property owners. The North Reach may also benefit from development in near-to mid-term and present opportunities for right-of-way acquisition.

Phase 3 extends south from highway 49 to New Melones Reservoir. Phase 3 is the South Reach (Preferred Alignment S1). The South Reach is the most remote and primitive of the reaches. It is composed of soft surface trails

and requires right-of-way acquisition from a number of property owners. Phase 3 could move up in the phasing depending upon the USBR's participation in funding.

Table 2: Estimate of Probable Cost

ITEM #	DESCRIPTION	Phase 1	Phase 2	Phase 3	PROJECT TOTALS
		HIGHWAY 49 TO KURT DRIVE (Alignment C1) COST	KURT DRIVE TO BRET HARTE H.S. (Alignment N1) COST	HIGHWAY 49 TO NEW MELONES RESERVOIR (Alignment S1) COST	
1	Type A trail (Asphalt Paved)	\$137,460	\$440,820	\$0	\$578,280
2	Type A trail (Trail Bridge Structure)	\$830,400	\$0	\$0	\$830,400
3	Type B trail (Soft Surface)	\$0	\$0	\$114,904	\$114,904
4	Type C trail (Natural Surface)	\$0	\$0	\$122,640	\$122,640
5	Class III Signage & Pavement Markings	\$0	\$0	\$5,800	\$5,800
6	Steel Prefabricated Bridge with Abutments	\$110,000	\$110,000	\$165,000	\$385,000
7	Concrete Barricade	\$49,600	\$117,800	\$0	\$167,400
8	Trailhead Landscaping	\$20,000	\$0	\$0	\$20,000
9	Information Kiosks @ Trailheads	\$20,000	\$10,000	\$20,000	\$50,000
10	Trailhead Safety & Security Lighting	\$12,500	\$0	\$12,500	\$25,000
11	Entry Signing	\$10,000	\$10,000	\$5,000	\$25,000
12	4-Strand Smooth Wire Fence	\$0	\$61,250	\$175,000	\$236,250
13	Cross Drain Culverts	\$0	\$0	\$9,000	\$9,000
14	Trash Receptacles	\$3,000	\$600	\$600	\$4,200
15	Benches	\$7,500	\$1,250	\$5,000	\$13,750
16	6" dia. Decorative Steel Bollards	\$6,000	\$4,500	\$3,000	\$13,500
17	Rest Areas with Shade Structure	\$0	\$12,500	\$0	\$12,500
	Contractor mobilization costs (2.0%)	\$24,000	\$15,000	\$13,000	\$52,000
	Traffic control (1.0%)	\$12,000	\$8,000	\$6,000	\$26,000
	NPDES/SWPPP Compliance (5.0%)	\$60,000	\$38,000	\$32,000	\$131,000
	Environmental mitigation and monitoring program (5.5%)	\$66,000	\$42,000	\$35,000	\$144,000
	Contractor overhead and profit @ 15%	\$205,000	\$131,000	\$109,000	\$445,000
	CONSTRUCTION COST TOTALS	\$1,573,000	\$1,003,000	\$833,000	\$3,412,000
	CONTINGENCIES @ 10%	\$157,000	\$100,000	\$83,000	\$341,000
	SUB-TOTAL CONSTRUCTION	\$1,730,000	\$1,103,000	\$916,000	\$3,753,000
	DESIGN COSTS =	\$104,000	\$66,000	\$55,000	\$225,000
	SURVEY & MAPPING =	\$43,000	\$28,000	\$23,000	\$94,000
	GEOTECHNICAL REPORTS =	\$26,000	\$17,000	\$14,000	\$56,000
	CONSTRUCTION MANAGEMENT/INSPECTION =	\$121,000	\$77,000	\$64,000	\$263,000
	PHASE TOTALS =	\$2,024,000	\$1,291,000	\$1,072,000	\$4,391,000

* Does not include land/easement acquisition costs, environmental studies, or mitigation costs.

Note: This opinion of probable cost is based on reasonable professional judgement and does not constitute a warranty. Costs are based on 2012 costs.



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REGULATION ENFORCEMENT

Upon adoption of the Angel Creek Master Plan and Trail Plan a series of use regulations should be adopted and implemented.

Successful multi-use trail programs start with clear and concise trail regulations and effective law enforcement. Well thought out trail regulations provide managers and staff with the authority to enforce safe and courteous trail behavior and help clarify for users the expectations while using the park facilities and the trail. It is important to avoid excessive regulations and enforcement and create a positive recreational experience for visitors. Most multi-use trail systems are policed by the very presence of people using the trail (eye-on-the-trail). The minimum amount of intrusive action regarding user conflict will maintain a positive environment, safe visitor experience and lessen the negative impact on adjacent areas. However, actions concerning park and/or trail degradation, such as vandalism, littering, dumping, water pollution, and habitat destruction should be effectively dealt with using strict enforcement by a police officer or ranger.

The purpose of enforcement is to:

- Provide protection from criminal activity.
- Enforcement of limited use designation where applicable.
- Prevent trespassing and vandalism.
- Protection against unreasonable risks associated with trail use.
- Prevent unauthorized vehicles on trails and staging areas.

Enforcement

How to gain compliance with necessary regulations has been a great challenge in many trails areas. This is especially true where land areas are large and budgets are lean. The following are important considerations for determining how to enforce regulations on trails:

- Inform users of the regulations:
 - Post regulations at trailheads and include them in trail brochures and on maps communicating why and how the regulations will be enforced and what the applicable penalties are.
- Signage programs shall be used to communicate appropriate locations and use.
- Communicate the reasons for regulations to the users affected. For example, communicating to mountain bikers that "up trail and down road" rules for travel directions are enforced to keep speeds at safer levels and skidding at a minimum may better ensure their compliance.
- Enforce rules and regulations consistently to assure that there is no perception of discrimination among different user groups.

- Employ a variety of on-site enforcement personnel if possible and appropriate such as:
 - Peer policing programs
 - Volunteer trail patrols.
 - Uniformed enforcement officers.
 - Cooperative agreements with local law enforcement and fire protection agencies.
- Consider sentencing trail offenders to work service on the trail as part, or all, of their penalty.
- Communicate emergency procedures for users and emergency personnel.
- No motorized vehicles shall be allowed on or off any trail or public use area, except authorized utility crews, emergency vehicles, City management, or maintenance personnel.
- Law Enforcement vehicles shall restrict vehicle use to existing access roads when possible.

All of these methods have been employed on multiple-use trails with varying degrees of success. The right choice for any particular situation will depend on many local factors and involve some experimentation. General principles to guide responses are offered in the next section. In general, though, using a strategy that employs a combination of techniques with a long-term perspective is best.

Trail Patrol Information

The City of Angels management will have the responsibility for patrolling trails, whether by staff, by contract or approved volunteer groups. The recommended MOU should address patrolling of trails and maintenance activities and liability for trails within the three participating jurisdictions (City of Angels, Calaveras County, and U.S Bureau of Reclamation).

The City of Angels management should develop a trail-monitoring program to evaluate trail conditions and determine whether or not new trails or trail management programs are effective in addressing user conflicts, safety issues and environmental impacts.

The trail system should be set up to be responsive to the general population, communities and visitor needs. Implementing a periodic survey process will also help the City management to be certain that trails are provided in a fair manner to various user groups.

The Angel Creek Trail will be patrolled to assure that it is safe and usable. The objectives of trail inspections will be safety and security, adjacent private property security, code enforcement, visitor information and education, litter control and minor maintenance.



To the extent feasible, volunteers may assist in certain aspects of trail supervision such as trail safety and security, litter control, information and education guides.

Because funding for trail patrol is scarce, the City may need to create new funding sources. An assessment district or other funding mechanism may need to be created.

The participating jurisdictions should ensure that their safety and enforcement standards are not in conflict as they relate to the trail. Jurisdictions will contribute to police patrols and park rangers who patrol trails in their jurisdiction.

Restrictions

Trailheads should be open sunrise to sunset. Gates should be provided where possible, and signs posted to inform users of operating hours.

The following are recommended management goals for the trail that complement both natural resources and recreational facilities:

- Users shall remain on designated trails and in appropriate areas.
- All undesignated trails are closed to trail users.
- Domestic animals shall be on leash at all times including on trails and in public use areas.

- Horses are not currently allowed on trails
- Temporary construction noise shall be restricted to the hours of 8am to 5pm. No construction shall take place during native bird breeding/nesting season.

TRAIL CORRIDOR MAINTENANCE

Preventative maintenance is vital for a safe trail user experience and minimal repair costs to the managing agency. It will be the collective responsibility of the City, County, and U.S Bureau of Land Management (USBR) to formulate a protocol to maintaining the Angel Creek Trail Corridor. It will include such activities as: facility upkeep, landscape maintenance, sign replacement, trail tread maintenance, fencing, mowing, litter and graffiti removal, painting and replacement, pest control, and natural resource management.

A successful maintenance program requires continuity and commitment among the managing agencies and some level of citizen involvement. Regular, routine maintenance on a year-round basis will not only improve safety, but will also contribute to the overall quality of the trail experience. The following should be part of the maintenance checklist:

Trailhead Areas

Trailheads areas will require frequent inspections and maintenance due to visitor use. Restrooms and picnic shelters must be cleaned on a daily basis. Signs, benches, fences, and gates should be kept in good working order and free from graffiti.

Trail Surfaces

Surfacing recommendations include concrete, asphalt, stabilized decomposed granite or crusher fines, and natural surface trails. Damage to the tread surface like cracks, spalding, wear, and erosion will need to be repaired periodically. Weed control will be necessary on a regular basis.

Routine inspections for erosion along the trail should be made monthly during the wet season, and immediately following local area flooding.

The trail surface should be kept free of debris, large rocks, broken glass and other sharp objects, loose gravel, and stray branches. Hard surface trails should be swept periodically.

Trash Removal And Illegal Dumping

Staff or volunteer effort should remove litter along the trail. Litter receptacles should be placed at access points such as regional trailheads and neighborhood access points.

Litter should be picked up twice a week (usually just before and after the weekend) and after any special trail related events.

Illegal dumping should be controlled by vehicle barriers, regulatory signage, and fines as much as possible. When it does occur, it must be removed immediately to prevent further dumping. As much as possible, adopt-a-trail groups, school groups, contributing businesses, neighborhood volunteers, community service, and inmate labor crews should be used in addition to maintenance staff.

Fences

Two types of fencing are proposed for the trail. A post and rail concrete fence is proposed as at staging areas and trailheads. This fence should be inspected periodically for damage and repairs made on an as needed basis. A second fence type, smooth wire, is proposed where the trail moves in close proximity to private property, industrial operations, ranching areas or significantly sensitive habitat areas closed to public access. This fence provides a barrier for restricted access to private and protected areas. Smooth wire fencing should be inspected bi-monthly for breaks or damage and repairs made as damage is identified.



Signs

Sign information is typically more intensified in the first ¼ mile of the trailhead. Park signs will be replaced along the trail on an as-needed basis. A monthly check on the status of signs should be performed with follow-up as necessary. Signs will be less frequent further into the trail system.

Bridges And Crossings

Bridges and culvert structures should be inspected once a month throughout the year on a routine bases and after every major flood event during the wet season. Debris accumulated on the creek crossings should be removed from bridge abutments and culverts after each recession of high water.

Natural Areas

In general, an attempt should be made to maintain some visibility between plantings at staging areas, trailheads, park facilities, buildings and signs to maintain clear view for security. This will also give park visitors good, clear views of their surroundings, which will enhance the aesthetic experience of the park and helps to clearly identify circulation at staging areas and facilities. Any introduced trees or shrubs shall be selected from a native plant list.

If an irrigation system is installed, it should be designed to avoid water run-off on the parking lot surfaces, building foundations, sidewalks and trail surfaces.

Pest And Vegetation Management

As a park adjacent to a creek corridor and moving through the floodplain, the trail passes through a diversity of landscape types. Portions of the corridor are characterized by mature riparian canopy forest, oak woodlands, to open meadows.

Some basic measures should be taken to best protect the park investment. This includes annual vegetation removal along both sides of the trail to prevent invasion of plants into the trail area. All run-off heads to the creek, therefore, use of chemical sprays should be avoided. Wherever possible, weed control should be accomplished by mechanical means. Use of chemical sprays should be limited to use only on those plants that are harmful to the public.

Vertical clearance along the trail should be periodically checked and any overhanging branches over the trail should be pruned to a minimum vertical clearance of 10 feet.

The following table summarizes maintenance recommendations for the trail facilities:

Table 3: Maintenance Recommendations and Frequency

Item	Frequency
Wood Sign replacement/repair	2-5 years
Aluminum Sign replacement/repair	4-7 years
Planted tree, shrub, & grass trimming/ fertilization (Park and Trailheads)	6 months-1 year / if needed
Pavilion general maintenance	1 year / as needed
Kiosk inspection	Bi-Annual
Bench replacement	4-6 years (as needed)
Culvert Cleanout	Bi-Annual – Fall/Spring
Trash removal	As needed, every other day
Fence inspections	Monthly / as needed
Graffiti removal	as needed
Restroom cleaning	Bi-Weekly
Pruning to maintain vertical clearance at trailheads and trail	1-4 years
Remove fallen trees	As needed (Check after storm events)
Weed control	Monthly
Bridge inspections	Bi-Annual (after each flood event)
Inspect creek bottom crossings	After each storm

Law Enforcement

Primary concern to law enforcement is good access route to the trail for both police patrol as well as emergency service vehicles. The trail will accommodate this need by providing controlled access points (with keyed, removable bollards and/or pipe gates) and a continuous trail with sufficient width to accommodate emergency service vehicles.

Additional enforcement measures appropriate for the trail facility include:

- Provide fire and police departments of the State, County and City with a map of the park, trailheads, staging areas, and trail system along with access points and keys or combinations to locked gates and or bollards.
- Develop adopt a trail program or citizen patrol groups to check the park system on a routine basis.
- Locate mileposts every mile or one half mile and identify markers on maps.
- Provide and maintain emergency telephones or call box systems linked to 911 networks on isolated sections of trail system.



Community Involvement

The most effective and most visible deterrent to illegal activity in the corridor will be the presence of legitimate park users. As a general pattern, introducing legitimate use into an area tends to drive out illegitimate activities. More public presence in the park will deter undesirable activity in the river corridor. Effective enforcement goes beyond law enforcement officers and should involve the entire community. There are several components to accomplishing this as outlined below:

Provide Good Access to the Trail – Wherever feasible, public access to the trail has been provided. Access ranges from providing conveniently located trailheads along the trail, to building sidewalk to accommodate access from private developments adjacent to the trail. Access points should be inviting and signed so as to welcome the public onto the trail.

Good Visibility from Adjacent Neighbors – Neighbors adjacent to the trail potentially provide 24-hour surveillance of the trail and can become the public agency's greatest ally. Though some screening and setback of the trail is needed for privacy of adjacent neighbors, complete blocking out of the trail from neighborhood view should be discouraged. This eliminates the potential of

neighbor's "eyes on the trail," and could result in a "tunnel effect" on the trail.

High Level of Maintenance - A well maintained trail system sends a message to the public that the community really cares about the trail. This message by itself can minimize undesirable activity at staging areas and trails. Prompt removal of graffiti, trash, and vandalized facilities maintains both a presence of park staff and park patrons.

Programmed Events – Events along the trail will help increase public awareness of the trail and thereby bring more people to the trail. A "friends" group in support of the development of the trail should be formed. This group can help initiate numerous public events along the trail in an effort to raise public awareness and increase support for the trail. Events might include a daylong trail clean up or a series of short interpretive walks led by a local trail groups, school groups, special interest clubs. Community groups can also assist the City with public support of future funding applications.

Community Projects – The support generated through the friends group could be further capitalized on by involving neighbors and friends of the trail in a community project along the trail. Ideas for community projects that have been successful on other trail projects include volunteer planting events,

art projects (often associated with adjacent schools), interpretive research projects, or even bridge building events. These community projects are the strongest means of creating a sense of ownership along the trail that is perhaps the strongest single deterrent to undesirable activity along the trail.

Infrastructure for Public Safety – Public safety infrastructure might include physical improvements along the trail such as emergency call boxes, lighting, and in some cases, remote video monitoring. Generally, infrastructure is expensive and may involve 24-hour remote monitoring. No conclusive proof exists that these devices are effective at reducing crime or improving police response time. In the few instances where they have been installed, vandalism has often been a problem. More importantly, these features may represent an additional liability hazard if they are not properly maintained and monitored. As a general rule, infrastructure should be considered as a final line of defense against safety issues on a trail.

Adopt-a-Trail Program – Businesses, educational institutions, and residential communities abut the trail. As neighbors to the trail, they often see the benefit of their involvement in the trail development and maintenance. Developments may view the trail as an integral piece of their neighborhood and be willing to take on some level of responsibility for the trail. Creation of

an adopt-a-trail program should be explored to capitalize on this opportunity and build civic pride.

Safety Inspections

Regular inspection of the trail and associated amenities is a key factor to trail safety. Daily visual inspections should be conducted and can help identify and correct problems before they become an issue. A fallen tree or limb, for example, can be readily removed from the trail or coned off to divert trail users away from the hazard until such time as maintenance crews can remove the hazard. A written record of inspections is recommended and will help create a database of information that can assist the City in several ways. Written records can reveal safety trends and use patterns that can assist the City with prioritizing of maintenance dollars. Written records also can help protect the City, County and USBR from potential liability, providing documentation of diligent maintenance practices targeted towards protection of the public.

A typical inspection record should include:

- Daily inspection reports noting any hazards that have been found along the trail along with remedial action. This should note basic items such as debris found on the trail, wash outs, or other trail obstructions
- Monthly inspections should be conducted



of the entire trail. These inspections should document the condition of the trail and notes should be made of any potential hazards on the trail (cracks, erosion, overhead vegetation, etc.). Corrective actions should be integrated into the next 30-day work plan.

- Quarterly visual and operational inspections should be made of all of the park amenities such as benches, signage, drinking fountains, bike racks, etc. Recommended corrective actions should be made and be integrated into the three month maintenance work plan

Risk Management

To minimize liability, it is critical to adhere to established standards in trail design, signage, and maintenance. In some states, substantial immunity is afforded public agencies that provide trails in accordance with widely accepted standards or guidelines, such as the Caltrans Highway Design Manual and the AASHTO Guide for the Development of Bicycle Facilities. Other practical measures include the following:

- Post warning signs for known hazards that are not easily identified such as rattlesnake warning signs. Warning signs should be posted no less than 50' from the hazard;
- Trail regulations will be posted and

enforced in each jurisdiction;

- Accurate routine maintenance records shall be kept;
- Trail facilities shall be regularly inspected for hazards;
- Hazards and maintenance problems reported by trail users will be evaluated and addressed with immediate and appropriate measures; and
- Ensure that there are adequate emergency access points to the trail along entire corridor.

These common-sense precautions are indicative of good faith and responsible stewardship of the trail facility, and likely will reduce the number of potential lawsuits or size of settlements.

Trail Closures

Notice of trail closures should be posted at all trail entrances and staging areas. Barriers will be used if feasible. The City should take appropriate measures to arrange trail detours where appropriate.

Reasons to close a trail may include, but are not limited to:

- Trail construction or repair.
- Dangerous conditions that threaten either the user or habitat.
- Special events.
- High fire danger or flood conditions

PROJECT FUNDING

The City of Angels used the funding from the Calaveras Council of Governments to develop this Master Plan. This document recommends a phased approach to implementation. The first phase of the project focuses the effort on the middle reach of the trail. Each of the implementation phases outlined in this Master Plan are centered on shared road construction project funding, future neighborhood development, and joint trail connectivity projects with the Bureau of Reclamation. The phasing strategy will further increase connectivity and best assure success of each subsequent phase of the trail system.

Future Funding

One of the primary goals of the Angel Creek Master Plan and Trail is to ensure that the City is positioned to successfully pursue future competitive funding. It is important for the City to consider multiple funding sources for various elements of the project. The City should also designate a key staff member to champion the trail project. This designated staff person would coordinate between departments and adjacent agencies. Inter department and agency cooperation will broaden the city's opportunity to pursue a greater variety of funding sources through the various phases of the project. Below are some key elements that help target these various funding sources.

Public Input And Support

Through the master planning effort, an open public process was utilized that has helped increase public awareness and build support for the trail project. Results from written public comments, stakeholder involvement, and adjacent agency collaboration were utilized to establish a vision and an acceptable alignment.

Multi-Jurisdictional Collaboration

Multi-jurisdictional support and collaboration provides a strong partnership in the success of a trail system. Involvement of local, State, and federal agency through the project's technical advisory committee in the master planning effort provides grant agencies with a clear view of the City of Angels commitment to the project. The Bureau of Reclamation's commitment to assist the City of Angels with connecting to the New Melones Reservoir creates a great opportunity for trail users to have regional recreational connectivity.

Plan Adoption

An adopted master plan and incorporation into the City of Angels 2020 General Plan provides clear assurance to the funding agency that the trail project is an important resource to the community. In addition to the master plan adoption, the City and local advocates could pursue incorporation of the trail into the (RTP) Regional Transportation Plan. The trail inclusion on the RTP gives it the possibility for SAFETEA-LU funding.



New Construction

As a unit cost, trail crossings with intersections are typically the most costly items to develop on a trail project. They are also essential for safe passage along the trail. Future road widening and construction projects are one means of providing trail crossing improvements. To ensure that roadway construction projects that cross the trail provide needed improvements, it is important that an effective review process is in place so that crossings meet Caltrans and MUTCD Pedestrian Bike Crossing Standards.

Developer Impact Fees

Developer impact fees that are tied to trip generation rates and traffic impacts produced by a proposed project can be used on areas where new development is proposed. A developer can reduce the number of trips by paying for on- and off-site bikeway improvements that encourage bicycling or walking rather than driving. Also, In-lieu parking fees may be used to help construct new bicycle parking or bike racks along the trail.

Volunteer Resources

Local volunteer programs can assist in reducing the cost of implementing and or maintaining portions of the trail. Groups like the California Conservation Corps (CCC) have helped agencies across the country with

trail and related facility implementation. Local schools or community groups may use the trail as a project for the year, possibly working with the city to offer construction, conservation and restoration, sign installation, or other trail related assistance. A local construction company may donate or discount services. A challenge grant program with local businesses may be a good source of local funding, where corporations, conservation groups, biking and hiking groups, or families “adopt a trail” and help construct and or maintain segments of the trail.

Funding Sources

There are a variety of potential funding sources including local, State, regional, and federal funding programs that can be used to construct the proposed bicycle improvements. Most Federal, state, and regional programs are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. Local funding for bicycle projects typically comes from Transportation Development Act (TDA) funding, which is prorated to each community based on return of gasoline taxes. Funding for many of the programs would need to be funded either with TDA, general fund (staff time), or possibly private grants.

The following table presents a summary of available funding along with timing, criteria, and funding agencies.

Grant Agency	Deadline Dates	Contact Agency	Annual Total	Matching Requirement	Applicants	Eligible Projects			NOTES:
						Commute	Recreation	Safety/Ed	
FEDERAL FUNDING									
Safe Accountable Flexible Efficient Transportation Equity Act – A Legacy of Users (SAFETEA-LU) Regional Surface Transportation Program (RSTP)	varies by RTPA	RTPAs, Caltrans	\$320 m	11.47% non-federal match	cities, counties, transit operators, Caltrans, and MPOs	✓	✓		RSTP funds may be exchanged for local funds for non-federally certified local agencies; no match may be required if project improves safety. Contact Caltrans, (916) 654-3271
SAFETEA-LU Congestion Mitigation and Air Quality Program (CMAQ)	Dec. 1 yearly	RTPAs, Caltrans	\$400 m	11.47% non-federal match	federally certified jurisdictions	✓			Counties redesignated to attainment status for ozone may lose this source. Contact Caltrans, (916) 654-3271
SAFETEA-LU Transportation Enhancement Activities (TEA)	varies by RTPA	RPTAs, Caltrans	\$60 m	11.47% non-federal match	federally certified jurisdictions	✓	✓		Funds are dispersed through the four shares listed below.
Regional Share (TEA)	varies by RTPA	RTPAs, Caltrans	\$45 m	11.47%	federal, state, or local, depending on category	✓	✓		Funding share to RTPAs.
Caltrans Share (TEA)	varies by RTPA	Caltrans	\$6.6 m	11.47%	Caltrans	✓	✓		Funding share to Caltrans. Available only if regional TEA funds are not used
Statewide Transportation Enhancement Share (TEA)	varies by RTPA	Caltrans, State Resources Agency	\$20-30 m	11.47%	federal, state (except Caltrans), regional and local agencies with a state partner	✓	✓		Funding share for all 12 TEA categories except conservation lands.
Conservation Lands Share (TEA)	varies by RTPA	Caltrans, State Resources Agency	\$11 m	11.47%	RTPAs, counties, cities and non-profits.	✓	✓		Funding share for conservations lands category - acquisitions of scenic lands with high habitat conservation value.

Enforcement, Maintenance & Funding



Grant Agency	Deadline Dates	Contact Agency	Annual Total	Matching Requirement	Applicants	Eligible Projects			NOTES:
						Commute	Recreation	Safety/Ed	
SAFETEA-LU Recreational Trails Program (RTP)	Oct. 1	State DPR	\$3 m	20% match	jurisdictions, special districts, non profits with management responsibilities over the land		✓		For recreational trails to benefit bicyclists, pedestrians, and other users; contact State Dept. of Parks & Rec. , Statewide Trails Coordinator, (916) 653-8803
Land & Water Conservation Fund (LWCF)	May 1st	State DPR	\$7.7 m statewide	50%, including in-kind	Federal, state, city, county, eligible districts		✓		Federally-funded. Projects that acquire and develop outdoor recreation areas and facilities. Contact State DPR, (916) 653-8758
State Funding									
Environmental Enhancement and Mitigation Program (EEMP)	Nov.	State Resources Agency, Caltrans	\$10 m statewide	not required but favored	local, state and federal government non-profit agencies	✓	✓	✓	Projects that enhance or mitigate future transportation projects; can include acquisition or development of roadside recreational facilities. Contact State Resources Agency, (916) 653-5656
Safe Routes to School (AB 1475)	May 31	Caltrans	\$18 m	10% min.	city, county	✓	✓	✓	Primarily construction program to enhance safety of pedestrian and bicycle facilities. Contact. Caltrans District 10, (209) 948-7543
Habitat Conservation Fund Grant Program	October 1	State DPR		50% non-state	city, county, eligible districts				Includes a trails/program/urban access category. Contact State DPR, (916) 653-8758

Grant Agency	Deadline Dates	Contact Agency	Annual Total	Matching Requirement	Applicants	Eligible Projects			NOTES:
						Commute	Recreation	Safety/Ed	
Bicycle Transportation Account	June 1	Caltrans	\$7.2 m	min. 10% local match on construction	city, county	✓		✓	State-funded. Projects that improve safety and convenience of bicycle commuters. Contact Caltrans, (916) 653-2750
Regional Transportation Improvement Program (RTIP)	December 15, odd years: 2011 2013 2015	RTPA	Undetermined	N/A	city, county, transit operators, Caltrans	✓		✓	Part of State Transportation Improvement Program (STIP), the main state program for transportation project funding. For "improving transportation within the region." RTPA must program funds.
Petroleum Violation Escrow Account (PVEA)	On-going	State Legislature	\$5 m	N/A	city, county, transit operators, Caltrans				Bicycle and trail facilities have been funded with this program. Contact Caltrans Federal Resource Office, (916) 654-7287
Community Based Transportation Planning Demonstration Grant	November	Caltrans	\$3 m	20% local	MPO, RTPA, city, county	✓			Projects that exemplify livable community concepts. Contact Caltrans, (916) 651-6012
Office of Traffic Safety Grants	Jan. 31	Office of Traffic Safety	Undetermined	N/A	state, city, county			✓	Bicycle and pedestrian projects have been funded through this program. Contact OTS, (916) 262-0990
Transportation Development Act (TDA) Article 3 (2% of total TDA)	Jan.	RTPA	Varies	Varies w/funding total	;	✓			Bicycle and pedestrian projects. Meet Caltrans design criteria www.mtc.ca.gov/funding/STA-TDA/

Enforcement, Maintenance & Funding



Grant Agency	Deadline Dates	Contact Agency	Annual Total	Matching Requirement	Applicants	Eligible Projects			NOTES:
						Commute	Recreation	Safety/Ed	
LOCAL FUNDING									
Developer Fees or Exactions (developer fee for street improvements - DFSI)		Cities or County	Varies	Varies	Varies				Mitigation required during local land use approval process
Agency Acronym Legend: AQMD - Air Quality Management District Caltrans - California Department of Transportation CMA - Congestion Management Agency CTC - California Transportation Commission FHWA - Federal Highway Administration MPO - Metropolitan Planning Organization RTPA - Regional Transportation Planning Agency State DPR - California Department of Parks and Recreation (under the State Resources Agency) SAFETEA-LU – Safe Accountable Flexible Efficient Transportation Equity Act – A Legacy of Users (Check agency web sites for more details on funding updates and application requirements)									

*Funding sources as of January 2012 – subject to change.

Additional Funding Sources

CALTRANS SHA LOAN PROGRAM (AB 1012)

This program offers short-term (maximum four-year) construction loans to local entities for State Transportation Improvement Program (STIP)-eligible projects included within an adopted Regional Transportation Plan.

Generally the project cost must be \$10 million or more; however, they may make exceptions for counties with smaller populations.

(See http://www.dot.ca.gov/hq/innovfinance/about_us.htm)

CALTRANS GRANT ANTICIPATION REVENUE VEHICLES (GARVEE BONDS)

GARVEE Bond funding offers local entities the means to accelerate construction of critical transportation projects to provide congestion relief benefits significantly sooner than traditional funding mechanisms. Debt service on the bonds is repaid through future county or interregional share allocations.

Projects must be STIP-eligible for federal funds apportioned to the State, have environmental clearance, a completed project design, and must meet all applicable federal requirements. Funding is limited to right-of-way and construction costs.

TRANSPORTATION FINANCE BANK (TFB)

The U.S. Department of Transportation (US DOT) designated California to participate in its State Infrastructure Bank (SIB) Pilot Program, authorized under the National Highway System Designation Act of 1995. The SIB Program was established to provide flexible project financing through loans, debt service guarantees, lines of credit, and other capital financing support. California established its SIB, the Transportation Finance Bank, to offer credit assistance to public and private entities for any stage of an eligible highway construction or transit capital project.

Federal Funding

Safe, Accountable, Flexible, Efficient, Transportation, Equity Act - A Legacy of Users (SAFETEA-LU)

Federal funding through the SAFETEA-LU (Transportation Enhancements Act) program will provide the bulk of outside funding.

SAFETEA-LU currently contains three major programs, STP (Surface Transportation Program), TEA (Transportation Enhancement Activities), and CMAQ (Congestion Mitigation and Air Quality Improvement) along with other programs such as the National Recreational Trails Fund, Section 402 (Safety) funds, Scenic Byways funds, and Federal Lands Highway funds.



SAFETEA-LU was signed into law August 10, 2005 and expired as of September 30, 2009. SAFETEA-LU was extended in 2010.

SAFETEA-LU funding is administered through the state (Caltrans or Resources Agency) and regional governments (Calaveras County Council of Governments). Most, but not all, of the funding programs are transportation versus recreational oriented, with an emphasis on (a) reducing auto trips and (b) providing an inter-modal connection. Funding criteria often includes completion and adoption of a master plan, quantification of the costs and benefits of the system (such as saved vehicle trips and reduced air pollution), proof of public involvement and support, CEQA compliance, and commitment of some local resources. In most cases, SAFETEA-LU provides matching grants of 80 to 90 percent--but prefers to leverage other moneys at a lower rate.

With an active and effective regional agency such as the Calaveras County Council, the City of Angels should be in a good position to secure more than its fair share of SAFETEA-LU funding. It will be critical to get the local state assemblyman and senator briefed on these projects and lobbying Caltrans and the California Transportation Commission for these projects.

SAFETEA-LU Highlights

The **Surface Transportation Program (STP)** amended as follows:

- Funding amount variable per year.
- Bicycle and pedestrian projects remain eligible.
- Sidewalk improvements to comply with the Americans with Disabilities Act (ADA) are now eligible for Surface Transportation Program funds.

The **National Highway System (NHS)** program was amended as follows:

- Pedestrian projects may now be funded with NHS funds.
- NHS funds may now be used on bicycle and pedestrian projects within Interstate corridors.

The **Congestion Mitigation and Air Quality Improvements (CMAQ)** program was amended as follows:

- \$6 billion available nationwide.
- Bicycle project eligibility remains essentially the same.
- A small percentage can be transferred to other programs.

The **Recreational Trails Program** was amended as follows:

- Competitive grant program.
- 30% of funds allocated to non-motorized trails.

The **Transportation Enhancement Program (TE)** are projects that:

- Expand travel choices.
- Improve cultural, historic, aesthetic, and environmental aspects of our transportation infrastructure .
- 10 % of the Surface Transportation Program

State Funding

SAFE ROUTES TO SCHOOL (AB 1475)

The Safe Routes to School program is a state program using funds from the Hazard Elimination Safety program from SAFETEA-LU. This program assists cities to improve school commute routes by eliminating barriers to bicycle and pedestrian travel through rehabilitation, new projects, and traffic calming measures. Applications are due in July and should be submitted to the attention of your Caltrans District Local Assistance Engineer. A local match of 10% is required for this competitive program, which will allocate \$18 million annually. Planning grants are not available through this program. To apply for funds, read the SR2S Program Guidelines and complete an Application Form.

BICYCLE TRANSPORTATION ACCOUNT

The State Bicycle Transportation Account (BTA) is an annual statewide discretionary program that is available through the Caltrans Bicycle Facilities Unit for funding bicycle projects. Available as grants to local jurisdictions, the emphasis is on projects that benefit bicycling for commuting purposes.

TRANSPORTATION DEVELOPMENT ACT (TDA) ARTICLE III (SB 821) BLOCK GRANT FUNDS

Transportation Development Act (TDA) Article III require that each Fiscal Year, agencies in the County apply for their apportionment. The funds are state block grants awarded annually to local jurisdictions for bicycle and pedestrian projects in California. TDA application must include specific projects that will be funded by TDA apportionment for each year. These funds originate from the state gasoline tax and are distributed to local jurisdictions based on population. Exceptions can be applied to cities with smaller populations.



Financing

The majority of funding for trail projects is derived from federal sources. These funding sources are extremely competitive, and require a combination of sound applications, local support, and lobbying on the regional and state level.

The managing agencies and citizen support groups should monitor the project phases identified in this Master Plan and subsequent updates, and keep a year-to-year list of projects and their TDA and other local funding allocations. Each year the City staff should review the list of projects slated for the upcoming year, review the funding requirements, deadlines and the readiness of each project to be funded. The actual schedule for implementation on a year-to-year basis will be determined at minimum by the following parameters:

- Acquiring Funding
- Right-of-Way Control
- CEQA Approvals
- Local Support

