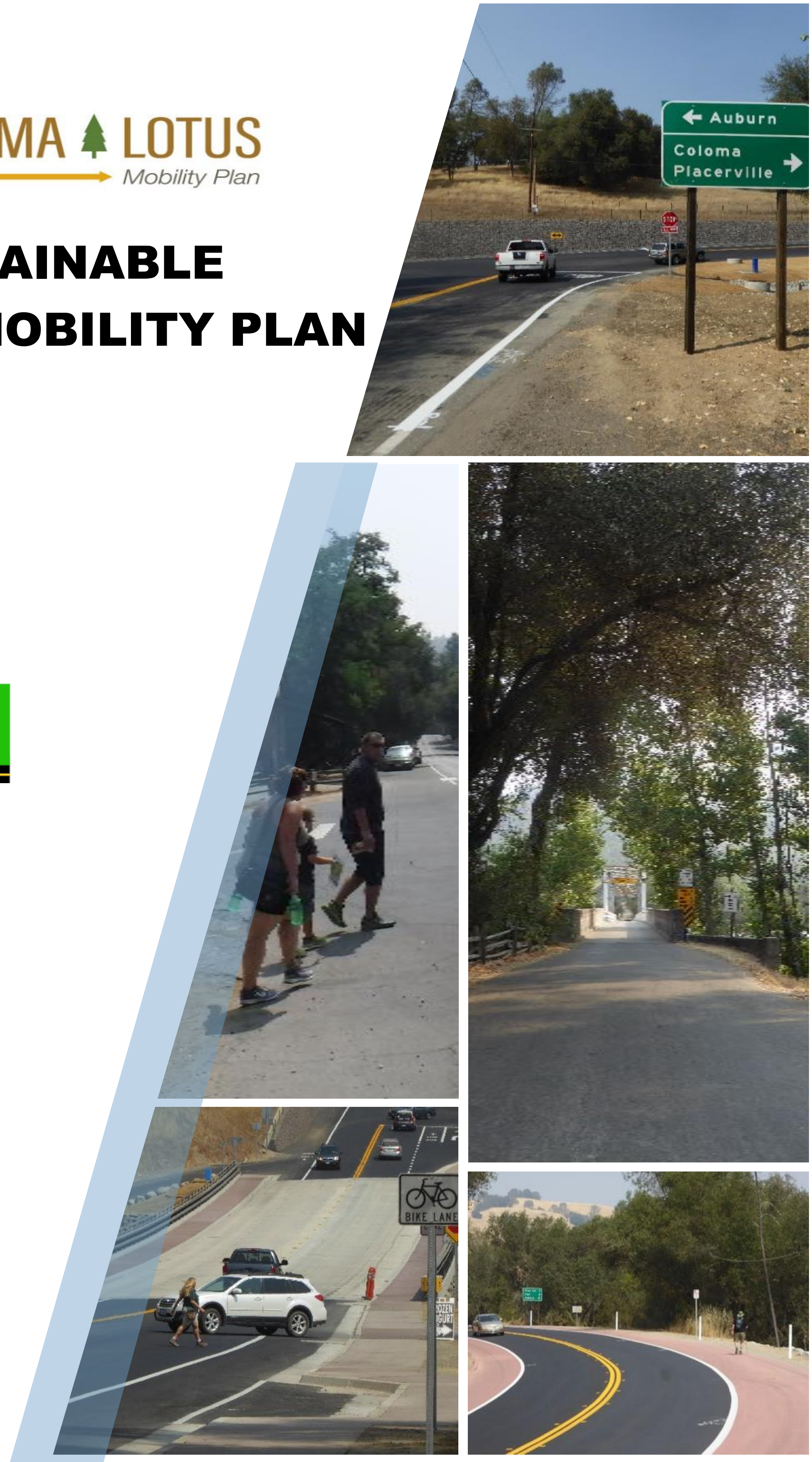
GHD

COLOMA LOTUS Mobility Plan

COLOMA SUSTAINABLE COMMUNITY MOBILITY PLAN

October 3, 2019



In collaboration with:

el dorado county edctc TRANSPORTATION COMMISSION

Caltrans

Funded By: Caltrans

COLOMA SUSTAINABLE COMMUNITY MOBILITY PLAN

October 3, 2019

Prepared for:

El Dorado Transportation Commission

Prepared in partnership with:
Caltrans; State Parks; County of El Dorado

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Executive Summary

Introduction

As the origin of California's Gold Rush and the genesis of one of American history's greatest migrations, the Coloma Valley is a place of state-wide and national historic significance. Moreover, the recreational assets provided by the South Fork of the American River traversing the Coloma Valley is globally recognized. With a local population of less than 1,000, the area is considered rural; however, tourism defines the local economy—bringing as many as 700,000 visitors from over 80 countries to the area each year. While historic tourism and river recreation comprise the majority of the visitation to the Coloma-Lotus corridor, the Coloma Valley's tourism industry includes burgeoning agritourism, hiking and mountain biking and horseback riding within the area's robust trail system, special events, and lodging economies.

Given that Coloma's transportation infrastructure was originally designed for local residential and ranching-oriented demand, the growth in visitation continues to place stress on the Coloma Valley's transportation system – designed primarily to circa 1950 standards. As a first step, two significant infrastructure improvements within Coloma have recently occurred or are scheduled to occur: 1) the recently completed South Fork American Bridge Project; and, 2) the impending Mount Murphy Bridge Replacement Project which is currently in its environmental phase. The two bridges bookend the State Route (SR) 49 corridor. The South Fork American Bridge Project replaced and upgraded the existing bridge to include two 12 foot lanes, 8 foot shoulders, 6 foot sidewalks, including river access improvements, supplemental parking, and traffic control. Similarly, the Mount Murphy Bridge Project will repair or replace the existing bridge crossing the South Fork of the American River in Coloma to provide greater multimodal access to Marshall Gold Discovery State Park. These two improvements represent the first steps in improving safety, mobility and connectivity for all road users of the Coloma Valley. This significant infrastructure investment will likely serve to induce greater visitation and the desire by visitors to access the many Coloma-Lotus recreational resources through active means of transportation. Improving the interface and multimodal connectivity of these two bridge improvement projects to the overall Coloma-Lotus transportation system represents a significant opportunity to improve mobility and accommodate future active transportation users within the Coloma-Lotus area.

The Coloma Community Sustainable Mobility Plan, called the Coloma-Lotus Mobility Plan (CLMP) herein aims to identify a prioritized list of supportive infrastructure treatments to provide safe, low-stress connectivity and accessibility between key points of interest, including residential neighborhoods, employment centers, shopping centers, schools, multi-modal connections, and recreation hubs. The study is funded by a Caltrans Sustainable Transportation Planning Grant, and supplemented by El Dorado County Transportation Commission (EDCTC) Surface Transportation Block Grant Program Exchanged Funds. It is the product of input received from the Coloma-Lotus community, Marshall Gold Discovery State Historic Park, El Dorado County, Caltrans, and the Coloma Sustainable Community Mobility Plan Stakeholder Advisory Committee (SAC), all of which emphasized the urgent need to proactively update the area's existing infrastructure to meet the needs of a growing tourist population. As a key emphasis, safety for pedestrians, bicyclists, and motorists on SR 49 and Lotus Road is highlighted with the goal of reducing conflict between all road users.

The CLMP study area includes State Route (SR) 49 through Marshall Gold Discovery State Park, along Cold Springs Road to State Route (SR) 153 and along Lotus Road through Henningsen Lotus Park from SR 49 to Bassi Road (see Figure ES.1).

Planning Goal, Objectives, and Approach

The CLMP is a guiding document to aid decision-makers in the funding and implementation of multimodal improvements to enhance the safety and efficiency the Coloma-Lotus transportation system. Although the plan focuses on active transportation infrastructure, all road users are considered. The document provides an assessment of baseline conditions, presents study area improvement concepts, and integrates a variety of performance metrics to determine the return-on-investment of the proposed expenditures. The latter will facilitate future competitive grant applications to implement the plan. The following objectives guided the development of the Coloma Lotus Mobility Plan:

- Build off the momentum created by the pedestrian and bicycle improvements of the South Fork American River Bridge Project and upcoming Mount Murphy Bridge Project to close the remaining gaps in the bicycle and pedestrian networks in Coloma-Lotus area with a focus on State Route 49 through the Gold Discovery State Park and on Lotus Road to, and south of Henningsen Lotus Park;
- Apply data collection methods including field observations, the use of cameras, and GIS and collision data to establish an accurate baseline of vehicle, bicyclist, and pedestrian counts, parking conditions, vehicle level of service, bicycle level of traffic stress and safety assessment;
- With direct input from the public and stakeholder groups, develop feasible corridor improvement concepts that: 1) maximize safety, accessibility and connectivity; 2) achieve acceptable operating conditions relative to future demand of all road users; 3) improve air quality; 4) provide consistency with Coloma's rural character and historic significance to deliver a prioritized plan of improvements that improves the safety and accessibility of all road users; and,
- Perform a transparent and objective performance-based analysis to identify preferred segment concepts using a variety of safety, demand and air quality analysis tools to calculate life-cycle

benefit-costs that will support infrastructure investment decisions made by EDCTC, Caltrans, California State Parks Department, El Dorado County, and other stakeholders. Specifically, this approach is intended to facilitate and inform the development of competitive grant applications for improvement implementation sponsored by EDCTC, Caltrans, California State Parks Department, and El Dorado County.

A key element of the CLMP planning process was active engagement with the public and stakeholders. The community engagement process helped establish a sound understanding of the unique local and historic conditions of the Coloma-Lotus study area, which in turn, helped inform the identification of context-appropriate improvements for addressing the safety and connectivity challenges in the study area.

Existing Conditions and Future Conditions Analysis

An analysis of current operational conditions was performed for all modes of travel within the study area, including motorists, pedestrians and bicyclists. This analysis, along with the public engagement process, was leveraged to determine the baseline conditions of the Coloma-Lotus study area and provide insight toward where resources would be best allocated to meet the needs of the corridor. Key findings of these assessments include:

- Locations/areas of greatest concern cited by the public include: SR 49 within Marshall Gold Discovery Park between SR 153 and Bridge Street; SR 153 at its juncture with SR 49; and, Lotus Road between the baseball field entrance and Firehouse Road. Greatest concerns cited by the public were high vehicular speeds; disregard by the motoring public of posted speed limits and intersection controls, pedestrian safety at crossings and bicycle safety.
- There are extensive connectivity gaps in both pedestrian and bicycle infrastructure. Lack of bicycling infrastructure accompanied by vehicular speeds – even within posted 25 mph zones – creates a high-stress environment for bicycling.
- Collision hotspots in order of frequency and severity are: SR 49 at Coloma Heights Road[1]; SR 49 at SR 153; SR 49 at Marshall Road; and Lotus Road at Bassi Road. Collision history along Lotus road indicates an evenly dispersed collision pattern which indicates a systemic segment-based safety problem on Lotus Road. Analysis of collisions types supports excessive speeds (rear-end and hit-object are indicative of excessive speed collisions).
- Pedestrian activity in the study area is heaviest on SR 49 near the Mount Murphy Bridge and Bridge Street. Bicycling activity is generally light. This is likely indicative of several factors including: the lack of bicycle infrastructure coupled with inadequate shoulder widths and prevailing vehicular speeds near or greater than 40 mph throughout much of the study area; the high-stress environment makes bicycling along SR 49 or Lotus Road in the study area limited to only

[1] Two serious collisions occurred at this intersection during the development of this report. These collisions are not reflected in the technical safety analysis.

confident and accomplished cyclist; and, the origin-destination desire lines may be more conducive to walking versus cycling – particularly within the State Park area.

- Analysis of study area intersection operations indicate that all intersections are operating at acceptable conditions with minimal delay experienced by motorists during the AM, Midday, or PM peak hours. No non-signalized intersections meet signal warrants at this time. These findings are not anticipated to be compromised by future growth in tourism.
- Parking supply is adequate to accommodate vehicular demand during average summer weekday and weekend conditions. However, anecdotally, peak event parking particularly associated with events at Henningsen Lotus Park can be strained. Additional parking is being planned by County Parks per the Henningsen Lotus Park Conceptual Master Plan.

Proposed Improvement Concepts

The proposed improvement concepts were developed based on transportation planning and engineering best practices and are intended to address the safety and mobility concerns highlighted during the public and stakeholder engagement process. All concepts are conceptual and have not gone through environmental review. Proposed improvement concepts are listed into four segments below (sub-segmented for presentation purposes) and graphically shown in Figure ES-1 and ES-2.

Segment 1: SR 49 – Marshall Road to Lotus Road

a. **West of Marshall Road** (Outside Study Area)

1. Continue Class II bike path beyond Amoloc Lane to Greenwood Creek
2. Connect southerly sidewalk to Amoloc Lane
3. Define shoulders as Class II bike lanes to Amoloc Lane

b. **Marshall Road and SR 49 Intersection**

1. Upgrade Intersection to channelize all approaches with bicycle and pedestrian Connections
2. Remove portion of two-way-left-turn-lane and add raised median islands/landscaping
3. Restrict Access to right-in-right-out for driveways on north (Coloma Club) and south River Shack Deli & Pub) sides
4. Add sidewalks on both sides of SR 49
5. Extend existing Class II bike lanes on both sides of SR 49 from Marshall to Amoloc Lane

c. **Marshall Road to Lotus Road**

1. Extend newly constructed sidewalk from bridge project limits west towards Marshall Road
2. Upgrade existing crossing near the River Shack to a Pedestrian Hybrid Beacon (HAWK)
3. Add Pedestrian Hybrid Beacon (HAWK) crossing at Beach Court
4. Add Pedestrian Hybrid Beacon (HAWK) crossing at River Park Drive

d. Lotus Road and SR 49 Intersection

1. Upgrade Intersection to roundabout - channelize all approaches with Bicycle and pedestrian connections with high visibility multi-stage crosswalks and lighting (*Environmental review of an intersection improvement project will include consideration of all potential alternatives)
2. Coloma gateway entry signage in roundabout
3. Add sidewalks and Class I multi-purpose path

Segment 2: SR 49 – Lotus Road to Coloma Heights Road

a. Lotus Road to Northerly North Beach Entrance

1. Narrow travel lanes to 11 feet
2. Reduce shoulder width to 4 feet
3. Add centerline rumble strips
4. Add Pedestrian Hybrid Beacon (HAWK) crossing at northern North Beach parking access
5. Add Class I multi-purpose path along River side of SR 49.
6. Vehicle speed feedback signs and additional 25 mph ahead notifications on southbound approach

b. North Beach Entrance to Mill Parking Pedestrian Access

1. Narrow travel lanes to 11 feet
2. Add sharrows for advanced cyclists (in 25 mph area)
3. Add Class I multi-purpose path on river side of SR 49.
4. Add Pedestrian Hybrid Beacon (HAWK) crossing at southern North Beach parking access

c. Mill Parking Pedestrian Access to Brewery Street

1. Narrow travel lanes to 11 feet
2. Add sharrows for advanced cyclists (in 25 mph area)
3. Add 10’ Class I multi-purpose path on river side of SR 49 from Mill Parking Lot to Mt Murphy Road transitioning to an 8’ multi-purpose path from Mt Murphy Road and Brewery Street.
4. Formalize parking on both sides of SR 49 near the Argonaut Farm to Fork Cafe and Post Office
5. Add sidewalk along west side behind parking lot
6. Add Pedestrian Activated Rectangular Rapid Flashing Beacons (RRFB) at: Brewery Street, Bridge Street, and at the North and South end of Mill Parking lot. Two additional locations were identified but are not prioritized at this time.

d. Brewery Street to Coloma Heights intersection

1. Narrow lanes to 11 feet
2. Convert south side sidewalk to decompose granite multi-purpose path from Back Street to Coloma Heights
3. Formalize State Park parking on north side to add distance between driveway and Coloma Heights intersection

4. Add striped center median on west leg

e. SR 49 and Coloma Heights Intersection

1. Narrow lanes to 11 feet
2. Realign and channelize intersection – add raised center median on south leg.
3. Continue decompose granite multi-purpose path through intersection from Coloma Heights south to SR 153

Segment 3: SR 49/Coloma Heights Road to Church Street and SR 153/Cold Springs Road to Monument Road

a. SR 49 and SR 153 Intersection

1. Narrow intersection approach lanes to 11 feet
2. Upgrade intersection to single-lane roundabout - channelize all approaches with bicycle and pedestrian connections with high visibility multi-stage crosswalks and lighting (*Environmental review of an intersection improvement project will include consideration of all potential alternatives)
3. State Park gateway entry signage in roundabout

b. SR 153

1. Narrow SR 153 lanes to 11 feet
2. Continue decomposed granite multi-purpose path from Coloma Heights south to SR 153/Cold Springs Road and continue to Monument Road
3. Add a vehicle speed feedback sign on SR 153/Cold Springs Road at northbound approach and on SR 49 westbound approach

Segment 4 Lotus Road – Bassi Road to SR 49

a. SR 49 to Henningsen Lotus Park

1. Narrow Lotus Road to 11 foot lanes to provide extra shoulder with existing pavement
2. Add centerline rumble strips
3. Add Class I multi-purpose path between Lotus Road and the river from SR 49 to Henningsen Lotus Park
4. Add vehicle speed feedback signs and additional 25 mph ahead notifications on southbound approach

b. Henningsen Lotus Park Entrance

1. Roadside clearing and/or lighting to improve visibility
2. Upgrade existing crossing at the ballfields and playground to Pedestrian Hybrid Beacon (HAWK)

c. Henningsen Lotus Park to Firehouse Road

1. Narrow Lotus Road to 11 foot lanes

2. Add vehicle speed feedback signs and additional 25 mph ahead notifications on Lotus Road northbound direction
3. Add centerline rumble strip
4. Add Class I multi-purpose path on west side of Lotus Road connecting Firehouse Road to Henningsen Lotus Park
5. Add Pedestrian Hybrid Beacons (HAWK) crossing at Firehouse Road

d. SR 49 to Henningsen Lotus Park

1. Add Class I multi-purpose path from near Beach Court at SR 49 to proposed pedestrian bridge crossing to Henningsen Lotus Park
2. Add pedestrian bridge crossing with Class I Multi-purpose path to Henningsen Lotus Park

e. Firehouse Road to Bassi Road

1. Narrow Lotus Road to 11 foot lanes
2. Add vehicle speed feedback signs and additional 25 mph ahead notifications on Lotus Road northbound direction
3. Add centerline rumble strip
4. Add pedestrian crosswalks on at intersection of Lotus Road and Bassi Road

Implementation and Next Steps

The conceptual drawings and designs in the Coloma Sustainable Community Mobility Plan present a future vision of potential transportation improvements in the plan area. A project, on the other hand, utilizes specific tasks within a scope, schedule and budget to construct transportation infrastructure such as a Class I bike path, sidewalk, or roadway improvement. Concepts presented in the Coloma Sustainable Community Mobility Plan may become a project when one of the agencies in the plan area that have jurisdictional authority to implement a project Caltrans, California State Parks, or El Dorado County – decide to implement a project within their jurisdiction. The project would then follow an approximately eight to ten year process of project development before it was constructed. The process to deliver a transportation project includes the following phases:

- Allocation of funding through all project phases including construction
- Execution of Project Initiation Documents (PID)
- Completion of environmental documentation required for project development under CEQA and NEPA, which includes mandatory public review and comment periods
- Acquisition of any needed right-of-way
- Completion of 100% Plans, Specifications & Estimates
- Construction of the project

The recommended proposed improvement concepts will serve to inform and guide future infrastructure and programming decisions based on available funding. To facilitate implementation options, alternative improvement concept packages were developed and prioritized based on potential return on investment. Benefit-cost assessments were based on: safety; mobility; health; air quality; recreation; and decreased auto-use. These criteria are key drivers for a variety of transportation funding sources.

Tables ES-1 and ES-2 summarize the monetized benefits, improvement costs and the resulting benefit-cost results by benefit category and by study segment respectively. The greatest return on investment by benefit category is for safety (i.e., collision reduction). The lowest return is for air quality improvement (i.e., vehicle emission reductions). Three of the four study segment improvement packages indicate a positive return on investment (B-C > 1.00). Table ES-3 shows how combining the improvements in Segment 1 and Segment 4 results in a positive return on investment (B-C > 1.00). Combining these two study segments is justified given that the proposed improvements address similar needs (i.e., providing a low-stress pedestrian/bicycle connection between SR 49 and Henningsen Lotus Park). Table ES-4 summarizes how the monetized benefits, improvement costs and the resulting benefit-cost results by category (i.e., mode shift, safety and air quality) become more favorable as a result of excluding the relatively high cost proposed pedestrian bridge improvement over the South Fork of the American River. Other “mixes” of improvement packages are possible and should be considered relative to the type of grant funding under consideration. Comprehensively, the overall B-C for the study area is 1.75. This and other technical information provided in the CLMP can be used by the EDCTC, the County of El Dorado, Caltrans and the State Park to inform future competitive grant application cycles as appropriate.

Table ES-1 Benefit-Cost by Benefit Category

Study Area	Total Annualized Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life-Cycle Cost	B/C
Study Area	Mode Shift to Bike Transportation	$ 1,164,251	$ 9,082,440	0.13	$ 23,285,010	$ 18,679,140	1.25
Study Area	Safety Benefit	$ 54,692,265	$ 29,906,100	1.83	$ 67,561,046	$ 42,365,829	1.60
Study Area	Air Quality/ Emissions	$ 4,662	See Mode Shift	.001	$ 39,460	See Mode Shift	.002
Study Area	**Total Benefit**	$ 55,861,178	$ 29,906,100	1.87	$ 90,885,516	$ 51,953,013	1.75

*Notes:

1. Monetized benefits based on Caltrans 2016 Societal Costs for Rural Areas. Costs based on capital cost plus O&M for Class I paths.
2. B/C results are not additive. Safety B/C reflects total improvement costs while Mode Shift and Air Quality reflect only improvement associated with bike facilities.

Table ES-2 Benefit-Cost By Segment

Segment	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life-Cycle Cost	B/C
1	$ 40,150,489	$ 15,434,900	2.60	$ 44,342,951	$ 17,106,213	1.77
2	$ 5,163,977	$ 5,907,900	0.87	$ 19,198,150	$ 16,057,500	1.20
3	$ 4,552,096	$ 2,225,300	2.05	$ 14,647,571	$ 3,035,300	4.83
4	$ 6,043,125	$ 6,338,000	0.95	$ 13,590,654	$ 15,754,000	0.86
Study Area	$ 55,861,178	$ 29,906,100	1.87	$ 90,885,516	$ 51,953,013	1.75

*Notes:

1. Monetized benefits based on Caltrans 2016 Societal Costs for Rural Areas. Costs based on capital cost plus O&M for Class I paths.
2. B/C results are not additive. Safety B/C reflects improvement costs while Mode Shift and Air Quality reflect only improvement associated with bike facilities.

Table ES-3 Benefit-Cost Summary Holistic (Combining Segment 1 and Segment 4)

Segment	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life-Cycle Cost	B/C
1 & 4	$ 46,193,614	$ 22,144,378	2.09	$ 57,933,605	$ 33,236,729	1.74

*Notes:

1. Monetized benefits based on Caltrans 2016 Societal Costs for Rural Areas. Costs based on capital cost plus O&M for Class I paths.

Table ES-4 Benefit-Cost (less Pedestrian Bridge)

Study Area	Total Annualized Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Year Life-Cycle Benefit	20 Year Life-Cycle Cost	B/C
Study Area	Mode Shift to Bike Transportation	$ 1,164,251	$ 1,957,440	0.59	$ 23,285,010	$ 11,554,140	2.00
Study Area	Safety Benefit	$ 54,692,265	$ 20,881,100	2.62	$ 67,561,046	$ 33,331,313	2.0
Study Area	Air Quality/ Emissions	$ 4,662	$ 1,957,440	.001	$ 39,460	$ 11,554,140	.003
Study Area	**Total Benefit**	$ 55,861,178	$ 20,881,100	2.68	$ 90,885,516	$ 42,928,013	2.12

*Notes:

1. Monetized benefits based on Caltrans 2016 Societal Costs for Rural Areas. Costs based on capital cost plus O&M for Class I paths.
2. No monetized benefit was credited to the Pedestrian Bridge. Costs based on capital cost plus O&M for Class I paths.
3. B/C results are not additive. Safety B/C reflects improvement costs while Mode Shift and Air Quality reflect only improvement associated with bike facilities.

COLOMA LOTUS Mobility Plan

0 0 1,400'
1 inch = 700 ft.

El Dorado County Transportation Commission
Coloma Sustainable Community Mobility Plan

VICINITY MAP OF STUDY AREA IMPROVEMENTS

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE ES-1

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Source:

COLOMA LOTUS Mobility Plan

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El Dorado County Transportation Commission Coloma Sustainable Mobility Plan

VICINITY OF MAP IMPROVEMENTS
MARSHALL GOLD DISCOVERY STATE PARK

Project No. **11180327**
Report No. **001**
Date **06.03.19**

FIGURE ES-2

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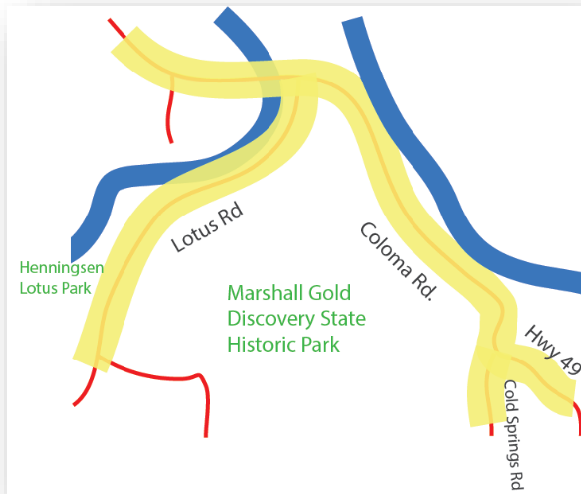
1. Introduction

The Coloma Community Sustainable Mobility Plan, referred to as the Coloma-Lotus Mobility Plan (CLMP) herein identifies a prioritized list of supportive infrastructure improvements to provide safe, low-stress connectivity and accessibility between key points of interest, including residential neighborhoods, employment centers, shopping centers, schools, multi-modal connections, and recreation hubs. Funded by a Caltrans Sustainable Transportation Planning Grant, and supplemented by El Dorado County Transportation Commission (EDCTC) Surface Transportation Block Grant Program Exchanged Funds, the CLMP was developed in coordination with the Coloma-Lotus community, Marshall Gold Discovery State Historic Park, El Dorado County, Caltrans, and the CLMP Stakeholder Advisory Committee (SAC).



The CLMP provides decision-makers with a clear understanding of existing and proposed conditions; identifies improvements; the ability to phase/prioritize the improvements; and, provides requisite information to facilitate implementation of the plan through competitive grant funding. Implementation of the CLMP will allow residents and visitors to safely and easily access desired destinations in the Coloma-Lotus area.

1.1 Study Area

Coloma is a census-designated place (CDP), with a relatively low population of 874 persons.[2] Tourism drives the local economy during the summer, fall and spring months—increasing the annual population by several hundred thousand each year. With abundant outdoor recreation opportunities, the presence of county, regional and state parks, and seasonal special event venues that serve the area, the draw of historic and agri-tourism and local-serving youth programs, visitation to the Coloma Valley has steadily increased. While the local population and employment growth is expected to remain relatively static, there is an expectation of continued growth in visitation and seasonal employment associated with tourism.[3]

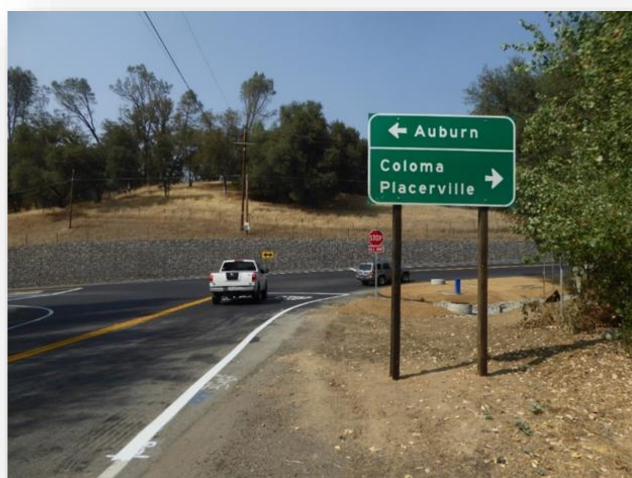
Anticipated growth in visitation will increase demand on already strained transportation facilities in the Coloma Valley, particularly those traversed by active users. Stakeholders have highlighted the

[2] U.S. Census Bureau, *2011-2015 American Community Survey*

[3] State of California Natural Resources Agency, Department of Parks and Recreation, *Marshall Gold Discovery State Park (Annual Visitation 2011-2016)*

need to address the issue of deficient facilities overwhelmed by the increasing number of visitors. The latter has increased the propensity for conflicts between vehicles, pedestrians and bicyclists, indicating the need to improve safety, connectivity and accessibility for all transportation users.

With the recent completion of the South Fork American Bridge Project and the impending Mount Murphy Bridge Replacement Project which is currently in its' environmental phase, an opportunity exists to parley these two significant infrastructure investments to improve the multimodal connectivity throughout the overall Coloma-Lotus transportation system. Recognizing this opportunity, meetings between California State Parks, El Dorado County, Caltrans, representatives of the community, and the EDCTC have provided the impetus for this study.



The CLMP project area includes SR 49 from Marshall Road to SR 153 / Cold Springs Road, including SR 49 through the State Park, Cold Springs Road from SR 49 through the State Park, and Lotus Road from Bassi Road through Henningsen Lotus Park to SR 49. SR 49 and Lotus Road are the foundation of the Coloma Valley's transportation network, which supports a relatively small resident population and large influx of tourists all in a tight geographic area bounded by ridges and the South Fork of the American River. SR 49 connects Coloma to the City of Placerville and Placer County cities to the south and west, respectively, while Lotus Road connects with roadways providing access to U.S. Highway 50 to Sacramento and South Lake Tahoe.

1.2 Background

1.2.1 Corridor History & Project Setting

Coloma is a small unincorporated community located within the river valley of the South Fork of the American River in El Dorado County. In 1848, James W. Marshall discovered gold near Coloma, beginning California's Gold Rush and shaping the cultural and physical future of the region.[4] Discovery of gold in Coloma's South Fork of the American River resulted in significant population growth, leading to one of the most influential mass migrations in American history. The origins of California's Gold Rush—which shaped the social, political, and environmental landscape of California and American history— are celebrated in Marshall Gold Discovery State Historic Park in Coloma.


118. James Marshall, the Discoverer of Gold

Following the Gold Rush, Coloma was El Dorado County's first County seat; however, when gold started to become less common, the seat was moved to Placerville, in 1857.[5] In the years that followed, Coloma's population began to dwindle. While the area is still considered rural and local population remains low, changes in tourism over the last several decades have drastically transformed the typical road user of the Coloma-Lotus corridor. Designed in the 1950s, Coloma's transportation infrastructure, namely SR 49 and Lotus Road, was planned to accommodate local residential and ranching traffic, and low volumes of interregional traffic. Since its mid-20th century implementation, transportation infrastructure within the Coloma-Lotus study area is not well suited to accommodate an increasing number of pedestrians, bicyclists and vehicles that comprise the approximately 700,000 visitors from over 80 countries that come to Coloma every year.[6]

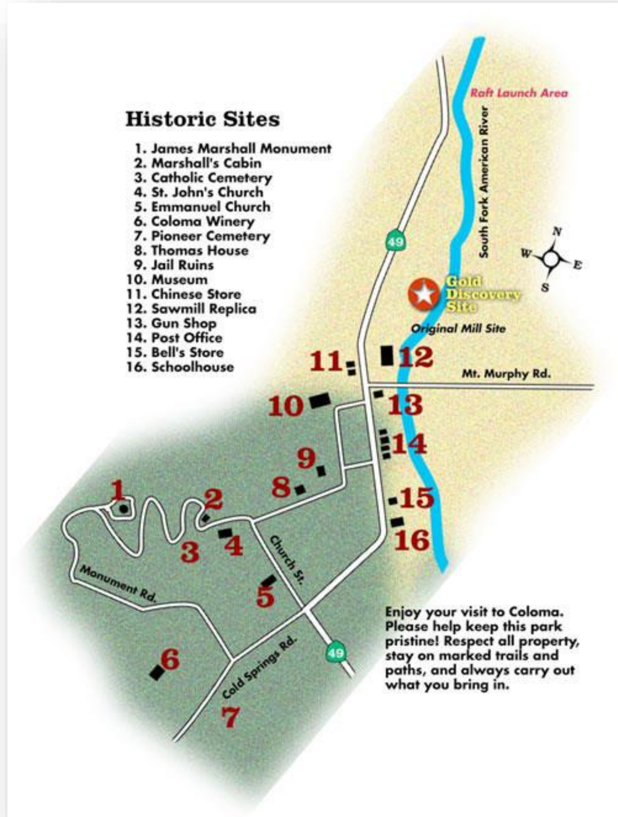
1.2.2 Parks, Recreation and Tourism

Visitation to the variety of tourist and outdoor recreation destinations in the Coloma Valley drives the local economy, providing Coloma with nearly $50 million in economic benefit each year.

[4] Profiles of California, edited by David Garoogian, *A Brief History of California*, Grey House Publishing, 2013.
[5] El Dorado County, Government, *About Us*
[6] El Dorado County Transportation Commission, Coloma Sustainable Community Mobility Plan RFP, April 2018

Visitation includes tourism grounded in the corridor's gold rush history, agriculture, river recreation, youth programs, and special events.

Parks sites within the Coloma-Lotus Valley include: Marshall Gold Discovery State Historic Park, Henningsen-Lotus County Park, and Cronan Ranch Regional Trails Park. These three destinations are the most extensive in the Coloma Valley with respect to size and amenities. In addition to these three major attractions, the Coloma Valley includes Dave Moore Nature Area, Greenwood Creek River Access, Magnolia Ranch Trailhead, all with parking areas that provide access to the South fork of the American River and hiking trails. Together, these locations provide tourism and outdoor recreation opportunities for visitors to the communities of Coloma and Lotus and the larger Coloma Valley. These destinations are described in greater detail below.



1.2.2.1 Marshall Gold Discovery State Historic Park

Marshall Gold Discovery State Historic Park (Marshall Gold Discovery SHP) was a key stakeholder throughout the development of the CLMP. The park serves the majority of the historic tourism to the area and includes a visitor center, museum, woodlands overlooking the river valley, and exhibits that describe the history of gold discovery in Coloma, surrounding El Dorado County and beyond.

Park visitors can participate in gold panning lessons, enjoy hikes along the park's numerous trails and rest at picnic areas situated within the serene oak woodlands of the park or view the Marshall monument, California's first historic monument and the final resting place of James Marshall.[7] Interpretive exhibits, historic buildings that survived the gold rush, youth programs, and regularly planned special events make the State Park a highly sought destination, which highlights the importance of the Coloma gold discovery to California State history specifically and American history more general. California Department of Parks and Recreation estimated 160,000 – 170,000 visitors annually in 2016, and visitation numbers are expected to increase in the future.[8]

Marshall Gold Discovery State Parks officials have identified several needed improvements within the park border. These include but are not limited to: providing better access to the southern portion of the State Park west of SR 153/Cold Springs Road; greater visibility of the park entrance gateways; improving connectivity of the off-road trail system within the park; better circulation to the State Park museum and visitor center – particularly during school field trips; reducing vehicle speeds of motorists on SR 49; and, increasing the margin of safety for pedestrians and bicyclists.

1.2.2.2 Henningsen Lotus Park

Henningsen Lotus Park, western El Dorado County's most popular recreation facility, is a roughly 50-acre park that provides a unique mix of public uses including: river and beach access; a

[7] California Department of Parks and Recreation, Marshall Gold Discovery State Historic Park, *http://www.parks.ca.gov/?page_id=484*

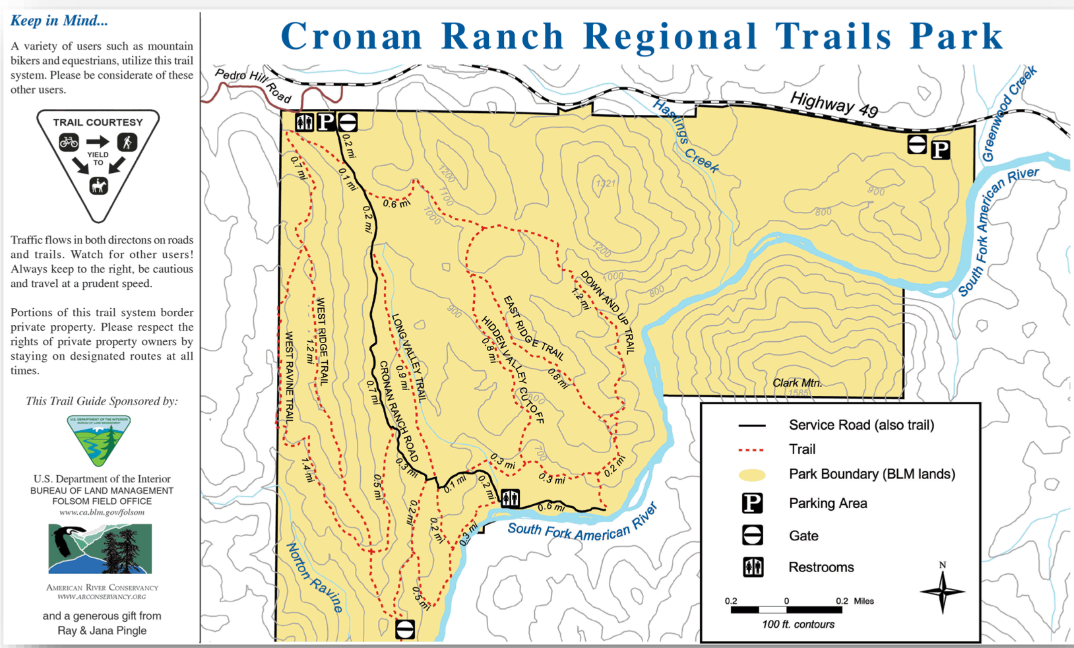
[8] State of California Natural Resources Agency, Department of Parks and Recreation, *Marshall Gold Discovery State Park (Annual Visitation 2011-2016)*

whitewater boating launch; sports fields; play structures; picnic areas; walking paths; three parking lots; and, pavilions which host a variety of public and private events.[9]

The Henningsen Lotus Park Conceptual Master Plan (2014) suggested a number of improvements to the existing trail system and the formalization of several informal routes between existing trail along the river and various beaches and gathering areas along the river. This plan acknowledges the need to improve existing facilities connecting river and historic recreation destinations with the greater Coloma-Lotus area.

1.2.2.3 Cronan Ranch Regional Trails Park

Cronan Ranch Regional Trails Park is situated four miles north of Coloma on SR 49 in Pilot Hill and borders the west bank of the South Fork of the American River. The park features twelve miles of trails used for a variety of recreational activities including hiking, mountain biking, and horseback riding. While the park is outside of the study area outlined in the CLMP, it is an important recreational attraction that draws recreational tourist visitation to nearby Coloma.[10]



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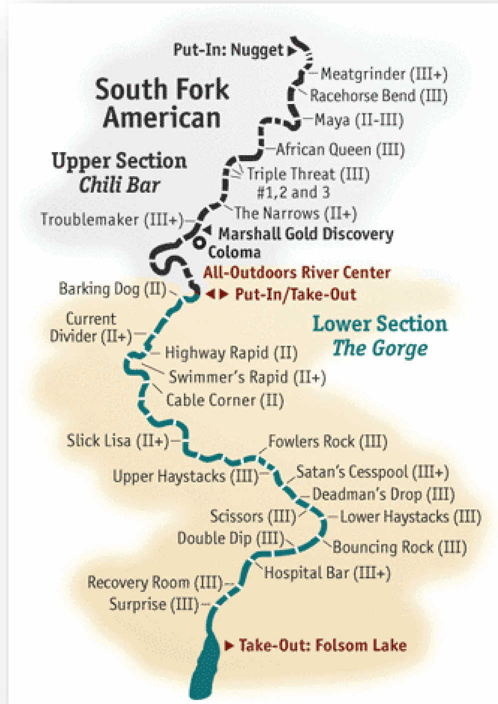
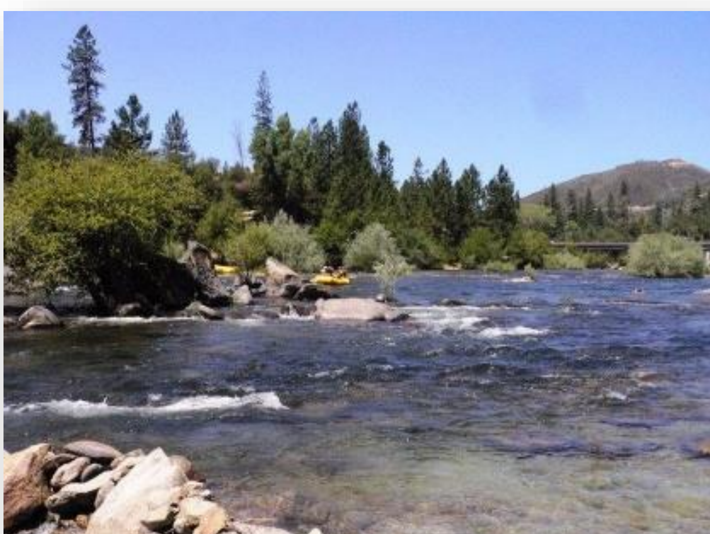
[9] El Dorado County, Parks and Trails, Henningsen Lotus Park, https://www.edcgov.us/Government/Parks/Pages/henningsen_lotus_park.aspx

[10] El Dorado County Transportation Commission, Coloma Sustainable Community Mobility Plan RFP, April 2018

1.2.2.4 South Fork of the American River



The South Fork of the American River serves as the epicenter of tourism in the Coloma Valley, providing the geography that spurred California's Gold Rush and impacted state and local history. The 21-mile long section of the South Fork of the American River spanning from Chili Bar Dam to Folsom Reservoir is the most popular whitewater rafting and kayaking destination in California. With a diversity of recreational facilities, river-front property, and annually scheduled recreational flows, this section of the South Fork of the American River is recognized across the country as a destination for Class II-III "white water" river recreation. In 2017, 105,541 boaters were estimated to have used the South Fork and 90,277 boaters were estimated in 2018.[11] Annual fluctuations are impacted by a variety of factors, including changes in water releases, summertime gas prices, unemployment rates, and public perception that the quality of river recreation is associated with snow pack rather than scheduled recreational water releases, which remain consistent between years.



From Coloma to Greenwood Creek in the Coloma Valley is a 5-mile middle section of the river that remains a consistently popular destination as a Class II section of the river, which coincides with the study area within the CLMP. To estimate seasonal river use, counts from two weekend dates, August 11, 2018 and September 2, 2018, one holiday and one non-holiday weekend day were averaged, and multiplied by 30, assuming that the majority of use occurs

[11] County of El Dorado, CAO, Parks Division, *El Dorado County River Management Plan 2018 Annual Report*

during the 30 weekend days that fall between Memorial Day Weekend and Labor Day Weekend.[12] Based on this estimation, approximately 45,645 people recreate along this section of the South Fork of the American River. Coloma is a popular put-in and take-out location for many users. Additionally, North Beach at Marshall Gold Discovery State Historic Park has become an increasingly popular put-in location for recreational tubers. Previous counts during holiday weekends below Marshall Gold Discovery State Historic Park showed up to 400 tubers floating this section.

1.2.2.5 Lodging, Agritourism and Special Events

While the majority of tourism in the Coloma Valley stems from visitors to Marshall Gold Discovery State Historic Park and from recreational activities, including river and trail use, visitors also come for camping, wine tasting, and special events. Places to stay include several campgrounds, private homes used as vacation rentals, and resorts. Privately owned campgrounds in the area have expanded in "growth and opportunity" with the increased popularity of commercial rafting and opportunities to hike and mountain bike in the area. The Coloma Valley wine industry is also expanding, providing another source of increased visitation to the area[13].

1.3 Regulatory and Planning Framework

This section summarizes the current policies and planning documents that guide and/or regulate the transportation planning decisions related to multimodal mobility improvements within the Coloma Valley. The purpose and goals of the following planning documents are discussed as they relate to the objectives set forth in the Coloma Lotus Mobility Plan (CLMP) and are incorporated, referenced, and utilized for justification for improvement concepts proposed for implementation.

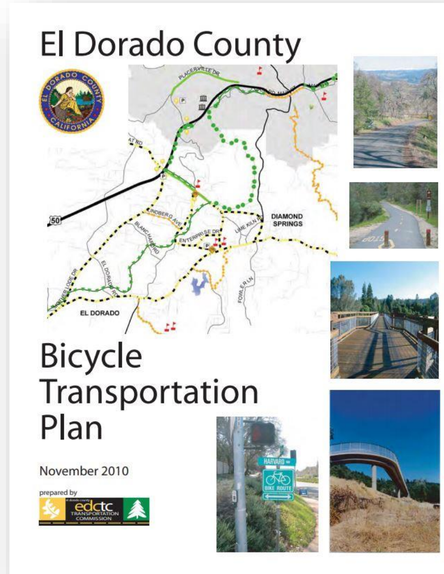
1.3.1.1 El Dorado County General Plan

The El Dorado County General Plan was adopted in July 2004, and last amended in September 2018. The document presents a set of policies and programs that form a plan for long-term development within the County. The General Plan aims to meet local and regional planning requirements, and guides development in the County. The transportation and circulation element addresses the composition of the County's non-motorized transportation system. More generally, the document describes low numbers of non-motorized

[12] County of El Dorado, CAO, Parks Division, *El Dorado County River Management Plan 2018 Annual Report*

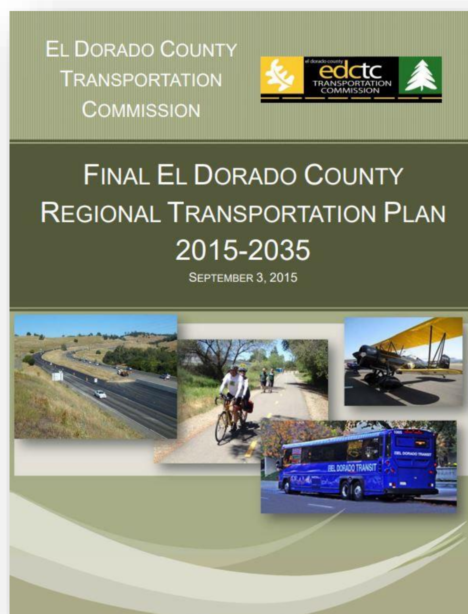
[13] State of California Natural Resources Agency, Department of Parks and Recreation, *Marshall Gold Discovery State Park (Annual Visitation 2011-2016)*

travel throughout the county due to low density development patterns, and lack of investment in bicycle and pedestrian facilities. The plan states that the majority of active transportation in the County occurs for recreational and social purposes rather than being an alternative mode to using a motor vehicle. The Coloma-Lotus area reflects the County's active transportation dynamic, and a lack of investment in facilities that support these uses.



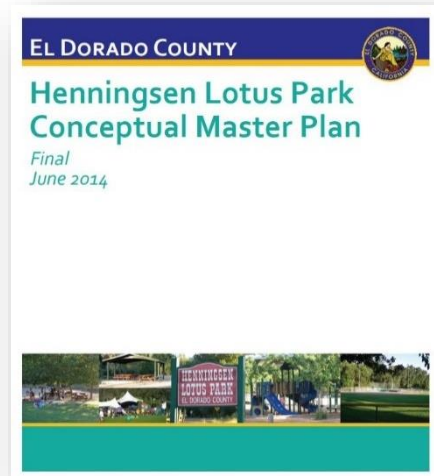
1.3.1.2 2010 El Dorado County Bicycle/Pedestrian Plan

The El Dorado County Bicycle Transportation Plan provides a framework for the development of the western slope of El Dorado County's bicycle transportation system. The plan aims to integrate land use development with multi-modal planning and the encouragement of bicycle commuting. Moreover, the plan intends to maximize safety, establish all possible funding opportunities, improve connectivity of the bikeway system, and develop segments of Class I Paths on the El Dorado Trail. The 2010 Plan identifies several improvements consistent with the proposed improvements within the CLMP, including Class II bike lanes on Lotus Road, and a Class I path, which includes a pedestrian bridge to provide river crossing access at the South Fork of the American River, near Henningsen Lotus Park within the CLMP study area. EDCTC is in the process of updating the 2010 El Dorado County Bicycle/Transportation Plan. The update will be a comprehensive Active Transportation Plan that includes both bicycle and pedestrian facilities in El Dorado County and the City of Placerville. The plan is scheduled to be completed in December 2019.



1.3.1.3 2015-2035 Regional Transportation Plan

The El Dorado County Transportation Commission (EDCTC) is the Regional Transportation Planning Agency (RPTA) for the western slope of El Dorado County. The Regional Transportation Plan 2015-2035 (RTP) was designed to be a guide for the systematic development of a balanced, comprehensive multimodal transportation system and provide a clear vision of regional transportation goals, objectives, and policies[14]. The RTP provides an assessment of existing and future needs, identifies improvements to meet these needs, and promotes consistency between the California Transportation Plan, the SACOG Metropolitan Transportation Plan, and other transportation plans developed by a variety of jurisdictions in response to statewide and interregional transportation issues and needs. The current plan highlights the reality of pedestrian and bicycle travel in El Dorado County, which is comprised of popular destinations for local recreational road travelers and tourists alike. Coloma is specifically identified as a frequent destination for recreational road travel due to its existence as a historic State Park and recreation center for river visitors.



1.3.1.4 Henningsen Lotus Park Conceptual Master Plan (2014)

Henningsen Lotus Park (HLP) is one of El Dorado County's most popular recreation facilities. The *Henningsen Lotus Park Conceptual Master Plan* is conceptual in nature and examines the improvement suggestions identified in the El Dorado County Parks and Trails Master Plan. The Henningsen Lotus Park Conceptual Master Plan includes a number of parking, recreation and trail improvements consistent with several of the alternatives proposed in the CLMP. The Henningsen-Lotus Park Concept Master Plan map and 2014 document can be found in Appendix D, which displays a clear overlap in trail improvements.

1.3.1.5 Marshall Gold Discovery State Historic Park Master Plan (1978)

Included in the Land Use and Facilities Element of the *Marshall Gold Discovery Master Plan* are several goals that relate to the intentions of the CLMP. These goals include: improving visitor orientation and circulation systems in the park; determination of the most suitable areas for the development and relocation of park facilities outside the prime historic areas; and identification of environmentally suitable areas for the development of recreation facilities.

[14] The EDCTC will complete an update of the Regional Transportation Plan by July 2020.

1.3.1.6 El Dorado County Active Transportation Connections Study (2017)

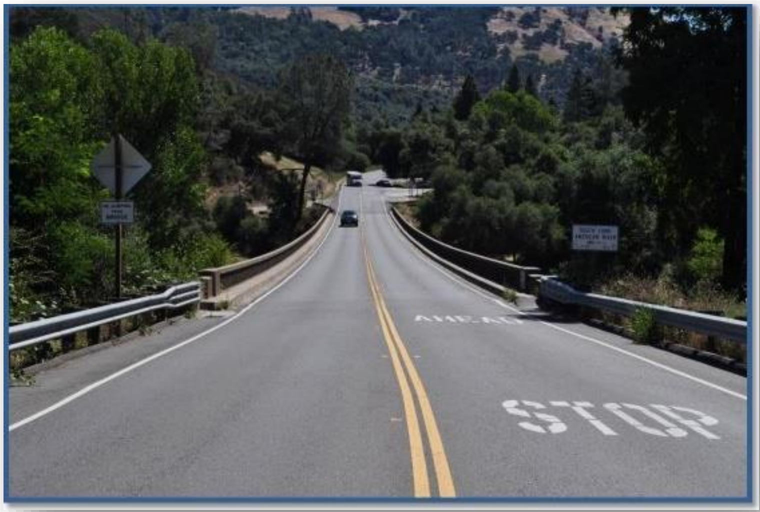
The *El Dorado County Active Transportation Connections Study* provides an outline for identifying which proposed active transportation projects might be the most competitive under grant application criteria and, provides a prioritized list of those projects. The study provides perspective and guidance for benefit-cost analyses, improvement prioritization and funding competitiveness of active transportation improvements in El Dorado County.

1.3.1.7 SACOG Bicycle and Pedestrian Transportation Master Plan (2015)

The *SACOG Bicycle and Pedestrian Transportation Master Plan* provides a guiding vision for a complete transportation system for the greater Sacramento region, with the goal of the implementation of a roadway system that supports healthy living, and active communities where bicycle and pedestrian modes provide viable, preferable, and safe choices for travel. Consistent with the El Dorado County Bicycle Transportation Plan 2010 Update, Caltrans District 3 Complete Streets Plan, and the CLMP, the SACOG Bicycle and Pedestrian Transportation Plan Update includes Class II Bike facilities on SR 49 and Lotus Road.

1.3.1.8 2017 Toward an Active California: California State Bicycle and Pedestrian Plan (CSBPP)

Toward an Active California is California's first statewide pedestrian and bicycle plan that describes the policies and actions to be implemented by Caltrans and its partner agencies to achieve the Department of Transportation's goal of doubling the number of walking trips and tripling the number of bicycle trips by 2020. Caltrans developed the plan to continue California's progress toward a sustainable, multi-modal transportation system that is safe for all road users. The plan aims to provide a vision to achieve the six goals of the *California Transportation Plan 2040*. The document focuses on policies and action that Caltrans can undertake, in conjunction with collaboration between the Caltrans and key agency partners. Moreover, the document's Performance Measures Technical Report describes and recommends several options for performance measures to evaluate system performance necessary to identify needs and gaps within local active transportation systems.



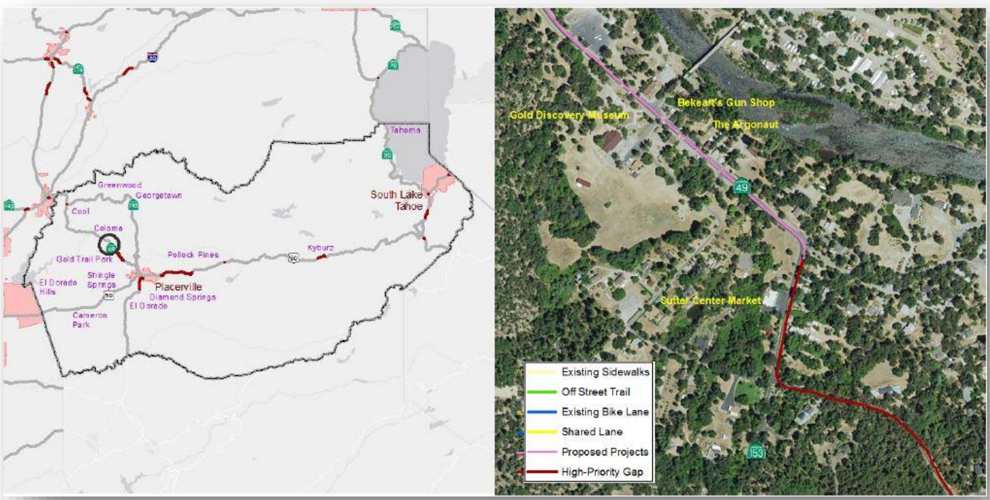
1.4 Planning Context

The Coloma Valley's booming tourism industry brings hundreds of thousands of visitors to Coloma annually, and the expectation of continued growth in visitation emphasizes the need to improve the area's transportation infrastructure. El Dorado County's decision-makers, stakeholders and community agree that Coloma's infrastructure lacks the ability to safely and effectively accommodate the bicyclists, pedestrians and motorists that traverse its existing roads—let alone those of the future.

As previously mentioned, Caltrans' State Route 49 South Fork of the American River Bridge Project was recently completed and the Mount Murphy Bridge Project is currently in the environmental phase. Together, these two projects provide a unique opportunity to further maximize the multimodal connectivity in the Coloma-Lotus area by identifying improvements that directly interface with these bridge improvements.

Proposed improvements in the CLMP study area have been identified in several planning documents described in the previous section. These include:

- The EDCTC Active Transportation Connections Study (2017) identified Class II bicycle facilities and 5 foot pedestrian facilities on SR 49 from Marshall Road to Lotus Road. [15]
- The El Dorado County Bicycle Transportation Plan (2010) also proposed Class II facilities along SR 49 through Coloma and along Lotus Road. While El Dorado County adopted the Bicycle Transportation Plan in 2010, it does not currently include a pedestrian plan. However, the new Active Transportation Plan being developed will include a pedestrian plan.[16]
- The SACOG Bicycle and Pedestrian Transportation Master Plan includes plans for bicycle lanes along SR 49 north of Coloma Heights Road, which would extend existing facilities on SR 49.[17]



Improvements recommended in the CLMP build upon the vision and methodologies described in these guiding documents to remedy identified active transportation infrastructure gaps and deficiencies in the study area.

1.5 Public Outreach

An extensive public outreach process was conducted throughout the development of the CLMP. Outreach efforts included two public workshops, four stakeholder meetings, and online engagement. The input received from these community engagement efforts helped to inform the study

[15] EDCTC *Active Transportation Connections Study*, August 2017

[16] The EDCTC is currently in the process of updating the 2010 Bicycle Transportation Plan.

[17] Caltrans District 3, *Complete Streets Plan*, May 2017

and the recommended infrastructure improvements. These outreach efforts are described below. Summaries of both community workshops, including inputs/responses from the polling and comment stations and the online questionnaire, are provided in Appendix A.

1.5.1 Community Workshops

Two community workshops were held during the course of the study, one in October 2018 and one in February 2019. The purpose and outcome of each workshop is described below.

1.5.1.1.1 Community Workshop # 1 – October 3, 2018

The purpose of the first workshop was to provide an opportunity for the community to learn about the CLMP, how to provide input, and how to stay engaged during the development of the plan. The workshop format included a presentation by the project team and an interactive live polling session. After the live polling session, the workshop proceeded into an open house format which allowed community members to provide input on key issues and needed improvements in the study area by placing comments on interactive boards. Community members were asked to provide input on where the issues are and/or where improvements are needed. A full summary of the workshop is provided in Appendix A.

The live polling session provided insight into workshop participant's foremost transportation concerns in the Coloma-Lotus area, which are discussed below.

Respondent Characteristics

A total of 52 members of the community attended the workshop, 25 of which participated in the live click polling. Forty-eight percent of respondents classified themselves as residents, while 8% classified themselves as a business owner/property owner. Thirty-two percent classified themselves as both residents and business/property owners, and 12% of respondents classified themselves as neither. Ninety-six percent of respondents stated they participated in recreational opportunities in Coloma.

Respondent Concerns

Respondents were asked what their biggest and second biggest concerns were for each corridor segment in the study area. Regardless of segment, *reducing vehicle speeds, bicyclist safety, and pedestrian safety* were cited as major concerns. The majority of respondents stated they wanted vehicle speeds reduced on SR 49 and Lotus Road, at 84 percent and 88 percent respectively.

Responses were mixed on the frequency of biking and walking on SR 49 and Lotus Road. For those who indicated they would not choose to ride or walk on either SR 49 or Lotus Road cited the lack of designated paths and fear for personal safety as their primary reason. Parking in the project area was cited as an issue only during summer weekends. Both controlled crosswalks with flashing beacons and roundabouts were favored as safety solutions and traffic control measures.

As part of the workshop, all community members were encouraged to place comments on study area maps to indicate precisely where key issues are and where improvements are needed. Those comments were geo-coded and cartograms displaying the collected responses from community members were developed and are provided in Figures 1.1, 1.2 and 1.3.

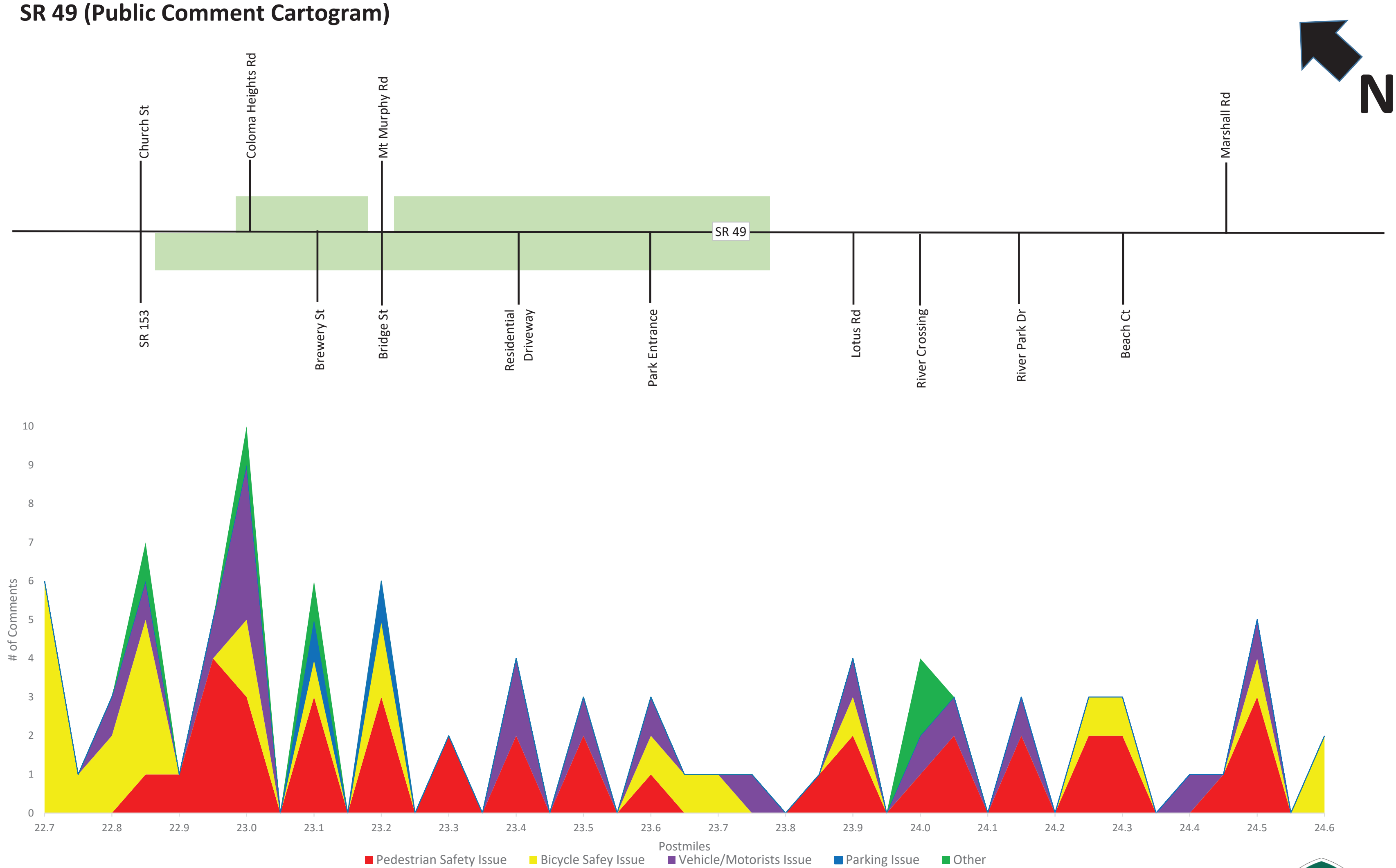
While a color identifies the type of concern, the height of a given location along the cartogram indicates the number of comments (i.e., indication of the magnitude of a given problem location). On the cartogram the x-axis marks the post-mile, the y-axis shows the number of comments and cross streets and park areas are denoted on top. The color and topography of the cartogram provides an indication of the areas or locations the public is most concerned about. The following colors denote a given concern:

- Red: reflects a pedestrian safety concern;
- Yellow reflects a bike safety concern;
- Purple reflects vehicle/motorist concern or operational issue;
- Blue reflects a parking concern; and,
- Green reflects “other,” an issue not included in any of the other dots. If community members wanted to list “other,” they were encouraged to leave a comment describing the issue on a post-it note.

As shown on the cartograms, the areas of greatest to concern expressed by the public who attended Workshop #1 include:

- Area within the Marshall Gold Discovery SHP between the SR 49 intersections at SR 153 and Bridge Street. Key issues are pedestrian safety and vehicle operations (excessive speeding) and biking safety nearer to SR 153.
- Lotus Road between the baseball field entrance of Henningsen Lotus Park and Firehouse Road. Key issues are pedestrian and bicycle safety and vehicle operations (excessive speeding). The intersection of Lotus Road and Bassi Road was also identified as a problem location with vehicle operations (excessive speeding) being the key concern.
- SR 153 at its juncture with SR 49. Key issues are pedestrian and bicycle safety and vehicle operations (excessive speeding).

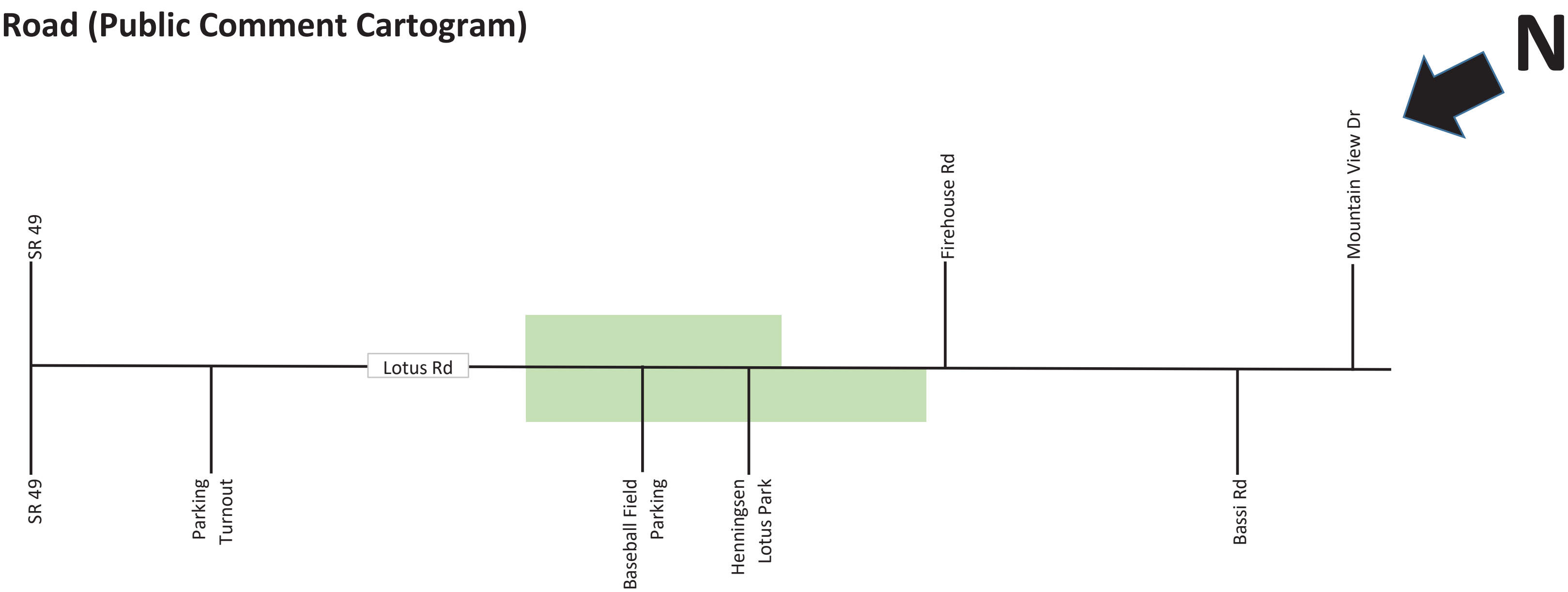
SR 49 (Public Comment Cartogram)

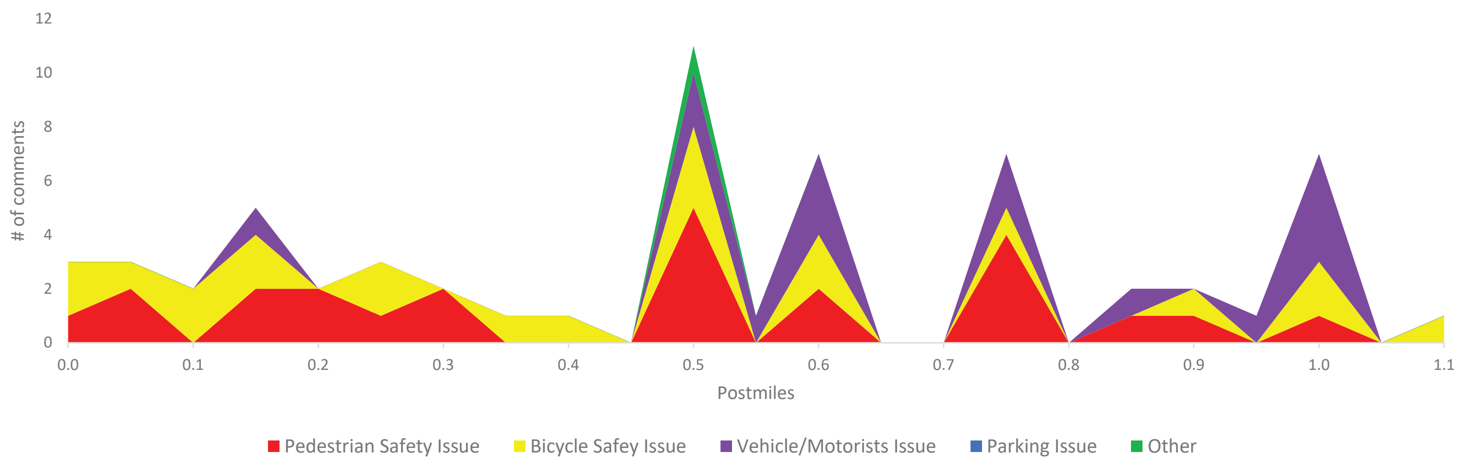


COLOMA LOTUS Mobility Plan

Figure 1.1

Lotus Road (Public Comment Cartogram)

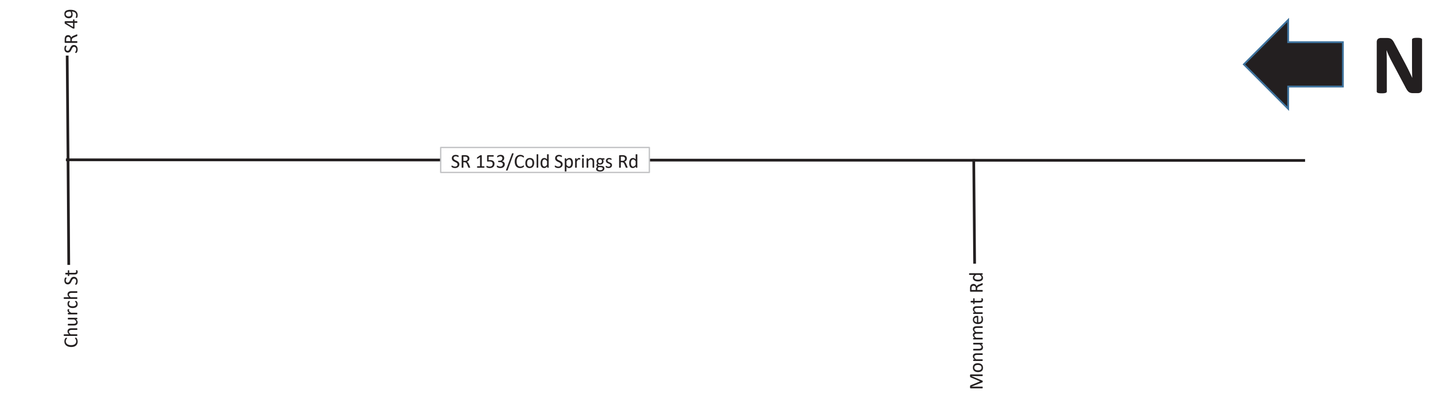


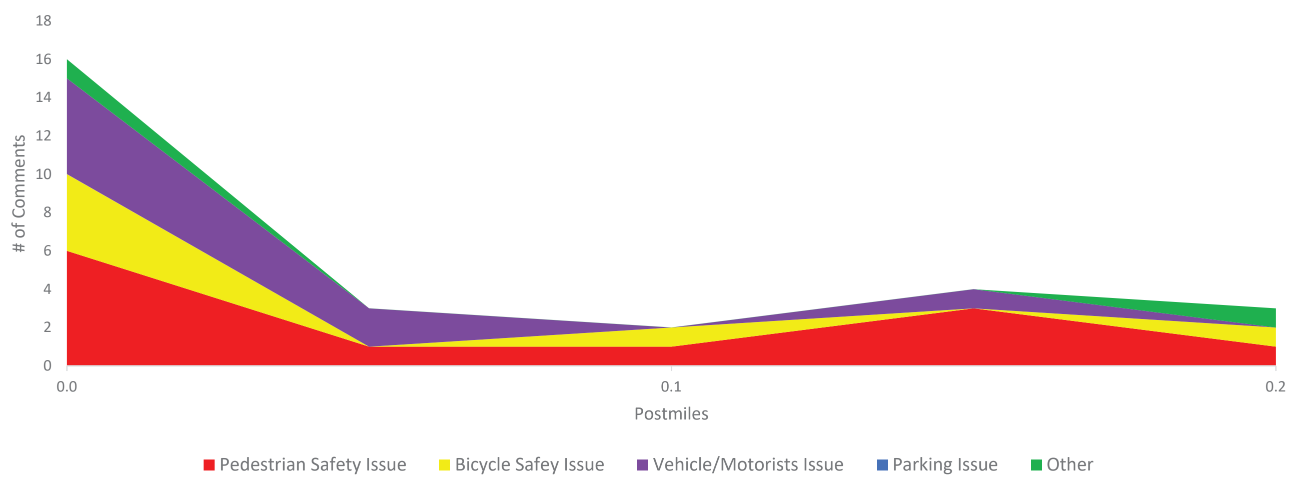


COLOMA LOTUS Mobility Plan

Figure 1.2

SR 153 (Public Comment Cartogram)





COLOMA LOTUS Mobility Plan

Figure 1.3

1.5.1.1.1 Community Workshop # 2 – February 5, 2019

The purpose of the second Coloma-Lotus Mobility Plan community workshop was to present the draft improvement recommendations and receive feedback from attendees on the community's priorities for improvements to enhance safety and connectivity within the Coloma-Lotus area. The format included a presentation by the project team, followed by a community open house, which allowed community members to view proposed improvements and provide input through post-it notes, comment cards, and one-on-one conversation with the project team. A full summary of the workshop is provided in Appendix A.

A total of 56 members of the community attended the second workshop. The open house format was comprised of information display boards of recommended improvements, and participants were asked to comment as to whether they could support the improvements. There were five information stations; one provided examples of proposed improvement types and four showed the improvement types that were being proposed along individual segments of SR 49 and Lotus Road in the project area. Each information station was staffed by one or more project team members who were available to walk community members through the displays and answer questions.

1.5.2 Online Engagement

To support and supplement public engagement efforts, a project logo and project page on the EDCTC website were developed. The website can be found at: https://www.edctc.org/coloma. The website provided project information, meeting summaries and other resources.

In addition to serving as a digital clearinghouse for study information, the CLMP project website hosted an online questionnaire from October 25th to November 25th. A total of 97 on-line questionnaires were completed. The online questionnaire provided the Coloma-Lotus community an additional opportunity to provide their thoughts on what they consider some of the biggest challenges/concerns within the study area and to offer their opinion on potential solutions.

The online questionnaire was identical to the questions asked during Workshop #1 and was intended to expand the survey sample and allow the results to be seamlessly combined. Although the responses varied slightly, the online questionnaire results emulated the workshop questionnaire results. In all, 122 of questionnaires were completed (25 at the first workshop and 97 on-line) which represents 14% sample of the total resident population in the Coloma-Lotus area (122 completed questionnaires / 874 residents). The full report of results from the Coloma-Lotus Mobility Plan Online Questionnaire is provided in Appendix A.

1.5.3 Media

The online questionnaire was posted on the EDCTC project website and social media platforms, as well as shared multiple times by other organizations, and was distributed on CL News, a local listserv. A news release including information about the Coloma-Lotus Community Study Workshops was sent to the following news sources:

- Coloma Lotus News
- Gold Country Media
- The Mountain Democrat
- Village Life Newspapers
- Sacramento Bee
- KCRA Channel 3
- KOVR Channel 13
- CBS Channel 13
- ABC Channel 10
- El Dorado Hills Telegraph
- The Clipper

Below are the community leaders, community-based organizations, neighborhood associations, and local agencies who shared the community open house information on their media platforms or through e-newsletters.

- Gold Trail Union High School District
- El Dorado County
- Coloma Lotus Business Council
- Coloma Lotus News
- El Dorado County Supervisor Lori Parlin, District 4
- Gold Trail Grange
- El Dorado County Chamber of Commerce
- Coloma Resort
- The Mountain Democrat
- Coloma Lotus Chamber of Commerce

- American River Recreation Association
- South Fork Arts and Recreation

1.5.4 Stakeholder Meetings

Three Stakeholder Advisory Committee (SAC) meetings occurred throughout the plan development process. The purpose of the meetings was to bring key stakeholders together to gather information early in the process, identify key issues and solutions, reach general consensus on the project approach, and receive input from stakeholders on candidate improvement concepts

1.5.4.1 Stakeholder Advisory Committee Members

- American River Conservancy
- American River Recreation Association
- American Whitewater
- Assistance League of Sierra Foothills
- California Outdoors
- California State Parks
- Caltrans
- Coloma Heights Homeowners
- Coloma Lotus Business Council
- Coloma-Lotus Chamber of Commerce
- Coloma Outdoor Discovery School
- El Dorado County Commission on Aging
- El Dorado County Senior Services
- El Dorado County Winery Association
- El Dorado County Youth Commission
- El Dorado County River Management Advisory Committee
- El Dorado Union High School District
- Friends of El Dorado Trails
- Gold Discovery Park Association
- Gold Trail Grange
- Gold Trail Union School District
- Marshall Gold Discovery State Historic Park
- Social Services Transportation Advisory Council
- South Fork Arts and Recreation

1.6 Performance Metrics

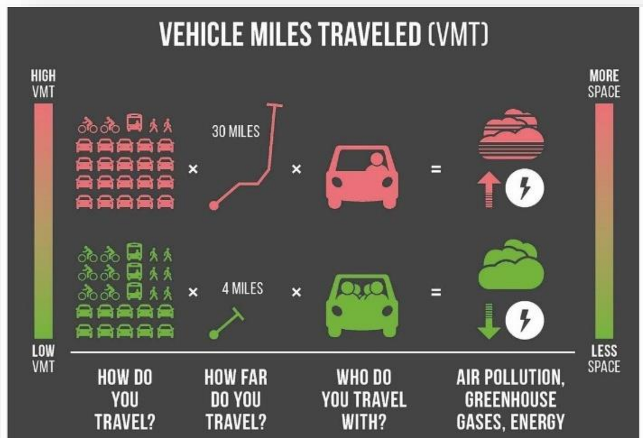
Several performance metrics were utilized to determine the multimodal baseline conditions in the CLMP study area. Some metrics such as delay, collision reduction, mode shift, and vehicle miles of travel reduction can be monetized and were incorporated into a benefit-cost analysis. Other quantifiable metrics such as indices, suitability scores, ordinal rankings etc., are not conducive to being monetized. It is important to understand that although some performance metrics cannot be monetized they still provide valuable information and can help inform improvement recommendations.

1.6.1 Vehicular Intersection Level of Service

Traffic operations were quantified through the determination of Level of Service (LOS), which is a qualitative metric that defines the experience of motorists. The measure of effectiveness that defines a motorist’s experience or LOS is delay. The greater delay – the worse LOS. LOS designates a letter grade "A" through "F" assigned to an intersection or roadway segment representing progressively worsening traffic conditions, determined by delay and congestion. “A” represents the best quality of service condition (little to no congestion) and “F” represents the worst (highly congested). LOS criteria are based on the Highway Capacity Manual (HCM) 6th Edition and are provided in Appendix B

1.6.2 Traffic Counts

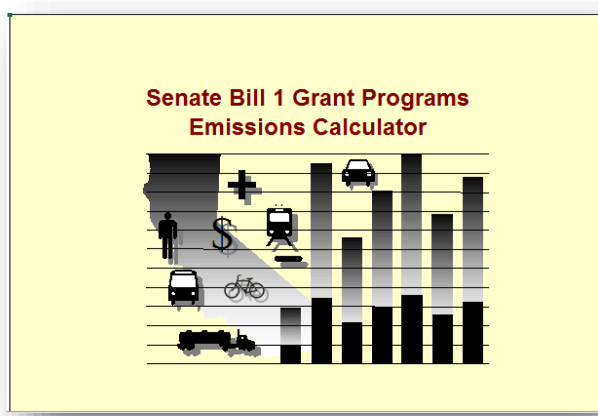
Bicycle and pedestrian counts were observed through direct observation on Friday and Saturday, August 24 and August 25, 2018. On September 25, 2018, peak hour intersection turning movement counts including vehicular, trucks, buses, and bicycle and pedestrian movements were collected by cameras mounted at seven locations within the project study area. Traffic counts were collected when local schools were in session within the AM and PM peak and Midday hours. Moreover, 2017 Average Annual Daily Traffic Volumes were obtained for SR 49 from Caltrans Traffic Census Program.



1.6.3 Vehicle Miles Traveled (VMT)

Vehicle Miles Traveled (VMT) is calculated by multiplying a number of trips by the average length of a given trip. Per SB 743, VMT is now the metric used to measure transportation impacts under the California Environmental Quality Act (CEQA). Decreasing VMT can result in improved air quality and health outcomes of a population. Trip lengths and therefore VMT per capita is generally lower in communities that are denser, more walkable, and provide safe opportunities for active transportation.

1.6.4 Air Quality



Air quality benefits associated with mode shifts to active transportation were estimated using the SB-1 Emissions Calculator. The SB-1 Emissions Calculator uses the latest California specific emission rates combined with regional vehicle fleet characteristics to estimate reductions in on-road mobile source emissions (i.e., criteria pollutants and greenhouse gases) associated with changes in vehicle activity (i.e., VMT reductions).

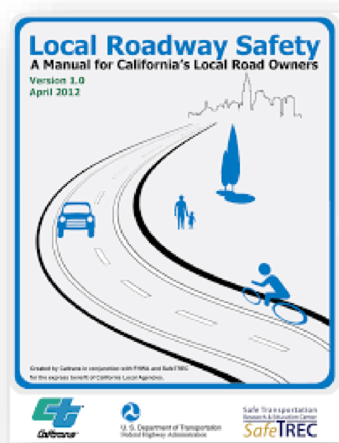
1.6.5 Bicycle Level of Traffic Stress

Based on the methodologies described in the Mineta Transportation Institute's *Report 11-19 Low Stress Bicycling and Network Connectivity* (2012), Bicycle Level of Traffic Stress (LTS) quantifies the stress level of a given roadway segment by considering a variety of criteria, including street width (number of lanes), speed limit or prevailing speed, presence and width of bike lanes, and the presence and width of parking lanes. LTS is designated with a 1 through 4 score, with 1 providing the most comfort and 4 providing the least comfort. Generally, LTS score of 1 indicates the roadway provides a stress level tolerable by small children, and a LTS score of 4 indicates a stress

level tolerable by only the strong and fearless of cyclists. For purposes of this analysis, LTS scores of 1-2 denote a low stress experience while LTS scores of 3-4 denote a high stress experience. As such, the goal is to achieve connectivity of the low-stress network among all key points of interest within the study area. By maximizing connectivity of the low-stress network, a greater proportion of the population who are willing and open to biking (60%) may consider using a bike for given trip rather than driving.

1.6.6 Safety

A safety assessment and collision analysis was performed to identify the concentration, severity and crash-type characteristics of collisions within the study area. Collision data for roadways and intersections within the study area was obtained through the El Dorado County Department of Transportation. The County receives, processes, and confirms the completeness of collision data from the California Highway Patrol's Statewide Integrated Traffic Records System



(SWITRS)—the accuracy of which is subject to reporting levels of law enforcement agencies supplying collision reports. Data was collected within a five-year period between January 1, 2013 and December 31, 2017 for collisions occurring on Lotus Road, State Route (SR) 49, and Cold Springs Road (SR 153).

Based on this data and the contributing factors of the baseline collision and safety analyses, location-specific and corridor-wide countermeasures were identified. Consistent with the Highway Safety Manual (HSM), the estimated reduction in collisions by collision type was determined. The predicted number of collision reductions were then monetized and included in the benefit/cost.

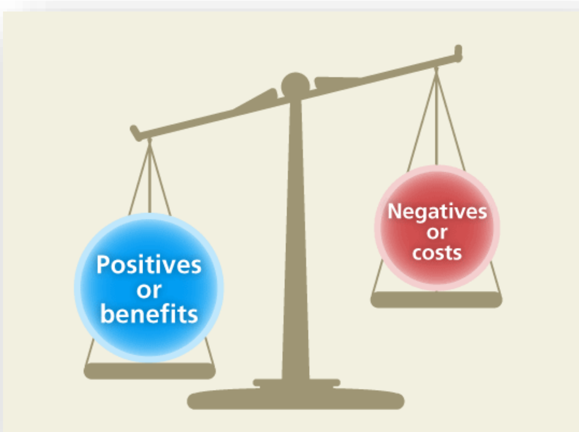
1.6.7 Origins and Destinations

Based on field surveys of the study area and GIS data from the El Dorado County website, significant points of interest were selected by EDCTC to inform the origins and destinations mapping, intended to reflect the mobility trends of both locals and residents within the study area. Origins and destinations within the study area were used to determine facilities necessary to improve safety and connectivity.

1.6.8 Improvement Costs

Proposed improvement costs were developed using planning level cost estimates based on per unit costs, quantities, and ROW needs of the improvements by segment. Unit costs were developed using the Caltrans cost database and industry standard values and were reviewed by El Dorado County Public Works.

1.6.9 Societal Costs



Monetized benefits were based on the Caltrans 2016 Economic Parameters of societal cost estimates developed by Caltrans Economic Analysis Branch and reflect statewide averages. This same societal cost information is resident in the Cal-B/C Framework (Cal-B/C V6.0 and Cal-B/C Corridor), Caltrans benefit-cost analysis software tool. The parameters are recommended for economic analysis on all modes, including highway, rail, and transit projects. The societal cost values for travel time, collisions and emissions were used for this study.

1.6.10 Benefit-Cost (Return on Investment)

Return on investment was studied in several ways: for the project area as a whole and by individual segment. To provide an indication of the projected return on investment for all project improvements within the study area, a benefit-cost (B/C) metric for the project area as a whole was developed. Moreover, a separate benefit-cost metric was developed for each of the study segments.

Benefit-cost was calculated using the following measures of effectiveness: Safety Benefit (i.e., collision reduction factor) using the HSIP calculator, and the Mobility, Health, Recreation, and Decreased Auto Use Benefits and vehicle emissions benefits using NCHRP 552 methodology and the SB-1 Emissions Calculator, which is discussed in further detail in Section 8.3.

Performance measures amenable to being monetized were first annualized and then expanded to reflect a 20-year improvement design-life (i.e., life-cycle costs). The proposed improvement costs were developed by using planning level cost estimates based on per unit costs, quantities, and ROW needs of the improvement by segment. Unit costs were developed using the Caltrans cost database and industry standard values and were reviewed by El Dorado County Department of Transportation. Planning level cost opinions were also developed including operations and maintenance (O & M) costs to determine the return on investment of the proposed improvements.

2. Existing Infrastructure

2.1 Overview

Field surveys of the CLMP project area were performed on Friday and Saturday, August 24 and August 25, 2018. Existing conditions data for infrastructure including presence of bicycle and pedestrian facilities such as bike lanes, sidewalks and crosswalks, and signage was collected and is described below.

2.2 Infrastructure

Seven striped crosswalks are located throughout the project area: One at Marshall Road, one in front of the River Shack, four within Marshall Gold Discovery State Historic Park, and one on Lotus Road at the Henningsen Lotus Park Playground.

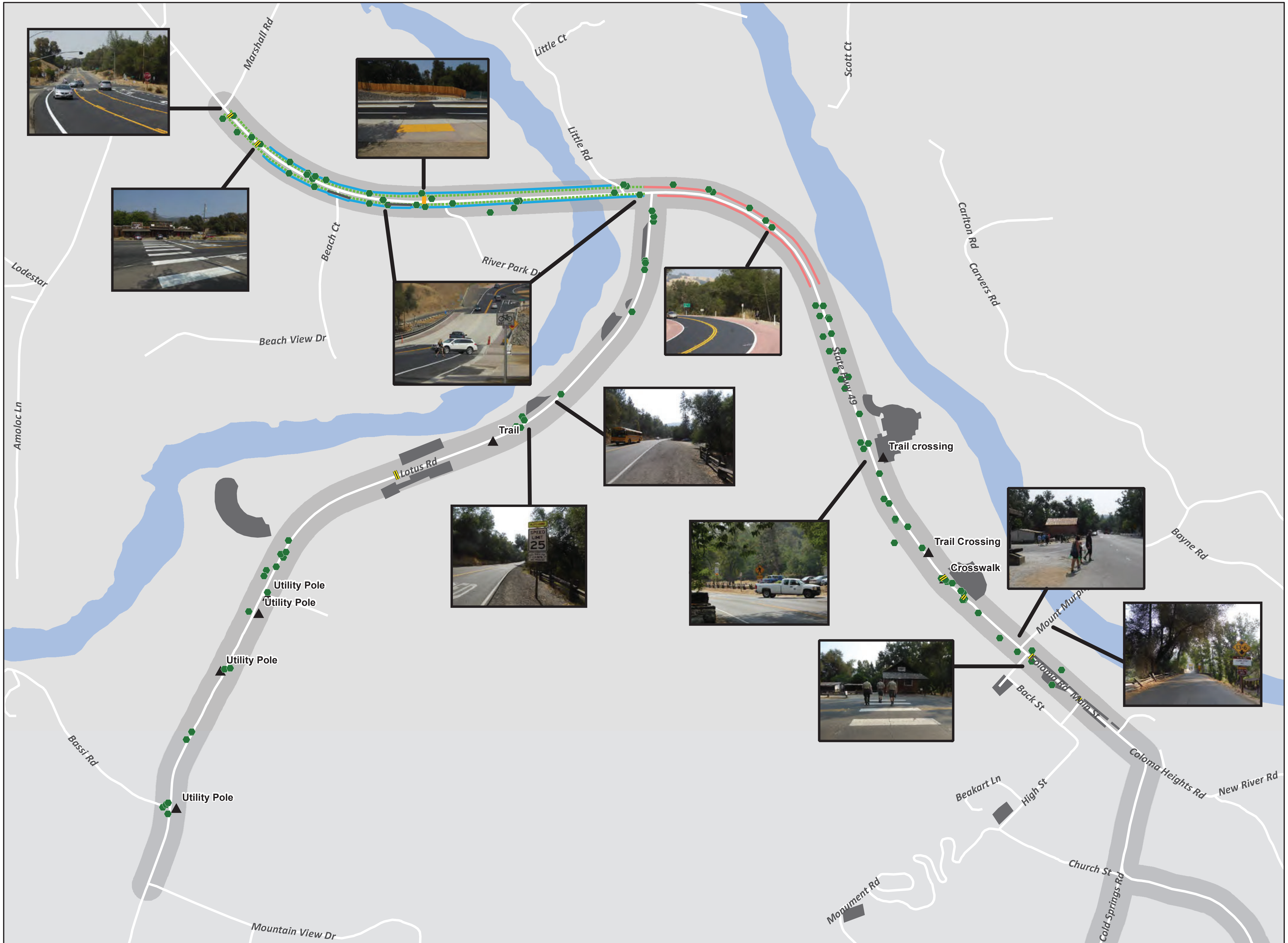
The project area's northwest terminus at Marshall Road features a crosswalk with flashing red stop light. A crosswalk location featuring curb ramp and median cut exists between Beach Court and River Park Drive, but the location does not have striping. The Gold Discovery Loop Trail crosses Highway 49 northwest of the Mill parking lot, but there is no crosswalk striping or signage. A three-way stop is located at the Lotus Road's intersection with Bassi Road. Stop signs are located in each travel direction, but no crosswalks exist at the intersection.

Class II bike lanes are located on both sides of SR 49 from Marshall Road to Lotus Road. Sidewalks exist in approximately the same stretch of roadway. Sidewalks begin just east of the Coloma Club crosswalk and end at Little Road on the north side and Lotus Road on the south side. East of the terminus of the sidewalks and bike lanes, the shoulder of SR 49 is colored red and is wide enough for pedestrian and bicycle use. Other than these areas, most of the project area lacks paved, accessible paths for pedestrian and bicycle travel.

Many unpaved pedestrian trails and roadside paths exist within the State Park. Based on input received during field reviews, elderly and disabled pedestrians can sometimes struggle to navigate these paths comfortably. A State Park employee noted that the trail from the Mill parking lot to the Mill Replica Site is ADA compliant but many children and elderly visitors struggle with the winding, unpaved path.

The speed limit along SR 49 is 45 mph from Marshall Road to Lotus Road, and 40 mph from Lotus Road to the North Beach parking lot in the State Park, where the speed limit drops to 25 mph. The speed limit is reduced temporarily to 15 mph at the eastern edge of the State Park, where the road curves south sharply at the intersection with Coloma Heights Road, and again just to the south as the road curves east near Church Street. The 25 mph zone ends after the second curve, but drops to 20 mph at the curve at the southerly limit of project area.

The speed limit along Lotus Road is 45 mph, except in the vicinity of the Henningsen Lotus Park Playground, where the speed limit is reduced to 25 mph when children are present.



COLOMA LOTUS Mobility Plan

- Signs
- Misc. Points
- Paved Shoulder
- Bike Lanes
- Sidewalks
- Bus Turn-Out
- Parking
- Project Area
- American River

Crosswalks

- Existing Striping
- Curb Cut Island

N

Miles

0 0.05 0.1 0.2

Existing Conditions Map

FIGURE 2.1

El Dorado County Transportation Commission

3. Study Area Origins and Destinations

3.1 Overview

Field reviews and GIS data from the El Dorado County website was used to identify notable destinations in the study area. Figure 3.1 shows the location of points where residents and visitors are likely to travel to and from along roads within the project area. These points of interest that create desire lines for biking and walking trips are described in detail below. Also included in this section is an overview of the Coloma-Lotus parking supply and parking demand characteristics.

3.2 Origins and Destinations

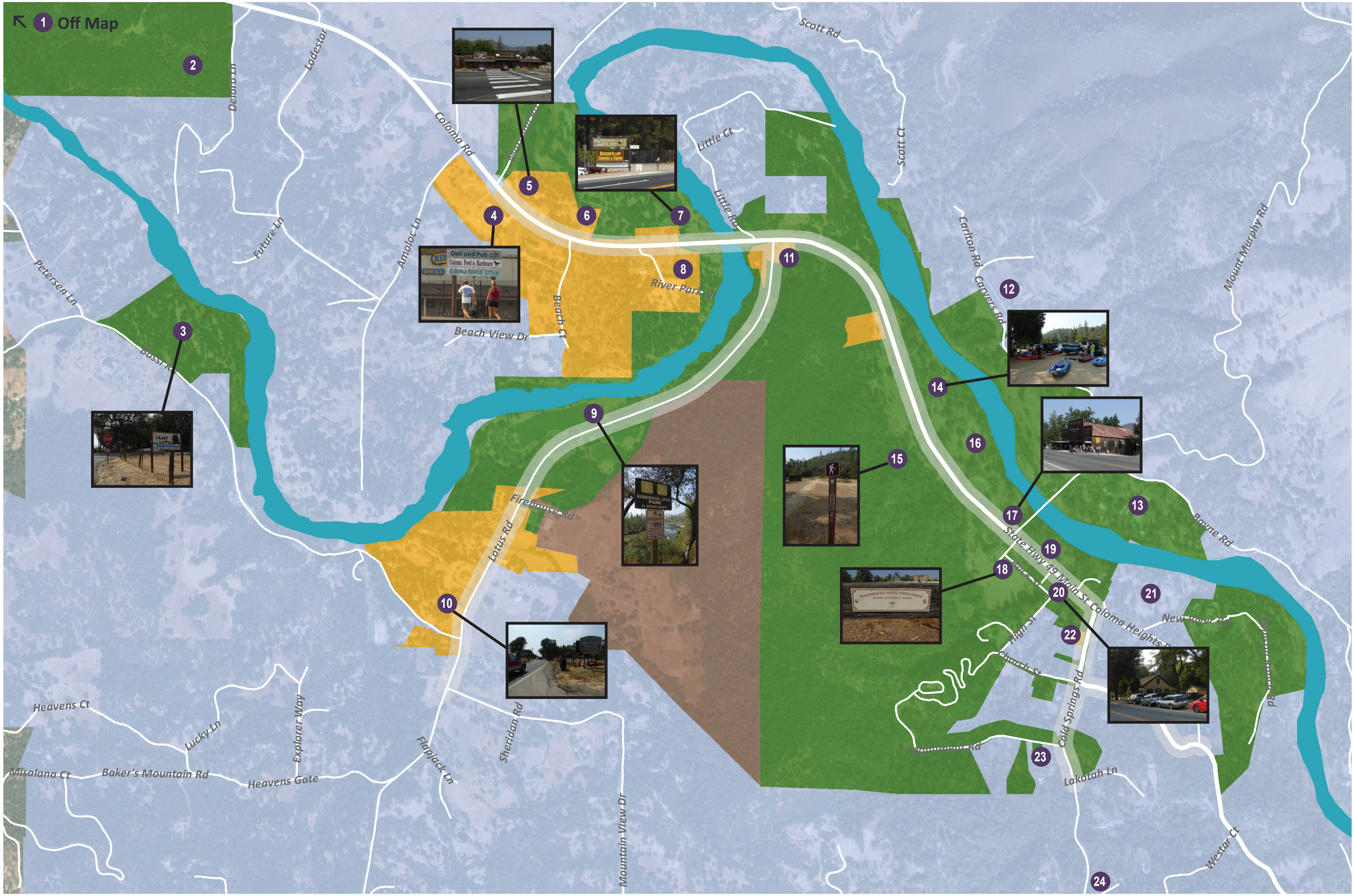
Notable destinations are numbered and sorted by category: Outdoor Recreation, Learning Activities, Community Hall, Lodging, Restaurants, Community, and Entertainment. Each numbered point on the map can be found in the legend at right, where each number is labeled and placed under its corresponding category.

Marshall Gold Discovery State Historic Park and its associated attractions are an important group of origins/destinations as the State Park is a destination for large numbers of tourists and school groups. Most visitors to the State Park drive personal vehicles, while some are brought in on buses including the majority of school groups. Nearly all visitors walk through the State Park along the roadway and cross SR 49 inside or out of the four crosswalks within the State Park. According to a State Park employee, the Mill site typically sees approximately 400 to 500 visitors each day, but sometimes the number climbs to 700 to 1000 per day, especially when school groups are visiting. The site is also visited by about 4 to 10 international guests each day.

Several restaurants and stores are located along SR 49 between Marshall Road and Lotus Road. This section of SR 49 has sidewalks and bicycle lanes and two crosswalks. However, the use in this area is much more vehicle-oriented area than in the State Park. The businesses in this section of the project area serve tourists as well as those who live in the surrounding residential areas with the bulk of their business occurring between Memorial Day and Labor Day.

While Lotus Road destinations are primarily oriented toward recreation and include Henningsen Lotus Park, All Outdoors Rafting and The River Store, one restaurant, The Lotus Pub, is also located on Lotus Road. Camp Lotus, a popular campground and recreation destination, is located on Bassi Road, which intersects with Lotus Road.

Several miles north of Coloma on SR 49, the Greenwood Creek River Access location, Magnolia Ranch Trailhead, and Cronan Ranch Trailhead. Together these three locations provide access to the South Fork of the American River for fishing and river running and to approximately 15 miles of trails used by hikers, mountain bikers, and equestrians. The trail system and river access are heavily utilized by Coloma Valley residents and visitors.



Origins and Destinations Map

FIGURE 3.1 Parking Analysis--Baseline Condition

El Dorado County Transportation Commission

Project Area
Agricultural Land
Commercial
Residential
Tourist Recreational
American River

0 600 1,200 2,400 Feet

N

COLOMA LOTUS Mobility Plan

Recreation Areas

1 Greenwood Creek
2 Dave Moore Nature Area
9 River Access
9 Henningsen Lotus Park
9 Henningsen Lotus Park Playground and Athletic Fields
14 North Beach
15 Monroe Ridge Trailhead
16 Gold Discovery Loop Trail
18 Beer Garden Picnic Area

Learning Activities

1 Mother Lode Rafting & Ropes Course
10 Current Adventures
13 Coloma Outdoor Discovery School
16 Gold Discovery Site
16 Sutter's Mill Replica
18 Gold Discovery Museum and Visitor Center
18 Marshall Gold Discovery State Historic Park
20 American River Conservancy

Lodging

1 Everhart/ Hart to Hart
3 Camp Lotus
7 Ponderosa RV Resort
7 Thousand Trails RV Resort
12 Villa Florentina
13 Coloma Resort
21 American River Resort
21 Coloma Cottages
24 Bella Vista Bed and Breakfast

Recreational Outfitters

4 Mother Lode Prospecting and Adventure Supplies
5 Reliable River Repair
6 California Canoe & Kayak
10 The River Store

Shopping and Dining

3 Camp Lotus Deli
4 River Shack
5 Coloma Club Café
6 Take a Bite Deli
6 Marco's Café
7 Gorilla Rock Tacos
8 Hotshot Imaging, Inc
8 Riyo Yogurt
8 Sierra Rizing Bakery, Catering & Coffee House
8 Squally's on the River
11 Sierra Nevada Photos
19 Argonaut Farm to Fork Café
22 Sutter Center Market

Post Offices

8 Lotus Post Office
19 Coloma Post Office

Events and Entertainment

17 Gold Trail Grange #452
23 Olde Coloma Theater

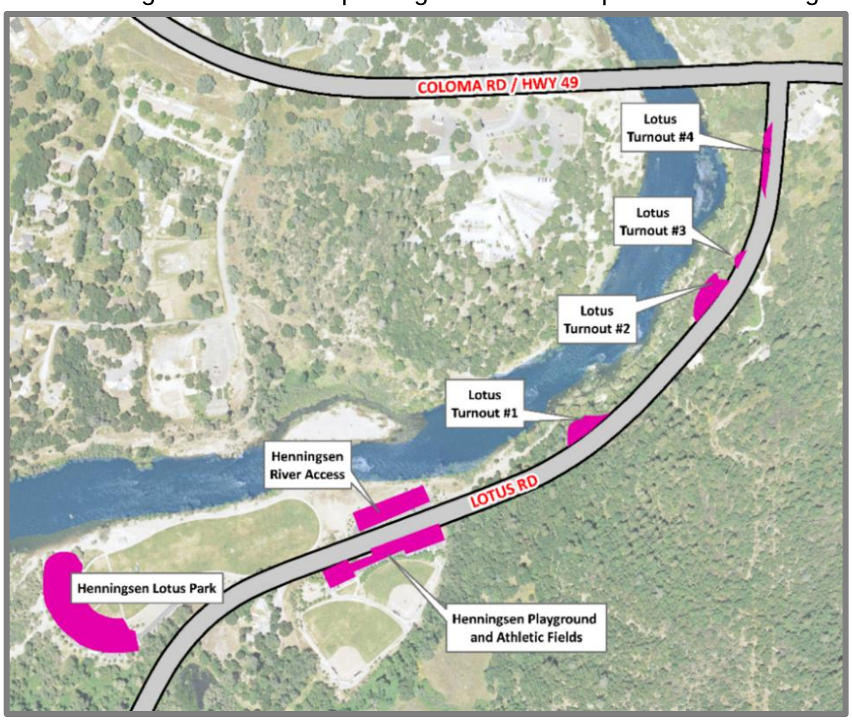
3.3 Lotus Road Parking

Parking counts were conducted along Lotus Road and SR 49 in two-hour blocks from 11:00 AM–1:00 PM and 2:00 PM–4:00 PM on Friday August 24, 2018 and 9:00 AM–1:00 PM on Saturday August 25, 2018 to capture both weekday and weekend usage. The parking analysis was conducted for 13 parking lots, gravel turnouts, and on-street parking areas along Lotus Road and SR 49. Three paved parking lots and four gravel lots were included in the parking analysis. The paved lots are located around Henningsen Lotus Park and are identified as follows: Henningsen Lotus Park, Henningsen Playground and Athletic Fields, and Henningsen River Access. The four gravel lots are located on the west side of Lotus Road between the paved lots at Henningsen Lotus Park and the terminus of Lotus Road at State Route 49. The four gravel lots are named Lotus Turnout #1 - #4 with #1 being the southernmost lot and #4 the northernmost lot.

Figure 3.2 Lotus Road Parking

3.3.1 Henningsen Lotus Park

The Henningsen Lotus Park parking lot serves the portion of Henningsen Lotus Park to the west of Lotus Road. This side of the park includes restrooms, a concrete walking track, river access and a large grassy area utilized as an athletic field or for other community purposes. The parking lot requires a parking fee collected at an attendant booth or drop-box in off hours, and consists of 128 parking spaces, 6 of which are for disabled parking. Parking day use fees are as follows: $5 per private vehicle, $18 per private vehicle annual pass, $45 per bus (25+ passengers), $22 per mini-bus (10-24 passengers), and $10 per vehicle with trailer. On the Friday the survey was performed, the majority of parking lot visitors used the park's river access as a drop-off point for river rafting, canoeing, kayaking and other water activities. Some general use was observed as well, such as joggers/walkers using the concrete walking track and dog-owners visiting with their pets. As seen in Table 3.1, which summarizes Lotus Road parking conditions, the project team observed much lighter use during the week than on weekends. The average observed use on Friday was 19.5% of capacity filled (or about 25/128 parking spots were full) compared to



an average 62.5% of capacity filled on Saturday (average 80/128 spots full). On Saturday, in addition to the visitors destined for the river, a martial arts event and youth soccer game took place in the park. According to the parking attendants and confirmed by data collected, peak parking use in this lot occurs on summer weekends around noon.

3.3.2 Henningsen Park Playground and Athletic Fields

The Henningsen Park Playground and Athletic Fields parking lot serves the portion of the Park to the east of Lotus Road. This portion of the park includes restrooms, water fountains, a children's playground, and two baseball fields. The parking lot requires a day use fee of $5 per private vehicle except for a few spaces reserved for visitors with children using the playground equipment and consists of 63 parking stalls, 3 of which are for disabled parking. Parking in this lot was relatively light throughout the observation period, and the average vehicle did not stay parked here very long (an average of about 38 minutes on Friday and 35 minutes on Saturday). On Friday, the lot was an average of 4.8% full (3/63 stalls full) compared to an average of 3.7% full (2.3/63 stalls full) on Saturday. Most users observed were visiting the children's playground equipment.

3.3.3 Henningsen River Access

The Henningsen River Access parking lot is located on the west side of Lotus Road north of the main Henningsen Lotus Park parking lot. The parking lot provides access to short trails that lead to the South Fork of the American River and to riverside amenities such as park benches and picnic tables. The parking lot requires a day use fee of $5 per private vehicle and consists of 54 parking stalls, 2 of which are designated for disabled parking. Parking in this parking lot was fairly light throughout the observation period, with an average of 9% full (4.9/54 stalls full) on Friday compared to an average of 8% full (4.3/54 stalls full) on Saturday. Many parking lot users arrived with fishing gear or came to eat lunch in the picnic area.

3.3.4 Lotus Turnout #1

Lotus Turnout #1 is located on the west side of Lotus Road to the north of the Henningsen Lotus Park River Access Parking Lot. This gravel turnout provides parking space for river access with fees being paid at the improved Henningsen Lotus Park locations. Discussions with users suggested that no parking enforcement existed at the turnout lots. Although this lot could be used as a parking alternative to the paved lots to the south, walking along the shoulder is dangerous due to the narrow and sloped shoulder and a blind, downhill curve where vehicles were observed speeding. The gravel lot does not have designated parking slots but supports a capacity of around 16 vehicles. Lotus Turnout #1 was an average of 18.8% full (3/16 stalls full) on Friday compared to an average of 19.8% full (3.2/16 stalls full) on Saturday.

3.3.5 Lotus Turnout #2

Lotus Turnout #2 is located on the west side of Lotus Road to the north of Lotus Turnout #1. This gravel turnout provides parking space for river access. The gravel lot does not have designated parking slots but supports a capacity of around 21 vehicles. Lotus Turnout #2 was an average of

1.6% full (0.3/21 stalls full) on Friday compared to an average of 2.4% full (0.5/21 stalls full) on Saturday.

3.3.6 Lotus Turnout #3

Lotus Turnout #3 is located on the west side of Lotus Road to the North of Lotus Turnout #2. This gravel turnout provides parking space for river access. The gravel lot does not have designated parking slots but supports a capacity of around 5 vehicles. Lotus Turnout #3 was an average of 6.7% full (0.3/5 stalls full) on Friday compared to an average of 3.3% full (0.2/5 stalls full) on Saturday.

3.3.7 Lotus Turnout #4

Lotus Turnout #4 is located on the west side of Lotus Road to the North of Lotus Turnout #3. This gravel turnout provides parking space for river access. The gravel lot does not have designated parking slots but supports a capacity of around 10 vehicles. Lotus Turnout #4 was an average of 5% full (0.5/10 stalls full) on Friday compared to an average of 20% full (2/10 stalls full) on Saturday.

3.3.8 Lotus Road Parking Summary

The Lotus Road Parking Analysis Summary can be seen in Table 3.1 below. As shown, parking supply within the Lotus Park area is sufficient to accommodate weekend parking demand with typically far more than 1/3 of available parking spaces being available at any one time. Parking duration typically spans no longer than 1.5 hours in most parking areas. The most popular and typically most utilized parking areas are the Hennignsen Lotus Park main parking area and the relatively small turnout areas #1 and #4.

Table 3.1 Lotus Road Parking Analysis – Summary Table

Parking Lot	Average Capacity (%)		Average Cars In Per 0.5 Hr		Average Cars Out Per 0.5 Hr		Average Time Parked (mins)	
	Friday	Saturday	Friday	Saturday	Friday	Saturday	Friday	Saturday
Henningsen Lotus Park	19.50%	62.50%	5.00	28.60	5.80	12.60	106.80	117.60
Henningsen Playground	4.80%	3.70%	2.60	2.00	2.33	1.20	38.40	34.80
Henningsen River Access	9.00%	8.00%	3.20	2.33	2.60	0.60	48.00	62.40
Turnout #1	18.80%	19.80%	1.40	2.33	1.20	1.40	101.40	47.40
Turnout #2	1.60%	2.40%	0.40	0.33	0.40	0.20	30.00	45.00
Turnout #3	6.70%	3.30%	0.20	0.17	0.20	0.20	60.00	30.00
Turnout #4	5.00%	20.00%	0.20	0.83	0.20	1.00	180.00	90.00

3.4 State Route 49 Parking

Two paved parking lots, one gravel lot, and three sections of on-street parking were included in this parking analysis. The paved lots are located around Marshall Gold Discovery State Historic Park on the northeast/river side of SR 49 and have been identified as follows: North Beach and Mill. The gravel lot is located riverside to the north of the State Historic Park and has been identified as the South Fork Turnover. One of the sections of the on-street parking is located to the north of the State Park on the west side of the Highway and has been identified as the American River On-Street Parking area. The other two on-street parking areas are located in the State Park/Coloma town core. One parking area is located near the Gold Trail Grange and the Argonaut Farm to Fork Café and is identified as Murphy on-street parking. The other is a small gravel turnout near the Beer Garden Picnic Area and is identified as Brewery Parking.

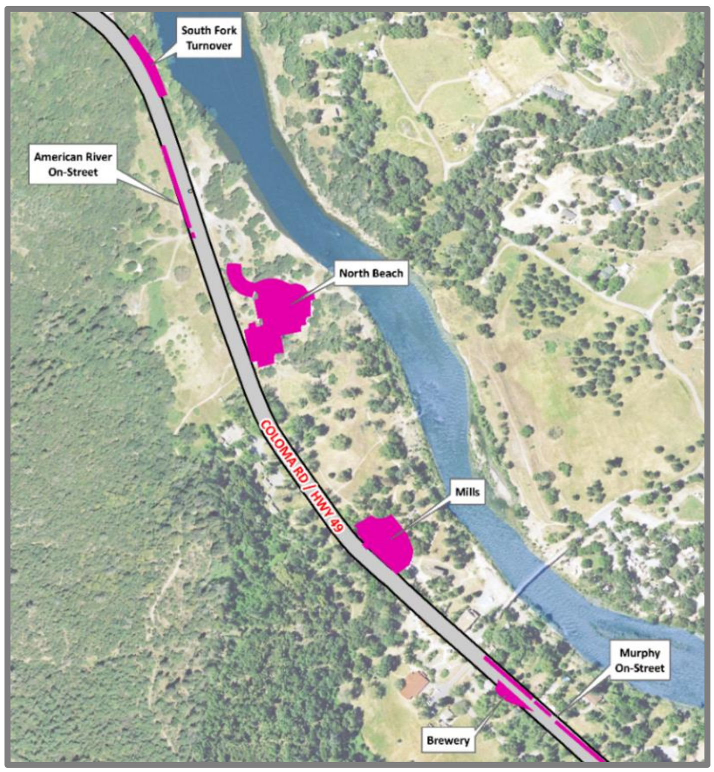


Figure 3.3 SR 49 Parking

3.4.1 North Beach

North Beach, the largest parking lot along SR 49, experienced higher amounts of traffic on Saturday, August 25, 2018 than on Friday, August 24, 2018. The North Beach Parking lot requires a fee for day use and provides access to a boat launch and take out and park amenities. The parking area allows for bus parking and is near to the river, picnic areas and restrooms. A walking path called the Gold Discovery Loop Trail connects the parking lot to the river, the park's Gold Discovery Site, Sutter's Mill Site, the Mill parking lot, Sutter's Mill Replica, Sutter's Mill Timber Display, the Park's Carpenter's Cabin, and two crosswalks that connect to State Park sites on the opposite side of SR 49. The parking lot has a maximum capacity of 115 parking spaces. During the four-hour period on Saturday, an average of 31.4% of the available stalls were occupied (36/115) while only 7.1% were occupied on Friday (8/115). Vehicles in this lot also tended to stay for a longer amount of time than other parking areas along SR 49, with an average of 132 minutes on Friday and an average of around 119 minutes on Saturday.

Two interviews with local residents took place along the walking path connecting the North Beach parking lot to the Mill parking lot. The residents stated that the 0.3 miles of unpaved dirt hindered the elderly and disabled from walking in downtown Coloma. Visitors were also witnessed jaywalking in front of the Mill parking lot due to a lack of crosswalks. Multiple desire paths could be pinpointed along Coloma Road. Particularly at the intersections of the Gold Discovery Loop Trail and Coloma Road.

3.4.2 Mill Parking Lot

The Mill Parking Lot is located on the riverside of SR 49 to the southeast of North Beach Parking. The Mill Parking Lot is connected to the North Beach Parking Lot by the Gold Discovery Loop Trail and provides access to the same park sites as the North Beach Parking Lot but is smaller with only 77 stalls and does not accommodate buses. Unlike North Beach, the Mill Parking Lot had a greater number of visitors on Friday during the survey. During the survey period the parking lot had an average occupancy rate of 16.1% on Friday (12.3/77). On Saturday, there was an average occupancy of 11.1% (8.5/77).

3.4.3 South Fork Turnover

During the observational period, parking at South Fork Turnover was prohibited. The gravel lot does not have designated parking stalls, but when open will have a capacity for approximately 20 vehicles.

3.4.4 American On-Street

The American On-Street parking area is on the west side of Highway 49 and is a gravel shoulder area. Although no designated parking spaces exist in this gravel lot, an estimated 15 vehicles could parallel park along this strip of shoulder. This parking area is not located near any State Park historic sites and does not provide river access without making a dangerous unprotected crossing of SR 49 and therefore was observed to be lightly utilized. Only one vehicle was parked on the shoulder area during the project team's field visit and was only parked for a half-hour.

3.4.5 Murphy On-Street

The Murphy on-street parking area is on-street parking located along the river side of SR 49. The on-street parking near Mt Murphy Road had the highest occupancy rates over the observational period. Of the 24 available stalls, 26.6% were occupied on Friday Saturday, August 25, 2018 and 42.7% on Saturday Friday, August 24, 2018. The large influx of visitors was attributed to the parking area's close proximity to The Argonaut Café and Bekeart's Gun Shop.

3.4.6 Brewery

The Brewery parking area is a small gravel turnout/on-street parking area on the southwest side of SR 49. The lot has no designated stalls but can support approximately 8 vehicles. This parking area is located near both the State Park Headquarters and Visitor's Center and many State Park sites as well commercial destinations located in the Coloma core. On Friday, the parking area was moderately occupied with an average 2.6 of the 8 stalls occupied, or about 33% of maximum capacity. On Saturday, the parking area was blocked off and vehicles were not allowed to park.

3.4.7 SR 49 Parking Summary

The SR 49 Parking Analysis Summary can be seen in Table 3.2. As shown, parking supply within the Lotus Park area is sufficient to accommodate weekend parking demand with typically more than 50% of available parking spaces being unoccupied. Parking duration typically spans no longer than 1.5 hours in most parking areas except for the North Beach area which typically spans approximately two hours. The most popular and typically most utilized parking areas are the North Beach parking lot and the on-street parking available on the north side (river side) of SR 49 denoted as Murphy On-Street.

Table 3.2 Highway 49 Parking Analysis - Summary Table

Parking Lot	Average Capacity (% Full)		Average Cars In Per 0.5 Hour		Average Cars Out Per 0.5 Hour		Average Time Parked (mins)	
	Friday	Saturday	Friday	Saturday	Friday	Saturday	Friday	Saturday
North Beach	7.20%	31.40%	1.00	8.57	1.43	3.14	132.60	119.40
Mill	16.10%	11.00%	3.29	3.00	4.14	2.29	85.80	72.60
Murphy On-Street	26.60%	42.70%	1.29	4.00	2.14	4.00	80.40	70.20
South Fork Turnover	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00
American On-Street	0.80%	0.00%	0.14	0.00	0.14	0.00	30.00	0.00
Brewery	32.80%	0.00%	2.57	0.00	1.71	0.00	34.80	0.00

COLOMA LOTUS
Mobility Plan

Travel Lines

Project Area

Parking

American River

77 Parking Lot Capacity

Parking Analysis

2.57	32.8% (0.58 hr)	1.71
Average vehicicles entering per hour	Average time spent & percent capacity	Average vehicicles exiting per hour

Feet
0 250 500 1,000

Friday Parking Analysis Map

FIGURE 3.3

El Dorado County Transportation Commission

COLOMA LOTUS
Mobility Plan

Travel Lines

Project Area

Parking

American River

77 Parking Lot Capacity

Parking Analysis

2.57 Average vehicicles entering per hour

0.58 hr 32.8% Average time spent & percent capacity

1.71 Average vehicicles exiting per hour

Feet
0 250 500 1,000

Saturday Parking Analysis Map

FIGURE 3.4

El Dorado County Transportation Commission

4. Bicycle and Pedestrian Counts

4.1 Overview

On Friday and Saturday, August 24-25, 2018, bicycle and pedestrian counts were manually performed. Bicycle and pedestrian counts were performed at two locations – at the intersection of SR 49 and Lotus Road and at the intersection of SR 49 and Mt. Murphy Road. Bicycle and pedestrian counts were collected by cameras on Tuesday, September 25th at seven locations throughout the project area.

Table 4.1 Average Bicyclists and Pedestrians per Hour

SR 49 at Mt Murphy Rd and Bridge St				
Day 1 - Friday 8/24/2018				
	NE	SW	SE	NW
Pedestrians	37.5	45.5	21.75	20.5
Bicyclists	1	0.5	0.25	0.5
Day 2 - Saturday 8/25/2018				
	NE	SW	SE	NW
Pedestrians	30.5	9	33	15.5
Bicyclists	0	0	0.25	1
SR 49 at Lotus Road T-intersection				
Day 1 - Friday 8/24/2018				
	S	W	E	
Pedestrians	0	0	0	
Bicyclists	1	0.5	1.5	

4.2 Direct Observation Bicycle and Pedestrian Counts

Direct observation bicycle and pedestrian counts are displayed graphically in Figure 4.1, titled *Average Hourly Bicycle and Pedestrian Counts (Map 1).* Pedestrians and Bicyclists were counted in two locations: the intersection of SR 49 with Mt. Murphy Road and Bridge Street (State Park core), and the intersection of SR 49 with Lotus Road (Lotus). The purpose of counting pedestrians and bicyclists at these intersections was to assess patterns of usage and movement through the project area.

Table 4.2 Total Pedestrians and Bicyclists

	Tuesday 9/25/18			
Lotus Rd & Bassi Rd				
	N	S	E	W
Pedestrians	2	0	0	0
Bicyclists	0	5	0	0
Marshall Rd & SR 49				
	NE	SW	SE	NW
Pedestrians	1	0	0	1
Bicyclists	0	0	1	0
Lotus Rd & SR 49				
	N	S	E	W
Pedestrians	0	0	0	1
Bicyclists	0	3	0	0
SR 49 at Mt Murphy Rd and Bridge Street				
	NW	SE	SW	NE
Pedestrians	49	74	77	69
Bicyclists	0	0	0	0
SR 49 & Brewery St				
	NE	SW	SE	NW
Pedestrians	1	7	10	13
Bicyclists	0	0	0	0
Church St & SR 49 / SR 153				
	N	S	E	W
Pedestrians	0	1	1	0
Bicyclists	1	0	2	1
Mill Parking Crosswalks				
	N	S	E	W
Pedestrians	0	0	34	58
Bicyclists	0	0	1	0

To capture both weekday and weekend usage, counts were performed in two-hour blocks from 11 AM – 1 PM and 2 PM – 4 PM on Friday, August 24 and from 9 AM – 11 AM and 11 AM – 1 PM on Saturday, August 25. At the State Park core location, counts were performed for a total of six hours: four hours on Friday, August 24, 2018 and two hours on Saturday, August 25, 2018. Counts at the SR 49 / Lotus Road intersection were conducted for four hours on Friday. Saturday was omitted due to low frequency of active transportation users as only 12 bicyclists and pedestrians were counted at this location on Friday.

As Table 4.2, the State Park core experienced significantly more pedestrian activity than the Lotus intersection. However, similar numbers of bicyclists were counted at each intersection. The similarity in cyclists and disparity in pedestrians implies that cyclists are generally biking through the project area while pedestrians park near the tourism destinations and only walk within a short distance of their vehicles.

While only bicyclists traveled through the Lotus intersection, they were heavily outnumbered by pedestrians at the State Park core location. Five hundred and seven pedestrians and bicyclists were counted on Friday at the State Park core location as opposed to only 12 bicyclists at the SR 49 / Lotus Road intersection. Of the 507 active transportation users counted at the State Park core location, 9 were cyclists and the remaining 498 were pedestrians. Pedestrians were observed to be predominantly elementary school groups and families with children. Other users included couples of various ages and small groups of adults.

4.3 Camera Bicycle and Pedestrian Counts

Intersection turn movement counts were performed using mounted video cameras at eight locations throughout the project area on Tuesday, September 25, 2018. Peak hour intersection turning movement by vehicles, trucks, buses, bicycle and pedestrian movements (crossings and intersection corner movement counts) were collected at the following eight locations:

(1) Lotus Road at Bassi Road

(2) SR 49 at Marshall Road

(3) SR 49 at Lotus Road

(4) SR 49 at Mt. Murphy Road

(5) SR 49 at Brewery Street

(6) SR 49 at Church Street/SR 153

(7) Two (2) pedestrian mid-block crossings at Mill

(8) Parking Lot north of Mt. Murphy Road

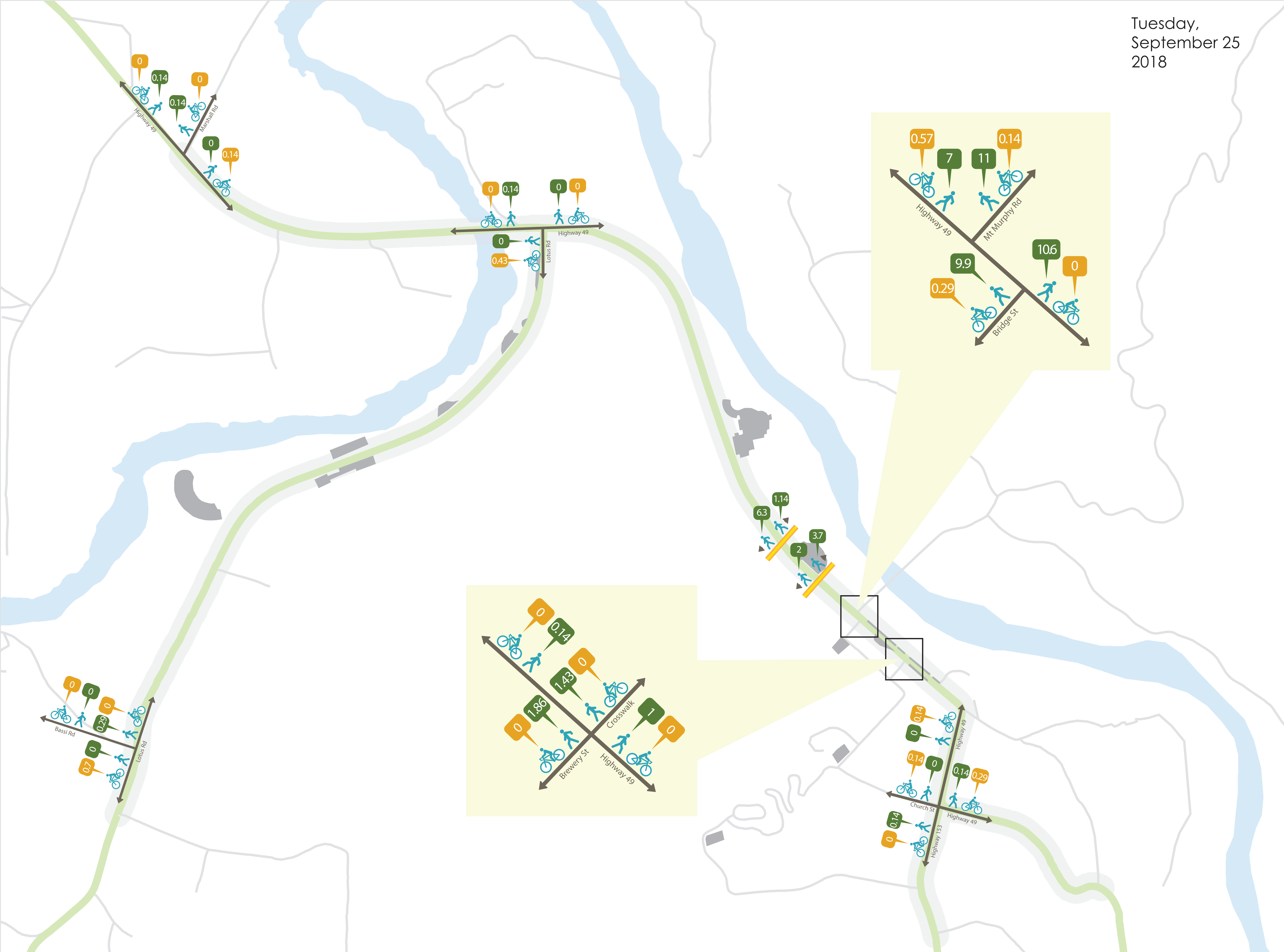
Traffic counts were collected when local area schools were in session. Counts were conducted from 7:00 a.m. to 9:00 a.m., from 11:00 a.m. to 2:00 p.m., and from 4:00 p.m. to 6:00 p.m. to collect the AM, Midday, and PM existing peak period conditions respectively.

For each intersection the peak hour containing the most traffic activity of all modes combined was identified. Figure 4.2 shows the pedestrian and bicycle activity during one selected peak hour from each intersection with the peak hour containing the highest frequency of pedestrians and cyclists of the three peak periods. The purpose of this map is to show peak active modal activity during time periods where roadways are generally impacted most by vehicles. Total daily pedestrians and cyclist counts are shown in Figure 4.3. These totals were divided by 7 hours to reach the hourly average displayed on the Hourly Average map (Figure 4.4).

These data are consistent with the manual data collection that indicate a significantly greater amount of pedestrian activity in the study area relative to bicycling.

For six of the eight surveyed locations, the peak hour of pedestrian and bicycle activity occurs during the PM peak commute hour of 4:00-5:00 p.m. or 5:00-6:00 p.m. Exceptions include the intersection of Lotus Road/Bassi Road which experiences peak pedestrian and bicyclist activity during the AM peak commute hour (7:00-8:00 a.m.) and the SR 49 at Mt. Murphy Road intersection that experiences its peak pedestrian and bicycle activity at noon time. This indicates that peak pedestrian and bicycle activity currently occurs during peak vehicle demand times. As demand for all these modes increase, the risk of exposure between pedestrian, bicyclist and motor vehicles will likely increase within the study area as well.

The noontime activity peak at the SR 49 at Mt. Murphy Road intersection is clearly indicative of tourist activity associated with Marshall Gold Discovery Park. The peak hour count of 64-73 pedestrians is significant given that it reflects approximately 50% of the daily pedestrian activity at this location.



Weekday Hourly Average Bicycle and Pedestrian Video Counts

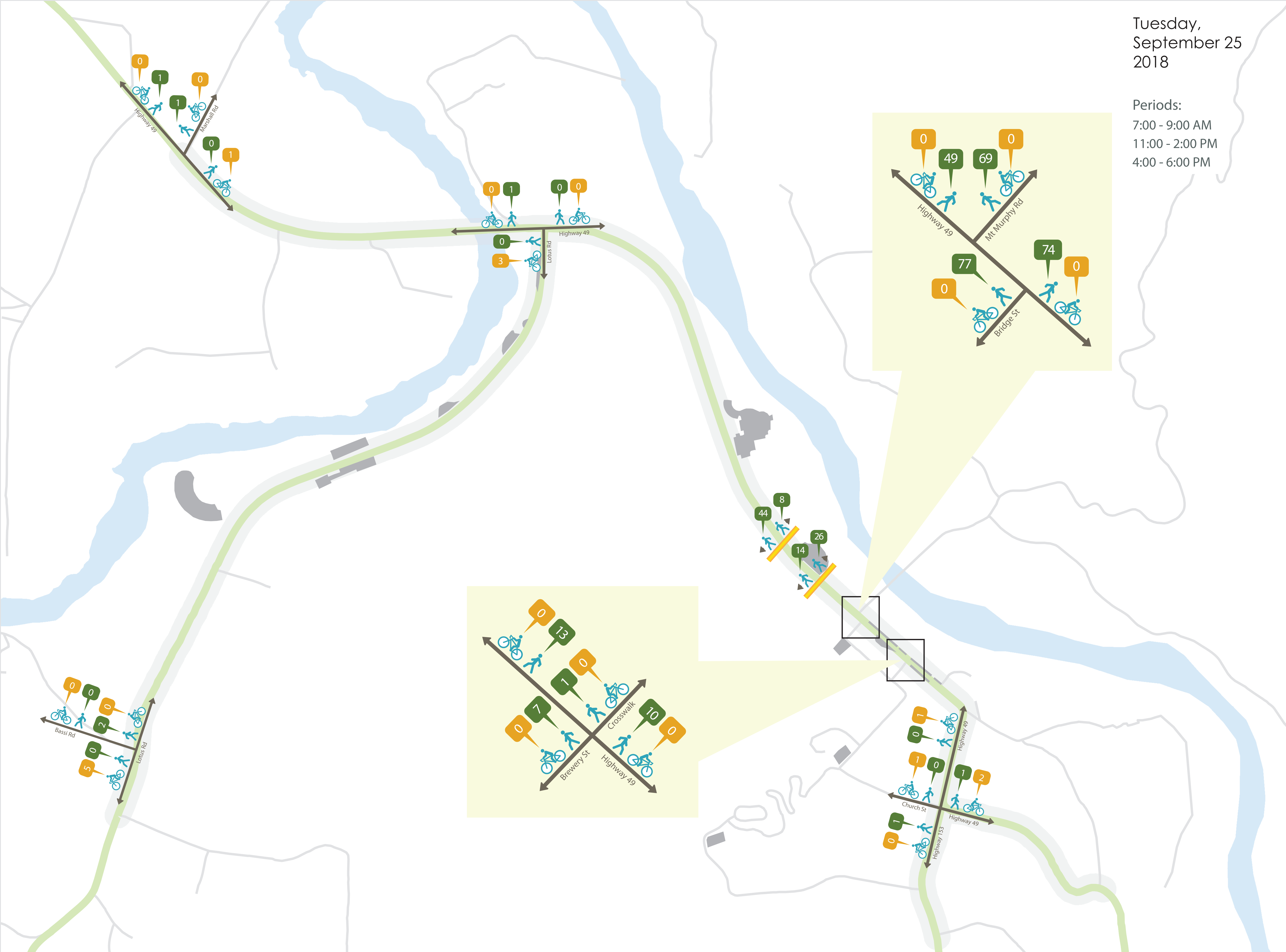
FIGURE 4.1

El Dorado County Transportation Commission

Weekend Hourly Average Bicycle and Pedestrian Counts

FIGURE 4.2

El Dorado County Transportation Commission



COLOMA LOTUS
Mobility Plan

Travel Lines
Project Area
Parking
American River

Bicyclists Observed in Peak Hour

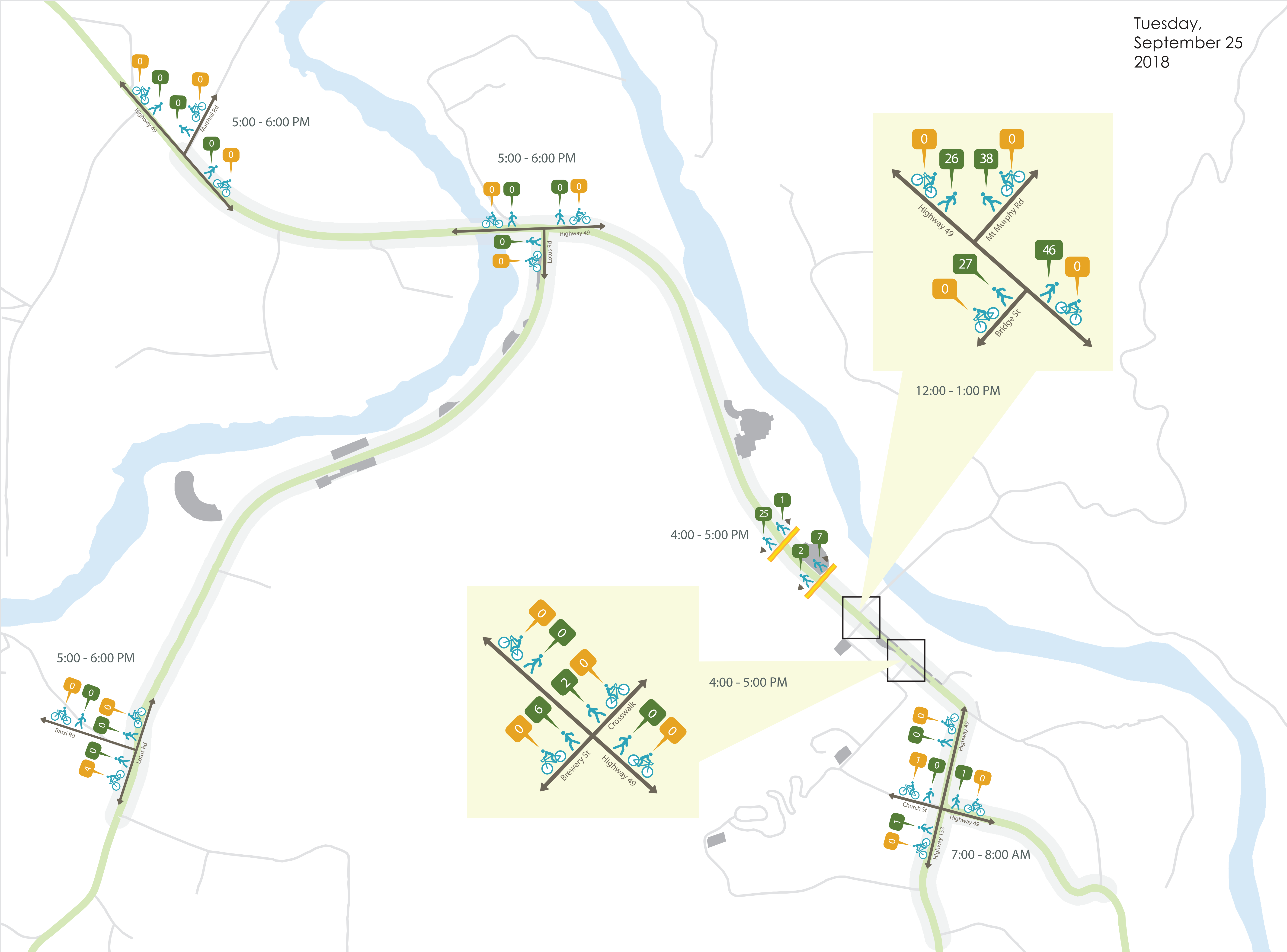
Pedestrians Observed in Peak Hour

Feet
0 250 500 1,000

Daily Total Bicycle and Pedestrian Video Counts

FIGURE 4.3

El Dorado County Transportation Commission



COLOMA LOTUS Mobility Plan

Travel Lines
Project Area
Parking
American River

Bicyclists Observed in Peak Hour

Pedestrians Observed in Peak Hour

Feet
0 250 500 1,000

Peak Period Bicycle and Pedestrian Video Counts FIGURE 4.4

El Dorado County Transportation Commission

5. Roadway Operations

5.1 Overview

Based on Caltrans most recently published traffic volumes (2017), annual average daily traffic on SR 49 ranges between 3,000 and 6,000 vehicles within the Coloma-Lotus study area depending on location. During peak visitor summer months, daily traffic increases to between 3,500 and 7,500. Average daily traffic on Lotus Road between SR 49 and Bassi Road ranges between 3,000 and 6,000 depending on season. Peak hour volumes during typical weekday conditions range between 200 and 600 peak hour vehicles depending on location and peak hour (i.e., AM Peak, Midday Peak, PM Peak). Given these relatively modest daily and peak hour volumes, two-lane rural highway operations on SR 49 and Lotus Road was not formally analyzed. Conversely, operational conditions at key intersections along both Lotus Road and SR 49 were analyzed.

Intersection operations were based on existing peak hour traffic counts described in the previous section. Existing AM, Noon, and PM peak hour intersection operations were analyzed utilizing the existing intersection lane geometrics and controls and the existing peak hour traffic volumes. Details on technical analysis parameters, methodology, and assumptions are provided below.

5.2 Data Collection & Study Locations

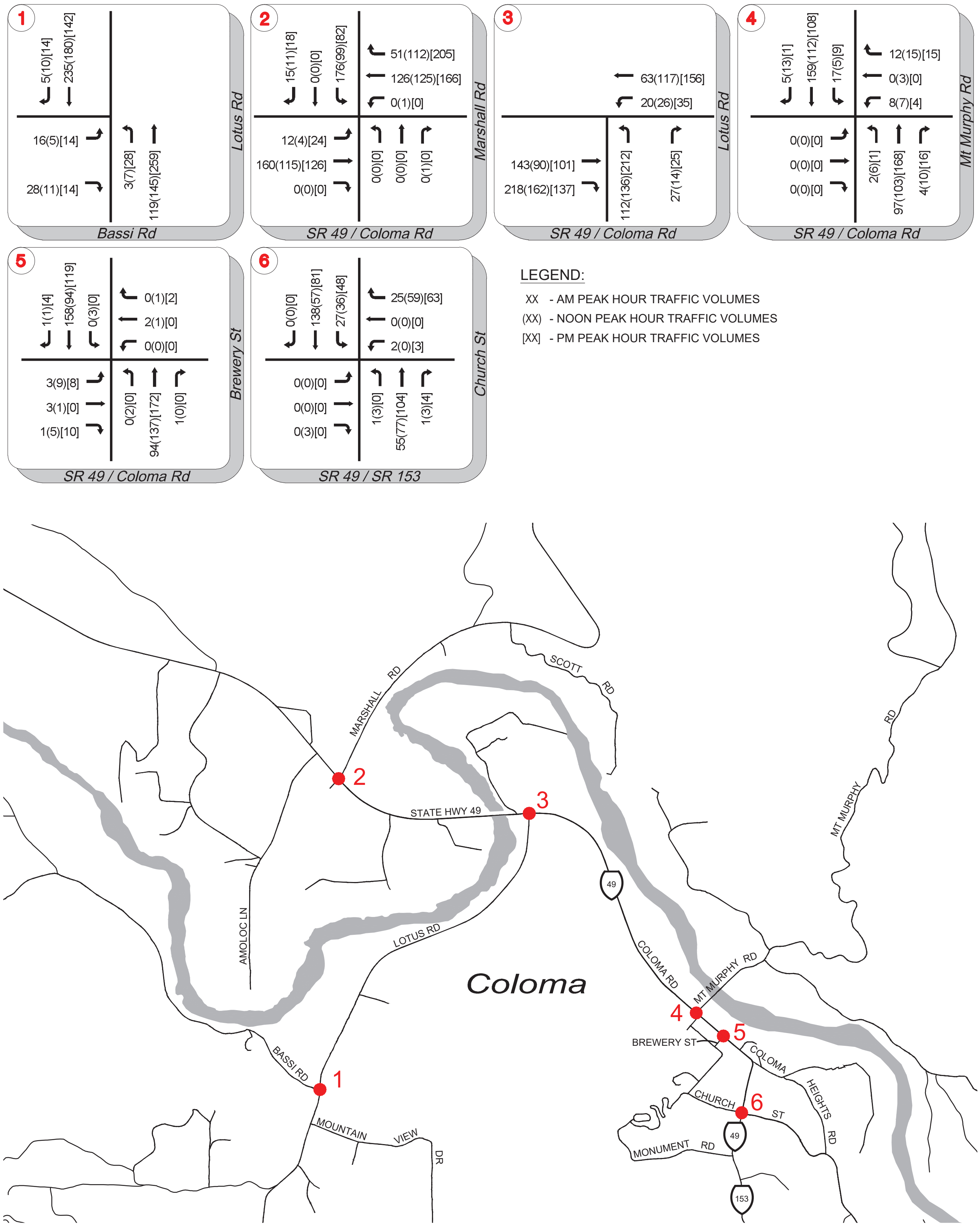
Seven study locations were identified for analysis in coordination with EDCTC, Caltrans, State Parks, and El Dorado County staff. These intersections are listed as follows:

1. Lotus Road at Bassi Road
2. SR 49 at Marshall Road
3. SR 49 at Lotus Road
4. SR 49 at Mt. Murphy Road
5. SR 49 at Brewery Street
6. SR 49 at Church Street/SR 153
7. Two (2) pedestrian mid-block crossings at Mill Parking Lot north of Mt. Murphy Road.

Study Location 1 and 2 are all-way stop-controlled intersections, and Study Locations 3 through 6 are side-street (one-way) stop-controlled intersections. Study Location 7 (two pedestrian crossings) was not formally analyzed for operations as appropriate. However, pedestrian crossing counts were performed at these crossings and are included in the Bicycle and Pedestrian Counts section.

The “AM” peak hour is defined as the one hour of peak traffic flow (which is the highest total volume count over four consecutive 15-minute count periods) counted between 7:00 am and 9:00 am. The “Noon” or “Mid-day” peak hour is defined as the one hour of peak traffic flow counted between 11:00 am and 2:00 pm. The “PM” peak hour is defined as the one hour of peak traffic flow counted between 4:00 pm and 6:00 pm. The weekday count was conducted when local and regional schools were in session.

The AM, Noon, and PM peak hour intersection turn movement counts are presented in Figure 5.1



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GHD

El Dorado County Transportation Commission
COLOMA LOTUS MOBILITY PLAN

EXISTING PEAK HOUR
TRAFFIC VOLUMES

Project No. **11180327**
Report No. **001**
Date **JULY 2019**

FIGURE 5.1

Filename: \\ghdnet\ghd\US\Roseville\Projects\Legacy\PRJ\2544\T2544\T2544TG002.dwg Plot Date: 30 July 2019 - 5:17 PM

Source:

5.3 Intersection Level of Service Methodology

Traffic operations are quantified through the determination of "Level of Service" (LOS). Level of service is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an intersection, representing progressively worsening traffic operations. LOS "A" represents free-flow operating conditions and LOS "F" represents over-capacity conditions. Levels of Service were calculated for all study intersection control types using the methods documented in the Transportation Research Board Publication Highway Capacity Manual, Sixth Edition, A Guide for Multimodal Mobility Analysis, 2016 (HCM 6th Edition).

The Synchro (Version 10, Trafficware) software program was used to implement the HCM 6th Edition analysis methodologies. Synchro takes into account intersection signal timing and queuing constraints when calculating delay, the corresponding delay, and queue lengths. For intersections with channelized free right-turn movements, HCM methodologies does not consider non-conflicting free right turn movements to contribute to vehicle delay at an intersection.

5.4 Intersection LOS Criteria

The vehicular delay-based LOS criteria for different types of intersection control are outlined in Appendix B. For a signalized or all-way stop-controlled (AWSC) intersection, an LOS determination is based on the calculated averaged delay for all approaches and movements. For a two-way or one-way (T-intersection) stop controlled (TWSC) intersection, an LOS determination is based upon the calculated average delay for all movements of the worst-performing approach.

5.5 Level of Service Policies

Caltrans' Guide for the Preparation of Traffic Impact Studies contains the following policy pertaining to the LOS standards within Caltrans jurisdiction:

> *Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS.*

The El Dorado County General Plan Transportation and Circulation Element (July 2004) has the following policy regarding intersection operations:

Policy TC-Xd *Level of Service (LOS) for County-maintained roads and state highways within the unincorporated areas of the county shall not be worse than LOS E in the Community Regions or LOS D in the Rural Centers and Rural Regions except as specified in Table TC-2. The volume to capacity ratio of the roadway segments listed in Table TC-2 shall not exceed the ratio specified in that table. Level of Service will be as defined in the latest edition of the Highway Capacity Manual (Transportation Research Board, National Research Council) and calculated using the methodologies contained in that manual. Analysis periods shall be based on the professional judgment of the Department of Transportation which shall consider* *periods including, but not limited to, Weekday Average Daily Traffic (ADT), AM Peak Hour, and PM Peak hour traffic volumes.*

5.6 Traffic Signal Warrant Analysis

Given that all six of the study intersections are non-signalized a supplemental traffic signal “warrant” analysis was performed. The term “signal warrants” refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the need for installation of a traffic signal at an otherwise non-signalized intersection. The signal warrant criteria presented in the latest edition of the Federal Highway Administration’s (FHWA) Manual on Uniform Traffic Control Devices (MUTCD), as amended by the MUTCD 2014 California Supplement, was applied for all study intersections. The signal warrant criteria are based upon several factors including volume of vehicular and pedestrian traffic, frequency of accidents, location of school areas etc. Both the FHWA’s MUTCD and the MUTCD 2014 California Supplement indicate that the installation of a traffic signal should be considered if one or more of the signal warrants are met. The ultimate decision to signalize an intersection however should be determined after careful analysis of all eight signal warrants.

This signal warrant analysis focused specifically on two warrants: Warrant #3 Peak-Hour-Volume; and, Warrant #7 Accident. Since Warrant 3 provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating at or above 40 mph).

This evaluation incorporates appropriate heavy vehicle adjustment factors, peak hour factors, and signal lost time factors and reports the resulting intersection delays and LOS as estimated using the HCM 6th Edition based analysis methodologies. Assessments of “design level” parameters (including queuing on intersection lane groups, stacking length requirements, etc.) are not included in this study.

5.7 Existing Intersection LOS Operations Summary

Intersection LOS results for weekday AM, Midday, and PM peak hour are provided in Table 5.1, Table 5.2 and Table 5.3 respectively. Based on the results, all study intersections were determined to operate above acceptable thresholds (LOS A or B).

Based on the traffic signal warrant analyses, none of the study intersections currently meet the criteria for the Peak-Hour-Volume based Warrant 3 or the Crash Experience based Warrant 7.

Table 5.1 AM Peak Hour Intersection Level of Service

Int ID	Intersection	Control Type	Overall HCM [1]	Eastbound LT	Eastbound T	Eastbound RT	Westbound LT	Westbound T	Westbound RT	Northbound LT	Northbound T	Northbound RT	Southbound LT	Southbound T	Southbound RT
1	Lotus Rd / Bassi Rd	AWSC													
	Delay (seconds) OR V/C		8.7	7.8		N/A				N/A	8.1			9.1	N/A
	Level of Service		**A**	**A**	**---**	**N/A**	**---**	**---**	**---**	**N/A**	**A**	**---**	**---**	**A**	**N/A**
2	Marshall Rd / SR 49	AWSC													
	Delay (seconds) OR V/C		10.6	9.3	10.7	N/A		10.1	8.3				N/A	11.9	7.8
	Level of Service		**B**	**A**	**B**	**N/A**	**---**	**B**	**A**	**---**	**---**	**---**	**N/A**	**B**	**A**
3	Lotus Rd / SR 49	TWSC													
	Delay (seconds) OR V/C		3.5				8.2	0.0		13.3		N/A			
	Level of Service		**A**	**---**	**---**	**---**	**A**	**A**	**---**	**B**	**---**	**N/A**	**---**	**---**	**---**
4	SR 49 / Bridge St (Mt Murphy Rd)	TWSC													
	Delay (seconds) OR V/C		1.1				N/A	9.8	N/A	**7.6**	0.0		7.5	0.0	
	Level of Service		**A**	**---**	**---**	**---**	**N/A**	**A**	**N/A**	**A**	**A**	**---**	**A**	**A**	**---**
5	SR 49 / Brewery St	TWSC													
	Delay (seconds) OR V/C		0.4	N/A	10.7	N/A		11.1	N/A	0.0			0.0		
	Level of Service		**A**	**N/A**	**B**	**N/A**	**---**	**B**	**N/A**	**A**	**---**	**---**	**A**	**---**	**---**
6	SR 49 / SR 153 / Church Street	TWSC													
	Delay (seconds) OR V/C		1.3				0.4		0.1	3.1	5.0	1.8	0.1	0.1	
	Level of Service		**A**	**---**	**---**	**---**	**A**	**---**	**A**	**A**	**A**	**A**	**A**	**A**	**---**

Note: --- indicates corresponding movement does not exist or LOS can not be computed.
N/A indicates delay same as the adjacent movement due to shared approach.
AWSC = All Way Stop Control, TWSC = Two Way Stop Control
1 - Based on HCM 2000, Chapter 16 Signalized Intersections and Chapter 17 Unsignalized Intersections methodology
Indicates that LOS exceeds LOS threshold

Table 5.2 Noon Time Hour Intersection Level of Service

Intersections Level of Service Summary : Existing Conditions NOON Peak Hour

Int ID	Intersection	Control Type	Overall HCM [1]	Eastbound			Westbound			Northbound			Southbound		
				LT	T	RT	LT	T	RT	LT	T	RT	LT	T	RT
1	Lotus Rd / Bassi Rd	AWSC													
	Delay (seconds) OR V/C		8.5	7.5		N/A				N/A	8.5			8.6	N/A
	Level of Service		**A**	**A**	**---**	**N/A**	**---**	**---**	**---**	**N/A**	**A**	**---**	**---**	**A**	**N/A**
2	Marshall Rd / SR 49	AWSC													
	Delay (seconds) OR V/C		9.3	8.7	9.7	N/A	8.5	9.4	8.2	N/A	N/A	7.9	N/A	10.3	7.7
	Level of Service		**A**	**A**	**A**	**N/A**	**A**	**A**	**A**	**N/A**	**N/A**	**A**	**N/A**	**B**	**A**
3	Lotus Rd / SR 49	TWSC													
	Delay (seconds) OR V/C		3.9				7.8	0.0		12.7		N/A			
	Level of Service		**A**	**---**	**---**	**---**	**A**	**A**	**---**	**B**	**---**	**N/A**	**---**	**---**	**---**
4	SR 49 / Bridge St (Mt Murphy Rd)	TWSC													
	Delay (seconds) OR V/C		1.2				N/A	9.5	N/A	7.5	0.0		9.5	7.5	
	Level of Service		**A**	**---**	**---**	**---**	**N/A**	**A**	**N/A**	**A**	**A**	**---**	**A**	**A**	**---**
5	SR 49 / Brewery St	TWSC													
	Delay (seconds) OR V/C		0.8	N/A	10.0	N/A		10.5	N/A	7.4	0.0		7.5	0.0	
	Level of Service		**A**	**N/A**	**B**	**N/A**	**---**	**B**	**N/A**	**A**	**A**	**---**	**A**	**A**	**---**
6	SR 49 / SR 153 / Church Street	TWSC													
	Delay (seconds) OR V/C		1.9			2.6			0.2	3.8	5.5	3.1	0.1	0.1	
	Level of Service		**A**	**---**	**---**	**A**	**---**	**---**	**A**	**A**	**A**	**A**	**A**	**A**	**---**

Note: --- Indicates corresponding movement does not exist or LOS can not be computed.

N/A indicates delay same as the adjacent movement due to shared approach.

AWSC = All Way Stop Control, TWSC = Two Way Stop Control

1 - Based on HCM 2000, Chapter 16 Signalized Intersections and Chapter 17 Unsignalized Intersections methodology

Indicates that LOS exceeds LOS threshold

Table 5.3 PM Peak Hour Intersection Level of Service

Int ID	Intersection	Control Type	Overall HCM [1]	Eastbound			Westbound			Northbound			Southbound		
				LT	T	RT	LT	T	RT	LT	T	RT	LT	T	RT
1	Lotus Rd / Bassi Rd	AWSC													
	Delay (seconds) OR V/C		9.1	8.0		N/A				N/A	9.6			8.4	N/A
	Level of Service		**A**	**A**	**---**	**N/A**	**---**	**---**	**---**	**N/A**	**A**	**---**	**---**	**A**	**N/A**
2	Marshall Rd / SR 49	AWSC													
	Delay (seconds) OR V/C		9.3	9.2	9.9	N/A		9.8	9.0				N/A	10.4	8.2
	Level of Service		**A**	**A**	**A**	**N/A**	**---**	**A**	**A**	**---**	**---**	**---**	**N/A**	**B**	**A**
3	Lotus Rd / SR 49	TWSC													
	Delay (seconds) OR V/C		5.8				7.8	0.0		15.3		N/A			
	Level of Service		**A**	**---**	**---**	**---**	**A**	**A**	**---**	**C**	**---**	**N/A**	**---**	**---**	**---**
4	SR 49 / Bridge St (Mt Murphy Rd)	TWSC													
	Delay (seconds) OR V/C		0.8				N/A	9.7	N/A	7.5	0.0		9.7	7.7	
	Level of Service		**A**	**---**	**---**	**---**	**N/A**	**A**	**N/A**	**A**	**A**	**---**	**A**	**A**	**---**
5	SR 49 / Brewery St	TWSC													
	Delay (seconds) OR V/C		0.6	N/A	10.0	N/A		9.3	N/A	0.0			0.0		
	Level of Service		**A**	**N/A**	**B**	**N/A**	**---**	**A**	**N/A**	**A**	**---**	**---**	**A**	**---**	**---**
6	SR 49 / SR 153 / Church Street	TWSC													
	Delay (seconds) OR V/C		2.2			3.2	0.9		0.2		5.8	4.2	0.1	0.1	
	Level of Service		**A**	**---**	**---**	**A**	**---**	**---**	**A**	**---**	**A**	**A**	**A**	**A**	**---**

Note: --- indicates corresponding movement does not exist or LOS can not be computed.
N/A indicates delay same as the adjacent movement due to shared approach.
AWSC = All Way Stop Control, TWSC = Two Way Stop Control
1 - Based on HCM 2000, Chapter 16 Signalized Intersections and Chapter 17 Unsignalized Intersections methodology
Indicates that LOS exceeds LOS threshold

Table 5.4 Summary of Warrant Analysis

#	Intersection	Warrant 3[1] Analysis		Warrant 7[3] Analysis		
				Criteria B Thresholds		
		Peak Hour Analyzed[2]	Warrant Met?	No. of Collisions within the Past Year	Crieria B Met?	Criteria C Met?
1	Lotus Rd & Bassi Rd	PM Peak	No	1	No	Insufficient Data Existing Counts were obtained only for the 2-hr windows of the AM, PM and Noon Peak
2	Marshall Rd & SR 49	AM Peak	No	0	No	
3	Lotus Rd & SR 49	PM Peak	No	0	No	
4	SR 49 & Bridge St/Mt Murphy Rd	Noon Peak	No	1	No	
5	SR 49 & Brewery St	Noon Peak	No	0	No	
6	SR 49/SR 153 & Church St	PM Peak	No	0	No	

Notes:

1. Warrant 3 of the CA MUTCD (2014 Edition) is the Peak Hour Warrant Analysis

2. Peak hours assessed for Existing Conditions Traffic Operations included the AM, PM and Noon Peak Hours. The peak hour exhibiting the highest volume was used in running the Warrant 3 analysis at a study intersection.

3. Warrant 7 of the CA MUTCD (2014 Edition) is the Crash Experience Warrant Analysis, and provides the following Standards of Analysis:

Standard:
The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:

A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and
C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

6. Bicycle Level of Traffic Stress – Baseline Condition

6.1 Overview

Existing bicycle conditions for the study area was analyzed based on Bicycle Level of Traffic Stress (LTS). The methodology for Bicycle LTS can be obtained from the paper, *Low Stress Bicycling and Network Connectivity* (Report 11-19, Mineta Transportation Institute, May 2012). Bicycle LTS is a rating system of the safety, comfort, and convenience of transportation facilities from the perspective of the user. The approach outlined in the Mineta report uses roadway data, (i.e., posted speed limit, number of travel lanes, daily traffic levels, and presence and character of shoulder or bicycle lanes) as a proxy for bicyclist comfort level. The Bicycle LTS methodology breaks road segments into one of four classifications/ratings for measuring the effects of traffic-based stress on bicycle riders, with 1 being the lowest stress or most comfortable, and 4 being the highest stress or least comfortable. The greater the separation between the outside travel lane and bicyclist generally means less stress for users. Examples and descriptions for each level of traffic stress are shown in Figure 6.1.

6.2 Bicycle Level of Stress (LTS) Methodology

LTS 1 is assigned to roads that would be suitable for most children to ride, and to multi-use paths that are separated from motorized traffic. LTS 2 is assigned to roads that could be comfortably ridden by the average adult population. For purposes of this analysis, road segments with LTS scores of 1 or 2 are characterized as “low-stress” bicycle connections. These low-stress LTS scores reflect bicycling conditions that 60 percent of the general population would consider favorable enough to consider using a bike. LTS 3 is the level assigned to roads that would be acceptable to an “enthused and confident” cyclists while LTS 4 is assigned to segments that are only acceptable to “strong and fearless” bicyclists, who will confidently tolerate riding on roadways characterized by minimal separation from high motor vehicle volumes and speeds. For purposes of this analysis, road segments with LTS scores of 3 or 4 are characterized as “high-stress” bicycle connections. So even if bicycle infrastructure exists between two places, it would not be considered viable for biking to 60% or more of the general pollution if the connection is rated as high-stress.

The Bicycle LTS methodology is broken into three categories: segments (along), intersection approaches (turn lanes), and intersection crossings (unsignalized). Specific criteria are applied separately for each category. Dependent upon community context and the detail level desired, the overall methodology can usually be simplified based on the general consistency of facility types, as certain elements (i.e. no turn lanes, no bike lanes, limited speeds, etc.) may not exist in a particular community.

It is likely that the LTS scores show directional differences (i.e. right turn lane vs. left turn lane) along a given route. Therefore, both directions are reported for a given roadway segment along Lotus Road and State Route 49. The methodology for the criteria aggregate (overall LTS) follows the weakest link principle: the dimension with the worst level of stress governs. For example, if a segment has a LTS 2 but there is an intersection approach at the end of the segment at LTS 4, then the whole segment is considered at LTS 4. Figure 6.1 presents the LTS for the segments, approaches, and intersections for the roadways in the study area.

Figure 6.1 Level of Traffic Stress (LTS) Score Descriptions

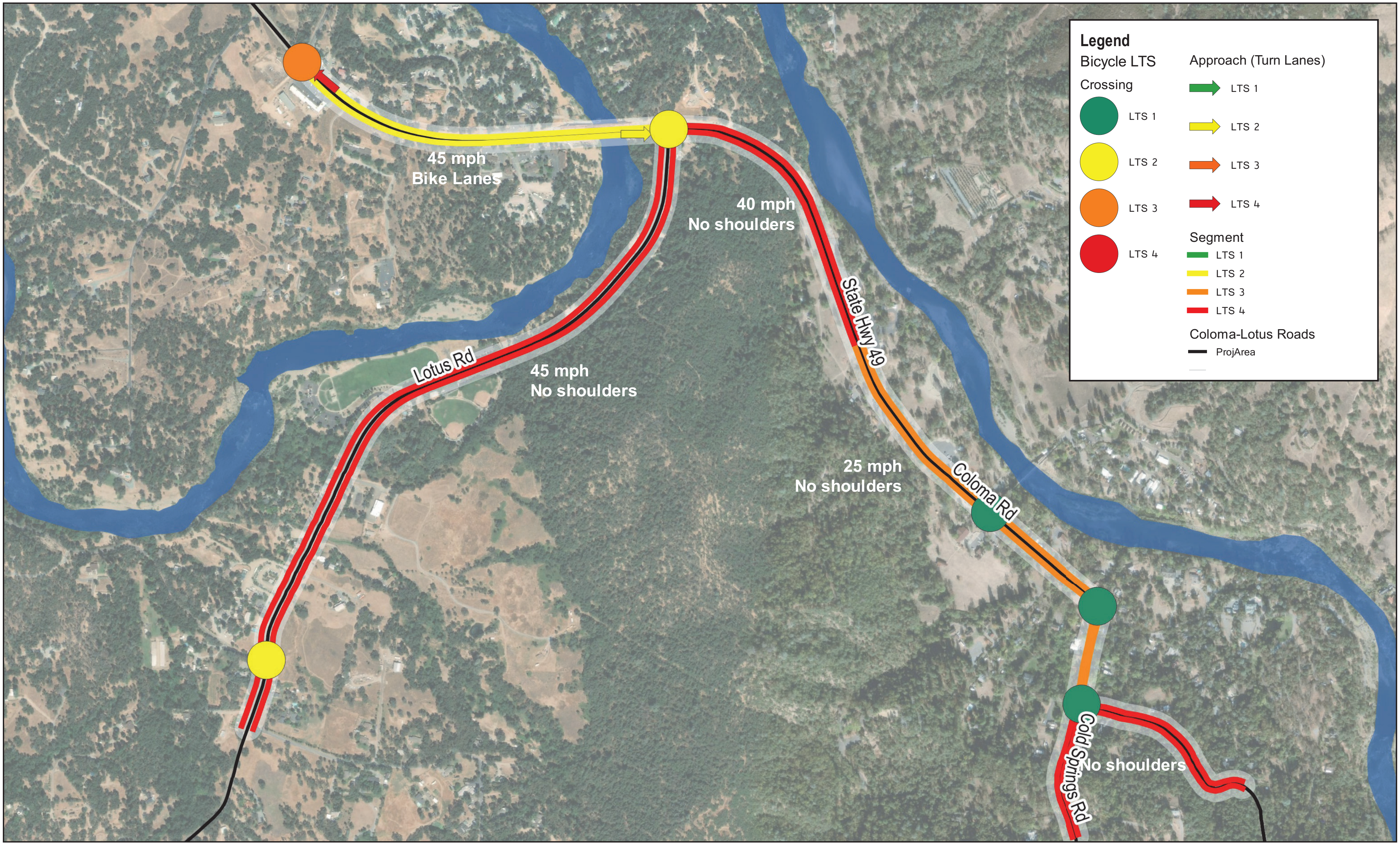
LTS 1  Comfortable for all ages and abilities	Represents little traffic stress and requires less attention, so is suitable for all cyclists. This includes children that are trained to safely cross intersections (around 10 yrs. old/5th grade) alone and supervising riding parents of younger children. Generally, the age of 10 is the earliest age that children can adequately understand traffic and make safe decisions which is also the reason that many youth bike safety programs target this age level. Traffic speeds are low and there is no more than one lane in each direction. Intersections are easy to cross by children and adults. Typical locations include residential local streets and separated bike paths/cycle tracks.
LTS 2  Comfortable for most adults	Represents little traffic stress but requires more attention than young children can handle, so is suitable for teen and adult cyclists with adequate bike handling skills. Traffic speeds are slightly higher but speed differentials are still low and roadways can be up to three lanes wide in total for both directions. Intersections are not difficult to cross for most teenagers and adults. Typical locations include collector-level streets with bike lanes or a central business district.
LTS 3  Comfortable for confident bicyclists	Represents moderate stress and suitable for most observant adult cyclists. Traffic speeds are moderate but can be on roadways up to five lanes wide in both directions. Intersections are still perceived to be safe by most adults. Typical locations include low-speed arterials with bike lanes or moderate speed non-multilane roadways.
LTS 4  Uncomfortable for most	Represents high stress and suitable for experienced and skilled cyclists. Traffic speeds are moderate to high and can be on roadways from two to over five lanes wide in both directions. Intersections can be complex, wide, and or high volume/speed that can be perceived as unsafe by adults and are difficult to cross. Typical locations include high speed or multilane roadways with narrow or no bike lanes.

Source: "Low Stress Bicycling and Network Connectivity", Mineta Transportation Institute, Report 11-19, May 2012.

6.3 Existing Bicycle LTS Summary

Figure 6.2 summarizes the Bicycle LTS results for the segments, crossings, and intersection approaches in the project area as applicable. Segments along Lotus Road are high-stress due to the higher speeds and the lack of bike lanes / no shoulders present. The recently completed SR 49 South Fork American River Bridge project included pedestrian and bicycle amenities including bike lanes and pedestrian facilities. As a result, low-stress is experienced along the SR 49 segment west of Lotus Road and at the intersection at SR 49/Lotus Road due to the presence of bike channelization and storage separate of the right turn lane. Conversely, SR 49 east of Lotus Road experiences varying degrees of high-stress as a result of either no shoulder or bike lanes, forcing bicyclists to share the road with either high or low speed vehicles (≥40 mph or 25 mph posted speed limit) or where there are higher speeds (≥40 mph) with a wide shoulder (>6 feet).

Based on counts, bicycle activity is generally light in the project area. However, with the recent completion of South Fork Bridge Project increased numbers of people have been observed walking and riding bikes across the new bridge on both weekdays and weekends. However, the lack of low-stress bicycle infrastructure connectivity, coupled with inadequate shoulder widths and vehicular speeds near 40 mph throughout much of the study area, increases the perceived “risk” which can suppress the number of people walking and biking in the overall project area. The high-stress biking environment along most of SR 49 and all of Lotus Road in the study area tends to keep biking on these roadways limited to only a confident and accomplished cyclists.



Paper Size ANSI

0.1 0 0.1 0.2 0.3 0.4 mi

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Map Projection: Lambert Conformal Conic
Horizontal Datum: NAD 1983 CORS96
Grid: NAD 83 CORS96 California State Plane Zone II FIPS 0402 Ft

GHD

El Dorado County Transportation Commission
COLOMA-LOTUS
MOBILITY PLAN

Existing Bicycle Level of Traffic Stress

Project No. **11180327**
Revision No. **-**
Date. **09/21/2018**

FIGURE 6.2

Document Path: K:\PRJ\2544\G2544\Bike LTS.qgs

Data Source:

Print Date:

Created By: Rosanna Southern

7. Safety Assessment and Collision Data Analysis

7.1 Overview

State Departments of Transportation are required to create a safety plan specific to their state's safety needs under the current transportation-funding bill (FAST-Act) and the Highway Safety Improvement Plan (HSIP). A Strategic Highway Safety Plan (SHSP) is a statewide-coordinated safety plan that provides a comprehensive framework for reducing highway fatalities and serious injuries on all public roads. SHSPs are a critical and comprehensive tool for states to keep moving towards zero deaths related to motor vehicles and roadways. California's Strategic Highway Safety Plan (SHSP) for 2015-2019 has adopted a "Toward Zero Deaths" (TZD) strategy for reducing traffic fatalities and injuries. The TZD is also a national strategy supported by the Federal Highway Administration and many other organizations.

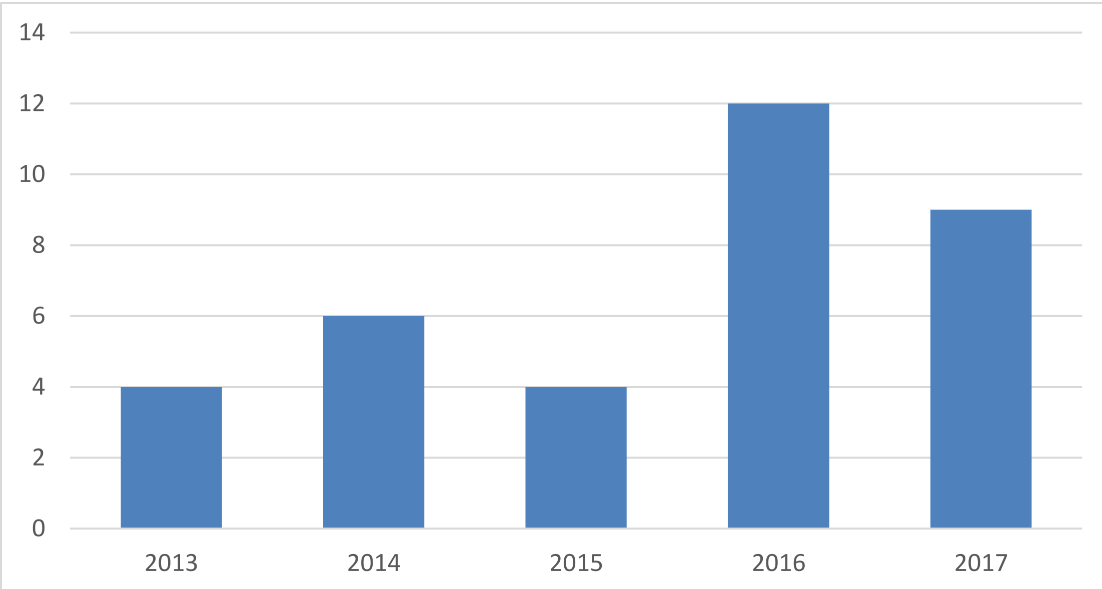
Collision data for the study roadways and intersections was obtained from El Dorado County Department of Public Works, who receives and processes the data from the Statewide Integrated Traffic Records System (SWITRS), from the California Highway Patrol. The accuracy of the data is subject to reporting levels of the law enforcement agencies supplying the collision reports. Data was collected for study corridors including Lotus Road, State Route 49 (SR 49), and Cold Springs Road (SR 153) for the five most recent years of available data between January 1, 2013 and December 31, 2017. Based on the collision data, there were 35 reported collisions along Lotus Road and SR 49 within the study area.

7.2 Collision Trends

Based on the five-year collision data, the number of collisions along the study corridors has increased in the last several years. Figure 7.1 shows the collisions by year for Lotus Road, SR 49, and Cold Springs Road (SR 153) combined. There was 1 fatal collision, 3 severe injury collisions, 9 other injury collisions, and 22 property damage only collisions. The fatal collision occurred on SR 49 at Coloma Heights Road, was a hit-object collision type with improper turning as the primary collision factor violation category[18]. Figure 7.2 presents the collision types by collision severity. The highest collision type was hit-object (16 collisions).

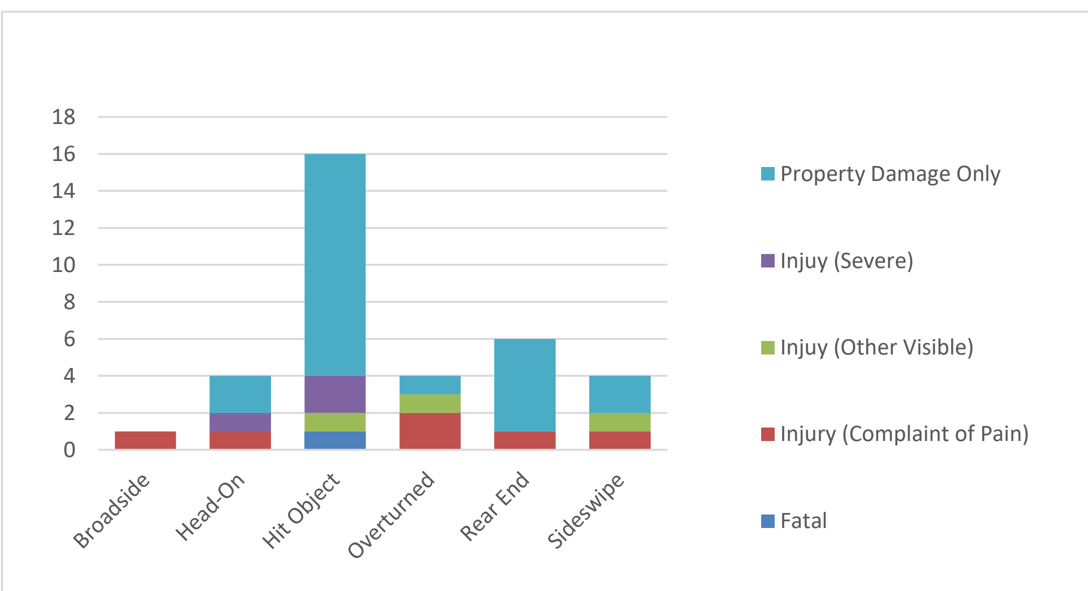
[18] Two serious collisions occurred at this intersection during the development of this report. These collisions are not reflected in this safety analysis.

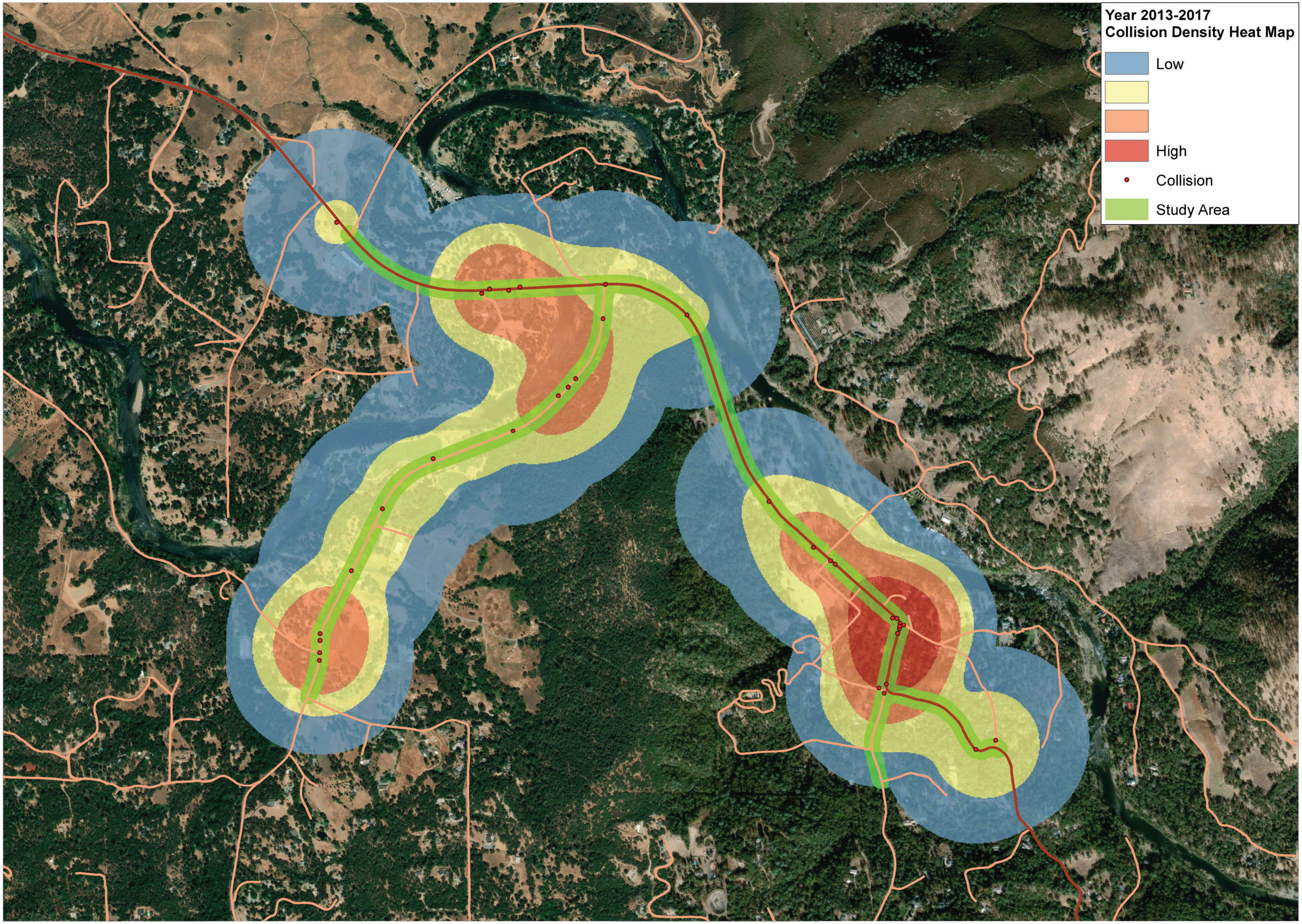
Figure 7.1 Collisions by Year



Three of the four head-on collisions occurred on SR 49 at the intersection of Coloma Heights Road where SR 49 turns sharply. This location also had the highest number of collisions (7 collisions). Most of the rear end collision types occurred on SR 49 near Mt. Murphy Road. There were no pedestrian or bicycle collisions (reported). The attached Figures show where the collisions occurred and the associated hot spots (density heat map), the collision severity, and the collision types along Lotus Road and SR 49.

Figure 7.2 Collision Type by Collision Severity





COLOMA LOTUS
Mobility Plan

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Miles
Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxiliary Sphere

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El Dorado County Transportation Commission
Coloma Lotus Mobility Plan

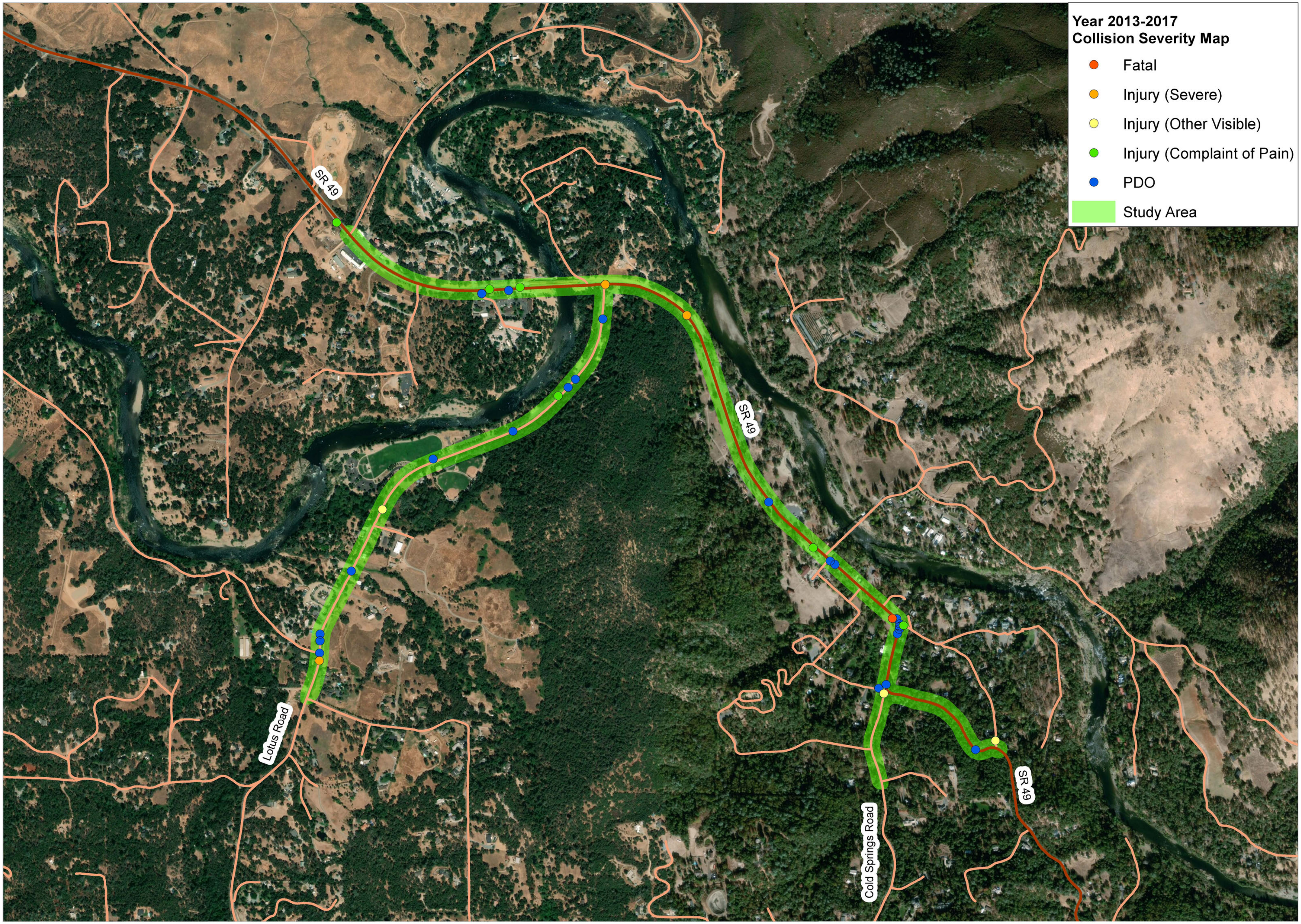
Density Heat Maps
Study Area Collisions

Project No. 11180327
Revision No. -
Date 10/02/2018

FIGURE 7.3

C:\Users\kkleinschmidt\Desktop\Coloma Base 36x48.mxd
Print date: 03 Oct 2018 - 13:56

Data source: SWITRS 2013-2017
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.



COLOMA LOTUS Mobility Plan

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Map Projection: Mercator Auxiliary Sphere
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Coloma Lotus Mobility Plan

Collision Severity Map
Study Area Collision

Project No. 11180327
Revision No. -
Date 10/02/2018

FIGURE 7.4

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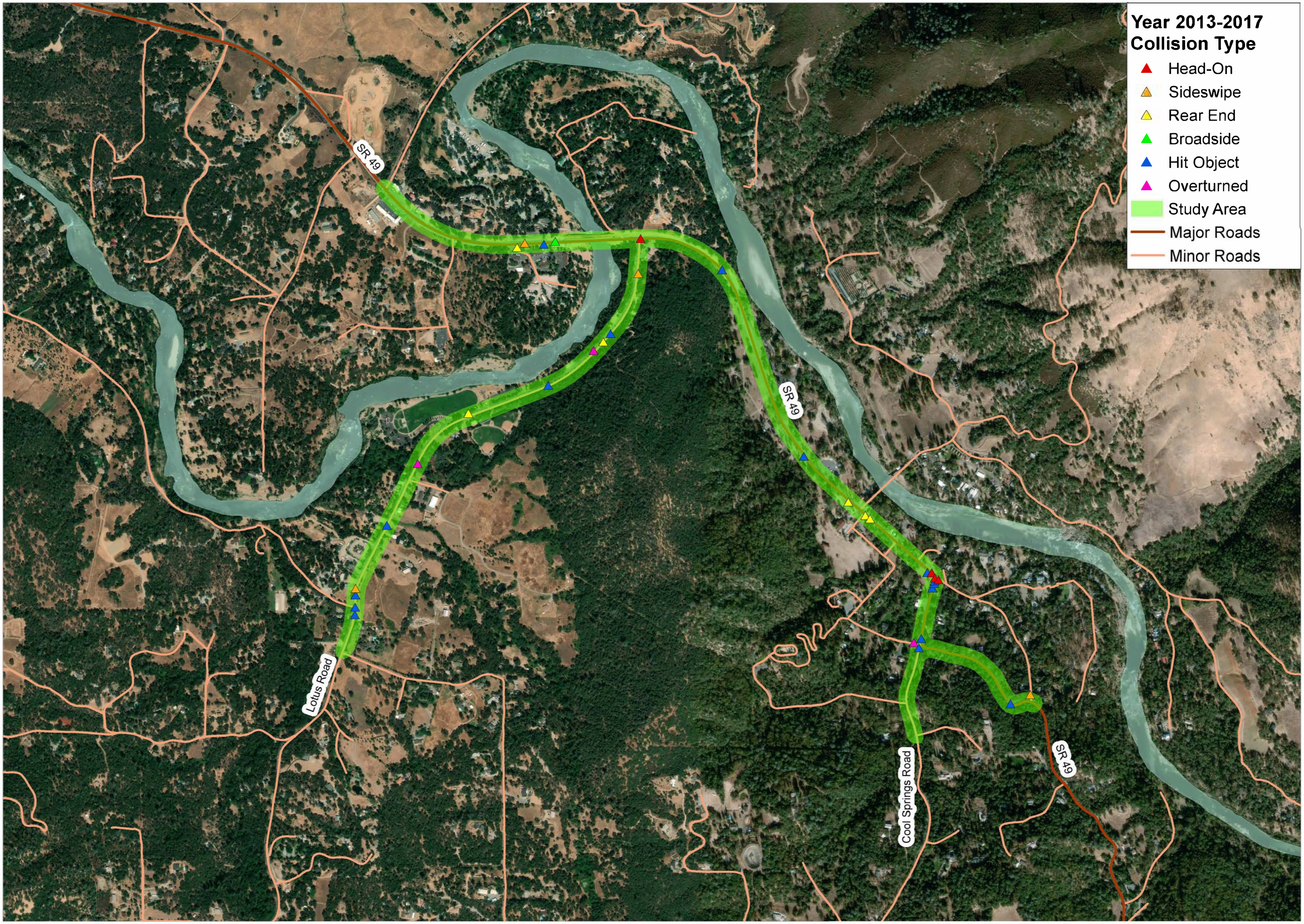
Data source: SWITRS 2013-2017
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.



COLOMA LOTUS Mobility Plan

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Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
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El Dorado County Transportation Commission
Coloma Lotus Mobility Plan

Collision Type Map
Study Area Collisions

Project No. 11180327
Revision No. -
Date 10/02/2018

FIGURE 7.5

8. Summary of Findings

8.1 Existing Conditions

Based on the results of the existing conditions analyses, along with input received during the public engagement process, the following baseline condition findings of the Coloma-Lotus study area were developed:

- Locations/areas of greatest concern cited by the public include: SR 49 within Marshall Gold Discovery Park between SR 153 and Bridge Street; SR 153 at its juncture with SR 49; and, Lotus Road between the baseball field entrance and Firehouse Road. Greatest concerns cited by the public were high vehicular speeds; disregard of posted speed limits and intersection controls by the motoring public, pedestrian safety at crossings and bicycle safety.
- There are extensive connectivity gaps in both pedestrian and bicycle infrastructure. Lack of bicycling infrastructure accompanied by excessive vehicular speeds – even within posted 25 mph zones – creates a high-stress environment for bicycling.
- Collision hotspots in order of frequency and severity are: SR 49 at Coloma Heights Road[19]; SR 49 / SR 153; SR 49 at Marshall Road; and Lotus Road at Bassi Road. Collision history along Lotus road indicates an evenly dispersed collision pattern which indicates a systemic segment-based safety problem on Lotus Road. Analysis of collisions types supports excessive speeds (rear-end and hit-object are indicative of excessive speed collisions).
- Pedestrian activity is heaviest during peak vehicle use times (i.e., AM, Midday, and PM peak hours) and is heaviest on SR 49 near the Mount Murphy Bridge and Bridge Street. Bicycle activity is generally light. This is likely indicative of the lack of bicycle infrastructure coupled with inadequate shoulder widths and vehicular speeds near 40 mph throughout much of the study area. This high-stress biking environment makes biking along SR 49 or Lotus Road in the study area limited to only confident cyclists.
- Analysis of study area intersection operations indicate that all intersections are operating at acceptable conditions with minimal delay experienced by motorists during the AM, Noon, or PM peak hours. No non-signalized intersections meet signal warrants at this time. These findings are not anticipated to be compromised by future growth in tourism.
- Parking supply is adequate to accommodate vehicular demand during average summer weekday and weekend conditions. However, anecdotally, peak event parking, particularly associated with events at Henningsen Lotus Park, can be strained. Additional parking is being planned by County Parks per the Henningsen Lotus Park Conceptual Master Plan.

[19] Two serious collisions occurred at this intersection during the development of this report. The collisions are not reflected in the technical safety analysis.

8.2 Future Conditions

8.2.1 Growth Expectations

Based on future growth scenarios in the El Dorado County Travel Demand Model, no growth in population or employment is projected in the Coloma-Lotus area out to the year 2040. Between 2011 and 2016 it was estimated that total visitation to Marshall Gold Discovery State Park grew by 58 percent, which is displayed in Table 8.1. Regional population growth (surrounding areas of the greater Sacramento region) is expected to continue. Coloma Valley's tourism industry is anticipated to grow commensurate with regional growth resulting in continued increases in visitation.[20]

Table 8.1 Rate of Growth in Visitation to Marshall Gold Discovery Historic State Park

Visitation Year	2011	2012	2013	2014	2015	2016	Rate of Growth
Interpretive Programs	447	565	762	790	863	910	**104%**
Program Participants	13,541	17,873	25,488	25,465	27,313	29,760	**120%**
Coloma Outdoor Discovery School	6,608	7,329	8,305	8,451	9,205	9,750	**48%**
Paid Day Use	86,944	81,822	105,030	100,016	103,020	104,693	**20%**
Miscellaneous Visitation						25,000	**100%**
Total Visitation	**107,540**	**107,589**	**139,585**	**134,722**	**140,401**	**170,113**	**58%**

8.3 Improvement Concepts

8.3.1 Improvement Concept Development

Corridor improvements were developed based on the stated objectives of the study, technical studies and findings, and on suggestions brought forth in the community and stakeholder engagement process. All proposed improvements were based on transportation planning and engineering best practices with the goal of reducing vehicle speeds, mitigating safety concerns, and improving connectivity of the low-stress pedestrian and bicycle network. All proposed improvements were screened for concurrence with the Stakeholder Advisory Committee to ensure engineering feasibility and consistency with the local and historic character of the Coloma Valley. For several improvements, individual meetings were held with key stakeholders including State

[20] State of California Natural Resources Agency, Department of Parks and Recreation, *Marshall Gold Discovery State Park (Annual Visitation 2011-2016)*

Parks, Caltrans and local property owners to ensure the improvement concepts were considered reasonable and feasible by those directly impacted.

8.3.1 Corridor Concept Planning Level Cost Estimates

To develop planning level cost opinions, each CLMP improvement concept was analyzed based on industry-accepted standards and best practices. Planning level project costs were developed using the 2018 Contract Cost Data provided by Caltrans, and bid summary results of recent projects to determine the unit costs and quantities. For Class I multipurpose paths (paved and decomposed granite), 20-year life-cycle costs for operations and maintenance (O&M) were also estimated based on industry norms for like facilities. Planning level cost estimates are necessary to determine the funding required for either alternative concept, and include higher than usual contingency costs to reflect the variation in actual costs that may occur during more advanced stages of concept implementation. The preliminary cost estimates are provided in **Appendix C**.

8.3.2 Segment Improvement Discussion

For analysis purposes, the study area was divided into the following four improvement segments:

Segment 1: SR 49 from Marshall Road to Lotus Road.

Segment 2: SR 49 from Lotus Road to Coloma Heights Road.

Segment 3: SR 49 from Coloma Heights Road to Church Street and Cold Springs Road/SR 153 to Monument Road.

Segment 4: Lotus Road from Bassi Road to SR 49.

Figures 8.3 through Figures 8.18 in the following sections exhibit preferred concepts. At some locations more than one improvement concept was considered. All concepts are conceptual and have not gone through environmental review that may modify a proposed improvement concept due to impacts or challenges identified during the environmental review process. Alternative concepts not recommended at this time are provided in Appendix D.

Figures 8.2 and 8.3 reflect the entire study area and associated improvements, displaying how each figure within a segment study area relate to the study area as a whole.

The overall improvement strategy is to reduce travel speeds through design modifications to SR 49 and Lotus Road (i.e., reduced lane widths, speed warning signs, intersection channelization and control modifications) while providing greater connectivity and separation between pedestrians and bicyclist. Pedestrian activated crossings are proposed to facilitate safe crossings a key points of interest along both SR 49 and Lotus Road. Two proposed roundabouts will “book end” the State Park providing gateway signage, reducing speeds and signifying to motorists that they are entering into a more pedestrian and bicycle oriented environment.

The following sections describe each segment, existing issues or needs of the segment, destinations served by the segment, proposed improvement concepts, associated benefits and costs, alternative improvement considerations, and figures that illustrate the improvements through each segment area.

COLOMA LOTUS Mobility Plan

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1 inch = 700 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Community Mobility Plan

KEY MAP

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.1

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Source:

COLOMA LOTUS Mobility Plan

El Dorado County Transportation Commission
Coloma Sustainable Community Mobility Plan

STUDY AREA VICINITY MAP OF PROPOSED IMPROVEMENTS

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.2

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8.3.2.1 Segment 1: SR 49 – Marshall Road to Lotus Road

Segment 1 spans the portion of SR 49 west of Marshall Road toward Amoloc Lane and east of Marshall Road past the SR 49 American River Bridge to Lotus Road. The study segment traverses by several restaurants, stores, river outfitters, and an RV resort. Beach Court connects to the study segment area at SR 49 between the segment limits, providing informal river access to the South Fork of the American River.

8.3.2.2 Existing Issues

While bike lanes and sidewalks exist within a portion of this study segment, a speed limit of 45 mph creates a high stress environment for both bicyclists and pedestrians. Unsafe speeds at the intersection of Marshall Road and SR 49 have resulted in collisions. The area currently does not provide safe and comfortable connectivity to destinations within other study segments.

8.3.2.3 Improvement Description

Proposed improvements include:

- Intersection improvements at Marshall Road/SR 49:
    - Channelization and traffic calming with proposed stamped concrete median islands
    - Proposed shared left/right exit at southbound leg of Marshall Road
    - Restriction to right-in/right-out at Marshall Road, and SR 49 entry points for the Coloma Club and River Shack Deli & Pub
    - Replacement of existing crossing with pedestrian hybrid beacon
- Extension of existing sidewalks and bike lanes to Amoloc Lane and Lotus Road
- Implementation of high visibility crosswalk with pedestrian hybrid beacons:
    - Beach Court and SR 49
    - Between Ponderosa Resort and River Park Village
- Intersection improvements at Lotus Road/ SR 49:
    - Roundabout with gateway entry sign (*Environmental review of an intersection improvement project will include consideration of all potential alternatives)
    - High-visibility multi-stage crosswalks
- Class I path near Beach Court:
    - Includes pedestrian bridge connecting to river access at Henningsen Lotus Park.

8.3.2.4 Alternative Improvement Considerations

Project illustrations of Segment One preferred concepts can be seen in Figures 8.3, 8.4, 8.5, 8.6, and 8.7. A roundabout was also considered at the intersection of Marshall Road and SR 49; however, the intersection improvements listed above were determined to be the preferred concept through the public and stakeholder engagement process. Project illustrations of that alternative are provided in **Appendix D**.

8.3.2.5 Destinations Served

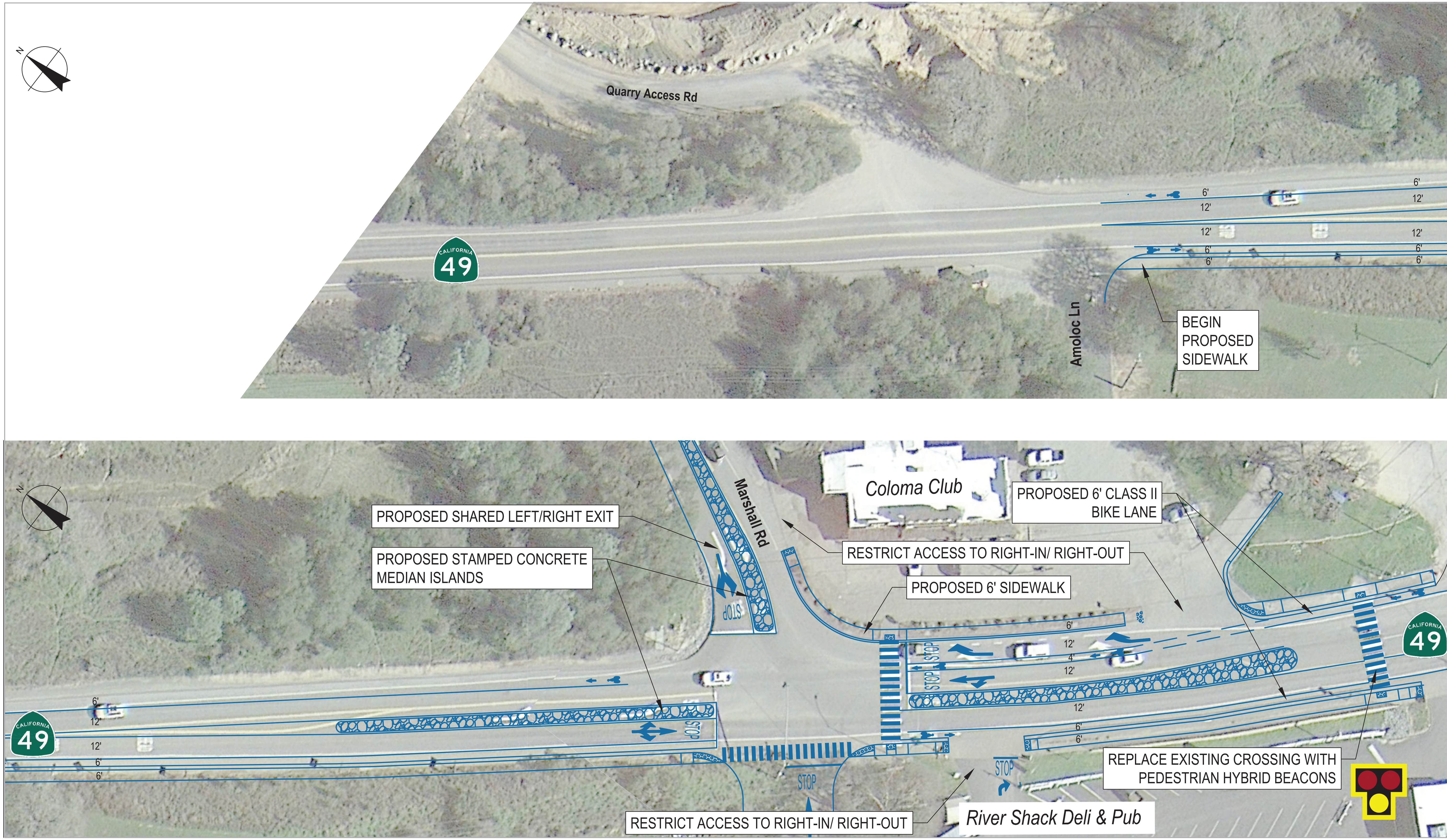
The following locations serve as Segment 1 destinations: Coloma Club Café; Reliable River Repair; Mother Lode Prospecting and Adventure Supplies; River Shack; Take A Bite Deli; Marco's Café; California Canoe & Kayak; Gorilla Rock Tacos; River Park shopping center, which includes: Hotshot Imaging, Inc., Riyo Yogurt, Sierra Rizing Bakery, Catering, and Coffee, Squally's on the River, two river outfitters, and more.

8.3.2.6 Benefits

The benefits of Segment 1 proposed improvements are multi-fold, aiming to reduce speeds, and improve safety and lower stress connectivity. Intersection channelization improvements at Marshall Road and SR 49 and implementation of a roundabout at Lotus Road and SR 49 include pedestrian crossing enhancements, will reduce speeds, calm traffic, and improve safety for both motorists and pedestrians. The stamped concrete raised median treatment and access controls (i.e., right-in right-out only turn restrictions) at the driveway immediately adjacent the SR 49/Marshall Road intersection would serve to eliminate non-intuitive conflicting driveway movements so near this intersection and facilitate safer pedestrian and bicycle crossings at this driveway. Implementation of high visibility crosswalks with hybrid beacons will improve safety and access between the north and southbound sides of SR 49. Extensions of existing sidewalk and bike lanes will improve pedestrian and bicycle access and reduced speeds associated with intersection improvements will result in lower level of traffic stress on SR 49 between Amoloc Lane and Lotus Road. Moreover, the Class I path from SR 49 near Beach Court to a pedestrian bridge crossing the River to Henningsen Lotus Park will provide low stress connectivity between SR 49 and Lotus Road destinations, including Henningsen Lotus Park.

8.3.2.7 Improvement Costs

Improvement costs include estimates of project administration, preliminary alternatives/environment document, design cost, construction and construction support. The total estimated cost for Segment 1 improvements is $15,435,000.



COLOMA LOTUS Mobility Plan

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1 inch = 50 ft.

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49 (Figure Map 2)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.3

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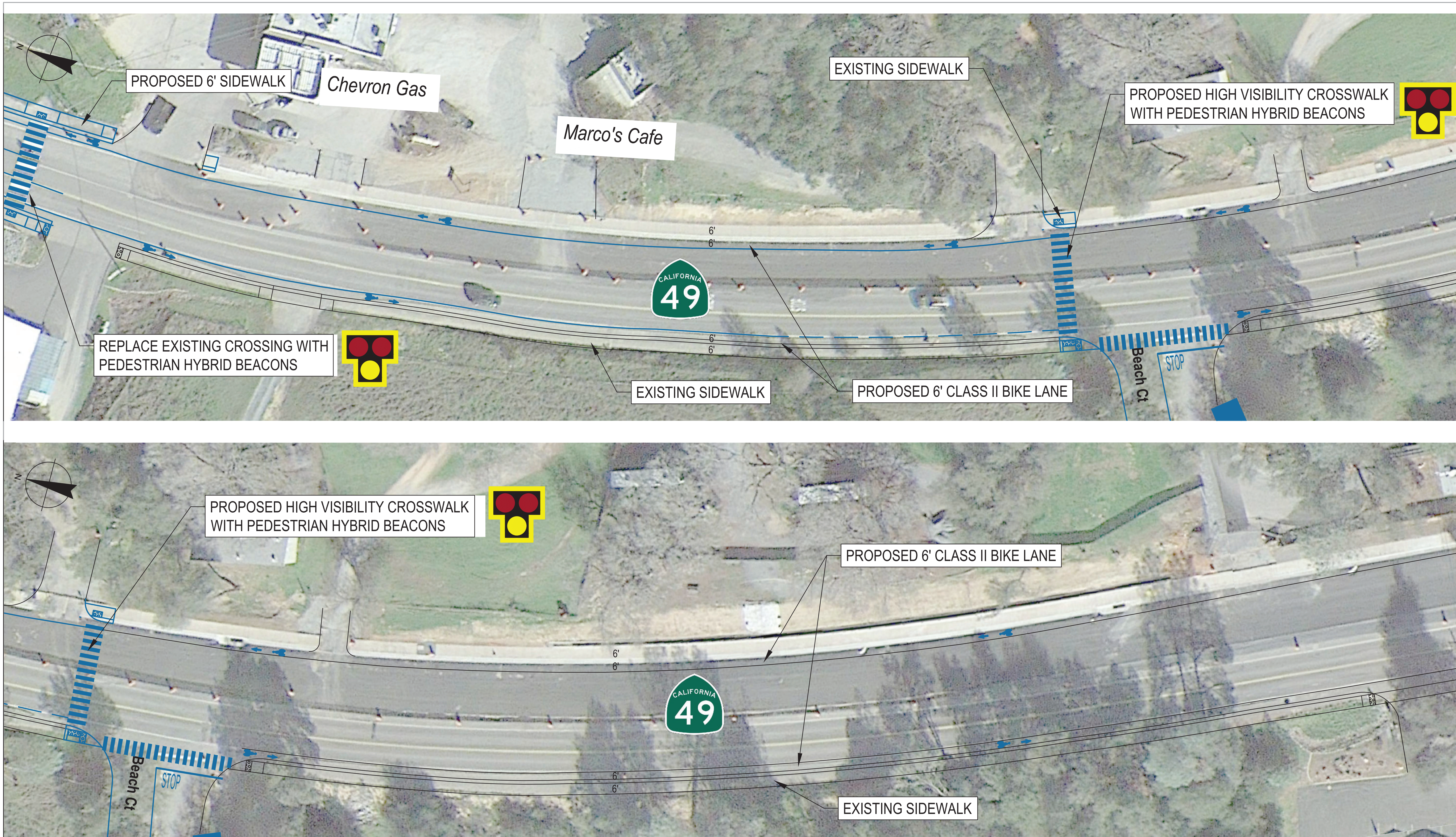

COLOMA LOTUS Mobility Plan

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1 inch = 50 ft.

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY (Figure Map 3)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.4

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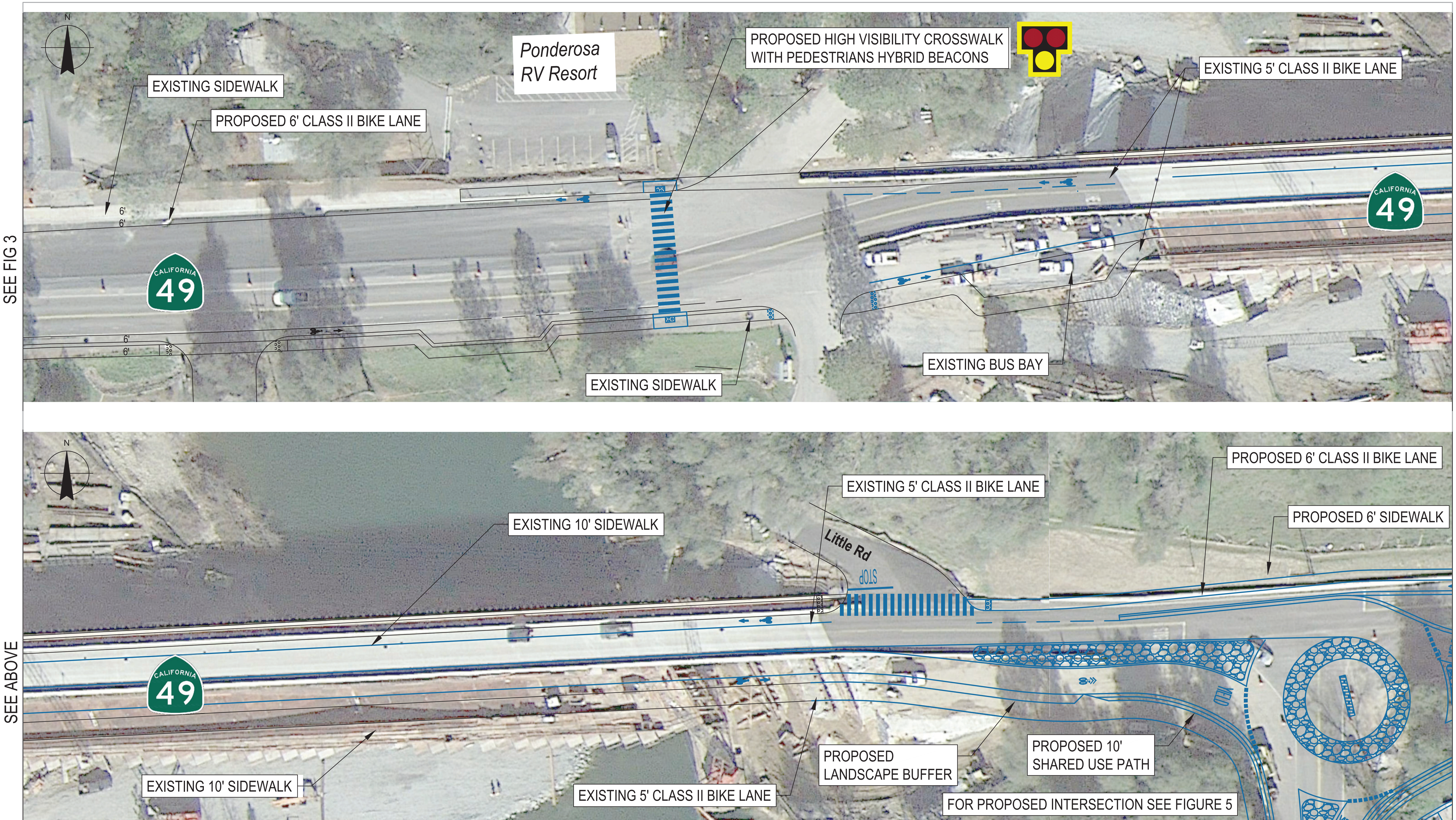

COLOMA LOTUS Mobility Plan

Per Transportation Operations Policy Directive #13-02, Caltrans is required to consider all control types, including yield-controlled roundabouts, as an alternative when considering making improvements to an intersection on the state highway system.

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: SR 49 (Figure Map 4))

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.5

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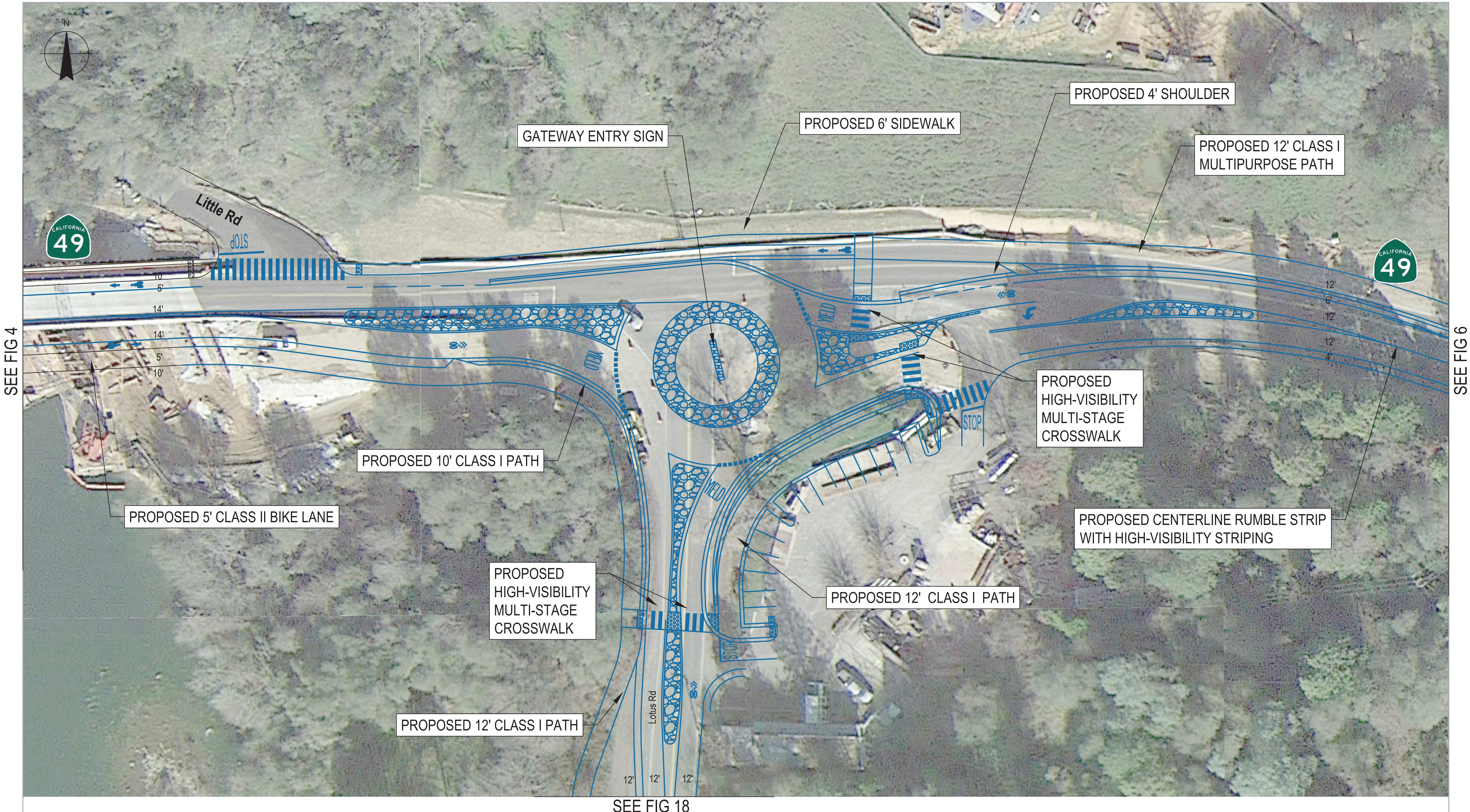

COLOMA LOTUS Mobility Plan

Per Transportation Operations Policy Directive #13-02, Caltrans is required to consider all control types, including yield-controlled roundabouts, as an alternative when considering making improvements to an intersection on the state highway system.

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49 (Figure Map 5)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.6

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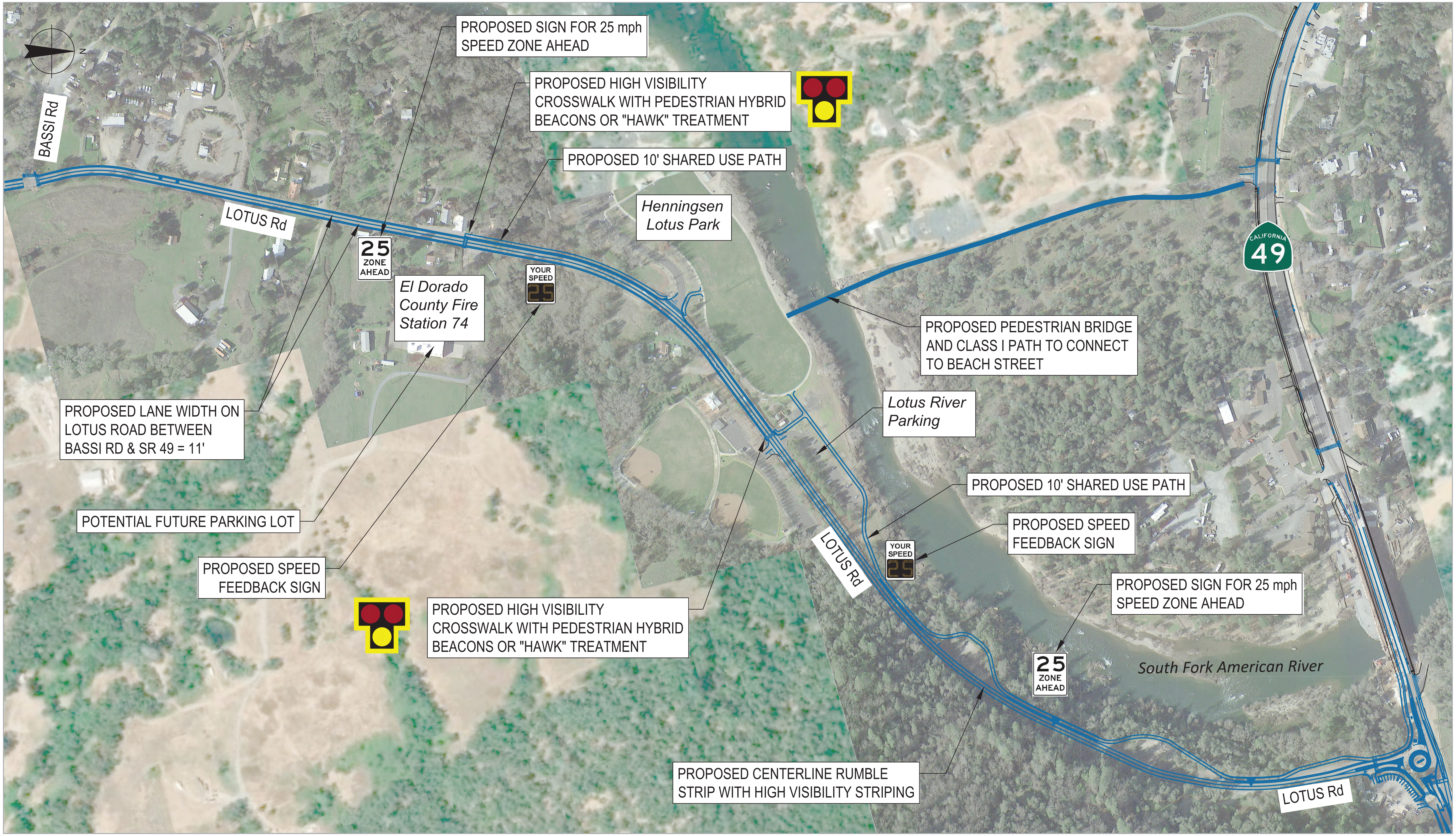

COLOMA LOTUS Mobility Plan

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1 inch = 300 ft.

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

LOTUS ROAD AND SR 49 CONNECTIVITY

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.7

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8.3.2.8 Segment 2: SR 49 – Lotus Road to Coloma Heights Road

Segment 2 spans SR 49 from Lotus Road at the northerly limit to the Intersection of Coloma Heights Road and SR 49 at the southerly limit of the segment. The segment study area traverses through the State Park's historic sites, past several river outfitter businesses, the Gold Trail Grange, Argonaut Farm to Fork Café, the State Park's North Beach and Mill parking lots, and access points to hiking trails, the river, resorts, and lodging.

8.3.2.9 Existing Issues

The speed limit from Lotus Road to the North Beach parking lot is 40 mph. While the speed limit is lowered through the State Park to between 15 and 25 mph, prevailing speeds are often higher than posted speeds. Several unpaved pedestrian trails and roadside paths exist throughout the State Park. Many of these unpaved paths are ADA compliant. However, based on public input received during the study field reviews these paths can be difficult for seniors and individuals with disabilities to navigate comfortably as no formal sidewalks exist. These conditions accompanied by relatively high vehicle speeds provide a high stress environment for bicyclists and pedestrians.

8.3.2.10 Improvement Description

Proposed improvements include:

- Reduction to 11 foot lanes to accommodate 4-6 foot shoulder
- Sharrows on SR 49 for more confident bicyclists
- Class I Multi-Purpose Paths
    - 12 ' paved path[21] from south of Lotus Road/ SR 49, wrapping around the Sierra Nevada House site
    - Varying 8' - 12' paved path along the river side of SR 49 from Lotus Road/ SR 49 to Coloma Heights Road/ SR 49
    - 8' -10' decomposed granite path traversing through the State Park, along the south side of SR 49
- Speed feedback signs
    - SR 49 through the State Park across from North Beach
    - South of Coloma Heights on SR 49
- Pedestrian Hybrid Beacon (HAWK) systems at proposed crosswalks
- Rectangular Rapid Flashing Beacons at existing and new crosswalks
- Centerline rumble strips with high visibility striping
- Parking improvements at several locations

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[21] State Parks prefers decomposed granite for all Class I multipurpose paths; however, cost estimates reflect the use of paved material in the Class I path traversing the riverside portion of SR 49.

- Intersection improvement: SR 49 and Coloma Heights Road
    - Channelized left turn lane on to Coloma Heights
    - Flattened curve
    - Raised median

8.3.2.11 Alternative Improvement Considerations

Project illustrations of Segment 2 preferred concepts are shown in Figures 8.8, 8.9, 8.10, 8.11, and 8.12. Conversion to roundabout control was considered as an alternative at the intersection of Coloma Heights Road and SR 49. Given its relatively large footprint (needed right-of-way), State Park preferred not to advance this concept. Project illustrations of this alternative are provided in **Appendix D**. Additionally, the number of rectangular rapid flashing beacons were reduced to lessen the visual impact in keeping with the rural and historic character of the segment area.

8.3.2.12 Destinations Served

Segment 2 destinations include: river access points, Marshall Gold Discovery Historic State Park; American River Nature Conservancy; Coloma Outdoor Discovery School, Gold Trail Grange; Argonaut Café, the Gold Discovery Museum and Visitor Center; Mt Murphy Bridge, Sutter's Mill Replica, and river lodging/resorts.

8.3.2.13 Benefits

The improvements proposed for Segment 2 are intended to benefit all users of the transportation system by reducing unsafe speeds in the segment to provide low stress connectivity between destinations in the area and improve the safety of the Coloma Heights/SR 49 intersection. The Class I decomposed granite trail proposed along the south side of SR 49 through the State Park and the Class I Paved Path proposed along the north side of SR 49 would provide low stress options for pedestrians and bicyclists through the entire segment while sharrows on SR 49 support more confident cyclists. The Coloma Heights/SR 49 intersection improvements will reduce speeds at that location through channelization (i.e., raised median and a flattened curve). Pedestrian hybrid beacons and RRFBs will improve the safety and visibility of pedestrians and bicyclists crossing the street and will also act as traffic calming devices due to their high visibility[22].

8.3.2.14 Improvement Costs

Improvement costs reflect project administration, preliminary alternatives/environment document, design cost, construction and construction support to yield a total estimated cost of $5,866,865.

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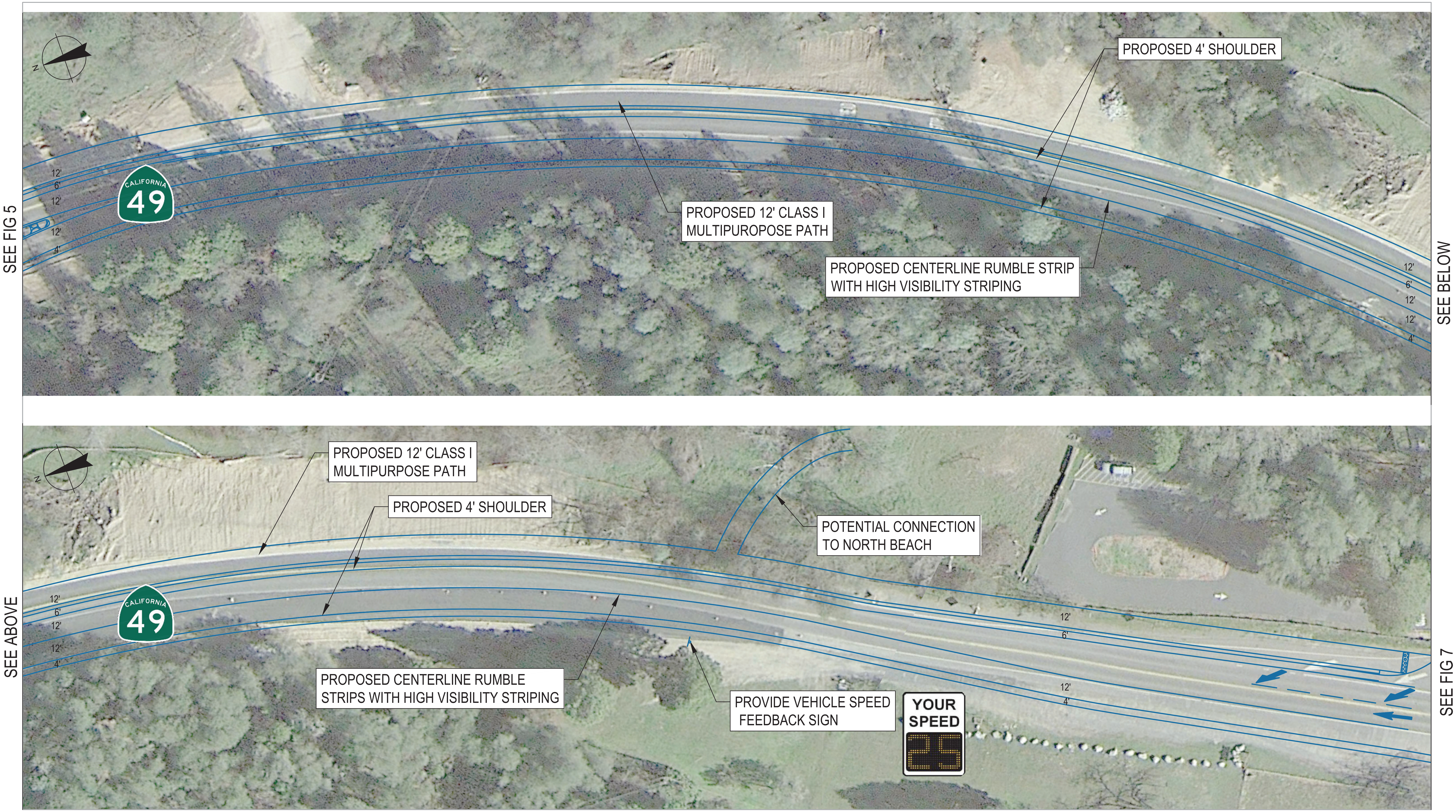
[22] State Parks prefers the proposed RRFBs located at the northern and southern ends of the historic State Park area (north end of the Mill parking lot and at Brewery Street) but would like to defer the implementation of the two middle RRFBs (located at the southern end of the Mill parking lot and at Bridge Street). The ultimate choice of the number and locations of RRFB treatments with Segment 2 will be based on input from State Parks, Caltrans and the public.



COLOMA LOTUS Mobility Plan

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1 inch = 50 ft.

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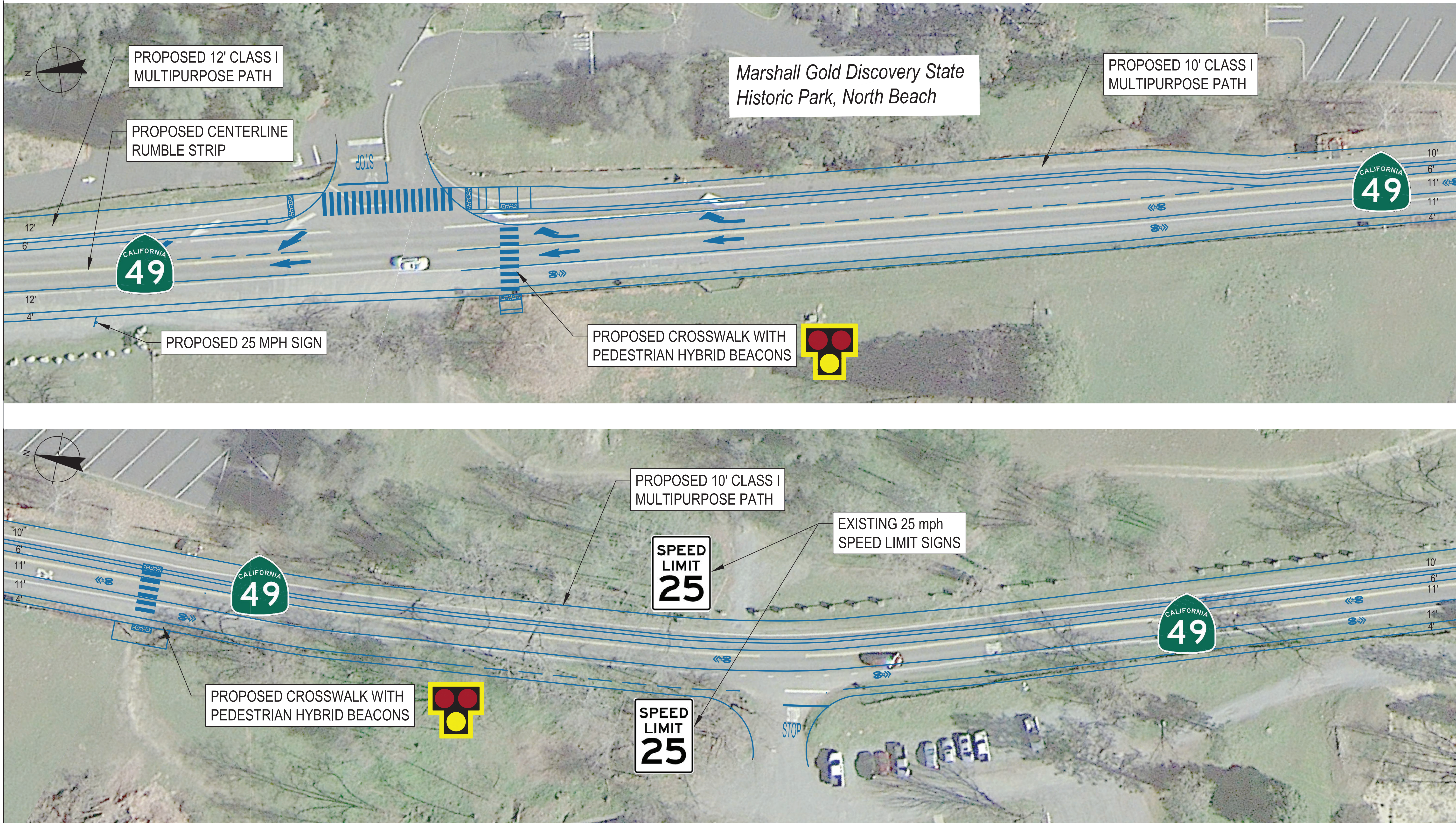
El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49 (Figure Map 6)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.8



COLOMA LOTUS Mobility Plan

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity
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MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49 (Figure Map 7)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.9

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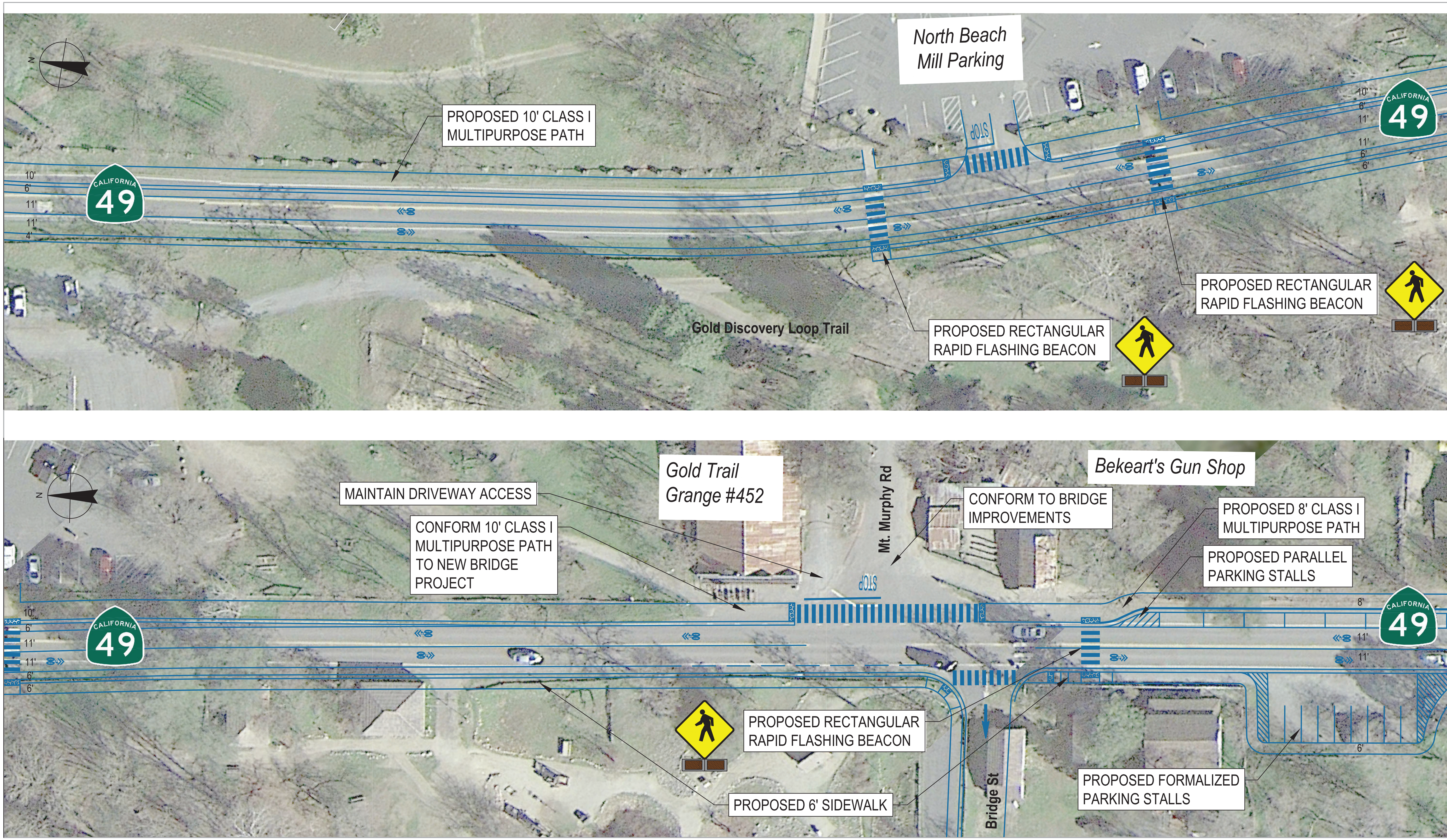

COLOMA LOTUS
Mobility Plan

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
SR 49/Mt Murphy Road (Figure Map 8)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.10

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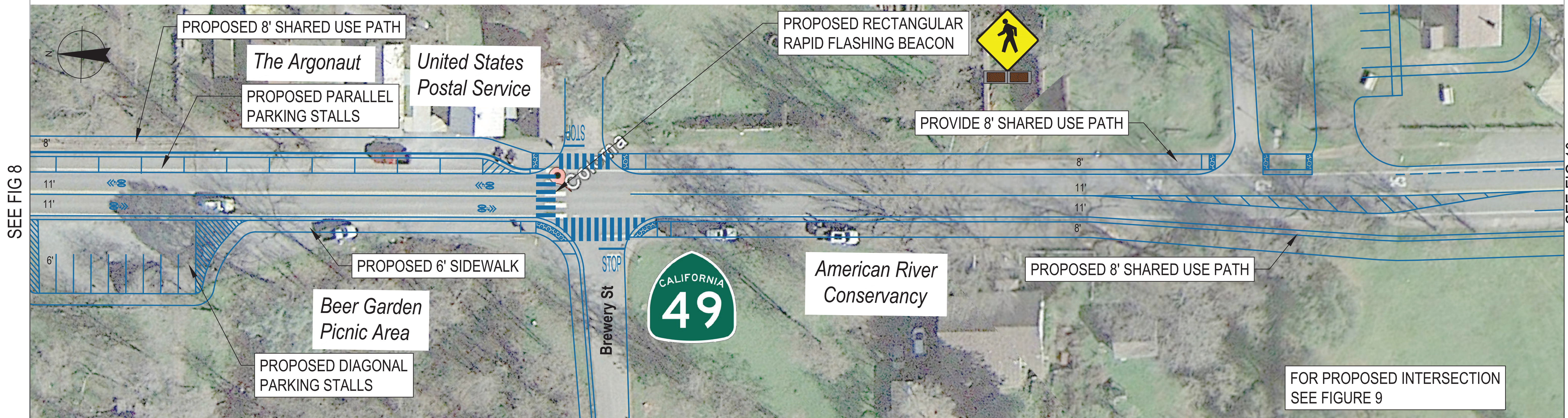

COLOMA LOTUS Mobility Plan

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1 inch = 50 ft.

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
SR 49/ Brewery Street (Figure Map 9)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.11

Filename: N:\US\Roseville\Projects\Legacy\PRJ\2544\A2544\Coloma and EDC_Placerville\Improvement - Concept Design\2544EX001.dwg Plot Date: 31 July 2019 - 10:28 AM

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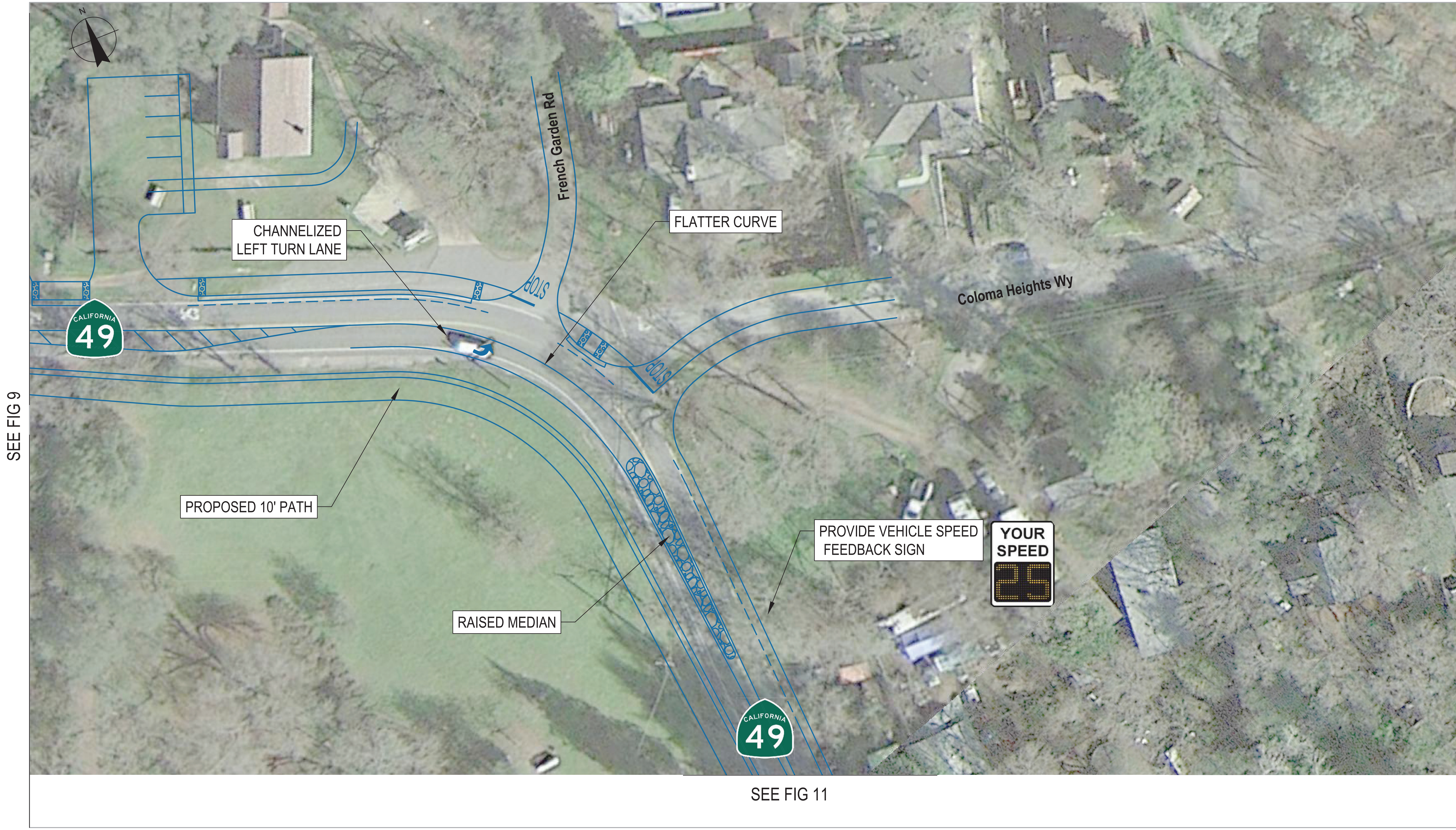

COLOMA LOTUS
Mobility Plan

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1 inch = 40 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
SR 49/ Coloma Heights (Figure Map 10)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.12

Filename: K:\PRJ\2544\A2544\Coloma and EDC_Placerville\Improvement - Concept Design\2544EX001.dwg Plot Date: 5 September 2019 - 9:14 AM

Source:

8.3.2.15 Segment 3: SR 49 – Coloma Heights Road to Church Street and SR 153/Cold Springs Road to Monument Road

Segment 3 is a short segment that spans SR 49 from Coloma Heights Rd to the Church Street/SR 49 intersection and south on SR 153/Cold Springs Road to Monument Road. The segment study area straddles the eastern portion of the State Park, passes by Sutter Center Market, and is closely connected to many of the State Park and river destinations within Segment 2.

8.3.2.16 Existing Issues

Similar to Segments 1 and 2, high prevailing speeds pose safety concerns and the segment lacks low stress connectivity for both bicyclists and pedestrians.

8.3.2.17 Improvement Description

Proposed improvements include the following:

- Reduction to 11 foot lanes to accommodate 4 foot shoulder and Class I Multi-purpose Trail
- Continuation of the Class I decomposed granite path in Segment Two, extending it to Monument Road
- Roundabout at SR 49/SR 153/Church Street intersection (*Environmental review of an intersection improvement project will include consideration of all potential alternatives)
- Speed feedback signs at roundabout approaches on SR 49 eastbound, and SR 153 northbound

8.3.2.18 Alternative Improvement Considerations

Project illustrations of Segment 3 preferred concepts as shown in Figure 8.13.

8.3.2.19 Destinations Served

Destinations served by Segment 3 include: Olde Coloma Theatre; Sutter Center Market; Marshall Gold Discovery State Historic Park and the American River Resort.

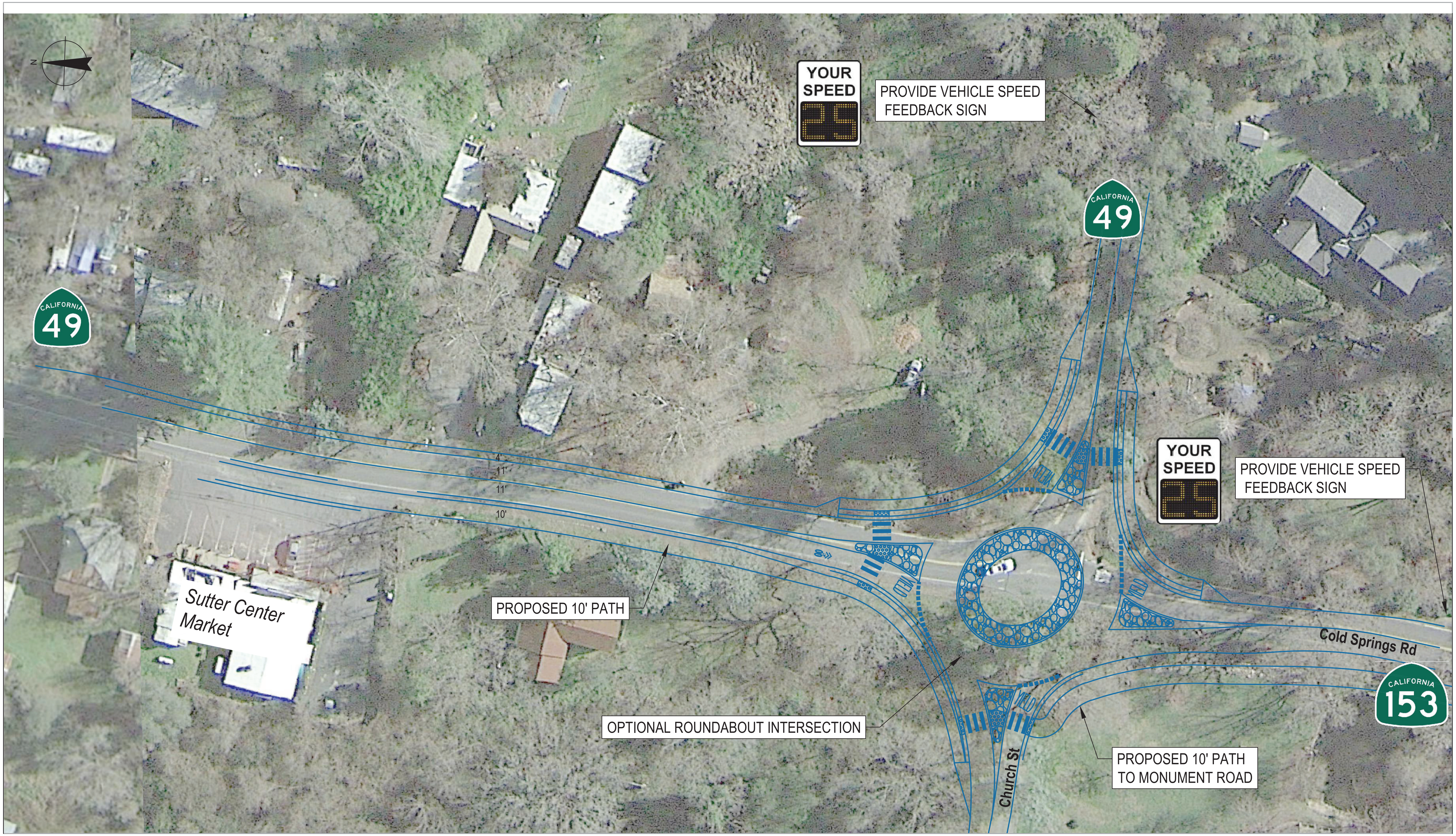
8.3.2.20 Benefits

Converting the intersection of SR 49/SR 153/Church Street to roundabout control will improve safety and multimodal access. A roundabout, coupled with speed feedback signs, will reduce speeds at this intersection, its approaches and ostensibly lower speeds at the nearby Coloma Heights Road/SR 49 intersection. It will also improve site distance between motorists and pedestrians and bicyclists. The multipurpose decomposed granite trail will provide low stress connectivity while remaining consistent with the rural and historic character of the State Park

8.3.2.21 Improvement Costs

Improvement costs include estimates of project administration, preliminary alternatives/environment document, design cost, construction and construction support. The total estimated project cost for Segment 3 is $2,226,000.

SEE FIG 10



COLOMA LOTUS Mobility Plan

Per Transportation Operations Policy Directive #13-02, Caltrans is required to consider all control types, including yield-controlled roundabouts, as an alternative when considering making improvements to an intersection on the state highway system.

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Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
SR 49/ Church Street/ SR 153 (Figure Map 11)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.13

Filename: N:\US\Roseville\Projects\Legacy\PRJ\2544\A2544\Coloma and EDC_Placerville\Improvement - Concept Design\2544EX001.dwg Plot Date: 31 July 2019 - 10:29 AM

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8.3.2.22 Segment 4: Lotus Road – Bassi Road to SR 49

Segment 4 traverses Lotus Road from Bassi Road at the southerly segment limit to SR 49 at the northerly segment limit. Lotus Road accesses Henningsen Lotus Park, which in turn provides public access to the South Fork of the American River several trails, athletic fields and a playground.

8.3.2.23 Existing Issues

Lotus Road experiences vehicles travelling at high speeds, has narrow shoulder width and no sidewalks or dedicated paths for bicycle or pedestrian travel. With the exception of a short 25 mph stretch that passes by the Henningsen Lotus Park playground (advisory when children are present), the posted speed limit on Lotus Road is 45 mph. However, speeding was cited by the public and stakeholders as a significant safety issue on the roadway.

8.3.2.24 Improvement Description

Proposed improvements include:

- Reduction to 11 foot lanes to accommodate 4 foot shoulder
- Centerline rumble strips with high visibility striping through the whole segment study area
- “25 MPH Zone Ahead” signage at two locations
- Replacement of two existing 25 MPH Speed Limit signage with Speed Feedback signs
- High Visibility Crosswalk with Pedestrian Beacon at the intersection of Lotus Road and Firehouse Road (this improvement recommendation is contingent on the County Parks proposed parking expansion at the current El Dorado Fire Station 74 site location).
- High Visibility Crosswalk at the intersection of Lotus Road and Bassi Road
- Class I Multi-purpose path along the eastern bank of the American River from SR 49 to Henningsen Lotus Park
- Retaining wall on Lotus Road next to the River Access Parking Lot

8.3.2.25 Alternative Improvement Considerations

Project illustrations of Segment 4 preferred concepts can be seen in Figures 8.14 8.15, 8.16, 8.17, 8.18, and 8.19. Class II bike lanes were considered as an alternative to the Class I path proposed to run from SR 49 alongside the South Fork of the American River next to Lotus Road. The Class II bike lane alternative was not considered for further study as the provision of Class II bike lanes would not improve the level of traffic stress due to the high prevailing vehicle speeds on Lotus Road. Project illustrations of that alternative are provided in **Appendix D**.

8.3.2.26 Destinations Served

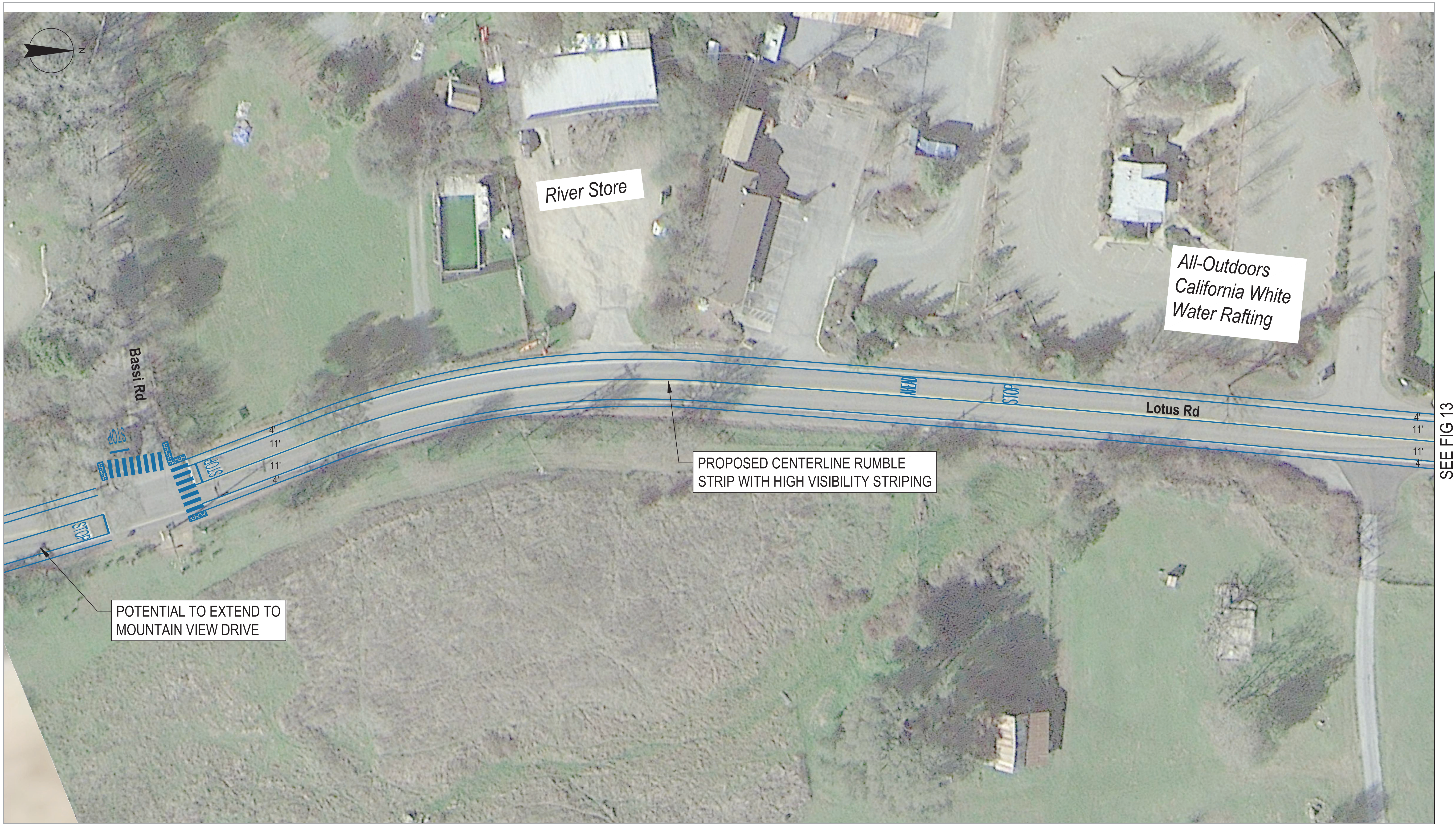
Destinations served by Segment 4 include: Henningsen Lotus Park and Playground, The Lotus Pub, The River Store; All-Outdoors California Whitewater Rafting, and Sierra Nevada Photos.

8.3.2.27 Benefits

The improvements proposed within Segment 4 would result in lower stress connectivity for bicyclists and pedestrians and improved safety for all users. The Class I path proposed alongside the river and Lotus Road would provide active transportation users with low stress access to Henningsen Lotus Park – particularly those coming from SR 49 to and from Henningsen Lotus Park. Implementation of a new high visibility crosswalk and pedestrian beacon at Firehouse Road addresses an existing gap in safe pedestrian crossings and would also provide a safe crossing at the end of the proposed Class I path. Moreover, connection to the Class I path and pedestrian bridge river crossing described for Segment 1 would provide further low stress connectivity to Segment 1 destinations. Implementation of rumble strips with high visibility striping is intended to reduce lane crossover and reduce speeds. Speed Feedback and 25 mph zone signage will increase awareness of motorists traveling through Lotus Park's vicinity to lower speeds and improve safety for park visitors and motorists.

8.3.2.28 Improvement Costs

Improvement costs include estimates of project administration, preliminary alternatives/environment document, design cost, construction and construction support. The total estimated cost of Segment 4 improvements is $6,339,000.



COLOMA LOTUS Mobility Plan

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1 inch = 50 ft.

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
LOTUS ROAD/ BASSI ROAD (Figure Map 12)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.14

Filename: N:\US\Roseville\Projects\Legacy\PRJ\2544\A2544\Coloma and EDC_Placerville\Improvement - Concept Design\2544EX001.dwg Plot Date: 31 July 2019 - 10:29 AM

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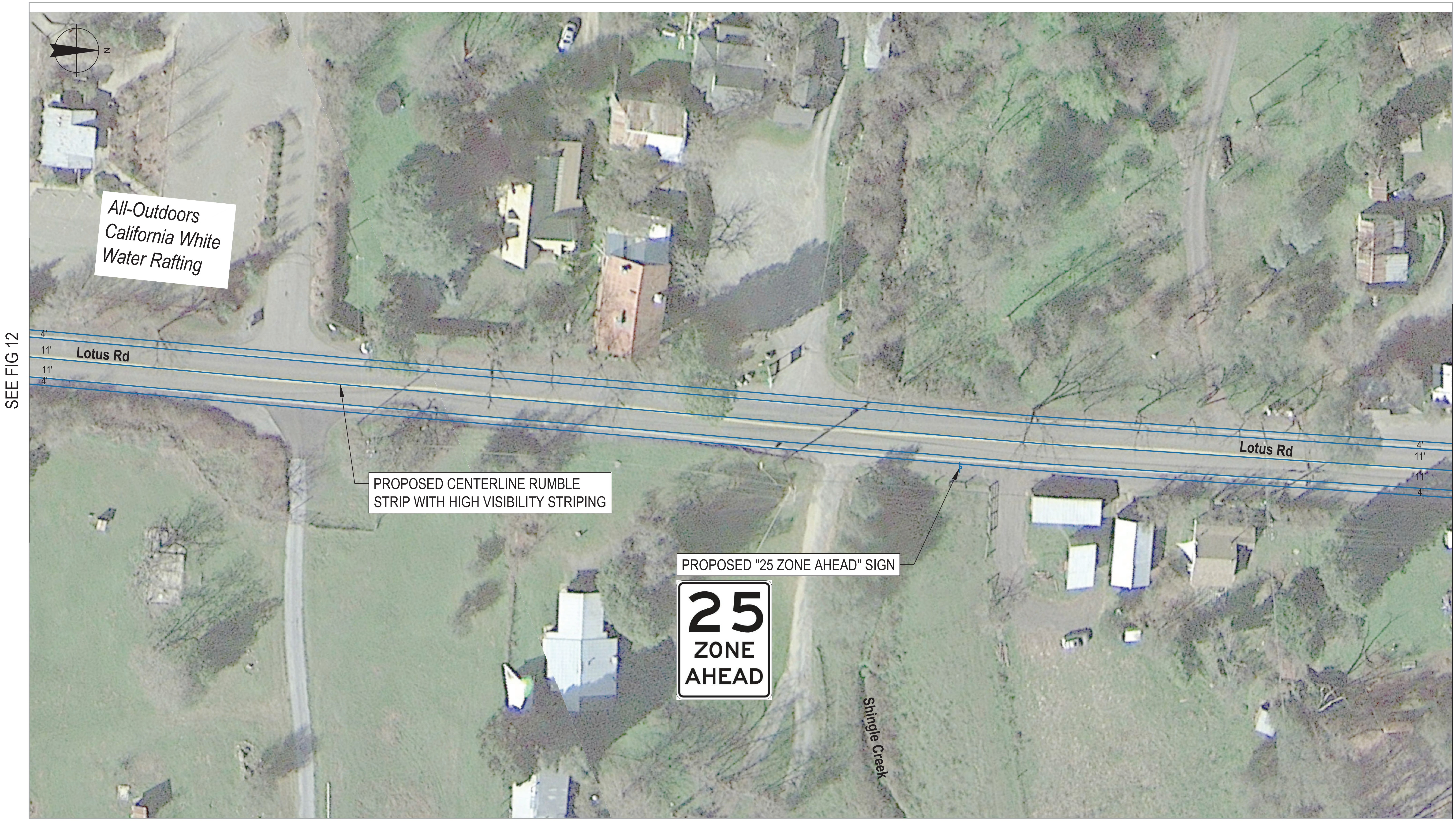

COLOMA LOTUS Mobility Plan

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
LOTUS ROAD/ SHINGLE CREEK (Figure Map 13)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.15

Filename: N:\US\Roseville\Projects\Legacy\PRJ\2544\A2544\Coloma and EDC_Placerville\Improvement - Concept Design\2544EX001.dwg Plot Date: 31 July 2019 - 10:30 AM

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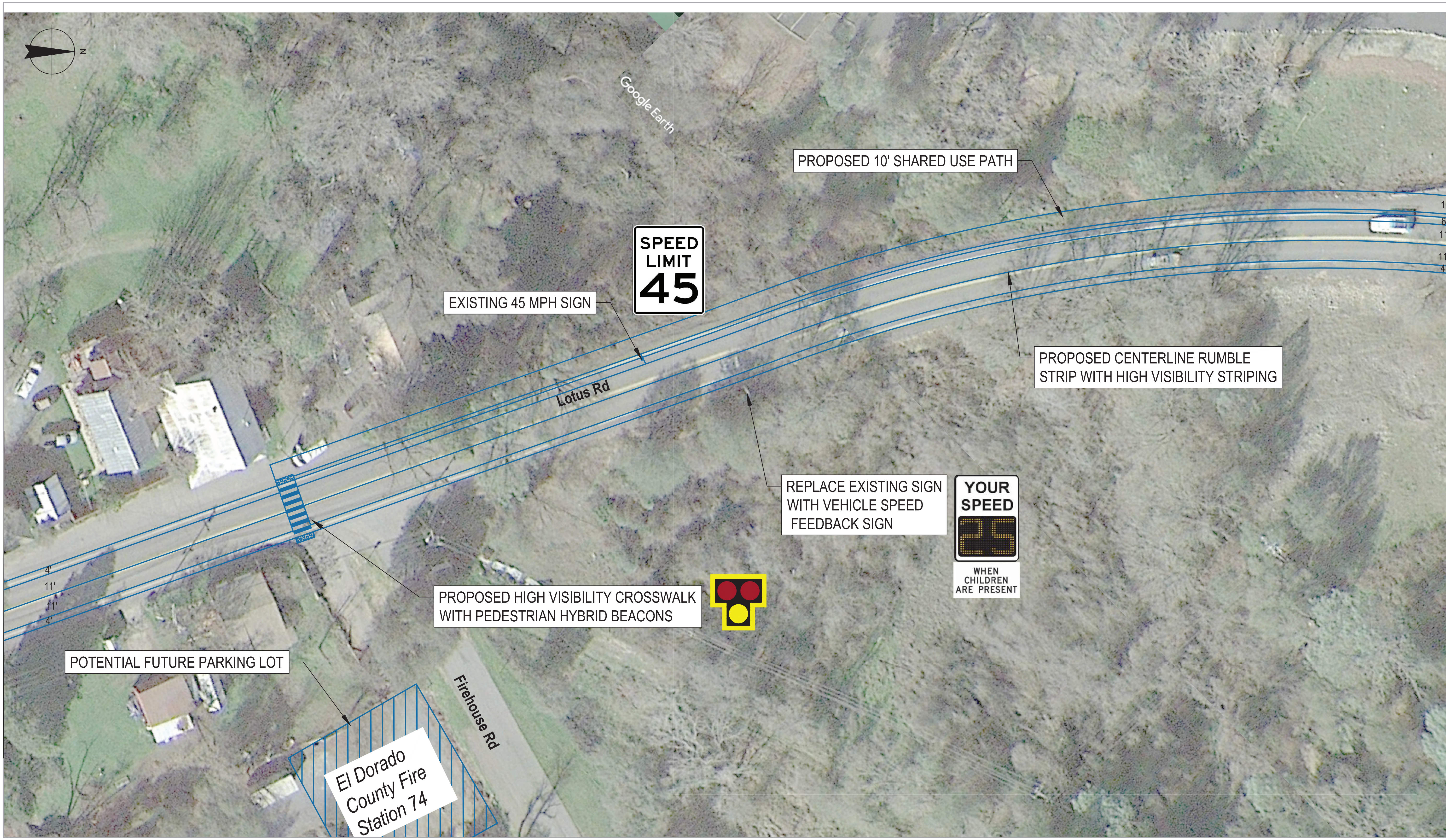

COLOMA LOTUS Mobility Plan

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1 inch = 50 ft.

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD/ FIREHOUSE ROAD
(Figure Map 14)

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 8.16

Filename: N:\US\Roseville\Projects\Legacy\PRJ\2544\A2544\Coloma and EDC_Placerville\Improvement - Concept Design\2544EX001.dwg Plot Date: 31 July 2019 - 10:30 AM

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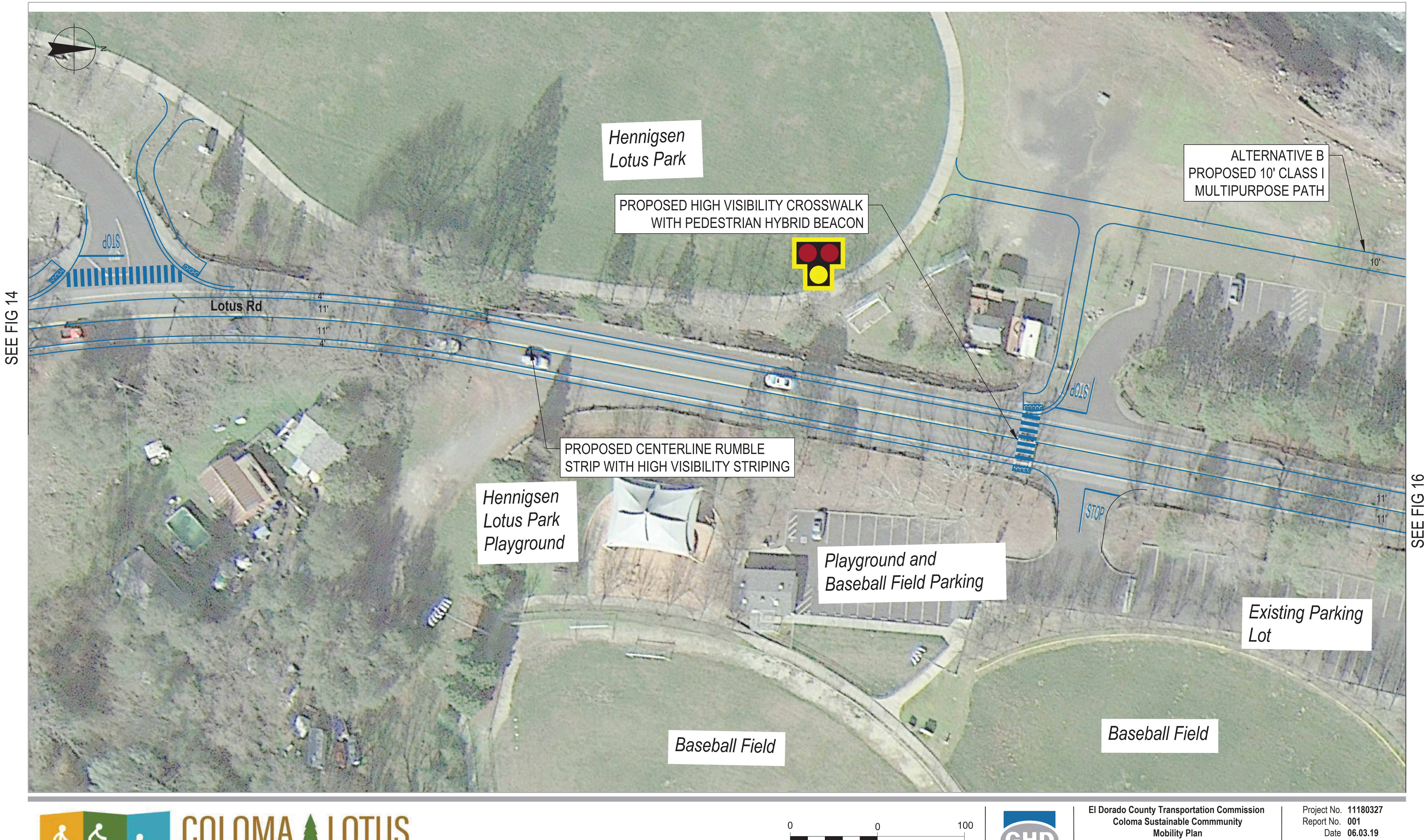

COLOMA LOTUS Mobility Plan

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD (Figure Map 15)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.17

SEE FIG 15

SEE FIG 17

COLOMA LOTUS Mobility Plan

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1 inch = 50 ft.

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Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD (Figure Map 16)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.18

Filename: N:\US\Roseville\Projects\Legacy\PRJ\2544\A2544\Coloma and EDC_Placerville\Improvement - Concept Design\2544EX001.dwg Plot Date: 31 July 2019 - 10:47 AM

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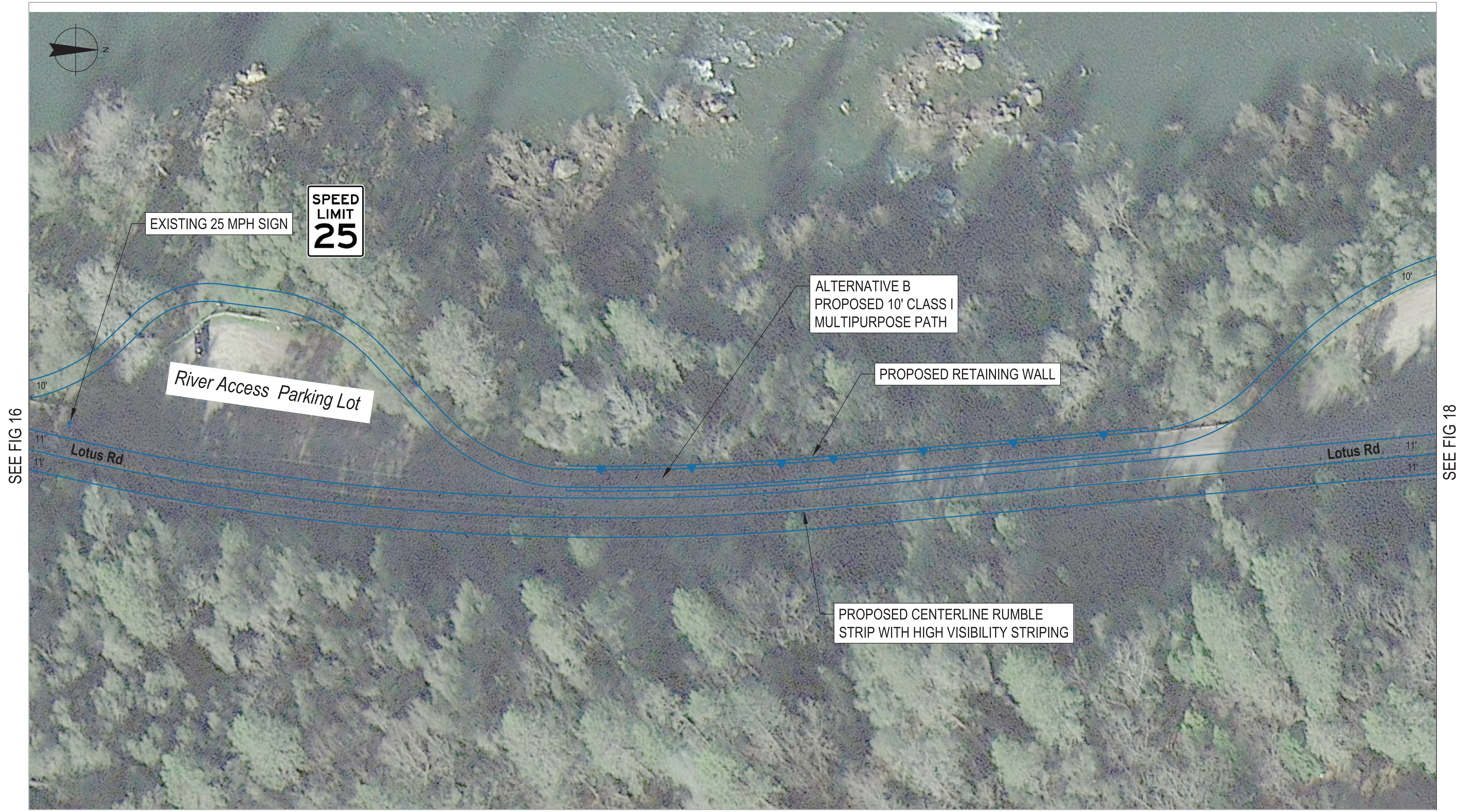

COLOMA LOTUS Mobility Plan

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1 inch = 50 ft.

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD (Figure Map 17)

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.19

Filename: N:\US\Roseville\Projects\Legacy\PRJ\2544\A2544\Coloma and EDC_Placerville\Improvement - Concept Design\2544EX001.dwg Plot Date: 31 July 2019 - 10:47 AM

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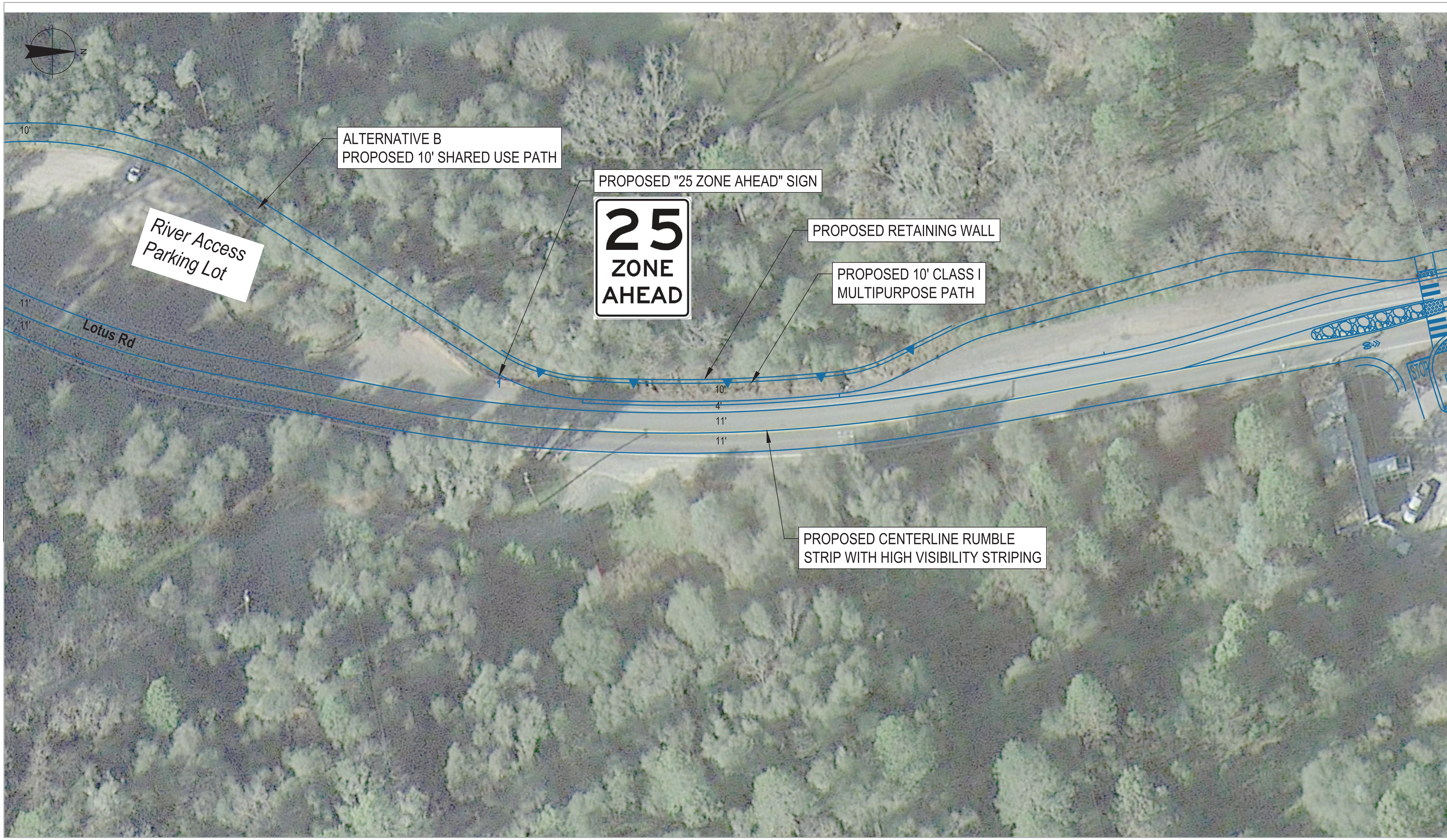
SEE FIG 17



SEE FIG 5

COLOMA LOTUS
Mobility Plan

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1 inch = 50 ft.

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El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

**MAP OF PROPOSED IMPROVEMENTS:
LOTUS ROAD (Figure Map 18)**

Project No. 11180327
Report No. 001
Date 06.03.19

FIGURE 8.20

Filename: N:\US\Roseville\Projects\Legacy\PRJ\2544\A2544\Coloma and EDC_Placerville\Improvement - Concept Design\2544EX001.dwg Plot Date: 31 July 2019 - 10:48 AM

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8.3.3 Improvement Concepts Deferred for Later Consideration

Several corridor improvement concepts were not advanced for more detailed quantitative analysis based on comments received during outreach to agency partners and the public. Concepts were presented during meetings with the State Park, El Dorado County Parks and stakeholder groups, then were shared with the public at two community workshops. Alternative concepts were developed and preferred improvement concepts were adopted based on input received through the community outreach process. The improvement concepts that were considered but ultimately not advanced for present consideration at this time are described below.

8.3.3.1.1 SR 49/Marshall Road Intersection Improvements

A roundabout was considered at the intersection of SR 49 and Marshall Road. A conceptual rendering of this alternative is provided in Appendix D. The major safety concern at this intersection is high vehicular speeds on SR 49 and Marshall Road southbound. Converting this intersection to single-lane roundabout control with ample deflection to reduce vehicle speeds and improve motorists' line of sight at each approach is the most effective strategy for addressing the safety issues at the intersection[23]. This alternative would work in conjunction with the proposed roundabout at SR 49/Lotus Road to moderate vehicular speeds and provide safer crossings for both pedestrians and bicyclists. A key public concern with a proposed roundabout control at this intersection was the number of truck turn movements from Marshall Road. Although the roundabout would be designed to accommodate truck turn radius requirements and provide a truck apron that would allow off-cycling along the inside of the circulatory lane, given these concerns and the fact that the proposed roundabout at SR 49/Lotus would achieve the desired vehicular speed reductions, consideration of a roundabout at SR 49/Marshall Road was deferred.

8.3.3.1.2 SR 49/Coloma Heights Road

A roundabout was also considered at the corner of SR 49 and Coloma Heights Road. A conceptual rendering of the alternative is provided in Appendix D. Based on collision data spanning 2013 to 2017, this intersection recorded the most collisions in the study area and is considered the top collision hot-spot. Converting this intersection to a single-lane roundabout control with ample deflection to reduce vehicle speeds and improve motorists' line of sight at each approach is the most effective strategy for addressing the safety issues at the intersection[24]. This alternative would work in conjunction with the proposed roundabout at SR 49/SR 153 to moderate vehicular speeds and provide safer crossings for both pedestrians and bicyclists. However, given the alternative's needed southward orientation, the removal of a large oak tree and taking a portion of the meadow on State Park property for needed right-of-way would be required. Given these concerns and the

---

[23] Excessive speeds on southbound Marshall Road was cited as a key concern at this location by the community combined with frequent disregard for obeying intersection controls (running the stop sign).

[24] Two serious collisions occurred at this intersection during the development of this report. The collisions are not reflected in the technical safety analysis.

fact that the proposed roundabout at SR 49/SR 153 would ostensibly achieve the desired vehicular speed reductions, consideration of converting SR 49/Coloma Heights Road to roundabout control was deferred.

8.3.3.1.3 Pedestrian Activated Rectangular Flashing Beacon (RRFB) System

Pedestrian Activated Flashing Beacons were proposed in multiple locations within Segment Two: SR 49 – Lotus Road to Coloma Heights Road. During the stakeholder and public engagement process, concerns over light pollution from the flashing beacons impacting the rural and historic character of the State Park and Coloma were voiced. Based on this input, the number of proposed pedestrian activated rectangular flashing beacons in Segment 2 was reduced from six to four locations. Potential locations for the additional two pedestrian activated rectangular flashing beacons can be considered in the future.

8.3.3.1.4 Lotus Road Bicycle Lanes

Two alternatives were presented for Lotus Road between Bassi Road and SR 49. Alternative A includes the installation of Class II bicycle lanes on Lotus Road, while Alternative B includes a Class I Path extending connecting Henningsen Lotus Park to SR 49 near Lotus Road. Due to the high speeds on Lotus Road, Class II bike lanes would not improve the Level of Traffic Stress and connectivity for the Lotus Road segment area. Thus, the improvement was deferred for later consideration. A conceptual rendering of the alternative is presented in Appendix D. A Class I path is the preferred proposed improvement, as it provides the lowest stress connectivity by physically separating bicyclists and pedestrians from vehicular traffic.

8.3.1 State Park Improvement Concepts

During development of the CLMP, several meetings were held with State Parks staff to discuss improvement concepts within the State Park. As part of this process State Parks staff developed their own improvement recommendations for the project area within Marshall Gold Discovery State Historic Park and for areas outside the State Park that provide connections to the park. These improvement recommendations are provided in graphic form in Appendix D.

Many of the improvements identified by State Parks relate to completing the trail system within the Marshall Gold Discovery State Park. Although this study supports all the off-system trail improvements identified by State Parks, they are not formally included in the study's improvement recommendations. A key goal of the CLMP is to apply a performance-based analysis approach that will facilitate and inform the development of competitive state and federal transportation grant applications for transportation projects. Most of the trail improvements identified by State Parks are not eligible to receive state or federal transportation funds described in Section 9.2 of the study. Consequently, they were not formally included in the benefit-cost analysis.

Conversely, improvements identified by State Parks that are on or along SR 49 are eligible for state or federal transportation funding and were considered as part of the CLMP. As such, several State Park recommended improvements were formally included in the CLMP improvement recommendations. For those improvements that were not included in the CLMP, the primary reasons were: 1) ineligible for state/federal transportation funding; and, 2) the proposed improvement's benefits were redundant to benefits of improvements already identified in the CLMP (i.e., the improvement would add costs without a commensurate improvement in benefit which serves to compromise the benefit-cost of the improvement package as a whole).

8.4 Analysis of Corridor Improvement Concepts

As stated previously, the overall CLMP improvement strategy is to reduce vehicle speeds through design modifications to SR 49 and Lotus Road (i.e., reduced lane widths, speed warning signs, intersection channelization and control modifications) while providing greater connectivity of the pedestrian and bicycle network and increasing separation (i.e., reducing conflicts) between pedestrians/bicyclists and motorists.

This section describes the various methodologies used to quantitatively analyze the merits of the CLMP recommended improvement concepts. These include the following analyses:

- Bicycle Level of Traffic Stress
- Safety Benefits
- Mode Shift Benefits
- Air Quality Benefits

Given that intersection operations during the peak hours currently operate with minimal delay (LOS A or B), vehicle delay reduction benefit resulting from intersection channelization or control type conversion (i.e., conversion from stop control to roundabout) improvements was not quantified. In addition, transit service improvements were not addressed as part of this study.

Analysis of monetized benefits was based on the societal cost information from Caltrans 2016 Economic Parameters. Accessibility indices/scores generated by the Bicycle LTS analysis are not amenable to monetization. Other non-monetized benefits that relate to state and federal transportation planning objectives such as environmental justice; economic development; and, climate change vulnerability were qualitatively addressed. This also includes beneficial outcomes such as: CLMP Consistency (with other existing plans and policies); CLMP Policy Consistency (EDCTC, Caltrans, and local agencies); Environmental Sensitivity (beyond air quality); and, Community Acceptance (based on the community engagement process).

8.4.1 Bicycle Level of Traffic Stress (LTS) Improvements

The Bicycle Level of Traffic Stress (LTS) with the proposed improvements is displayed in Figure 8.20. The proposed Class I paths would improve LTS significantly by connecting the State Park, river and camping destinations and Coloma which would provide low stress connectivity for both bicyclists and pedestrians throughout the study area. The Class I path proposed along SR 49 in the State Park would improve the LTS score significantly and provide the lowest stress option for active transportation users. Lotus Road will remain a high-stress facility for bicyclists; however, the Class I multi-purpose trail proposed along Lotus Road to Henningsen Lotus Park provides a lower stress option for risk-averse cyclists. Moreover, for those who would like to access Lotus Park from SR 49 north of the South Fork of the American River Bridge, the proposed Class I multi-purpose trail along near Beach Court that connects to a pedestrian bridge accessing Henningsen Lotus Park would be a viable low-stress option to access the county park.

Other related improvements that contribute to improving LTS scores are described below.

A total of eleven pedestrian activated crossings including seven Pedestrian Hybrid Beacons and four Rectangular Rapid Flashing Beacons (RRFB) are proposed to facilitate safe crossings at key points of interest (i.e., desire lines) along both SR 49 and Lotus Road. Although a formal warrant analysis for these treatments was not performed as part of this study, consistent with the Manual on Uniform Traffic Control Devices (MUTCD), the criteria considered for recommending the Pedestrian Hybrid Beacons or RRFB included vehicular speeds, peak hour vehicle volumes, crossing activity and collision history[25].

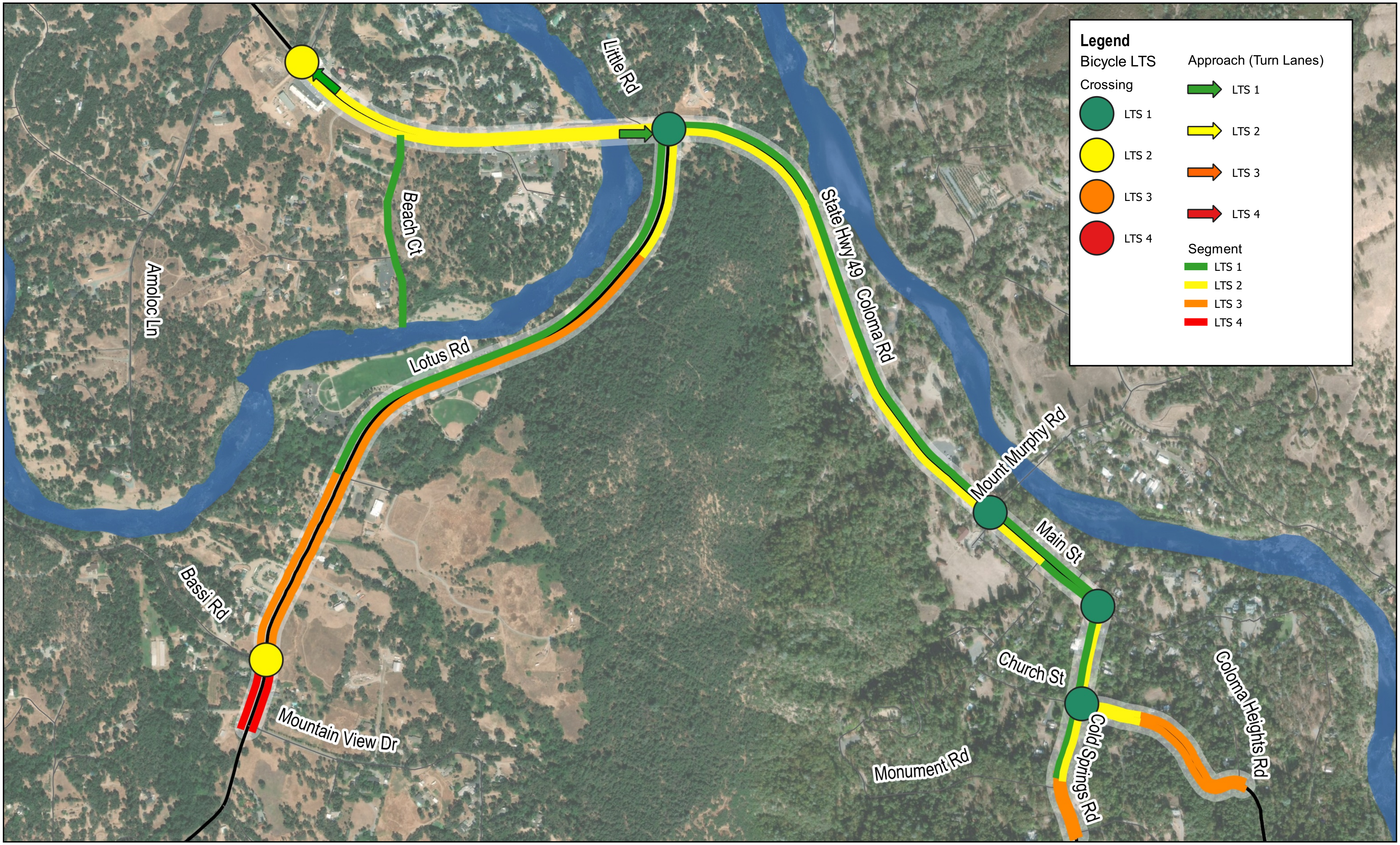
Proposed intersection channelization improvements on SR 49 at Marshall Road and Coloma Heights Road, would serve to more directly separate and channelize turn movements and calm traffic to reduce excessive speeds - the common crash cause at both these locations.

The two proposed roundabouts at Lotus Road/SR 49, and Cold Springs Road/Church Street will serve “book end” the State Park by providing gateway signage, reducing speeds and signifying to motorists that they are entering into a more pedestrian- and bicycle-oriented environment. Converting to roundabout control will also improve the level of traffic stress for bicyclists choosing to traverse the roadway at the approaches to the roundabouts.

In addition to intersection improvements intended to reduce speed, speed feedback and “25 mph Zone Ahead” signage is also intended to reduce speeds and make motorists more aware they are entering into a lower speed environment. Speed reduction by way of intersection improvements, improved pedestrian crossings, and signage would all serve to improve the LTS throughout the study generally and specifically at intersection approaches.

As shown in Figure 8.20, the proposed improvement concepts would provide a network of low-stress options for most adult and child cyclists, connect important points of interests throughout the study area and improve safety for all road users.

[25] The MUTCD Warrant criteria for installation of a Pedestrian Hybrid Beacons must be met at all proposed Pedestrian Hybrid Beacon crossing locations prior to implementation.



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Map Projection: Lambert Conformal Conic
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El Dorado County Transportation Commission
COLOMA-LOTUS
MOBILITY PLAN

Improved Bicycle Level of Traffic Stress

Project No. **11180327**
Revision No. **-**
Date. **06/10/2018**

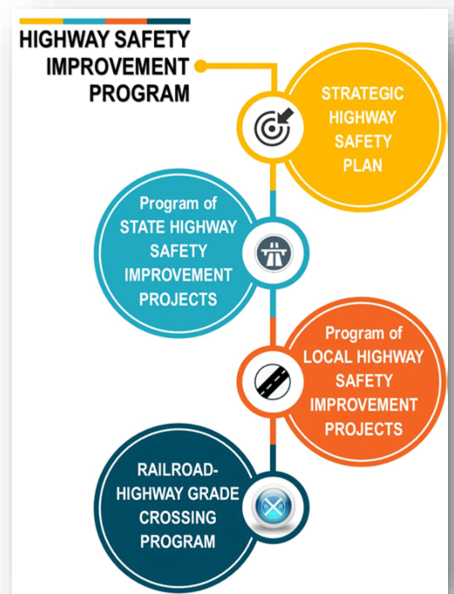
FIGURE 8.21

Data Source:

Created By: Paige Thornton

8.4.2 Safety Benefits

The Highway Safety Improvement Program (HSIP) is a fundamental program providing federal-aid under the Fixing America's Surface Transportation Act (FAST), enacted in 2015. The purpose of HSIP is to significantly reduce the number of serious and fatal traffic crashes on all public roads. The Division of Local Assistance (DLA) manages California's local share of HSIP funds.

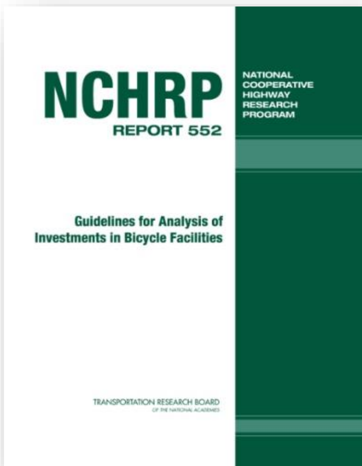


In order to estimate the safety benefits associated with each concept area, a collision modification factor (CMF) analysis was performed using Caltrans' Highway Safety Improvement Program (HSIP) Analyzer tool. Collision modification factors are multiplicative factors used to calculate the expected reduction in collisions associated with a particular countermeasure. Crash Modification Factors (CMFs) have been established based on safety research over the last several decades; however, CMFs may not be available for all countermeasure types—despite the safety improvements provided by the improvement. The HSIP analyzer utilizes the CMFs published in the Local Roadway Safety Manual (Version 1.4, June 2018) and the societal crash cost based on the California 2016 Economic Parameters, which are also resident in Cal B/C - the statewide analysis tool for cost-benefit analyses. The completed HSIP Analyzer documents are provided in Appendix C.

The proposed improvements, collision data and estimated costs were utilized to compute benefit-cost ratios for roadway and intersection control improvements within each concept area. A maximum of three safety countermeasures are allowed for selection when applying for HSIP funding, and each are chosen based on the Collision Modification Factor (CMF) associated with the selected countermeasure and applicable crash data. This reduction in collisions is translated to a monetized safety benefit, which is compared against the countermeasure cost to produce a benefit-cost ratio.

8.4.3 Bicycle Mode Shift Benefits

The induced demand for bicycle facilities associated with proposed improvements was estimated using the National Cooperative Highway Research Program (NCHRP) 552 methodology provided in the *Guidelines for Analysis of Investment in Bicycle Facilities*. Research indicates that cyclists are more likely to utilize a facility if they live within a 1.5 mile buffer than if they live outside of this distance. Moreover, the highest likelihood of a member of the population to use the facility exists if they live within a .5 mile buffer around the facility. The NCHRP 552 methodology suggests that bicycle commute mode share can be utilized to estimate the number of existing and future bicycle ridership based on the population, and low, moderate, and high likelihood multipliers at 1.5 mile, 1 mile, and .5 mile buffers that surround a facility. Benefit values are based on the following assumptions:



- Existing cyclists near a new facility will shift from a nearby facility to a new facility; and
- The new facility will induce new cyclists as a function of the number of existing cyclists relative to the attractiveness of the proposed facilities.

The benefits of the induced demand resulting from improvements were monetized into mobility, health, recreation, and decreased auto-use benefits. These benefits were compared against the estimated costs of improvements to calculate a benefit-cost ratio on a project area-wide basis and by segment.

8.4.3.1 Residential and Employment Demand

To determine bicycle demand per NCHRP 552, a GIS analysis was performed on the study area street segment using a walk time analysis tool in the ArcGIS Online platform. The walk time analysis tool was used to generate a 0.5 mile, 1 mile, and 1.5 mile walk time buffer around each “improvement” area.

Parcel data along with residential and employment data by Traffic Analysis Zone (TAZ) from El Dorado County’s travel demand model was used as the basis for approximating affected baseline population groups (residents, commuters, children etc.) within the Coloma-Lotus study area. In order to reconcile the geographic mismatch between the block group polygons, TAZs polygons and the buffer coverage area, the percentage of residential parcel coverage intersected by the buffers was used to allocate American Community Survey 5-year population estimates within each buffer distance. Per the US Census Bureau, an average household size of 3 was applied to number of residential units resident in the County’s baseline traffic model (single and multi-family) within the residential parcel the buffers intersected. Population percentages were then computed and used to allocate the ACS-based population control total within each buffer. This same procedure was used to allocate the Coloma area employment control total based on the El Dorado County travel demand model employment data and the commercial/retail parcel data.

Forecast growth in residential units and employment for the Coloma area resident in the El Dorado County travel demand model TAZs indicated that no growth is projected in the Coloma-Lotus study area out to 2040.

The NCHRP 552 buffers and the respective breakdown of resident population and employment are shown in Figures 8.21 below. This socio-economic information was combined with commuter mode share data for El Dorado County to operationalize the NCHRP 552 mode shift methodology. NCHRP 552 worksheet tables that provide greater detail of the calculations of demand and benefits for local populations are provided in **Appendix E**.

8.4.3.2 Visitor Demand

Given the large number of tourists that come to Coloma to visit for Marshall Gold Discovery State Historic Park and take advantage of the river and trail recreation opportunities, bicycle demand of the visitor population must also be estimated. The NCHRP 552 methodology is designed to estimate the demand of local populations using commute share and population data. However, the Coloma Valley offers a unique scenario of increased populations due to tourism over a 6-7 month period who must also be considered as potential users of new facilities. In order to estimate the induced bicycling demand among the visitor population, the NCHRP 552 was adapted for application.

To estimate the annual visitation to the State Park an annual visitor count summary was obtained from the State of California Department of Parks and Recreation. The count summary was used in total for the comprehensive project area analysis and was also applied to Segments Two and Three—the segments most geographically associated with Marshall Gold Discovery State Historic Park.

To estimate the counts in river recreation visitation, the 2018 counts in seasonal visitation for the Coloma to Greenwood section of the South Fork of the American River were sourced from the El Dorado County River Management Plan 2018 Annual Report. The counts included individuals counted on two dates during the peak visitor season. The average of counts taken on these two dates were calculated and multiplied by a factor of 30 to represent the number of weekend days that fall between Memorial Day and Labor Day—the peak river recreation season. To distribute these benefits by segment, the total river outfitters within the Coloma to Greenwood section were identified and the counts were distributed between these outfitting locations according to their location associated with a given segment.

Given the desire for visitors to be in the proximity of the State Park, Henningsen Lotus Park and the river, visitor populations were considered fully encapsulated within the 1.5 mile buffer of the proposed bicycle improvements. The existing visitor bicycle mode share was assumed to be 10% -

consistent with the visitor mode share results from the 2018 Visitor Travel Survey for the Lake Tahoe Region.[26]

The NCHRP 552 buffers and the respective breakdown of both resident and visitor populations are shown in Figure 8.22. NCHRP 552 worksheet tables that provide greater detail of the calculations of demand and benefits for visitor populations are provided in **Appendix E**.

8.4.3.3 Resident and Visitor VMT Reductions

Combining both resident and visitor populations the NCHRP 552 analysis results yield a projected daily and annual VMT reduction of: 342 VMT and 46,350 VMT respectively.

8.4.3.4 Air Quality

The air quality benefits associated with the vehicle miles of travel reductions associated with the projected mode shift from auto to bicycle transportation (i.e., NCHRP 552 Method) was estimated using the SB-1 Emissions Calculator. On-road mobile source emission reduction benefits will naturally decrease over time given the attrition of older more polluting vehicles combined with the market penetration of newer less polluting vehicles. Hence, the annual emissions benefit resulting from the CLMP will decrease over time. Screenshots of the on-road activity inputs are shown below. The source the baseline countywide VMT estimate is the most recent published Highway Performance Monitoring System (HPMS, 2017) for El Dorado County. The countywide VMT projection is based on expanding the 5-year (2012-2017) historical VMT growth rate to 20 years. The “Build” VMT reduction is based on the NCHRP 552 mode shift results. Zero percent overrides for trucks and buses were assumed.

1B HIGHWAY DATA

Average Daily Vehicle-Miles Traveled (VMT)	No Build	Build
Base (Year 1)	4,869,920	4,869,578
Forecast (Year 20)	5,939,122	5,938,780

Percent of VMT	No Build Default	No Build User Override	Build Default	Build User Override
Percent Truck	9%	0%	9%	0%
Percent Bus	0%	0%	0%	0%

Trip or Route Length (miles)	No Build	Build
Average Trip Length for Passenger Vehicles	1.50	1.50
Average Trip Length for Trucks	1.50	1.50
Average Route Length for Buses	1.50	1.50

1D \VERAGE SPEED/FUEL CONSUMPTION

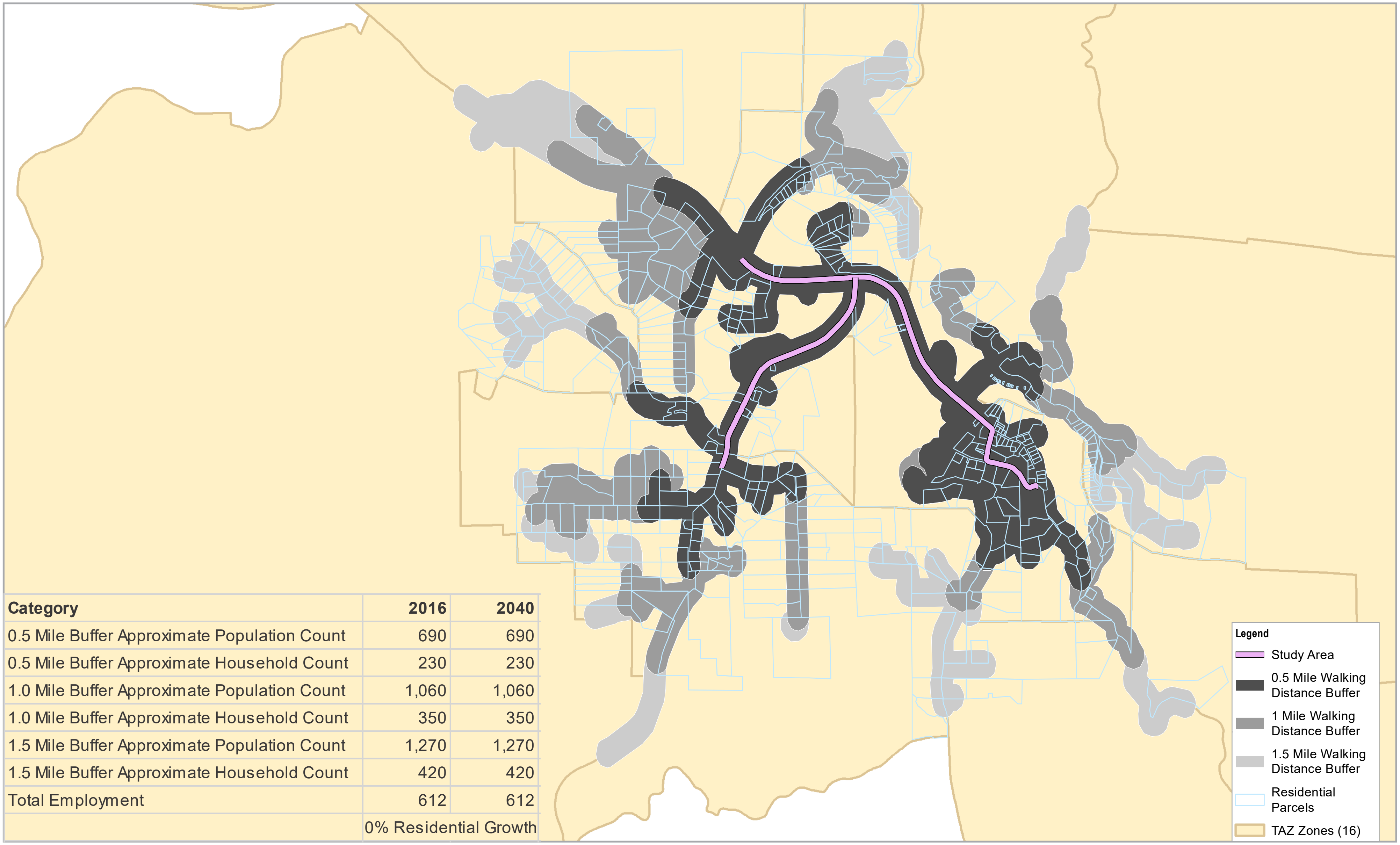
Average Speed (Passenger Vehicles)	No Build	Build
Base (Year 1)	35	35
Forecast (Year 20)	35	35

Average Speed (Trucks)	No Build	Build
Base (Year 1)	35	35
Forecast (Year 20)	35	35

Average Speed (Buses)	No Build	Build
Base (Year 1)	35	35
Forecast (Year 20)	35	35

Average Ton-Miles/Gallon (Freight Locomotive)	No Build	Build
Base (Year 1)	0	0
Forecast (Year 20)	0	0

[26] Source: Tahoe Regional Planning Agency



Category	2016	2040
0.5 Mile Buffer Approximate Population Count	690	690
0.5 Mile Buffer Approximate Household Count	230	230
1.0 Mile Buffer Approximate Population Count	1,060	1,060
1.0 Mile Buffer Approximate Household Count	350	350
1.5 Mile Buffer Approximate Population Count	1,270	1,270
1.5 Mile Buffer Approximate Household Count	420	420
Total Employment	612	612
	0% Residential Growth	

Paper Size ANSI A

0 0.15 0.3 0.45 0.6

Miles

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet

GHD

El Dorado County
Coloma Mobility Plan

Buffer Analysis (Resident)

Project No. 11180327
Revision No. -
Date 02/04/2019

FIGURE 8.22

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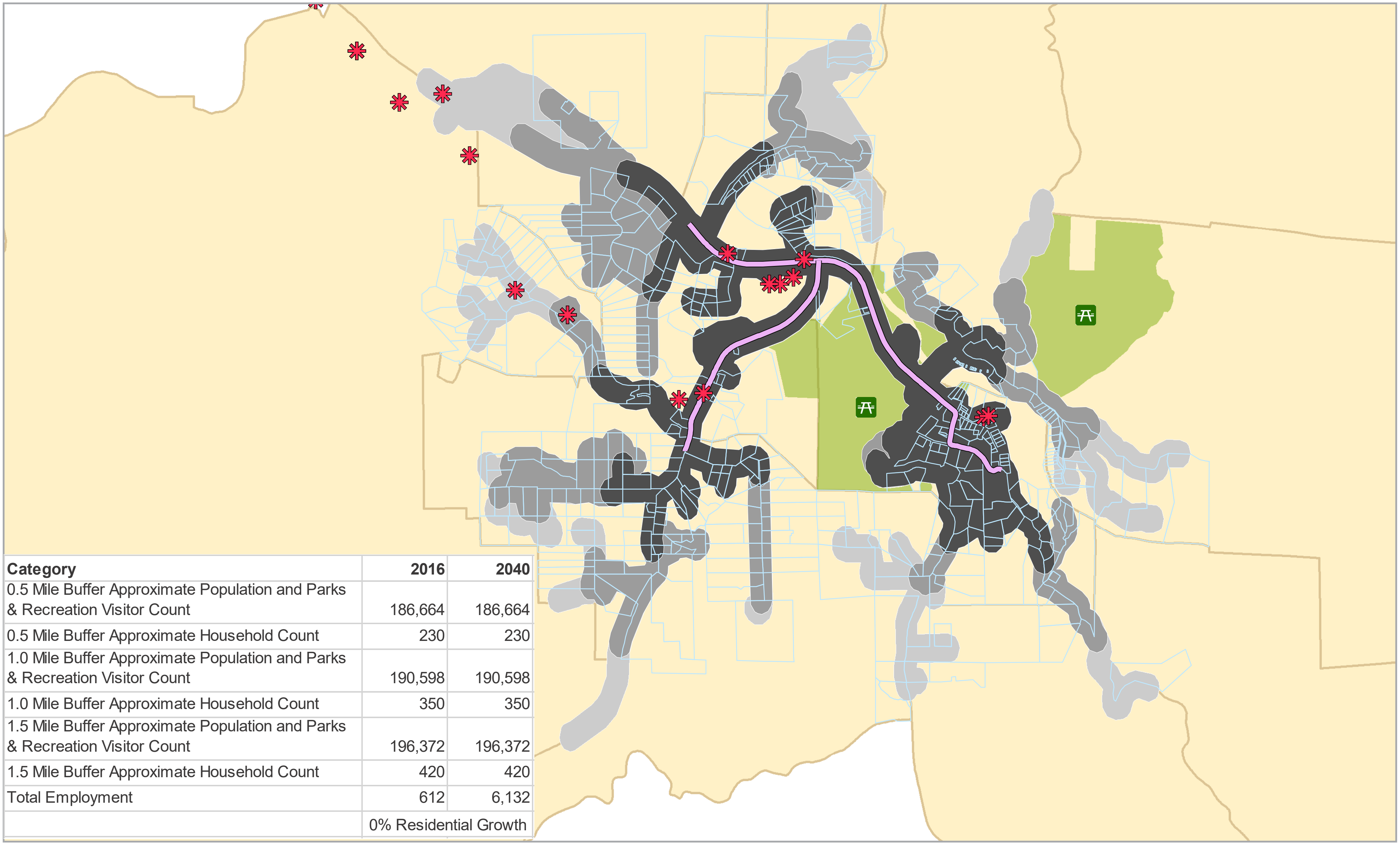
Print date: 29 Apr 2019 - 14:28

Data source: GHD, 2019, El Dorado County, 2019. Created by: bnamsaly



Category	2016	2040
0.5 Mile Buffer Approximate Population and Parks & Recreation Visitor Count	186,664	186,664
0.5 Mile Buffer Approximate Household Count	230	230
1.0 Mile Buffer Approximate Population and Parks & Recreation Visitor Count	190,598	190,598
1.0 Mile Buffer Approximate Household Count	350	350
1.5 Mile Buffer Approximate Population and Parks & Recreation Visitor Count	196,372	196,372
1.5 Mile Buffer Approximate Household Count	420	420
Total Employment	612	6,132
	0% Residential Growth	

Legend

- Rafting Outfitters
- Marshall Gold Discovery State Historic Park Park
- Study Area
- 0.5 Mile Walking Distance Buffer
- 1 Mile Walking Distance Buffer
- 1.5 Mile Walking Distance Buffer
- Residential Parcels
- TAZ Zones (16)

Paper Size ANSI A

0 0.15 0.3 0.45 0.6

Miles

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet

GHD

El Dorado County
Coloma Mobility Plan

Buffer Analysis With Park& Recreation Visitor Count

Project No. 11180327
Revision No. -
Date 5/23/2019

FIGURE 8.23

K:\PRJ\2544\G2544\MXD's\NCHRP 552 Buffer Analysis (Park&Recreation).mxd
Print date: 23 May 2019 - 15:57

Data source: GHD, 2019, El Dorado County, 2019, State of CA Dept of Parks and Recreation Marketing and Business Development Division (formerly Planning Division); Author: Barry.Trute@parks.ca.gov.
Created by: bnamsaly

8.4.4 Benefit-Cost Analysis

A comprehensive benefit-cost (B/C) analyses was performed using the benefits from the entire Coloma-Lotus study area incorporating air quality, safety, and induced demand-associated benefits. All analysis results amendable to benefit monetization were incorporated into the benefit-cost assessment. Benefits were monetized based the societal cost information from Caltrans 2016 Economic Parameters. The latter information informs the Caltrans Cal-B/C analysis tool. These were combined with the planning level improvement cost opinions. Benefit-cost estimates were computed for the study area as a whole, for each analysis segment, and other combinations worthy of consideration for funding competitiveness. All quantitative benefits were annualized and projected to reflect a 20-year design year condition (life-cycle) for both benefits and capital and maintenance costs of all recommended improvements.

8.4.4.1 Safety Benefits

As shown in Table 8.2, for the project area as a whole, the safety benefit-cost analysis offers a robust B/C of 1.6. The expected safety benefit of the chosen countermeasures will provide an approximate $55 million in benefit. Selected countermeasures include roundabouts, roadway resurfacing and widening, installation of rumble strips and high visibility striping.

Intersection improvements, including roundabouts and channelization on SR 49 at Marshall Road and Coloma Heights Road resulted B/C ratios of greater than 2.0. Implementation of high visibility striping and/or rumble strips resulted in a benefit-cost ratio ranging from of 22.5 to 44.1. Selected safety countermeasures were based on the likelihood of collision reduction. While roundabouts involve a substantial capital investment, the empirically based safety benefits that result from this countermeasure are significant.

8.4.4.2 Mode Shift Benefits

The monetized benefit resulting from mode shifts to bicycles by resident and tourist populations are provided in Tables 8.3 and 8.4 respectively. The B/C results with and without the proposed Class I path along Beach Court and pedestrian bridge (river crossing) are shown. The B/C ratios associated with induced bicycling demand do not exceed 1.0 including the pedestrian bridge. Conversely, the B/C without the cost of the pedestrian bridge yields a B/C of over 2.0.

It should be noted that the mode shift results does not reflect mode shift from vehicles to walking. The NCHRP 552 methodology is not appropriate for this purpose. Estimation of induced pedestrian demand would increase the benefit-cost of proposed CLMP bicycle and pedestrian facility improvements.

8.4.4.3 Air Quality Benefits

The emissions reduction results of the CLMP by pollutant expressed in tons/year are provided in Table 8.5. This includes both health-based criteria pollutants: carbon monoxide; nitrogen oxide; particulate matter 10 microns in diameter or less; sulfur oxide; volatile organic compounds; and fine particulates 2.5 microns in diameter or less (inclusive with PM_{10}) as well as the primary climate change pollutant carbon dioxide.

The Caltrans Economic Parameters of the societal cost of each pollutant expressed as dollar cost per ton for rural areas of California (i.e., Coloma, California) is shown below. Based on these societal costs, Table 8.6 presents the monetized benefits for the Class I multipurpose paths and Class II bike lanes of the CLMP.

- Carbon Monoxide (CO): $75 per ton
- Nitrogen Oxide (NO_X): $13,900 per ton
- Particulate Matter (PM_{10}) $107,700 per ton
- Sulfur Oxide (SO_X) $54,400 per ton
- Volatile Organic Compounds (VOC) $1,025 per ton

Only bicycle related improvements are credited for air quality reduction benefits given that these are the only improvement types that result in a mode shift (i.e., VMT reduction). Although there is a positive on-road mobile source emission reduction benefit, it is not significant.

8.4.5 Other Benefits

8.4.5.1 Policy and Plan Consistency

Improvement concepts proposed in the CLMP are consistent with the actions, policies and strategies set forth in the following policy and planning documents: El Dorado County General Plan Transportation and Circulation Element September 2018 amendment; 2010 El Dorado County Bicycle and Pedestrian Plan; 2015 – 2035 EDCTC Regional Transportation Plan; 2014 Henningsen Lotus Park Conceptual Master Plan; 1978 Marshall Gold Discovery State Park Master Plan; 2015 SACOG Bicycle and Pedestrian Master Plan; 2017 Toward an Active California: California State Bicycle and Pedestrian Plan (CSBPP); and 2017 EDCTC Active Transportation Connections Study.[27]

8.4.5.2 Social Equity

Although the Coloma-Lotus area is not defined as "disadvantaged" based on state or federal criteria – it does serve as a vital resource to disadvantaged communities. Over 50,000 school children from all over Northern California, including disadvantaged communities in the Central Valley and Bay Area, come to Coloma each year to stay as long as three days to participate in State Parks' interpretive history programs or to take part in the hands-on environmental education opportunities available through programs like Oakland's Inspiring Connections Outdoors or the Coloma Outdoor Discovery School. Many of these children from disadvantaged communities are coming for the first

[27] Given that this study did not address visitor population and the seasonal fluctuation of demand, the Coloma-Lotus area was not highly prioritized in this study.

time in their lives to a place like Coloma to experience nature. Providing safe pedestrian and bicycle facilities for young visitors is an important priority for the State Park and the community as a whole. As such, the proposed investment of approximately $30 million for transportation improvements in the Coloma-Lotus area will equitably benefit disadvantaged communities.

8.4.5.3 Climate Adaptation

Qualitatively, the improvements recommended in the CLMP could contribute to resiliency with regards to climate adaptation. While there are no signalized intersections within the study area currently requiring electricity to operate, intersections are stop controlled. The two proposed roundabouts would provide improve circulation and flow in the event of an emergency, and do not require power to operate. Furthermore, roundabouts can contribute to additional emission reductions by decreasing vehicle delay and hard acceleration events. The CLMP demonstrates that the recommended improvements achieve GHG emission reductions, improving the region’s ability to meet statewide climate goals.

8.4.5.4 Environmental Stewardship

This study did not include an environmental screen; however, several improvements stand out for the potential to produce increased footprints and environmental impacts. These improvements include: the pedestrian river crossing between the proposed Class I paths near Beach Court and along Lotus Road; the two proposed roundabouts, at SR 49 and Lotus Road; and the Class I path proposed from SR 49 to Henningsen Lotus Park along Lotus Road.

8.4.5.5 Community Acceptance

As described in Section 1.5 Public Outreach, the CLMP planning process included a comprehensive public outreach effort that included both traditional (community workshops, stakeholder interviews and meetings) and non-traditional (on-line tools, live polling, etc) strategies. Ample input was received representing 14% sample of the Coloma-Lotus resident population. The CLMP improvement recommendations were developed based on this community input.

Table 8.2 Comprehensive Safety Benefit-Cost Summary

Segment	Countermeasure	2019 Annualized Benefit	2019 Annualized Cost	B/C	Expected Life (Years)	20-Yr Life-Cycle Benefit	20-Yr Life Cycle Cost	B/C
1	Roundabout at Lotus/SR 49 (NS4A)	$ 37,661,760	$ 14,859,109	2.5	20	$ 37,661,760	$ 15,225,549	2.5
1	Intersection Improvements at SR 49/ Marshall (NS12)	$143,800	$ 371,478	0.4	20	$ 143,800	$ 371,478	0.4
1	Reconstruct Roadway/Roadway Widening (R24)	$ 2,239,300	$ 204,313	11.0	10	$ 4,478,600	$ 408,626	11.0
2	Resurface Roadway and New High Visibility Striping (R24)	$ 3,400,000	$ 5,462,939	0.6	10	$ 6,800,000	$ 10,925,878	0.6
2	Coloma Heights/ SR-49 Intersection Improvements (NS6)	$ 1,268,200	$ 444,961	2.9	10	$ 2,536,400	$ 889,922	2.9
3	Roundabout (NS4B)	$ 4,017,924	$ 2,225,300	1.8	20	$ 4,017,924	$ 2,225,300	1.8
4	Rumble strips - Entire Segment (R34)	$ 1,987,094	$ 45,064	44.1	10	$ 3,974,188	$ 90,128	44.1
4	Reconstruct Roadway/Roadway Widening (R24)	$ 3,974,187	$ 6,292,936	0.6	10	$ 7,948,374	$ 12,585,872	0.6
Study Area	Total Expected Monetized Benefit and Costs	$ 54,692,265	$ 29,906,100	1.8		$ 67,561,046	$ 42,356,313	1.6

*Notes:
1. Safety benefit analyzed using Caltrans HSIP analyzer, and considers full project costs, including set-aside for pedestrian improvements.

Table 8.3 Comprehensive Induced Demand Benefit-Cost Summary (preferred concepts)

Segment	Total Annualized Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life-Cycle Cost	B/C
Study Area	Mode Shift to Bike Transportation	$ 1,164,251	$ 9,082,440	0.13	$ 23,285,010	$ 18,679,140	1.2

*Notes:
1. Mode Shift to Bike Transportation induced demand benefit calculated using NCHRP 552 methodology. Pedestrian bridge has not been monetized into benefit through induced demand.
2. 20-year life cycle cost estimated using planning-level cost estimates and 20 year O&M costs of Class I Paths. Pedestrian bridge O&M not included, as it has a 50 year life cycle.

Table 8.4 Comprehensive Induced Demand Benefit-Cost Summary (no pedestrian bridge)

Segment	Total Annualized Benefit	2019 Benefit	2019 Cost	B/C	Expected Life (Years)	20 Year Adjusted Benefit	20 Year Adjusted Cost	B/C
Study Area	Mode Shift to Bike Transportation	$ 1,164,251	$ 1,957,440	0.59	20	$ 23,285,010	$ 11,554,140	2.02

*Notes:

1. Mode Shift to Bike Transportation induced demand benefit calculated using NCHRP 552 methodology.

2. 20-year life cycle cost estimated using planning-level cost estimates and 20 year O&M costs of Class I Paths.

Table 8.5 Emission Reduction Results (Class I and II Bike Facilities)

Year	TONS EMISSIONS SAVED (tons/yr) CO	CO_2	NO_X	PM_{10}	SO_X	VOC	$PM_{2.5}$
1	0.53122	55.98518	0.04706	0.00052	0.00056	0.03280	0.00049
20	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
2	0.53122	55.98518	0.04706	0.00052	0.00056	0.03280	0.00049
3	0.53122	55.98518	0.04706	0.00052	0.00056	0.03280	0.00049
4	0.53122	55.98518	0.04706	0.00052	0.00056	0.03280	0.00049
5	0.53122	55.98518	0.04706	0.00052	0.00056	0.03280	0.00049
6	0.53122	55.98518	0.04706	0.00052	0.00056	0.03280	0.00049
7	0.53122	55.98518	0.04706	0.00052	0.00056	0.03280	0.00049
8	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
9	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
10	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
11	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
12	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
13	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
14	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
15	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
16	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
17	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
18	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
19	0.13637	33.57376	0.00816	0.00025	0.00033	0.00671	0.00023
Total	**5.49141**	**828.35510**	**0.43540**	**0.00691**	**0.00830**	**0.31692**	**0.00638**

Table 8.6 Emission Reduction Monetized Benefits (Class I and II Bike Facilities)

EMISSIONS REDUCTION	Short Tons Total Over 20 Years	Caltrans Societal Cost	Monetized Benefit 20 Years
CO Emissions Saved	5.49141	$75	$411.86
CO_2 Emissions Saved	828.35510	$38	$31,477.49
NO_X Emissions Saved	0.43540	$13,900	$6,052.11
PM_{10} Emissions Saved	0.00691	$107,700	$743.95
$PM_{2.5}$ Emissions Saved	0.00638		$0.00
SO_X Emissions Saved	0.00830	$54,400	$451.63
VOC Emissions Saved	0.31692	$1,025	$324.85

Table 8.5 Comprehensive Benefit-Cost Summary (preferred concepts)

Segment	Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life-Cycle Cost	B/C
Study Area	Mode Shift to Bike Transportation	$ 1,164,251	$ 9,082,440	0.13	$ 23,285,010	$ 18,679,140	1.25
Study Area	Safety Benefit	$ 54,692,265	$ 29,910,578	1.83	$ 67,561,046	$ 42,365,829	1.60
Study Area	Air Quality/ Emissions	$ 4,662	See Mode Shift	.0005	$ 39,460	See Mode Shift	.002
Study Area	**Total Benefit**	$ 55,861,178	$ 29,906,100	1.87	$ 90,885,516	$ 51,953,013 [5]	1.75

*Notes:

1. Mode Shift to Bike Transportation calculated using NCHRP 552 methodology. Pedestrian bridge benefit was not monetized.
2. 20-year life cycle capital cost based on planning-level cost estimates. 20 year O&M costs of Class I Paths. Pedestrian bridge O&M not included (50-year life cycle).
3. Safety benefit based on Caltrans HSIP analyzer reflects full project costs.
4. Annual on-road emission benefits decrease over the 20-year life-cycle due to fleet turnover
5. Derived by adding the total project cost, and the O&M cost associated with Class I Paths
6. B/C results are not additive. Safety B/C reflects total improvement costs while Mode Shift and Air Quality reflect bike facility costs.

Table 8.6 Comprehensive Benefit-Cost Summary (less pedestrian bridge)

Segment	Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life Cycle Cost	B/C
Study Area	Mode Shift to Bike Transportation	$ 1,164,251	$ 1,957,440	0.59	$ 23,285,010	$ 11,554,140	2.02
Study Area	Safety Benefit	$ 54,692,265	$20,881,100	2.62	$ 67,561,046	$33,331,313	2.03
Study Area	Air Quality/ Emissions	$ 4,662	See Mode Shift	.002	$ 39,460	See Mode Shift	.003
Study Area	**Total Benefit**	$ 55,861,178	$20,881,100	2.68	$ 90,885,516	$42,928,013 [5]	2.12

*Notes:

1. Mode Shift to Bike Transportation calculated using NCHRP 552 methodology. Pedestrian bridge benefit was not monetized.
2. 20-year life cycle capital cost based on planning-level cost estimates. 20 year O&M costs of Class I Paths. Pedestrian bridge O&M not included (50-year life cycle).
3. Safety benefit based on Caltrans HSIP analyzer reflects full project costs.
4. Annual on-road emission benefits decrease over the 20-year life-cycle due to fleet turnover
5. Derived by adding the total project cost, and the O&M cost associated with Class I Paths
6. B/C results are not additive. Safety B/C reflects total improvement costs while Mode Shift and Air Quality reflect bike facility costs.

9. Implementation Plan

9.1 Recommendation Summary

9.1.1 Total Project Area Consideration

The Coloma Valley's river geography and points of interest throughout the study area make recreation, tourist destinations and Coloma proper inextricably interconnected. On any given day, it is not uncommon for visitors or residents to traverse points along the entire CLMP study area. For this reason, the proposed CLMP improvements should be considered as a unified package across the project study area. Additionally, where intersections improvements are proposed, adjacent pedestrian facilities should be packaged with these improvements to ensure safe connectivity. The HSIP program allows grant applicants to apply for dual application consideration for set-aside pedestrian crossing enhancements and Common Benefit-Cost Ratio Application. Collision data is not required for pedestrian crossing enhancements set-asides.

With the demonstrated positive return on investment (B-C of 1.75) for the study area as a whole, the proposed CMLP improvements reflects a robust comprehensive package. However, to better inform and guide future programming decisions relative to availability of funding and for maximizing flexibility for pursuing alternative funding opportunities, alternative CLMP improvement packages were examined. Example alternative improvement packages are described below.

9.1.2 Total Benefit Cost by Segment

The combined benefit-cost calculations provide a complete view of the total benefits provided between each benefit type; however, in order to maximize flexibility for implementation, analysis was further refined to focus on each benefit type specific to their associated funding sources. Tables 9.1, 9.2, 9.3, and 9.4 below exhibit the combined benefit-cost ratio by segment. Further detail on the benefit-cost calculations of each analysis type is provided in their respective appendix.

9.1.2.1 Segment One – SR 49 Marshall Road to Lotus Road

As presented in Table 9.1, the mode shift to bike transportation induced demand benefits associated with the local and tourist populations alone reports a low B/C ratio; however, consideration of additional benefits, specifically those related to safety, increase the B/C significantly. Both the baseline year (2019) and the 20-year life-cycle results show a positive return on investment with B/Cs of 2.60 and 2.59 respectively.

9.1.2.2 Segment Two – SR 49: Lotus Road to Coloma Heights Road

As presented in Table 9.2, the baseline combined B/C results for segment two are on the lower side; however, the 20-year life-cycle adjustment yields a positive return on investment (B/C of 1.20).

9.1.2.1 Segment Three: SR 49/Coloma Heights Road to Church Street to SR 153/Cold Springs Road

As shown in Table 9.3, proposed improvements within segment three provide the highest baseline benefit-cost ratio of 2.05, and 20-year cycle-life B/C of 4.83. This is due to the lower cost estimation of a decomposed granite path compared to that of a paved path. The use of decomposed granite was explored throughout other segments; however, the geography along the river and regulations regarding path types allowed next to the highway precluded the consideration of this as an alternative treatment in some locations.

Safety benefits buttress the combined B/C for this segment, which yields a robust baseline B/C ratio of 2.05, and this proportion only shows improved results over time. Air quality benefits are positive but insignificant.

9.1.2.2 Segment Four: Lotus Road – Bassi Road to SR 49

Table 9.4 displays the results of the combined B/C analysis with “Alternative B”—a Class I Path proposed along Lotus Road’s section of the South Fork of the American River. Benefits associated with mode shift to bike transportation induced demand improve over the 20-year life-cycle. The combined benefits decrease over the 20-year life-cycle due to the 10-year life-cycle of improvements associated with safety benefits. However, induced demand benefits do not include pedestrian demand. Further analysis of the induced demand of pedestrians resulting from the Class I facility may increase the B/C for this segment.

9.1.2.3 Pedestrian Bridge – Segment One and Four

The Class I path near Beach Court and pedestrian bridge crossing the South Fork of the American River to Henningsen Lotus park provides connectivity for active transportation users between Segments 1 and 4. This improvement can be examined within the context of the benefits provided by both of these segments. Table 9.5 provides the benefit-costs of Segments 1 and 4 collectively

As is shown, the combined safety and induced demand benefit-cost ratio for Segments 1 and 4 yields a stronger B/C when considered together. However, this may be a conservative estimate as the analysis of the induced demand of pedestrians produced by the new facility was not examined. Additional methods should be explored to estimate the demand and monetize the benefits associated with pedestrian demand specifically which would only improve the already encouraging results of the combined B/C analyses.

Table 9.1 Segment 1: Combined Benefit-Cost Summary 20-Year Life Cycle

Segment	Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life-Cycle Cost	B/C
1	Mode Shift to Bike Transportation	$ 100,967	$ 7,510,500	0.01	$ 2,019,331	$ 8,977,500	0.22
1	Safety Benefit	$ 40,044,860	$15,434,900	2.59	$ 42,284,160	$15,639,213	2.70
1	Air Quality/ Emissions	$ 4,662	See Mode Shift	0.001	$ 39,460	See Mode Shift	.004
1	**Total Benefit**	$ 40,150,489	$ 15,434,900	2.60	$ 44,342,951	$ 17,106,213 [5]	2.59

*Notes:
1. Mode Shift to Bike Transportation calculated using NCHRP 552 methodology. Pedestrian bridge benefit was not monetized.
2. 20-year life cycle capital cost based on planning level cost estimates. 20-year O&M costs of Class I Paths. Pedestrian bridge O&M not included (50-year life cycle).
3. Safety benefit based on Caltrans HSIP analyzer reflects full project costs.
4. Annual on-road emission benefits decrease over the 20-year life-cycle due to fleet turnover
5. Derived by adding the total project cost, and the O&M cost associated with Class I Paths
6. B/C results are not additive. Safety B/C reflects total improvement costs while Mode Shift and Air Quality reflect bike facility costs

Table 9.2 Segment 2: Combined Benefit-Cost Summary 20-Year Life Cycle

Segment	Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life-Cycle Cost	B/C
2	Mode Shift to Bike Transportation	$ 491,114	$ 848,340	0.58	$ 9,822,290	$ 5,090,040	1.93
2	Safety Benefit	$ 4,668,200	$ 5,907,900	0.79	$ 9,336,400	$ 11,815,800	0.79
2	Air Quality/ Emissions	$ 4,662	See Mode Shift	.005	$ 39,460	See Mode Shift	.008
2	**Total Benefit**	$ 5,163,977	$ 5,907,900	0.87	$ 19,198,150	$ 16,057,500 [5]	1.20

*Notes:
1. Mode Shift to Bike Transportation calculated using NCHRP 552 methodology.
2. 20-year life cycle capital cost based on planning level cost estimates. 20-year O&M costs of Class I Paths.
3. Safety benefit based on Caltrans HSIP analyzer reflects full project costs.
4. Annual on-road emission benefits decrease over the 20-year life-cycle due to fleet turnover
5. Derived by adding the total project cost, and the O&M cost associated with Class I Paths
6. B/C results are not additive. Safety B/C reflects total improvement costs while Mode Shift and Air Quality reflect bike facility costs

Table 9.3 Segment 3: Combined Benefit-Cost Summary 20-Year Life Cycle

Segment	Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life-Cycle Cost	B/C
3	Mode Shift to Bike Transportation	$ 529,509	$ 108,000	4.90	$ 10,590,187	$ 918,000	11.54
3	Safety Benefit	$ 4,017,924	$ 1,858,300	2.16	$ 4,017,924	$ 1,858,300	2.16
3	Air Quality/ Emissions	$ 4,662	See Mode Shift	.043	$ 39,460	See Mode Shift	.043
3	**Total Benefit**	$ 4,552,096	$ 2,225,300	2.05	$ 14,647,571	$ 3,035,300 [5]	4.83

*Notes:

1. Mode Shift to Bike Transportation calculated using NCHRP 552 methodology.
2. 20-year life cycle capital cost based on planning level cost estimates. 20-year O&M costs of Class I Paths.
3. Safety benefit based on Caltrans HSIP analyzer reflects full project costs.
4. Annual on-road emission benefits decrease over the 20-year life-cycle due to fleet turnover
5. Derived by adding the total project cost, and the O&M cost associated with Class I Paths
6. B/C results are not additive. Safety B/C reflects total improvement costs while Mode Shift and Air Quality reflect bike facility costs.

Table 9.4 Segment 4: Combined Benefit-Cost Summary 20-Year Life Cycle

Segment	Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life-Cycle Cost	B/C
4	Mode Shift to Bike Transportation	$ 77,182	$ 615,600	0.13	$ 1,628,632	$ 3,693,600	0.44
4	Safety Benefit	$ 5,961,281	$ 6,338,000	0.94	$ 11,922,562	$ 12,676,000	0.94
4	Air Quality/ Emissions	$ 4,662	See Mode Shift	.008	$ 39,460	See Mode Shift	.011
4	**Total Benefit**	$ 6,043,125	$ 6,338,000	0.95	$ 13,590,654	$ 15,754,000 [5]	0.86

*Notes:

1. Mode Shift to Bike Transportation calculated using NCHRP 552 methodology.
2. 20-year life cycle capital cost based on planning level cost estimates. 20-year O&M costs of Class I Paths.
3. Safety benefit based on Caltrans HSIP analyzer reflects full project costs.
4. Annual on-road emission benefits decrease over the 20-year life-cycle due to fleet turnover
5. Derived by adding the total project cost, and the O&M cost associated with Class I Paths
6. B/C results are not additive. Safety B/C reflects total improvement costs while Mode Shift and Air Quality reflect bike facility costs.

Table 9.5 Combined Benefit-Cost Summary 20-Year Life Cycle Segments 1 and 4

Segment	Total Annualized Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life Cycle Cost	B/C
1 & 4	Mode Shift to Bike Transportation	$ 178,148	$ 8,126,100	0.02	$ 3,647,963	$ 12,671,100	0.29
1 & 4	Safety Benefit	$ 46,006,141	$ 22,144,378	2.08	$ 54,206,722	$ 28,691,729	1.89
1 & 4	Air Quality/ Emissions	$ 4,662	See Mode Shift	.0006	$ 39,460	See Mode Shift	.003
1 & 4	**Total Benefit**	$ 46,193,614	$ 22,144,378	2.09	$ 57,933,605	$ 33,236,729 [5]	1.74

*Notes:
1. Mode Shift to Bike Transportation calculated using NCHRP 552 methodology. Pedestrian bridge benefit was not monetized.
2. 20-year life cycle capital cost based on planning level cost estimates. 20-year O&M costs of Class I Paths. Pedestrian bridge O&M not included (50-year life cycle).
3. Safety benefit based on Caltrans HSIP analyzer reflects full project costs.
4. Annual on-road emission benefits decrease over the 20-year life-cycle due to fleet turnover
5. Derived by adding the total project cost, and the O&M cost associated with Class I Paths
6. B/C results are not additive. Safety B/C reflects total improvement costs while Mode Shift and Air Quality reflect bike facility costs.

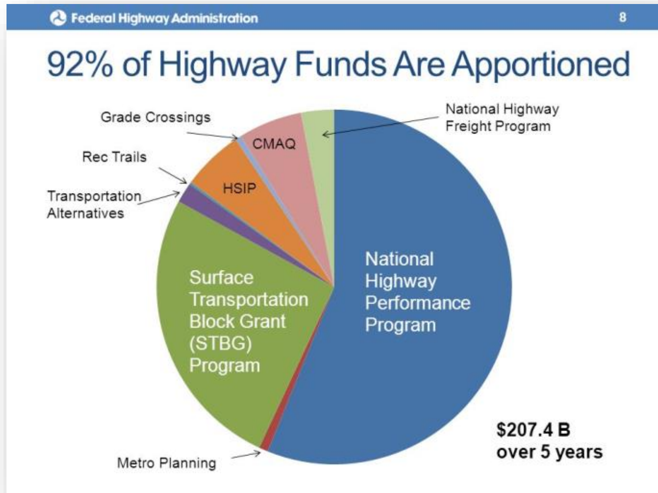
Table 9.6 Benefit-Cost Summary 20-Year Life Cycle Segments 1 (no Pedestrian Bridge)

Segment	Total Annualized Benefit	2019 Annualized Benefit	2019 Annualized Cost	B/C	20-Yr Life-Cycle Benefit	20-Yr Life Cycle Cost	B/C
1	Mode Shift to Bike Transportation	$ 100,967	$ 385,500	0.26	$ 2,019,331	$ 1,852,500	1.09
1	Safety Benefit	$ 40,044,860	$ 6,409,900	6.25	$ 42,284,160	$ 6,409,900	6.60
1	Air Quality/ Emissions	$ 4,662	See Mode Shift	0.01	$ 39,460.00	See Mode Shift	0.021
1	**Total Benefit**	$ 40,150,489	$ 6,409,900	6.26	$ 44,342,951	$ 7,876,900	5.63

*Notes:
1. Mode Shift to Bike Transportation calculated using NCHRP 552 methodology. Pedestrian bridge benefit was not monetized.
2. 20-year life cycle capital cost based on planning level cost estimates. 20-year O&M costs of Class I Paths. Pedestrian bridge O&M not included (50-year life cycle).
3. Safety benefit based on Caltrans HSIP analyzer reflects full project costs.
4. Annual on-road emission benefits decrease over the 20-year life-cycle due to fleet turnover
5. Derived by adding the total project cost, and the O&M cost associated with Class I Paths
6. B/C results are not additive. Safety B/C reflects total improvement costs while Mode Shift and Air Quality reflect bike facility costs.

9.2 Funding

This section provides an overview of available funding opportunities that improvements identified in this plan may be eligible for. The list is not exhaustive and additional funding opportunities may be available now or in the future. Funding opportunities include state, federal and local sources. The most applicable are described below.



9.2.1 Active Transportation Program (ATP)

9.2.1.1 Overview

Created in 2013 by SB 99 and AB 101, the Active Transportation Program (ATP) exists to encourage active modes of transportation. ATP funds are eligible to be used in implementing infrastructure projects, plans, non-infrastructure (NI) projects, and combination projects.

The goal of the program is to:

- increase the number of trips biking and walking
- improve the safety and mobility of these users
- assist regional agencies in reducing greenhouse gas emissions pursuant to SB 375's reduction goals by expanding the active transportation efforts of these agencies
- improve public health, including reducing childhood obesity
- ensure disadvantaged communities are included in the benefits of funding
- provide funding for a variety of projects that will benefit a diversity of active transportation users

9.2.1.1.1 Distribution of ATP Funding

The ATP designates competitive grant funding as follows: 50% of funds to the State for statewide competition, 40% to Metropolitan Planning Organizations (MPOs) in large urbanized areas with populations greater than 200,000 for jurisdictions within MPO boundaries, 10% to regions with populations between 5,001 and 200,000 for small, urban or rural programs. A minimum of 25 percent of each of the allocated funds must benefit disadvantaged communities. Projects identified in the CLMP will be eligible to apply for ATP funds through either the statewide ATP funding round or the SACOG ATP regional funding program.

9.2.1.1.2 CLMP: Eligibility and Competitiveness in ATP Grant Funding

Improvement concepts proposed within this plan are eligible for regional ATP funding applications through SACOG and through the statewide competitive grant process[28].

9.2.1.1.3 Surface Transportation Block Grant Program (STBGP) (formerly RSTP)

The STBGP offers the potential to fund for projects proposed in the CLMP, including recreational trails projects under 23 U.S.C. 206 and pedestrian and bicycle projects in accordance with section 217, which includes modifications to comply with accessibility requirements of the Americans with Disabilities Act of 1990. STBGP funds are programmed by EDCTC to El Dorado County and the City of Placerville.

9.2.2 Highway Safety Improvement Program (HSIP) Funds

HSIP funding is distributed to States under The Fixing America's Surface Transportation Act (FAST). HSIP funding aims to reduce serious and fatal injuries on all public roads. Distributed by the California Division of Local Assistance (DLA), California's Local HSIP funding focuses on infrastructure projects that maximize the benefit of nationally-recognized crash modification factors (CMFs).The improvement concepts associated with safety proposed in this plan offer strong safety benefits overall, as seen in the safety benefit-cost analysis described previously.

The safety analysis conducted in this plan, and provided in further detail within Appendix E, can be utilized in obtaining HSIP funds for the chosen countermeasures. The collision data reported only vehicular collisions. Thus, the countermeasures reflect roadway and intersection improvements only. Funding for these improvements may be requested for federal reimbursement, and all analyses show a federal reimbursement ratio of between 90 and 100 percent. Because there were no non-vehicular collisions, pedestrian and bicyclist improvements are not eligible for HSIP funding

[28] Given that there is no formal schools in the immediate CLMP project area, the improvements identified in the CLMP were not considered good candidates for the Safe Routes to School (SRTS) component to the ATP.

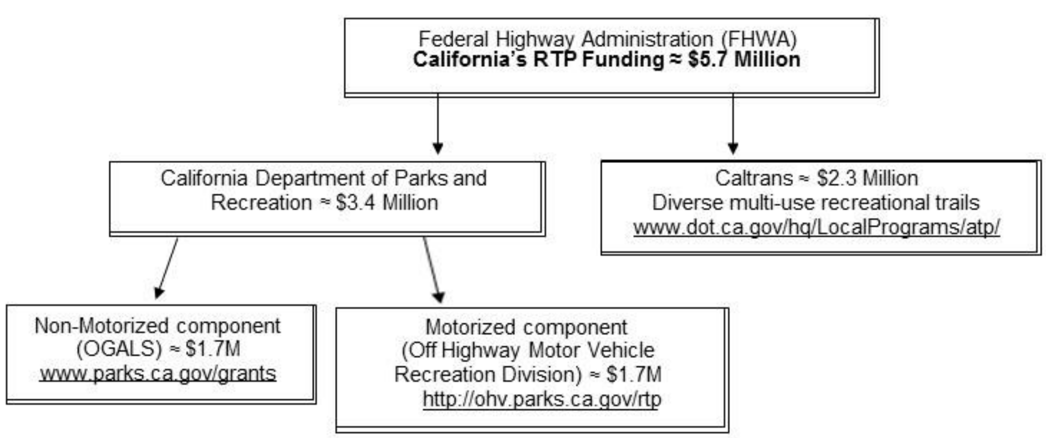
associated with the crash modification factors of selected countermeasures within the study area; however, HSIP does allow a dual application process that includes set-asides for various improvement types, including pedestrian crossing enhancements, as well as the associated of additional safety improvements as other-safety related costs. Moreover, where intersection improvements are proposed, pedestrian enhancements near the juncture should be grouped with intersection improvements in order to ensure the safety of all users.

9.2.3 Congestion Mitigation and Air Quality (CMAQ) Funds

CMAQ funds are federal funds that provide a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas). Funds may be used for a transportation project or program that is likely to contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution, and that is included in the metropolitan planning organization's (SACOG) current transportation plan and transportation improvement program (TIP) or the current state transportation improvement program (STIP) in areas without an MPO. In the six-county SACOG region, SACOG directly apportions El Dorado County's share of CMAQ funds to EDCTC. EDCTC administers the process for project solicitation, project selection and programming. All the improvement projects identified in the CLMP are eligible projects including roundabout conversions.

9.2.4 Regional Trails Project (RTP) Funds

Regional Trails Project funding is from the Federal Highway Administration (FHWA) distributed between the California Department of Parks and Recreation (DPR) and the California Department of Transportation for distribution through the Active Transportation Program. Non-motorized DPR projects are administered by the Office of Grants and Local Services (OGALS). OGALS conducts the RTP non-motorized funding application cycles - the next cycle is anticipated by 2020/2021. The Recreational Trail Program funding is also currently available through the California ATP described above, subject to the application guidelines specified by the CTC.



9.2.5 Proposition 68 (2018 Bond Act) Funds

Proposition 68, the Parks, Environment and Water Bond, passed in 2018, authorizing $4 billion in general obligation bonds for state and local parks and recreation, environmental protection projects, and water infrastructure projects. The programs described below administer project funding under Proposition 68. These funding sources may be available to fund CLMP improvements.

Figure 1

Uses of Proposition 68 Bond Funds

(In Millions)

Natural Resource Conservation and Resiliency	**$1,547**
State conservancies and wildlife conservation	767
Climate preparedness and habitat resiliency	443
Ocean and coastal protection	175
River and waterway improvements	162
Parks and Recreation	**$1,283**
Parks in neighborhoods with few parks	725
Local and regional parks	285
State park restoration, preservation, and protection	218
Trails, greenways, and rural recreation	55
Water	**$1,270**
Flood protection	550
Groundwater recharge and cleanup	370
Safe drinking water	250
Water recycling	100
Total	**$4,100**

9.2.5.1 Rural Recreation and Tourism Program – Department of Parks and Recreation

While unavailable in 2019, improvements proposed within this plan are eligible for future funding under the Rural Recreation and Tourism Program, upon appropriation by the legislature. The Rural Recreation and Tourism Program distributes competitive grant funding to projects located within non-urbanized counties, with populations under 500,000, that will create new recreation opportunities in rural communities related to economic and health-related goals. As a non-disadvantaged community, the study area could result in up to 80% of the project grant-funded, and at least 20% of the project matched under the Rural Recreation and Tourism Program.[29]

9.2.5.2 Regional Parks Program – Department of Parks and Recreation

While also unavailable in 2019, grant funding is available through the Regional Parks Program, which aims to create, expand, or improve regional parks and regional park facilities under Proposition 68 (Pub. Resources Code §80065(a). Once appropriated by the legislature, more than $23 million in funding will be available through the program.

9.2.5.3 California River Parkways Grant Program – California Natural Resources Agency

River Parkways projects will be funded by roughly $7 million in Proposition 68 funding, “for the purposes of the California River Parkways Act of 2004.” [30] Improvements identified in the CLMP may be eligible for River Parkways Program funding under the recreation and conversion to river parkways section of the program’s eligibility criteria.

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[29] https://www.parksforcalifornia.org/communities

[30] http://resources.ca.gov/grants/california-river-parkways

9.3 Project Prioritization

All identified CLMP multimodal improvement concepts are conceptual and have not gone through environmental review. As specific projects are developed, they will include specific detailed project plans and engineering-based designs. Each will undergo environmental review which may modify that specific improvements either due to potential environmental impacts identified, consistency analysis with other applicable planning documents or other challenges identified in the environmental review process.

The proposed CLMP improvements can be prioritized based on the benefit-cost analyses describe above, partner agency input, community and stakeholder support and the funding eligibility of a specific improvements.

There are several viable alternative project prioritization approaches for implementing the CLMP improvement recommendations. Using benefit-cost as the prioritization driver – each of the four segment improvement packages can be bundled and prioritized by segment (i.e., Segment 1, 2, 3 and 4 as presented herein) from highest to lowest return on investment. This will result in the most cost-effective segments sequentially advancing for funding first. This approach better ensures that there will be independent utility and benefit resulting from implementation of an entire segment's improvement package. The benefit-cost analysis provided in this plan informs this prioritization approach. Based on the results, the following prioritization plan would result:

Priority 1) Segment 3 Improvement Package (SR 49 from Coloma Heights Road to SR 153 (continuing to Monument Road)

Priority 2) Segment 1 Improvement Package (Marshall Road to Lotus Road (includes continuing improvements to Amoloc Road)

Priority 3) Segment 2 Improvement Package (Lotus Road to Coloma Heights Road)

Priority 4) Segment 4 Improvement Package (Bassi Road to SR 49)

Another viable alternative implementation approach is to systemically prioritize and implement the lowest cost improvement types immediately. Under this approach the recommended improvements, independent of segment, can be pursued in order of lowest to highest cost. Under this prioritization approach low cost improvements such as speed warning signs, Pedestrian Hybrid Beacons (HAWK), Pedestrian Activated Rectangular Rapid Flashing Beacons, Class II bikeway striping, restriping SR 49 and Lotus Road to 11 ft. lanes, centerline rumble strips, formalizing parking areas etc. will be implemented first regardless of segment (0-5 yr. implementation time frame). These improvement types span all four study area segments. This would be followed by Class I bike paths and sidewalk improvements and intersection channelization improvements (5-10 yr. implementation time frame); followed by construction of the two roundabouts (10-15 yr. time frame); followed by the pedestrian bridge (15-20 yr. implementation time frame). A potential drawback to this approach is that even collectively the more immediate low-cost improvements may not generate a compelling benefit-cost to be competitive for grant funding.

Lastly, funding program criteria that are the most amenable to the CLMP improvement packages should be considered. Utilizing the performance-based analysis of the proposed CLMP improvements, the following programs can be ranked based on project selection criteria and competitiveness: 1) ATP (given that all CLMP project benefits can be credited); 2) HSIP (for only CLMP safety related benefits); and, 3) CMAQ (although the CLMP results in an air quality benefit, the reductions in emissions are marginal). Furthermore, Regional Trails Project (RTP) and Proposition 68 (2018 Bond Act) funds would be more appropriate/competitive for those proposed CLMP improvements that related to County and State park circulation.

Technical Appendices (presented under separate cover)

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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Coloma Sustainable Community Mobility Plan

Technical Appendix

October 3, 2019

In collaboration with:

Appendix A: Outreach

- Public Workshop Summaries
- Stakeholder Advisory Committee Meeting Summaries
- Ratified Stakeholder Advisory Committee
- Online Questionnaire Summary
- Public Comment on Draft Plan

COLOMA LOTUS
Mobility Plan

Coloma-Lotus Mobility Plan
Community Workshop #1

Wednesday, October 3
6:00 – 7:30 p.m.
Gold Trail Grange
319 CA-49, Coloma

el dorado county edctc TRANSPORTATION COMMISSION

Introduction

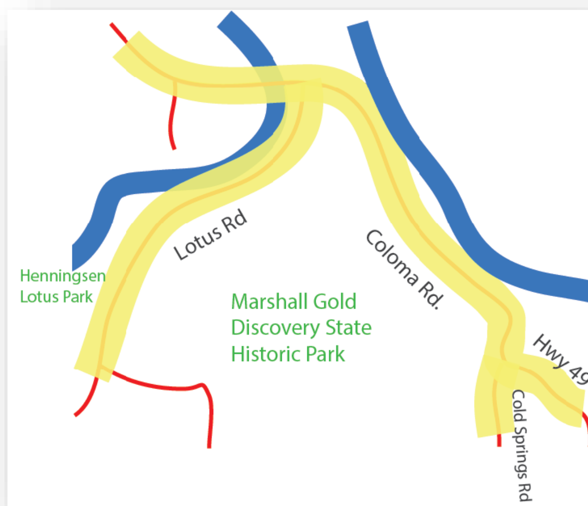
On Wednesday, October 3, the El Dorado County Transportation Commission held a community workshop for the Coloma-Lotus Mobility Plan. The community workshop was held from 6:00 to 7:30 p.m. at the Gold Trail Grange located at 319 CA-49 in Coloma, California. More than 50 people attended the community workshop.

Dan Bolster, Senior Transportation Planner at EDCTC

Project Overview

The El Dorado County Transportation Commission (EDCTC) received a Caltrans Sustainable Communities Planning Grant to study a portion of the Coloma-Lotus area. With the grant, EDCTC hired a consultant team comprised of GHD, Green DOT and AIM consulting to assist EDCTC in examining ways to improve traffic circulation in the Coloma-Lotus area for motorists, pedestrians, and bicyclists.

The Coloma-Lotus Mobility Plan will evaluate existing conditions and provide recommendations to improve circulation for all travelers. Selection of proposed improvements will be performance-based to ensure expected benefits are commensurate with costs. This information will inform future grant applications for project funding and implementation.



Coloma-Lotus Mobility Plan Area

Community Workshop Purpose and Format

The community workshop provided an opportunity for the community to learn about and provide input on the Coloma-Lotus Mobility Plan. The community workshop format included a presentation by the project team and an interactive live polling session in which community members were asked to use their phones or were provided smart devices to answer questions about the project area. After the live polling session, the workshop proceeded into an open house format which allowed community members to provide input on key issues and needed improvements in the study area by placing comments on interactive boards. Community members were asked to provide input on where the issues are and where improvements are needed.

The community workshop included a welcome introduction from both Gladys Cornell of AIM Consulting and Dan Bolster with EDCTC, remarks from El Dorado County District 4 Supervisor Michael Ranalli regarding public safety, and an overview of the Coloma-Lotus Mobility Plan by Jim Damkowitch of GHD.

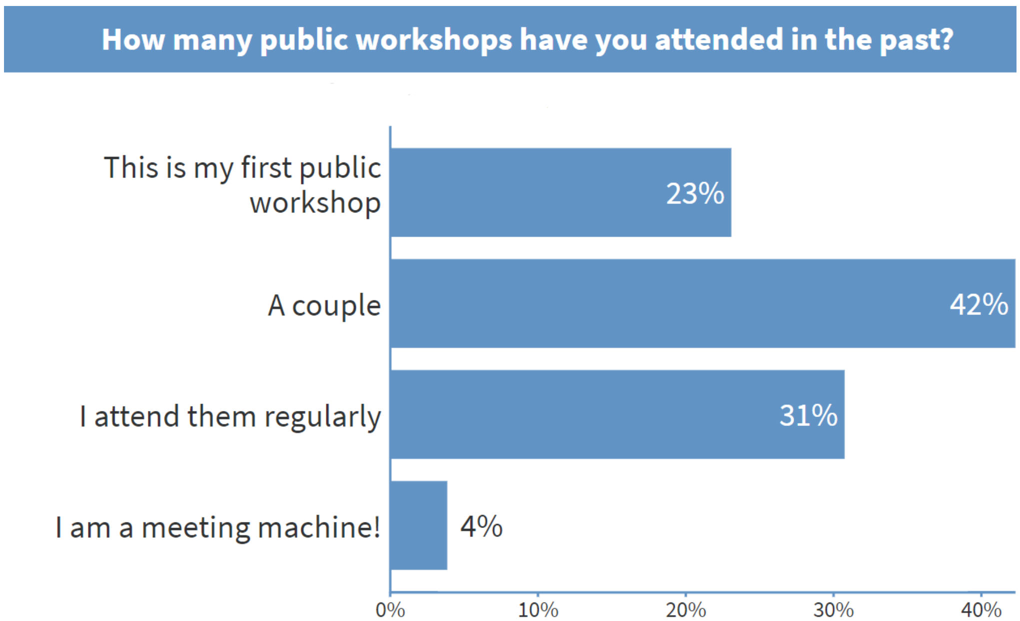
In his presentation, Jim Damkowitch outlined the project's goals which include identifying transportation deficiencies in the area, understanding the community's priorities for mobility improvements, developing the technical information needed to support grant applications, and the creation of a mobility plan to improve travel in the Coloma-Lotus area for motorists, bicyclists, and pedestrians. He also provided an overview of the data collection done to date and that there will be an additional community workshop where the project team will seek community feedback on proposed mobility improvements.

Supervisor Michael Ranalli, EDCTC Executive Director Woody Deloria, Project Manager Jim Damkowitch and Todd Tregenza of GHD

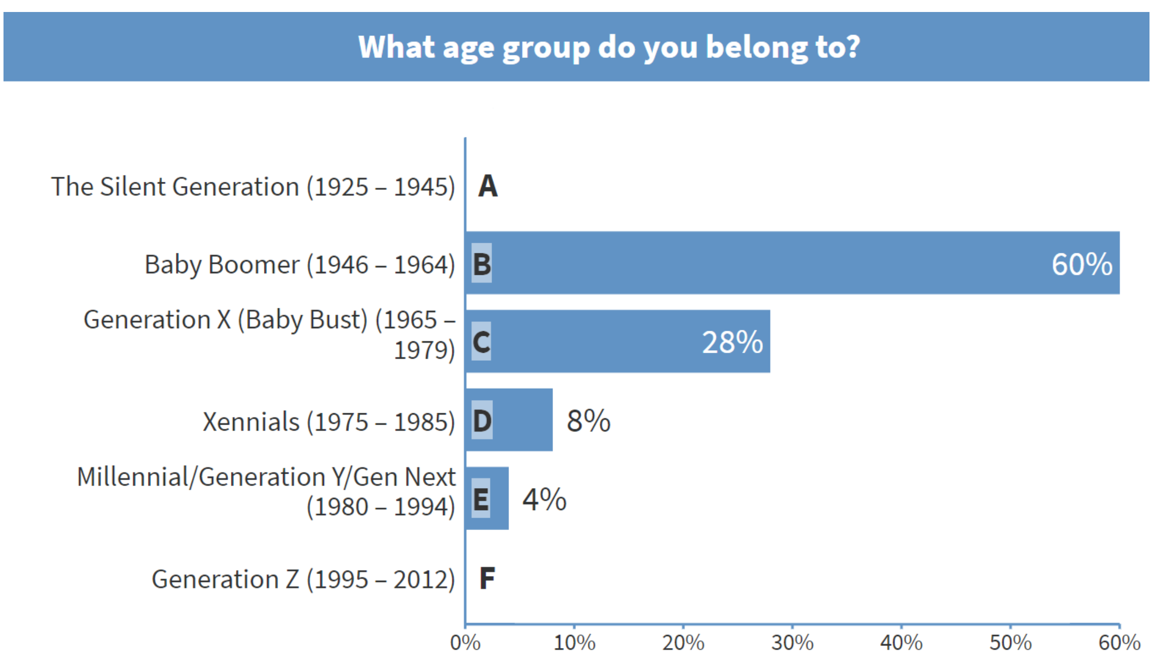
Live Polling

During the community workshop, community members were asked to participate in an interactive live-polling activity. Below is a summary of the live polling results.

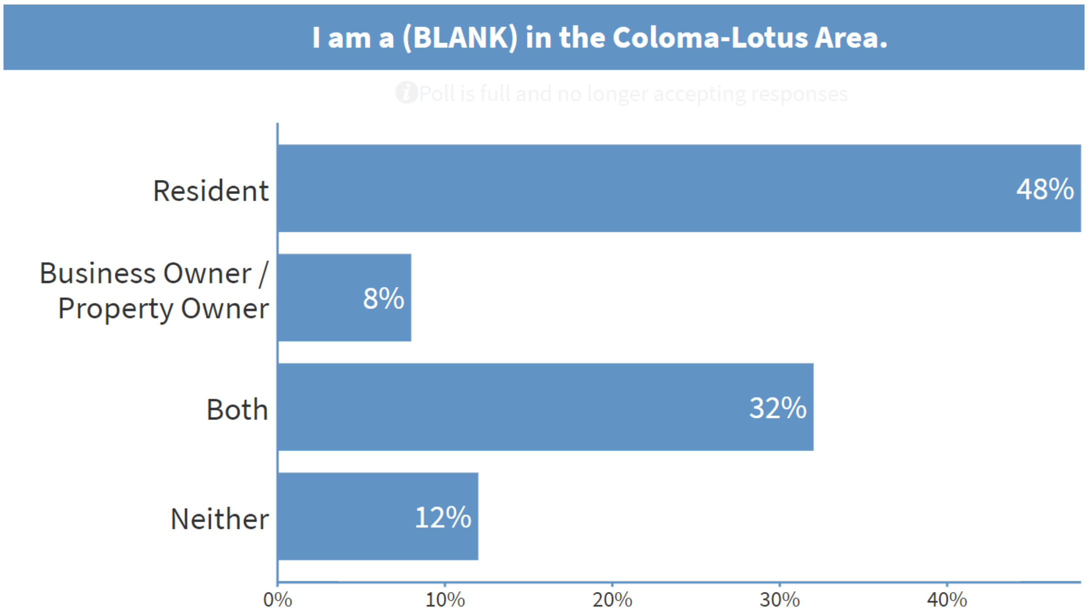
How many public workshops have you attended in the past?



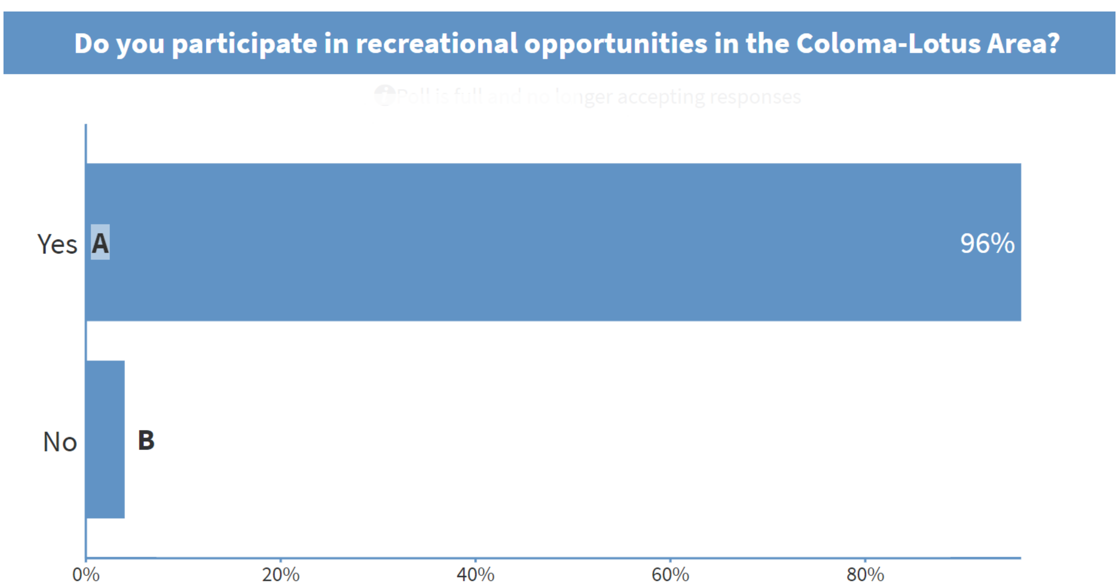
What age group do you belong to?



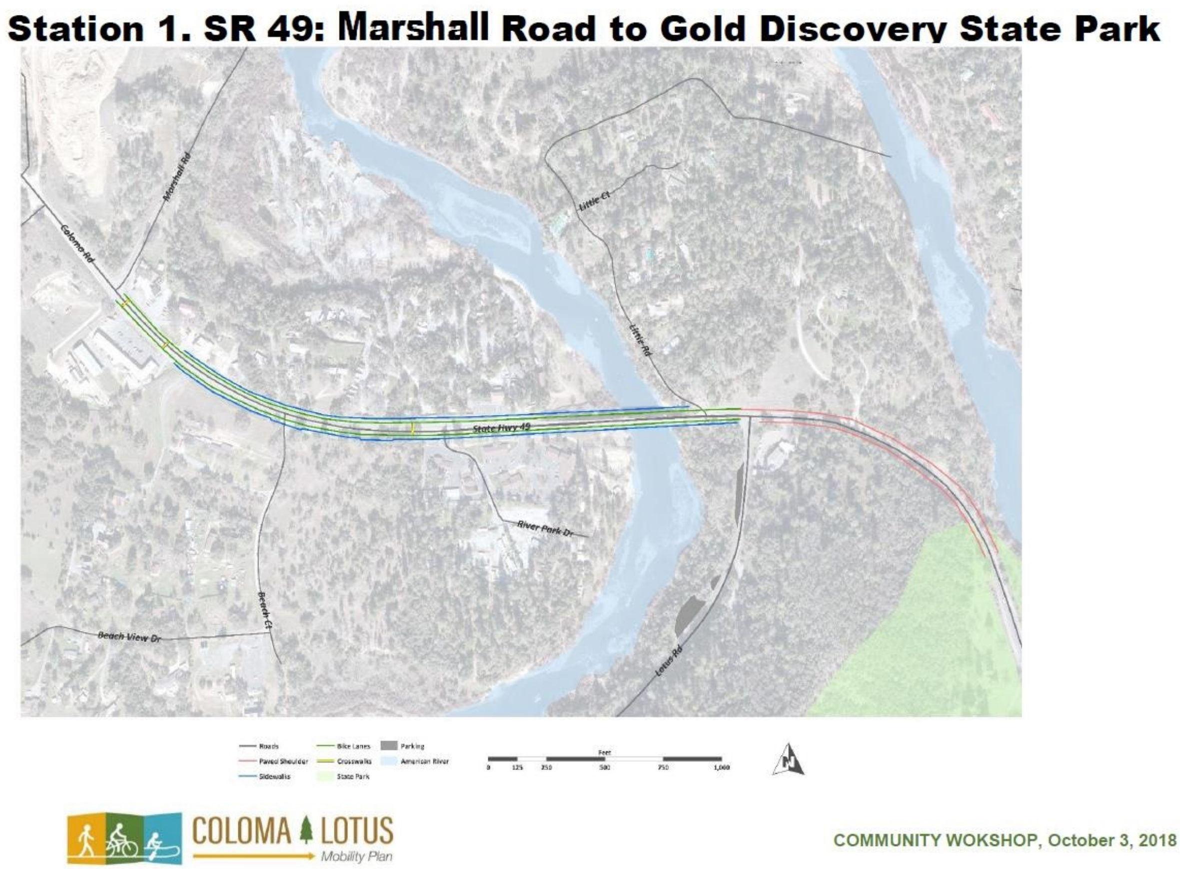
I am a (BLANK) in the Coloma-Lotus Area.

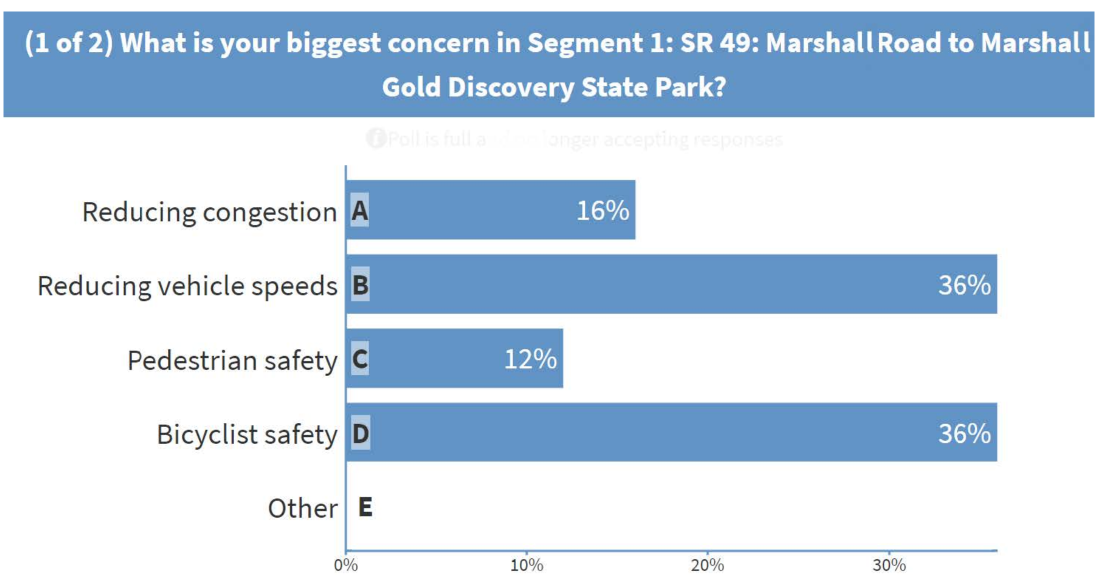


Do you participate in recreational opportunities in the Coloma-Lotus Area?

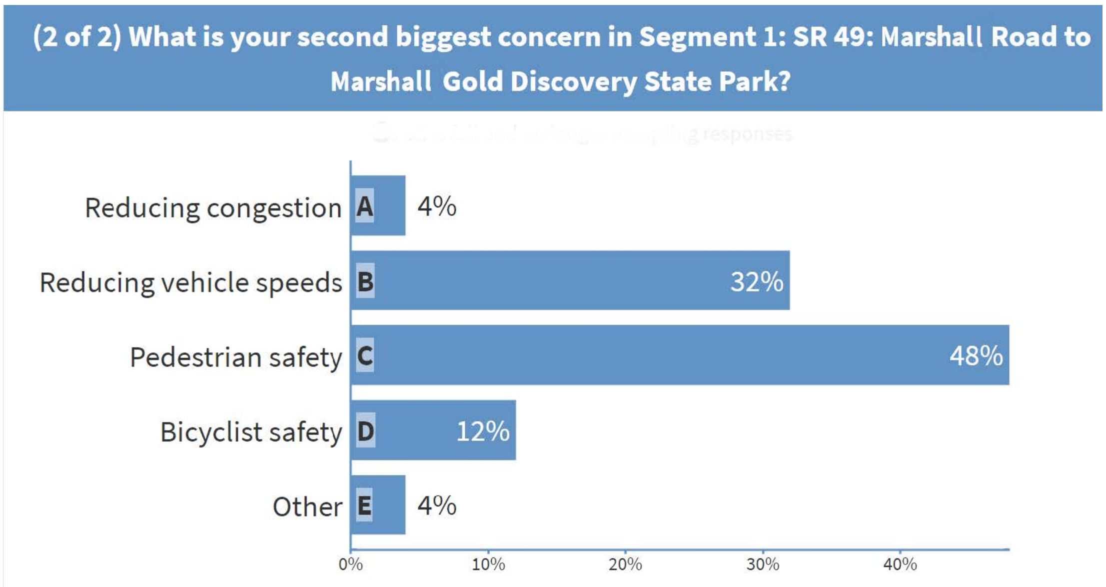


(1 of 2) What is your biggest concern in Segment 1: State Route 49: Marshall Road to Marshall Gold Discovery State Park?



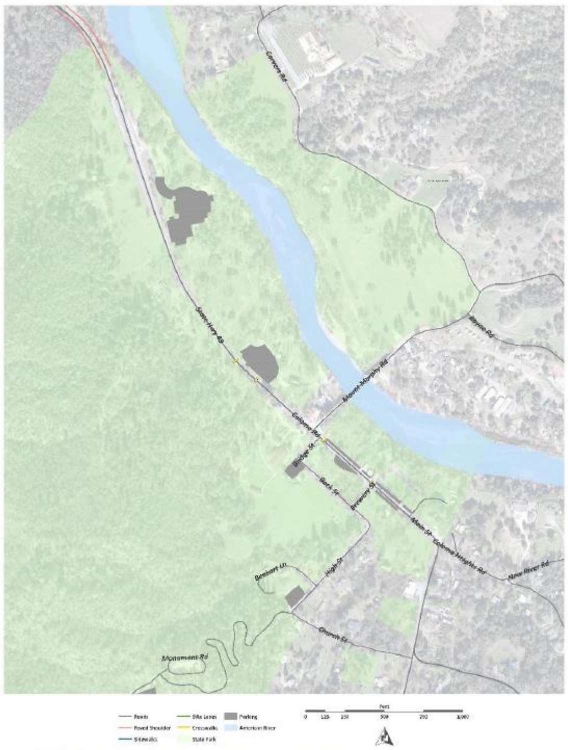


(2 of 2) What is your second biggest concern in Segment 1: State Route 49: Marshall Road Marshall Gold Discovery State Park?



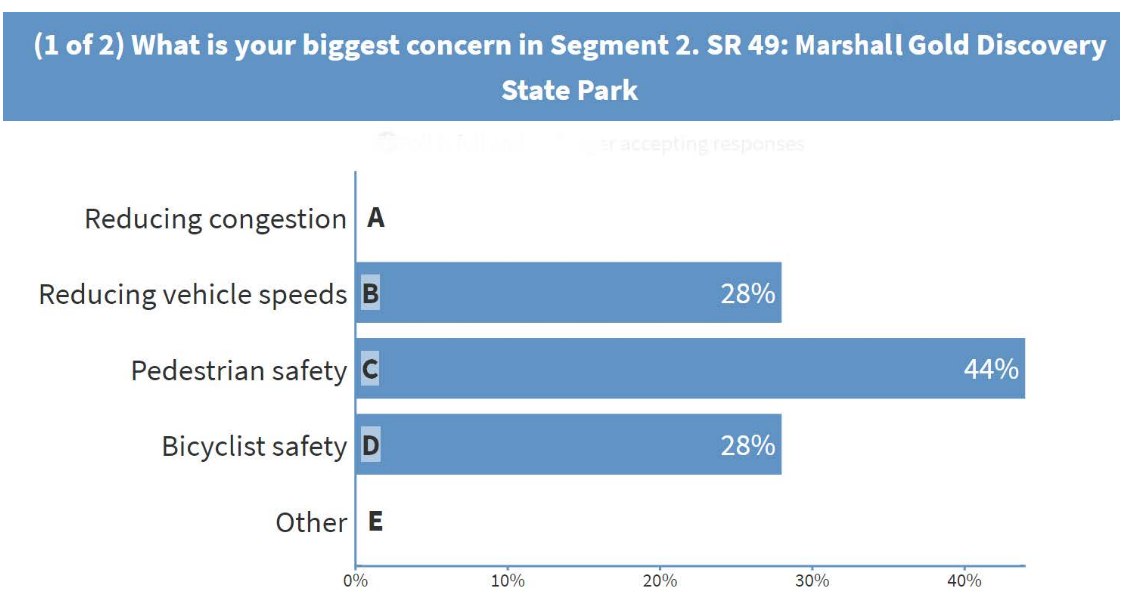
(1 of 2) What is your biggest concern in Segment 2. State Route 49: Marshall Gold Discovery State Park?

Station 2. SR 49: Marshall Gold Discovery State Park

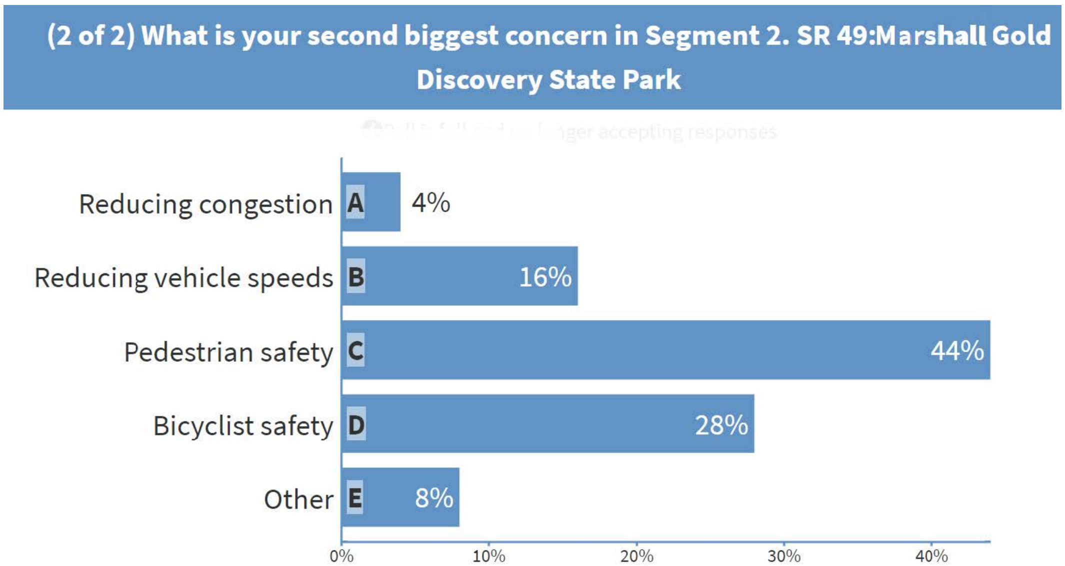


COLOMA LOTUS Mobility Plan

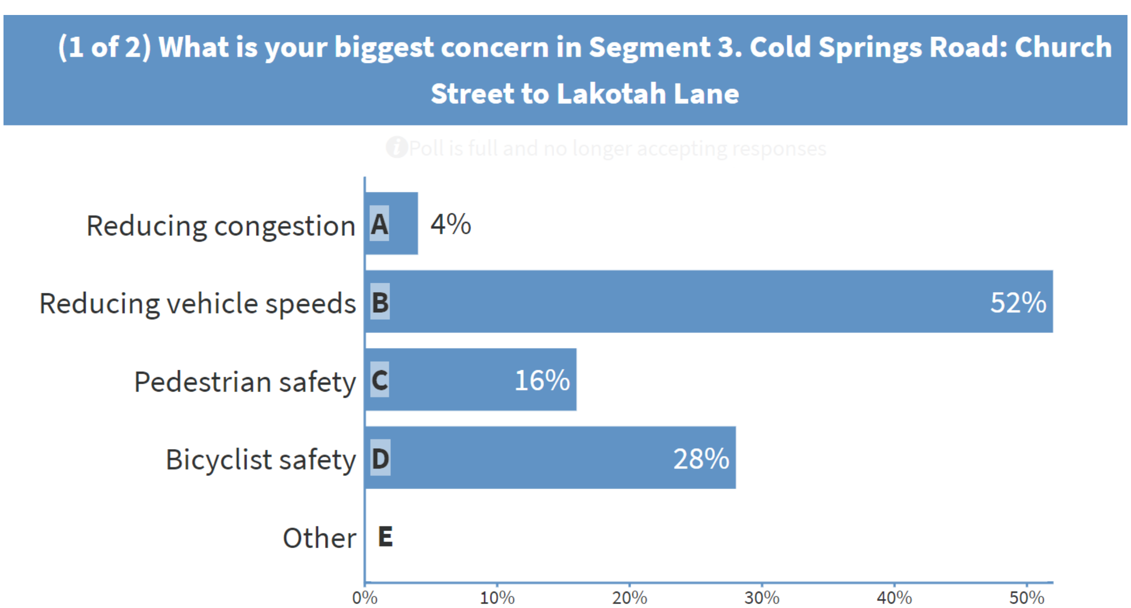
COMMUNITY WOKSHOP, October 3, 2018



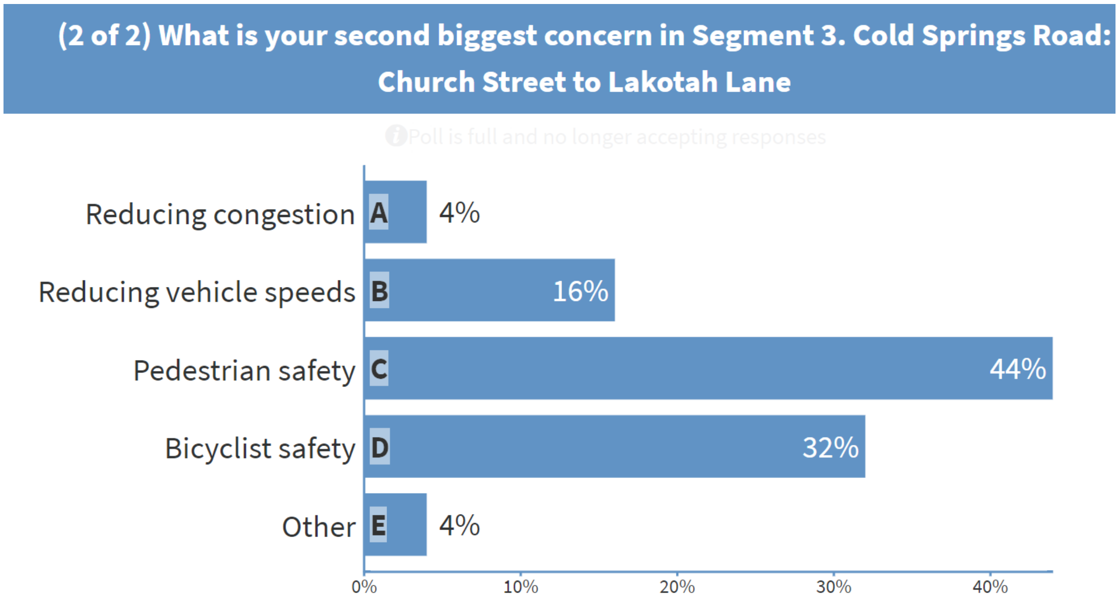
(2 of 2) What is your second biggest concern in Segment 2. State Route 49: Marshall Gold Discovery State Park?



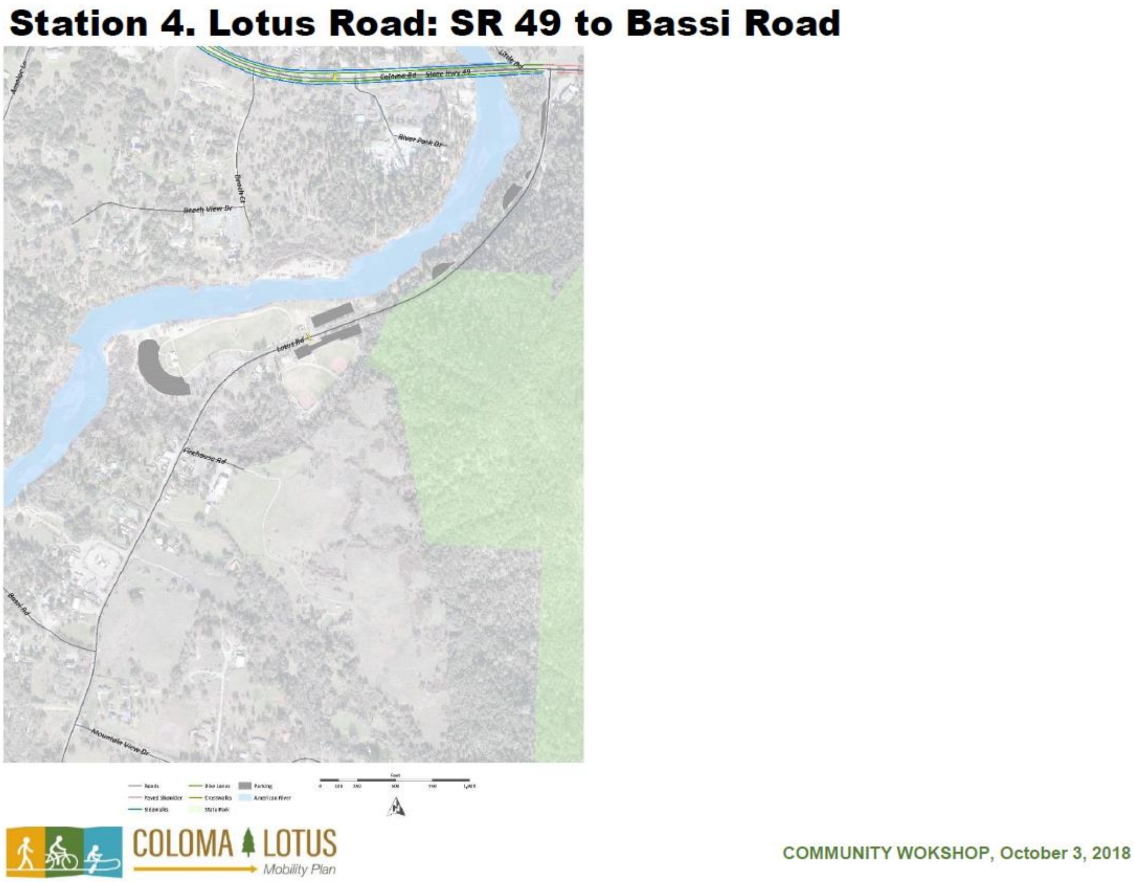
(1 of 2) What is your biggest concern in Segment 3. Cold Springs Road: Church Street to Lakotah Lane?

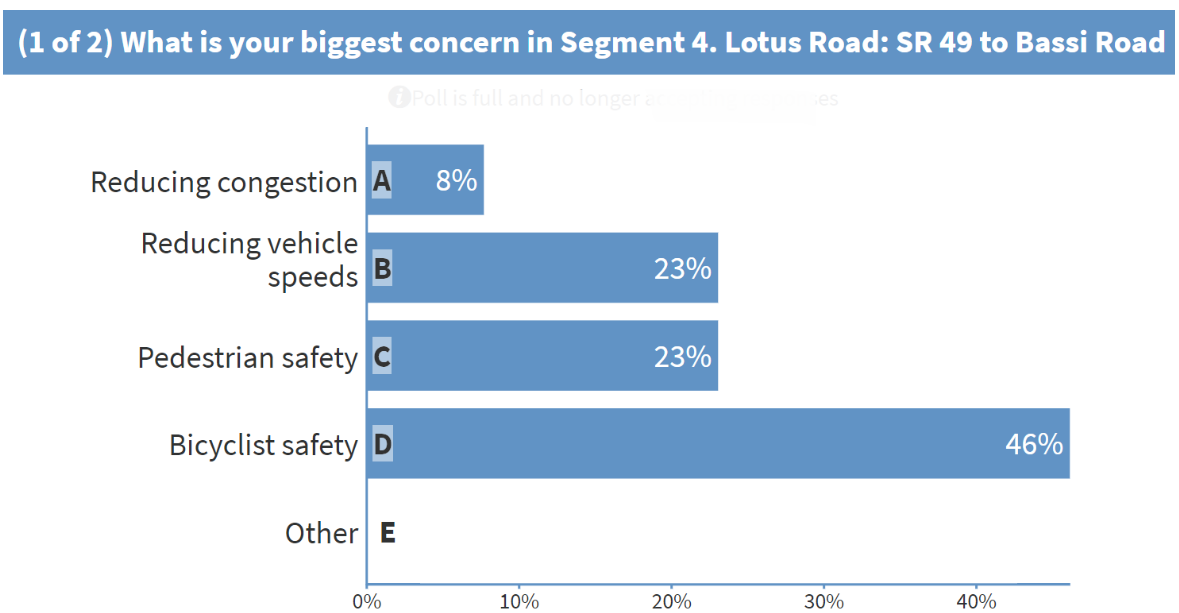


(2 of 2) What is your second biggest concern in Segment 3. Cold Springs Road: Church Street to Lakotah Lane?

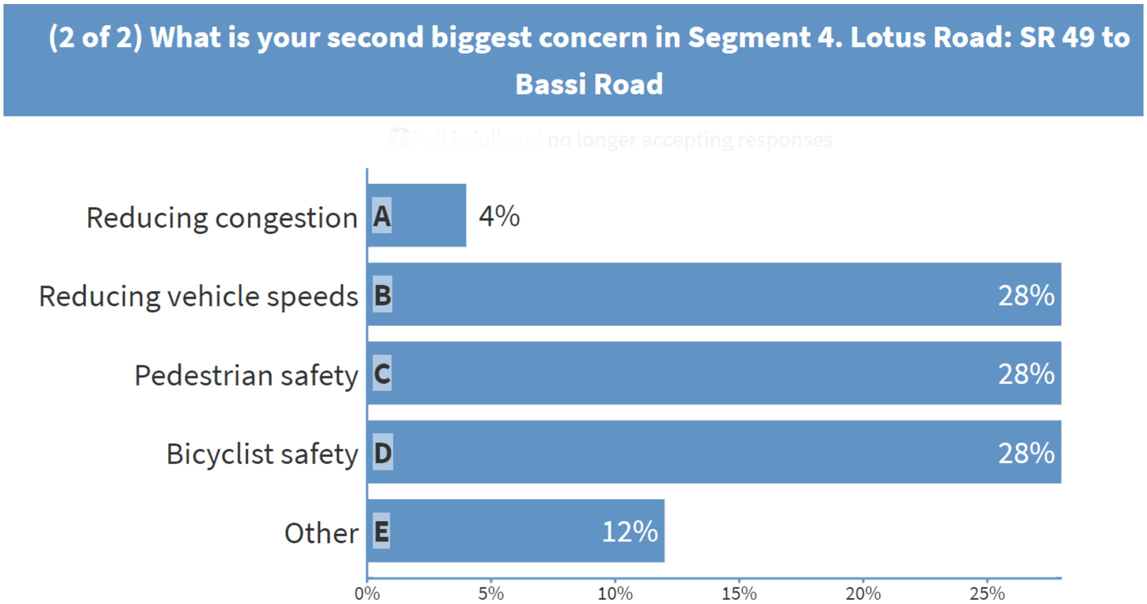


(1 of 2) What is your biggest concern in Segment 4. Lotus Road: SR 49 to Bassi Road?

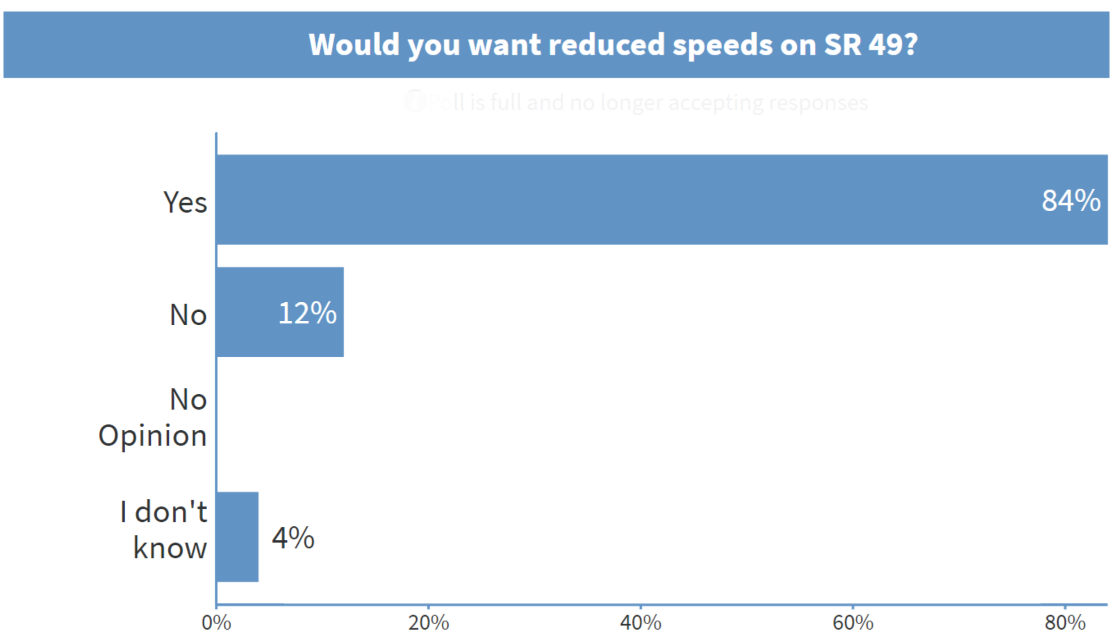




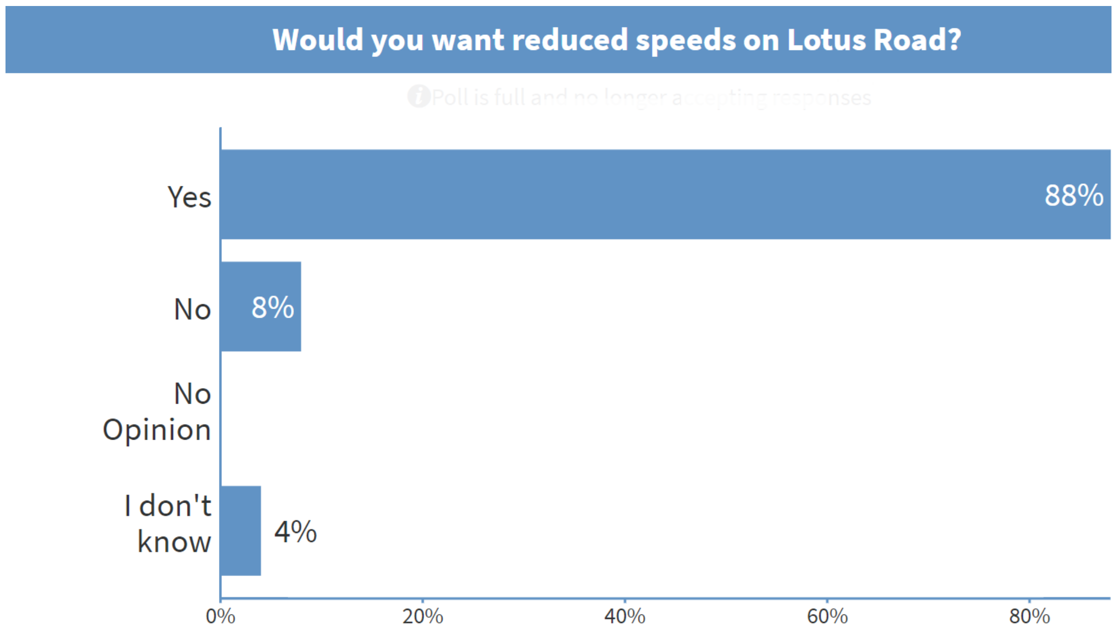
(2 of 2) What is your second biggest concern in Segment 4. Lotus Road: SR 49 to Bassi Road?



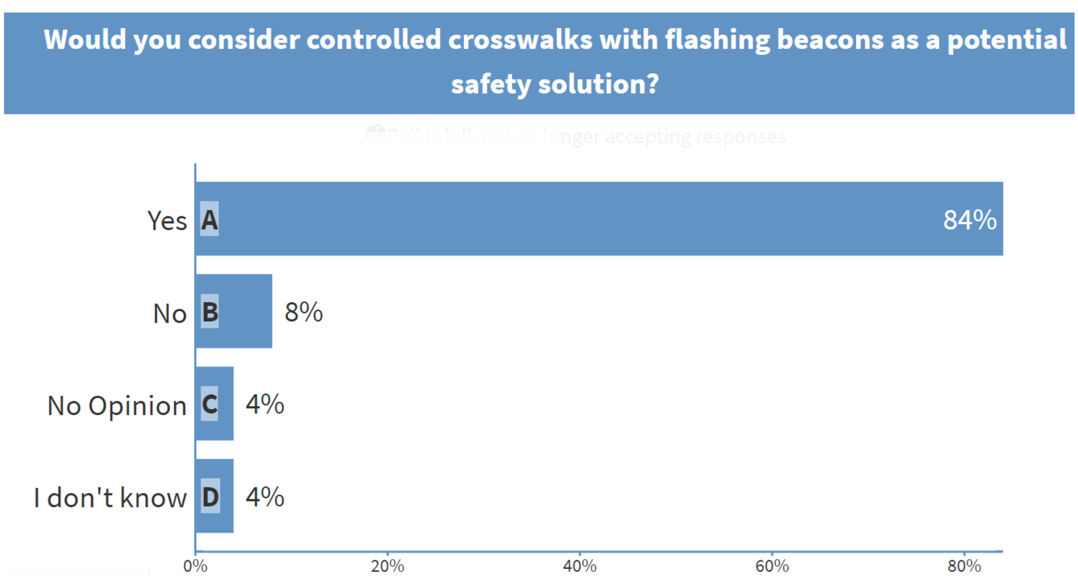
Would you want reduced speeds on SR 49?



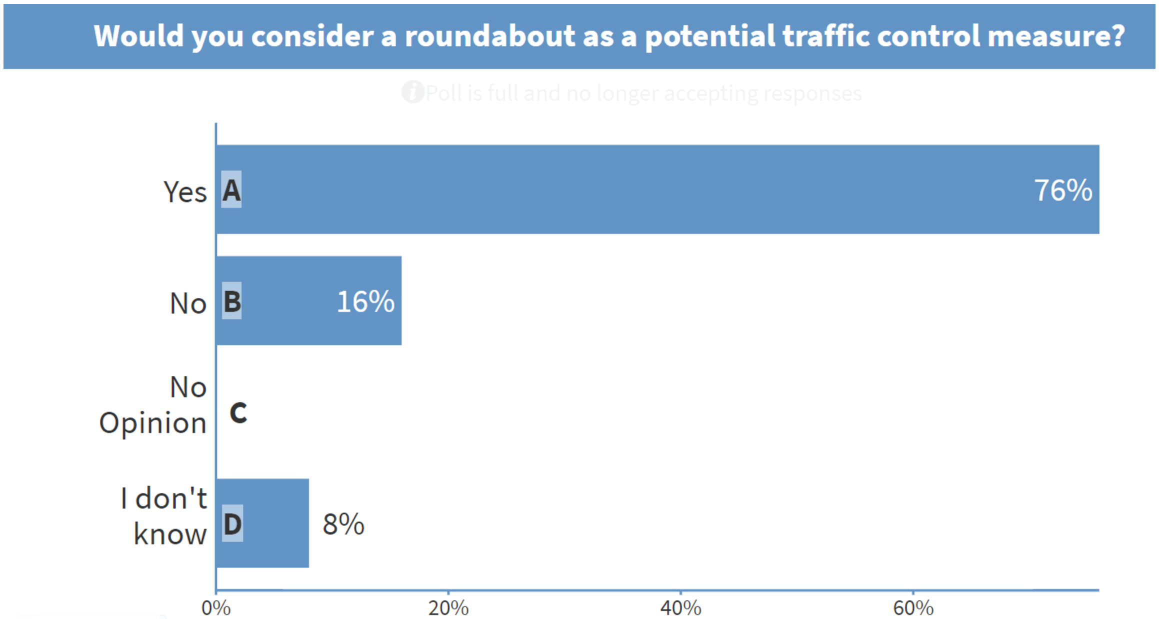
Would you want reduced speeds on Lotus Road?



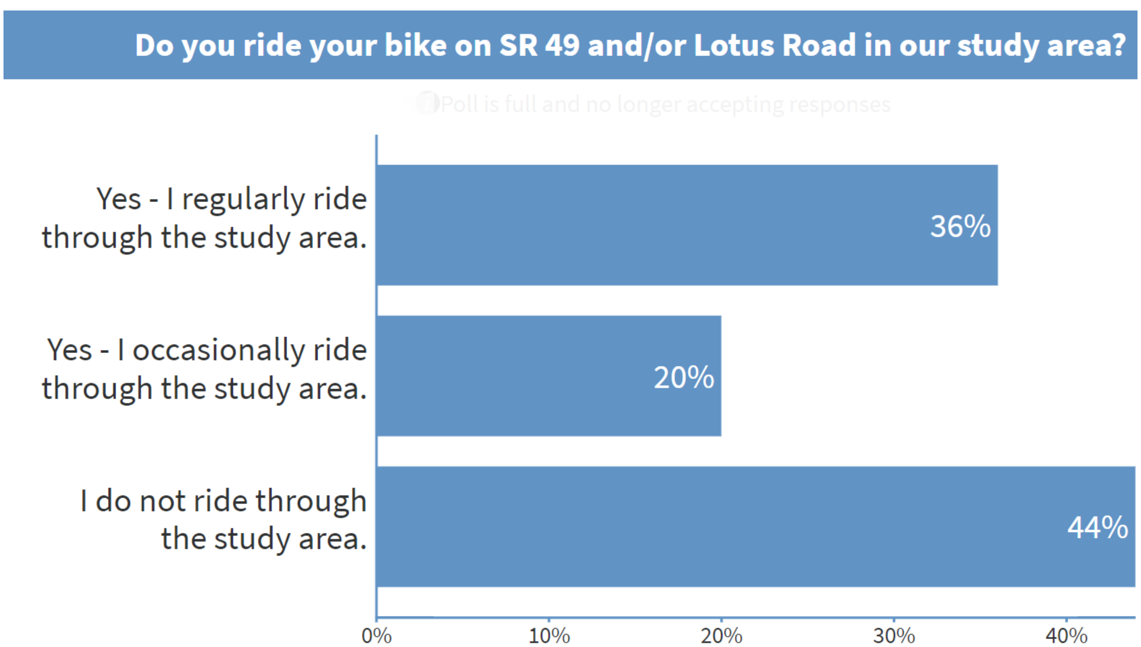
Would you consider controlled crosswalks with flashing beacons as a potential safety solution?



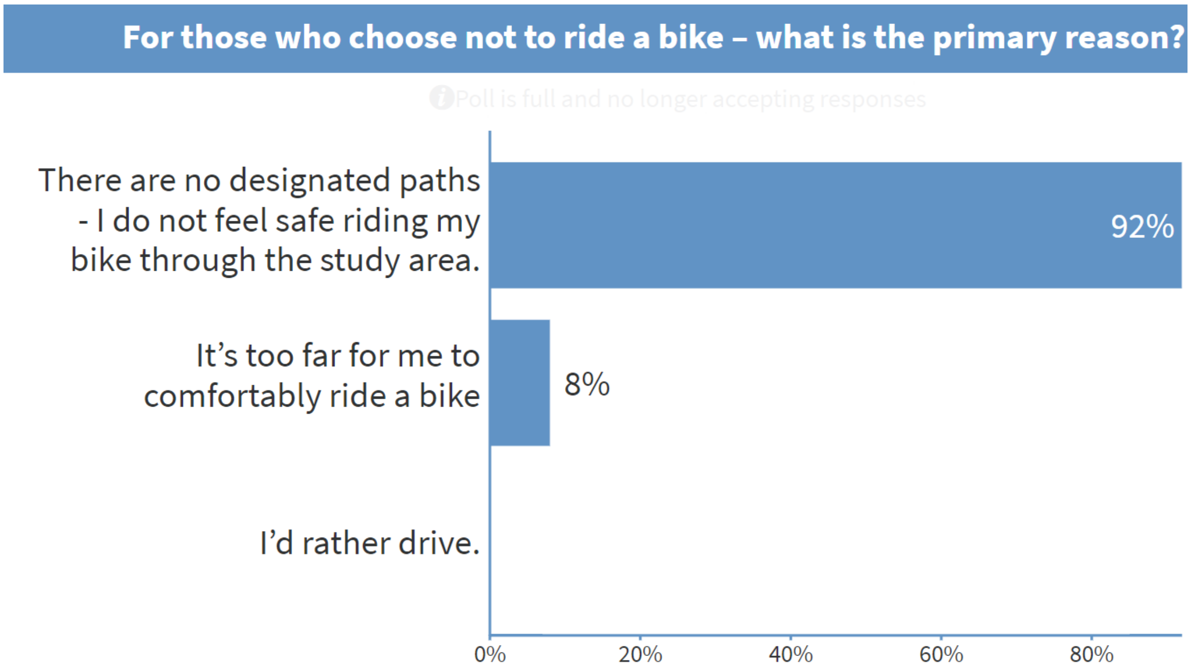
Would you consider a roundabout as a potential traffic control measure?



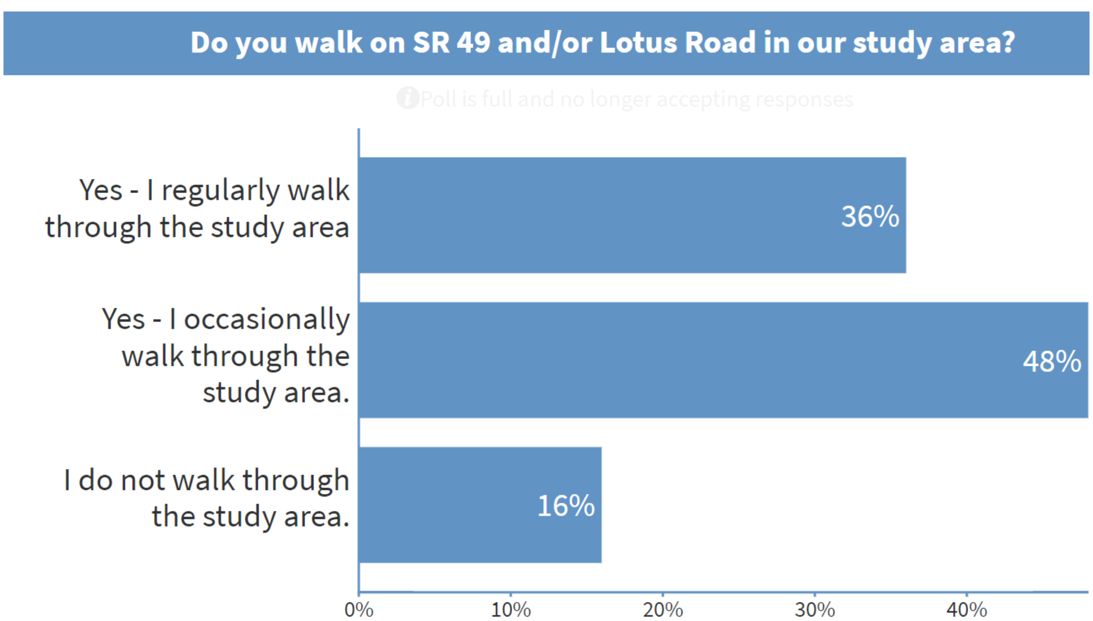
Do you ride your bike on SR 49 and/or Lotus Road in our study area?



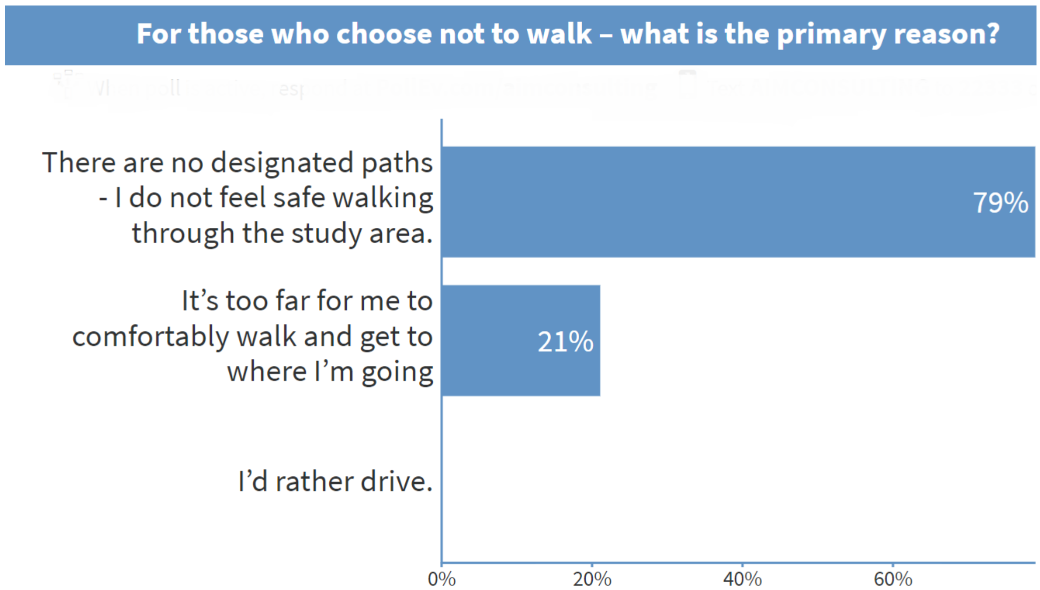
For those who choose not to ride a bike – what is the primary reason?



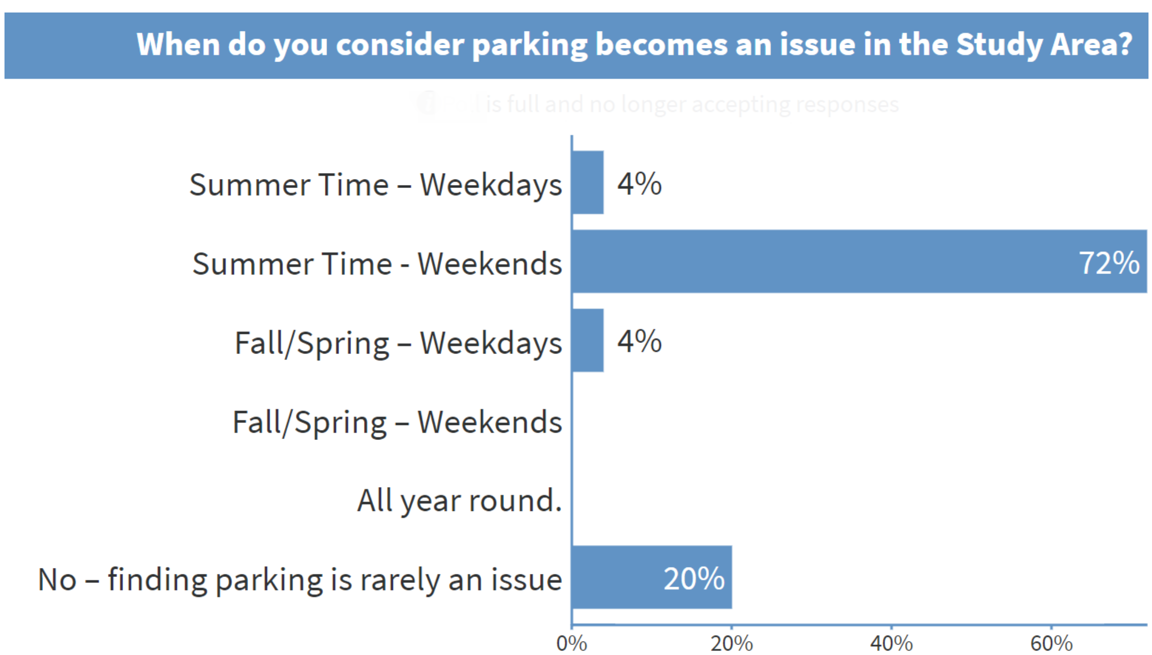
Do you walk on SR 49 and/or Lotus Road in our study area?



For those who choose not to walk – what is the primary reason?



When do you consider parking becomes an issue in the Study Area?

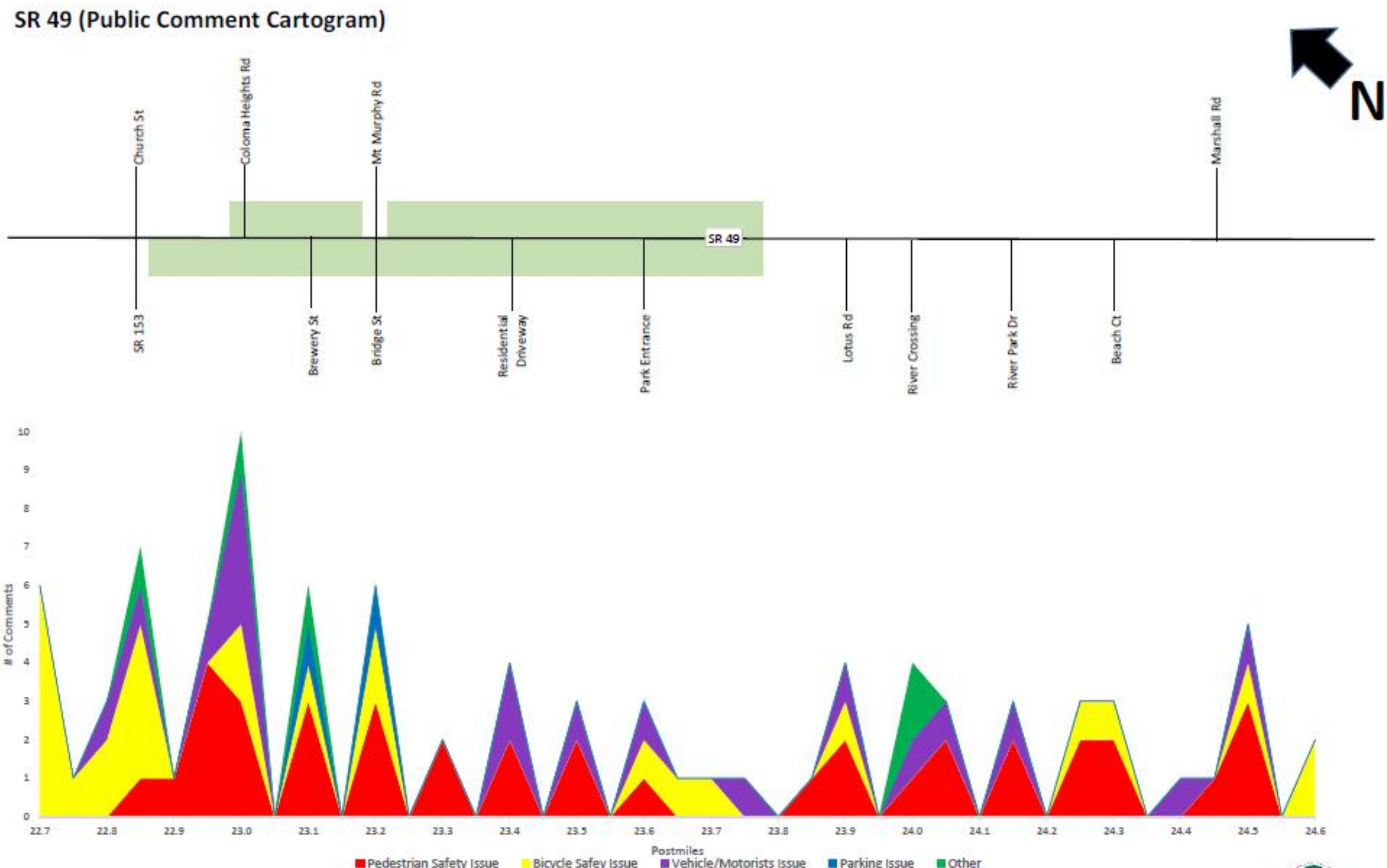


Board Comments

Community members were asked to place dots on maps of the study area to indicate key issues and needed improvements. Below are cartograms displaying responses from community members. Red represents concern with pedestrian safety, yellow represents concern with bike safety, purple represents vehicle / motorist operational issues, blue represents an issue with parking, and green represents "other," an issue not included in any of the other dots. If community members wanted to list "other," they were encouraged to leave a comment describing the issue on a post-it note.

Green DOT, Jeff Schwein, El Dorado County Noah Triplett and community member

Segment 1 and 2: State Route 49 from Church Street to Marshall Road



<u>Additional Comments</u>

Segment 1

- Lotus and 49 intersection – The crosswalk needs more separation.
- Lotus Parking area south of 49 – This is private land, no public parking.
- Red Dot east of lotus on 49 – There needs to be more separation for bikes and pedestrians.
- Red Dot on Beach Court – Install a lighted crosswalk for people to safely access businesses on both sides of road.

- Crosswalk east of Marshall road on State Route 49 – Lots of drivers run the stop sign with high speeds. Drivers also do not stop at the crosswalk when occupied.
- West of Marshall Road – The very short section of Highway 49 from Amoloc to Marshall Rd is too dangerous for anyone to walk safely, especially disabled residents.
- West of Marshall Road – Study should also consider a bike route from Marshall Road to Greenwood Creek.
- Marshall Road and State Route 49 intersection – A sidewalk from Scott Road to Highway 49 on Marshall Road would serve dozens of parcels.

Project Manager, Jim Damkowitch, gives an overview of the Coloma-Lotus Mobility Plan

- Marshall Road – We need bike safety shoulder improvements to Prospectors Road since it is a popular bike route.
- Marshall Road – There needs to be shoulder improvements to Prospectors Road.

Segment 2

- Roundabout at North Beach Welcome to MCDSHP – North of Mount Murphy. (2)
- Green Dot at Brewery Street – The knocked down brick buildings and surrounding fence completely obstruct any shoulder on the road. This section is “blind” for cars speeding down this little hill.
- It is super scary to walk with a little one, especially in a stroller. There are also often cars parked along here that obstruct any safe pedestrian / bike space.

Community members at the workshop

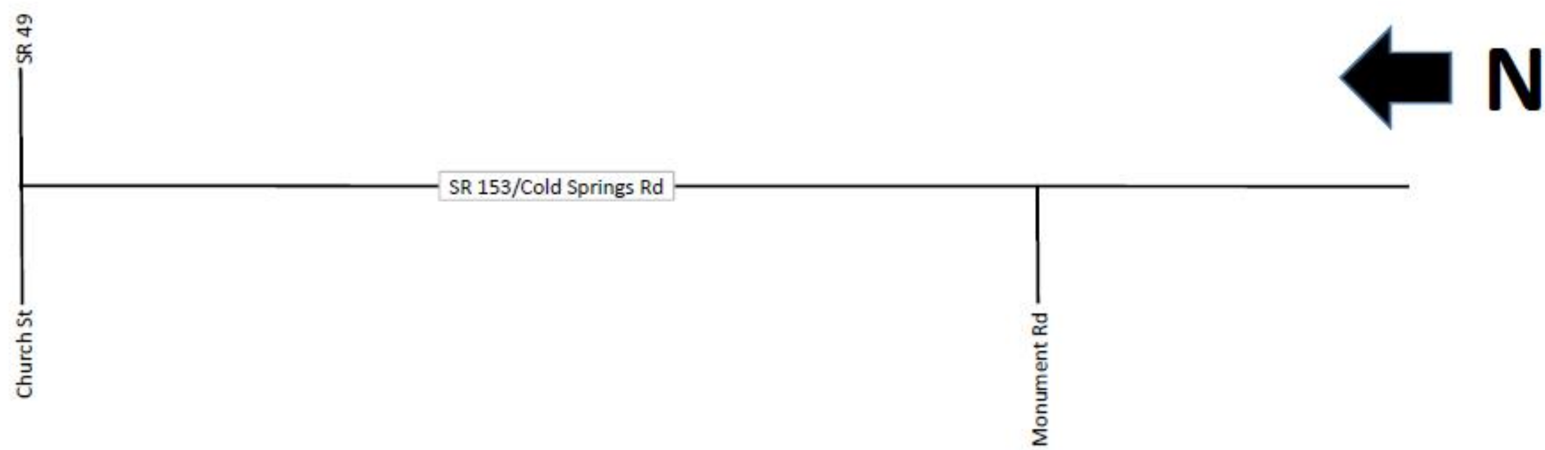
- Blue Dot at Brewery Street parking– There should be better designated parking for the Nature Center. (2)
- Coloma Heights – We try to bike / walk at this curve, but it is completely unsafe.

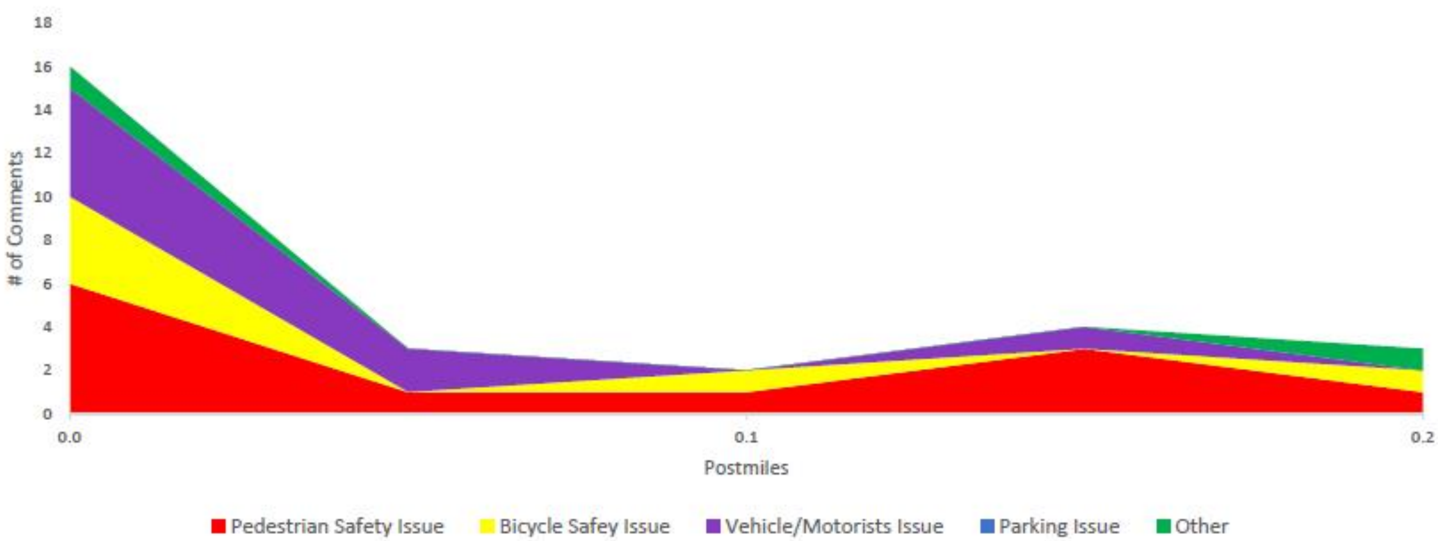
- Coloma Heights – Look at the intersection of Coloma Heights Road to Highway 49 park entrance please (roundabout circle). (2)

- From Coloma Heights – There is a lot of pedestrian traffic from the American River Campground to / from Nugget Market in the summers.
- Off Coloma Heights – Lots of campground people walk from New River to State Park.
- Coloma Heights Road is a dangerous intersection, people could bike but it is unsafe.
- Church Street intersection – The local Fire Safe Council did road clearing on four major roads in 2017.
- The only section that could not be done (owned by DOT) was Cold Springs Road from Highway 49 up to Monument Road. *Lotus, Marshall, Cold Springs, and Bayne Rd.
- Orange dot on Church Street intersection - People want to walk to the theater, but there are no shoulders and cars travel at high speeds.
- There is lots of foot traffic, which is why we need way finding and directional signs. (2)
- South Highway 49 – Bike lane / trail up highway 49 towards Placerville is also lacking, which makes it a dangerous ride up Highway 49.
- South Highway 49 – Bike improvements to south should be on Highway 49 not Cold Springs Road, due to extra “double dip” to Placerville on Cold Springs.

Segment 3: Stateroute 153/Cold Springs Road

SR 153 (Public Comment Cartogram)





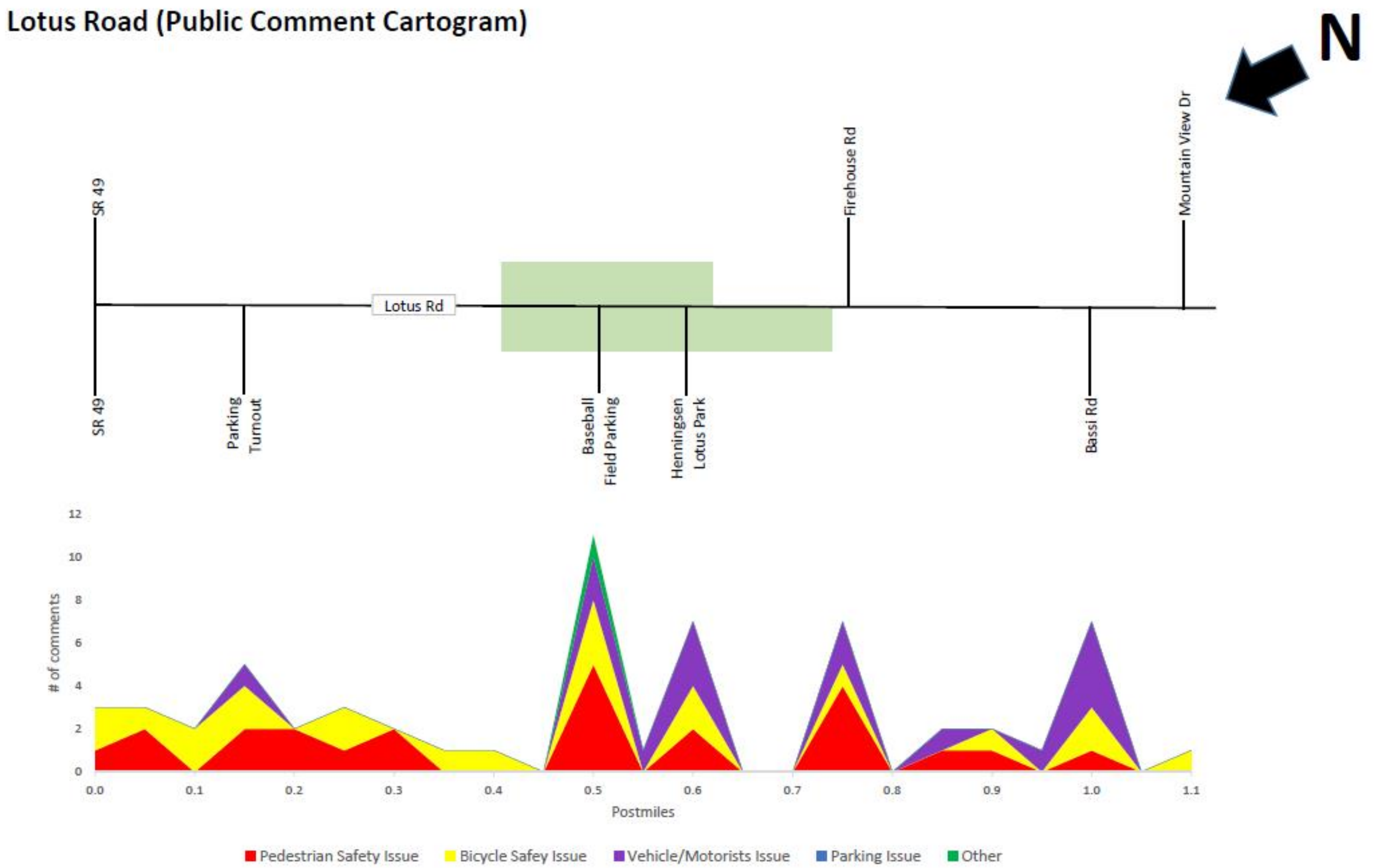
Additional Comments

- Green Dot between Monument Road and Lakotah Lane – Even two feet would help as you are climbing the lane.
- Monument Road – We would like to walk to the theatre.

- North of Monument – You cannot walk here, you cannot bike here, and it is dangerous to drive.

Segment 4: Lotus Road from Stateroute 49 to Mountain View Road

Lotus Road (Public Comment Cartogram)



COLOMA LOTUS Mobility Plan

Additional Comments

- Green dot on Lotus Road south of Highway 49 – The park trail by the river needs to connect to Highway 49. (2)
- In Park – Important to buy this for the future park.
- East of the Park needs a flashing beacon and park crossing HLP.
- At park on Lotus Road – Turning left traveling northbound creates a sight line issue especially when foliage is dense. (2)

- Off of Firehouse Road – Create a connector parcel for Park & State Park
- Red dot on Fire house and Highway 49– Lotus Road is not pedestrian or bike safe on Highway 49 west of Beach Court.

Comment Cards

- It is important to keep the glare from amber lights and light fixtures on the roadway downward instead of out.
- You need to activate the other side of the river across from the Coloma Resort to enhance safety because the current road is very dangerous with cars and trucks on the one-lane bridge.
- For the live polling, consider adding a question: Are you willing to contend with road work associated with improvements?
- Provide bike lock up areas that students can use during the week to lock their bike at a school bus stop in the Coloma-Lotus Mobility Plan area.

Community members at the workshop

- The 40 mile per hour and 45 mile per hour speed limit is too high. Cars have been passing me in Lotus on the double yellow. It is a very dangerous situation for other travelers. It would also be great to be able to access Davis Moore, Greenwood and Cronin and the many rafting companies further down Highway 49. Also, many people need bike / walk access to Camp Lotus from Bassi Road to Camp Lotus.
- Cross walk areas could be larger 25 - 30 feet. Cars stop farther away from where people walk. Storm drains cover gullies with road way and underground road side drains. Add an alternative bike with a pedestrian right of way. "Other road" parallel to road like bike path near Truckee River.

Notification

Fliers were posted at the following locations in the Coloma-Lotus area:

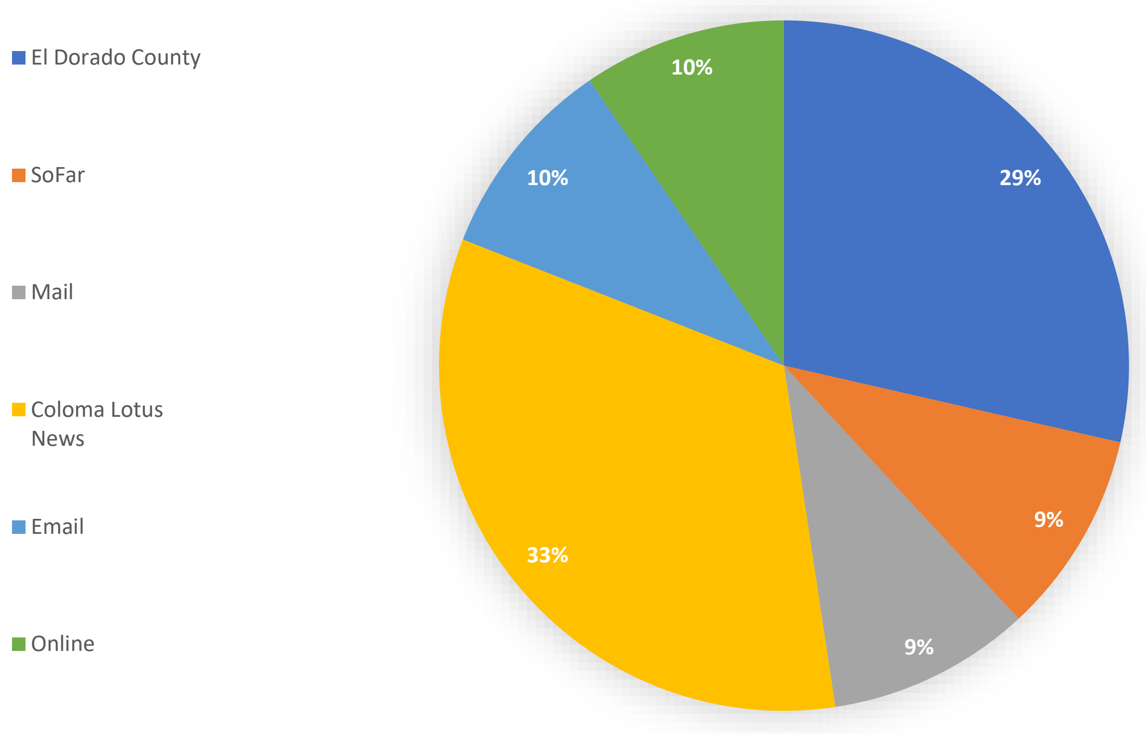
- Gold Trail Grange
- California State Parks
- Coloma Post Office
- Lotus Post Office
- El Dorado County Library
- Sierra Rizing Bakery

Community Workshop Flier

Below are the community leaders, community-based organizations, neighborhood associations, and local agencies who shared the community open house information on their media platforms or through e-newsletters.

- El Dorado County River Management List
- El Dorado County Parks Management List
- El Dorado County Transit Authority
- Camp Lotus
- Coloma Lotus Business Council
- Coloma Lotus News Email List
- El Dorado County Department of Transportation
- Caltrans Distribution List
- Gold Trail Union High School District
- Coloma Lotus Chamber of Commerce
- El Dorado County Fire Department
- El Dorado County Supervisor Michael Ranalli
- El Dorado County Office of Education
- American River Conservancy
- Camp Lotus
- Coloma Heights Homeowners
- Coloma Resort
- Gold Discovery Park Association
- Coloma Lotus News
- El Dorado County Commission on Aging
- California State Parks
- Social Services Transportation Advisory Council

Attendees were asked to share how they heard about the event.
Below is a summary of their responses.



Coloma-Lotus Mobility Plan Community Workshop Notification Plan

Last Updated – Thursday, September 20

COLOMA-LOTUS MOBILITY PLAN	
Date & Time:	Wednesday, October 3, 2018 6:00 – 7:30 p.m.
Location:	Gold Trail Grange, 319 Highway 49, Coloma, CA 95613

	Notification Type	When
☐	Email Notification Email Notification (flyer) • Stakeholder List *Ask to share flyer through email distribution, social media, e-newsletters (if applicable) and at meetings / upcoming events	Initial Thurs. 9/13 Wed. 9/26 Tues. 10/2
☐	Email Reminders to Public Database • Two weeks before • One week before • Day before	Tues. 9/18 Weds. 9/26 Tues. 10/2
☐	Electronic Newsletters • Content for local e-newsletters including: o El Dorado County o El Dorado County Transit Authority o Coloma Lotus Business Council o Coloma Lotus News Email List o El Dorado County Department of Transportation o Caltrans Distribution List o School District Email Distribution • El Dorado Union High School District • Gold Trail Union High School District	Week of 9/24
☐	Flyers / Posters • Flyers / Posters at key activity centers / businesses o Community Meeting Venue - *Gold Trail Grange* o Public Libraries ▪ El Dorado County Library - Placerville o Coloma and Lotus Post Offices o Businesses along corridor ▪ Sierra Rizing Bakery & Argonaut Cafe	Mon. 9/17 until workshop

☐	Social Media • El Dorado County Transportation Commission • El Dorado Transit Authority • Reach out to key stakeholders and encourage to share on their social media pages o El Dorado County Chamber of Commerce o Coloma Lotus Chamber of Commerce o El Dorado County Fire Department o El Dorado County Senior Services o El Dorado County District 4 Supervisor o El Dorado County Youth Commission o El Dorado County Office of Education o American River Conservancy o Coloma Heights Homeowners o Coloma Resort o Gold Discovery Park Association o Friends of El Dorado Trails o Coloma Lotus Business Council o Coloma Lotus News o El Dorado County Commission on Aging o Garden Valley Ranch Estates o California State Parks o Shingle Springs Band of Miwok Indians o Social Services Transportation Advisory Council o United Auburn Indian Community	Tues. 9/18 until workshop
☐	News Release • AIM drafting news release • AIM to send news release to local news sources: o Gold Country Media o The Mountain Democrat o Village Life Newspapers o Sacramento Bee o KCRA Channel 3 o CBS Channel 13 o ABC Channel 10	Wed. 9/26

Coloma-Lotus Mobility Plan
Community Open House #2 Summary

Tuesday, February 5, 2019

6:00 – 7:30 p.m.

Gold Trail Grange

319 CA-49, Coloma

Introduction

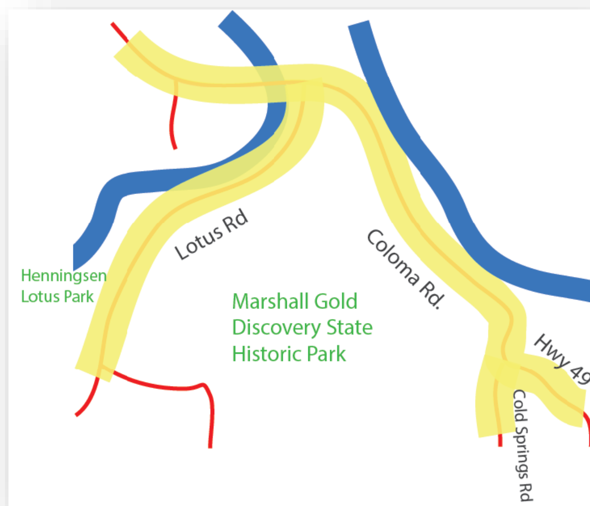
Approximately 56 people attended the second Coloma-Lotus Mobility Plan community open house hosted by El Dorado County Transportation Commission (EDCTC). The open house was held on February 5th from 6:00 to 7:30 p.m. at the Gold Trail Grange located at 319 CA-49 in Coloma, California.

Dan Bolster, Senior Transportation Planner at EDCTC

Project Overview

EDCTC received a Caltrans Sustainable Communities Planning Grant to study traffic conditions with the Coloma-Lotus area. With the grant, EDCTC hired a consultant team comprised of GHD, Green DOT and AIM Consulting to assist EDCTC in examining ways to improve traffic circulation and enhance safety in the Coloma-Lotus area for motorists, pedestrians, and bicyclists.

The Coloma-Lotus Mobility Plan will provide recommendations to improve circulation and safety for all travelers by analyzing the existing conditions, evaluate technical solutions and best practices and community input. The goal of the plan will be to identify multimodal infrastructure improvements to improve safety and connectivity within the Coloma-Lotus area. Selection of proposed improvements will be performance-based to ensure expected benefits are commensurate with costs. This information will inform future grant applications for project funding and implementation.

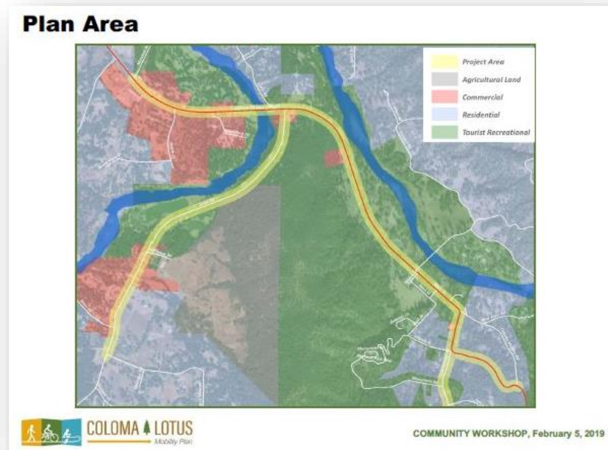


Coloma-Lotus Mobility Plan Area

Community Open House Purpose and Format

The purpose of the second Coloma-Lotus Mobility Plan community open house was to present the draft improvement recommendations and receive feedback from attendees on the community's priorities for improvements to enhance safety and connectivity within the Coloma-Lotus area. The format included a presentation by the project team, followed by a community open house, which allowed community members to view proposed improvements and provide input through post-it notes, comment cards, and one-on-one conversation with the project team.

The community open house included a welcome introduction from Dan Bolster, Senior Transportation Planner at EDCTC, remarks from El Dorado County District 4 Supervisor Lori Parlin, and an overview of the Coloma-Lotus Mobility Plan by Jim Damkowitch, Project Manager at GHD.



In his presentation, Jim Damkowitch outlined the project's goals and scope which include identifying transportation issues in the area, understanding the community's priorities for improvements, developing the technical information needed to support grant applications, and the creation of a mobility plan to improve travel in the Coloma-Lotus area for all travelers. He also provided an overview of the community outreach done to date, including the first community workshop held in October 2019, an online questionnaire hosted from October through November, and three stakeholder advisory committee meetings (SAC #1), (SAC #2), (SAC #3 Summary forthcoming) hosted throughout the project's duration. In addition, Jim provided an overview of the open house format.

Community Comments Received from Information Stations Display Boards

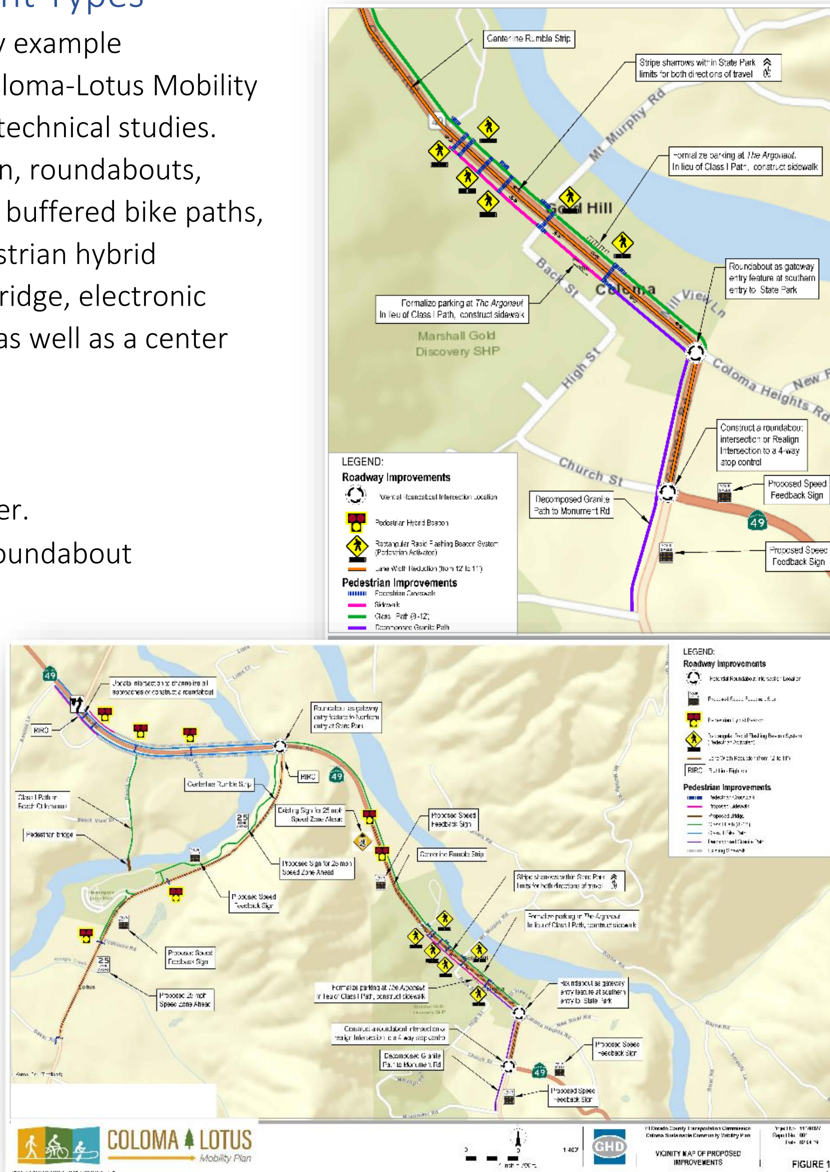
There were five information stations; one provided examples of proposed improvements and four provided examples of proposed improvement types along individual segments of State Route 49 and Lotus Road in the project area. Each information station was staffed by one or more project team members who was available to walk community members through the displays and answer questions. Community members were asked to visit the information stations, review the proposed improvements highlighted on the display boards and provide their thoughts on the recommended improvements through post-it notes. Below is a summary of the board comments. For full size renderings of the interactive boards, see the appendix at the conclusion of this summary.

Station 0: Example Improvement Types

The purpose of this station was to display example improvements types applicable to the Coloma-Lotus Mobility Plan based on input from the public and technical studies. These include: intersection channelization, roundabouts, Class I multipurpose paved paths, Class II buffered bike paths, rectangular rapid flashing beacons, pedestrian hybrid beacons, Class II bike paths, pedestrian bridge, electronic speed warning and speed advisory signs as well as a center median rumble strip.

<u>Public Comments</u>

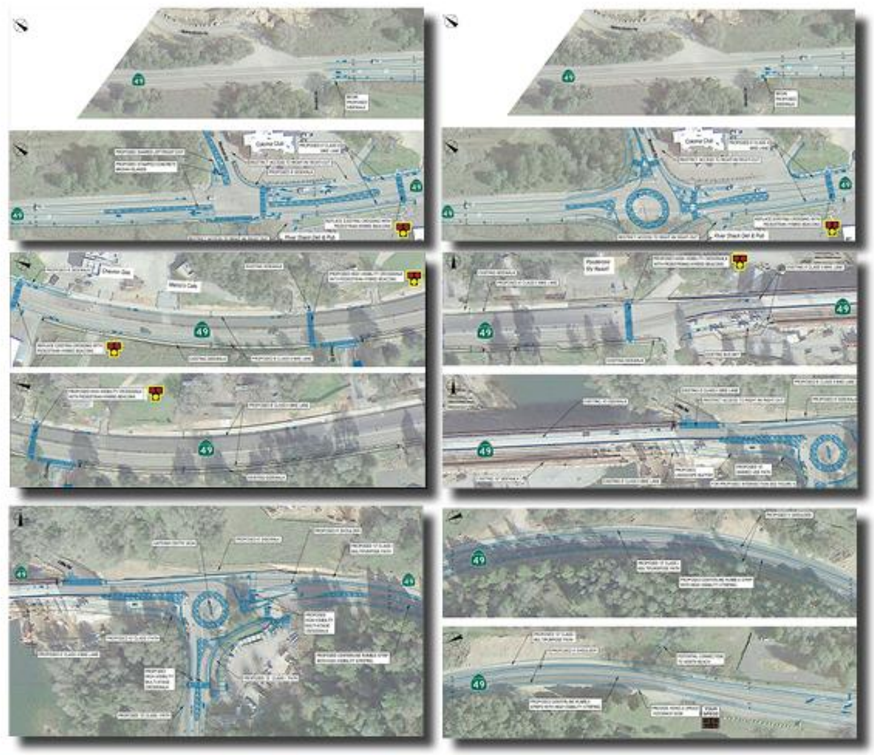
- No pedestrian bridge over the river.
- Where did the before and after roundabout construction bar chart come from on the Example Improvement Types board? It is too vague and there is no data.
- The pedestrian hybrid examples are too urban for historic park, please come with better and more compatible examples.



Example Improvement Figures

Station 1: State Route 49: Marshall Road to Gold State Discovery Park

The purpose of this station was to provide an overview of the proposed improvement concepts along State Route (SR) 49 from Marshall Road to Marshall Gold Discovery State Historic Park (State Park). Proposed improvement concepts include sidewalks, concrete median islands, Class II bike lanes, crosswalks with pedestrian hybrid beacons, landscape buffers, channelization improvements at SR 49/Marshall Road (Option A) or a single lane roundabout (Option B), a single lane roundabout at SR 49/Lotus Road, Class I bike lanes and a centerline rumble strip with high visibility striping.



Proposed Improvements along State Route 49 from Marshall Road to Marshall Gold Discovery State Historic Park

<u>Public Comments</u>

The numbers accompanying a given community comment indicates that more than one community member agreed with or had the same comment.

- Please use roundabouts. They are safer and more efficient. (3)
- Yes, on roundabouts. (3)
- Pull the bike / walk trail off of the road and do not put in the roundabout.
- The yield turn getting onto Lotus Road is good, but we can do without the roundabout.
- The stop sign from Lotus Road is blocked by two other signs. The stop sign from State Park is too far up from the stop line. The wall is invisible on foggy days and it is the number one reason why roundabouts are a bad idea.
- The roundabout at Highway 49 and Lotus Road is a death trap.
- I like the roundabout idea, but please no signal.
- I agree, a roundabout is the safest option.
- Roundabouts take up too much space and it will make the Old Sierra Nevada House lot unsafe. Crosswalks will be good enough.

- I personally have experienced the Galt and Plymouth roundabouts with double tandem trailers and have not had an issue. It is very safe and artistically appealing.
- This design at the intersection of Highway 49 and Lotus Road looks much safer than the existing intersection configuration. For residents, but more so summer pedestrian crowds.
- I like the roundabout at the intersection of Highway 49 and Lotus Road.
- The roundabout at Highway 49 and Lotus Road takes up a lot of space, but does not provide enough benefits. Crosswalks will be good enough.
- Create a bike / walking path at Highway 49 and Little Road without the roundabout.
- Leave all as is. The roundabout at the intersection of Highway 49 and Lotus Road is way too much expenditure for benefit.
- Roundabouts are the safest option to slow traffic.
- Where is the El Dorado Transit overlay?
- Create a walking path / sidewalk on Amoloc Lane to the strip mall and hardware store.
- There needs to be a sidewalk from Amoloc Lane to Marshall Road.
- Yes, to crosswalks in this area.
- Shorten the raised median to provide access to 7183 Highway 49 and other addresses.
- There needs to be a left turn lane for the post office.
- The speed limit needs to be 35 miles per hour.

Jim Damkowitch, Senior Project Manager at GHD

- There needs to be a 25 mile per hour speed limit through Henningsen Lotus Park.
- I love the pedestrian bridge to Henningsen Lotus Park.
- The pedestrian bridge connecting to Beach Street is not a good idea.
- The pedestrian bridge is only a good idea if it comes with a freestyle play spot.
- There shouldn't be a bridge across the river, as it will create trespassing issues. Land value will decrease with more roundabouts.
- I am not a fan of the pedestrian bridge.
- Lotus Road was built for a signal. Why not just add a traffic pressure signal?
- The signal is not necessary, why spend the money and down grade from the already funded signal? (This comment was left at the intersection of Highway 49 and Marshall Road).
- For Figure 1b, follow the proposed recommendations with the following revisions: Thank you for including the proposed pedestrian bridge from Beach Court to Henningsen Lotus Park. Please also consider including the following design options: The elevation of the

bridge will likely need to be high enough to remain above 1997 flood levels, meaning that the Henningsen Lotus Park end of the bridge may need to be sited nearer to Lotus Road. This may mean bisecting the ball field with the bridge, to a greater degree than the PG&E power lines do at present, or it may mean pushing the Henningsen Lotus Park end of the bridge to the upstream end of the ball field, nearer to Lotus Road. Include as an option the potential acquisition of the two parcels (APN 00601141 and 00634115, zoned Recreational Facilities and Community Commercial, respectively) which together with a new public easement could serve as the site for an alternative terminus of the bridge upstream of the proposed site, and the headquarters for an adjacent whitewater park. Include as an option solar powered gates on Beach View (located at the end of commercially zoned parcels) to protect the neighborhood privacy of Beach View residents.

- Use Figure 2b, installing the roundabout for the intersection of Marshall Road with Highway 49. This is preferable to the channelized intersection update because the alternative proposed loss of the left-hand turn land from southbound 49 onto Marshall Road would impact ongoing Highway 49 traffic. Thank you for extending the sidewalk to Amoloc Lane. Please ensure that Southbound Highway 49 traffic can make a left turn into the Coloma Club/old Highway 49. Turning onto Marshall Road and making a right-in turn to the Coloma Club will be too tight a turn for 2-way driveway traffic (the setback is inadequate).
- I like the bike trail circuit concept at Lotus Road.
- Yes, on extending the sidewalks to Amoloc Lane. (4)
- Summertime tubers take out at the 49 Bridge and walk back to North Beach at Marshall Gold to put in again. Though the 12’ Class I multipurpose path that begins at Little Road is ideal for this walk, this requires river-to-walkway access from the upstream side of the Highway 49 bridge, where pedestrian access to the river is currently blocked by a field of large boulders. At present river-to-walkway access is restricted to the downstream side of the 49 Bridge. In order for tubers to walk from the downstream side of the 49 Bridge to North Beach at Marshall Gold, the currently proposed pedestrian crosswalks would require tubers to take a circuitous route that will likely result instead in jaywalking in a very busy intersection. Please address this tuber pedestrian need. The local community has been designing an art project for the past two years for installation on the high retaining wall at this intersection. The proposed gateway entry sign in the roundabout could potentially interfere visually with this project, and should be sized to prevent this problem. The proposed sidewalk adjacent to this wall may also force the art project to be moved higher (by the height of the sidewalk) due to Caltrans height requirements. Tight coordination between the CL Mobility Plan staff and the community art project group will be needed.

- For Figure 6, please construct the pedestrian connection to North Beach in order to divert foot traffic away from Highway 49 at the first opportunity.

Station 2: Cold Springs Road: Church Street to Lakotah Lane

Proposed Improvements along Cold Springs Road from Church Street to Lakotah Lane

The purpose of this station was to provide an overview of the proposed improvements along Cold Springs Road from Church Street to Lakotah Lane. Proposed improvement concepts include a shared use path, a left turn lane, vehicle speed feedback sign, 10-foot path to Monument Road. Options at Church Street/SR 49 intersection include a single lane roundabout (Option A) or a four-way stop (Option B). Options at the SR 49/Coloma Heights intersection include converting to a single lane roundabout (Option A) or improved channelization (Option B)).

<u>Public Comments</u>

- The Highway 49 intersection will be much more functional and safer with this option rather than the current configuration or the other alternative in 10 B.
- There is no footpath on the side of Highway 49 near French Garden Road.
- How do we ask to have this corner cleaned up for visibility regularly at Cold Springs Road and Highway 49?
- If this is a problem for people coming down Cold Springs Road, put a stop sign on Highway 49, such as a 3-way stop.
- Cars can still go fast around this corner. This design does not protect pedestrians in the cross walk.
- I favor 10 A over 10 B, because it will be much safer for pedestrians at the intersection of Highway 49 and Coloma Heights Way.
- Figure 10 B needs crosswalks at the intersection of Highway 49 and Coloma Heights Way.

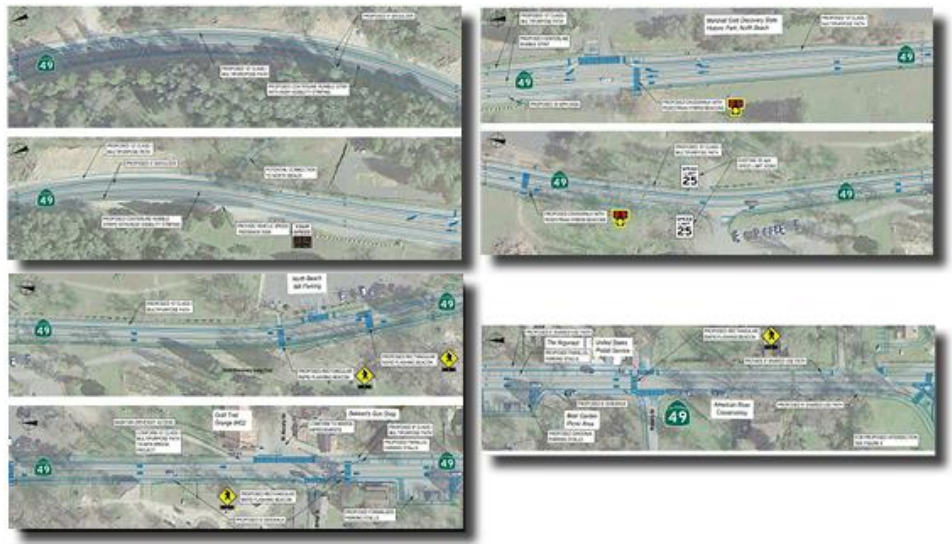
- With crosswalks, this design at the intersection of Highway 49 and Coloma Heights Way is much safer for children crossing near Highway 49.
- It doesn't seem safe for a crosswalk as people come down Highway 49 pretty quick and visibility is poor turning the corner. Sounds good in theory, but might not pan out in reality.
- I like roundabouts, but I don't think one is needed on Highway 49 and Coloma Heights Way.
- Please use roundabouts as they are safer.
- The vehicle speed feedback sign is better than a roundabout.
- The intersection of Highway 49 and Cold Springs Road is a terrible location for a roundabout.
- A roundabout seems like a good solution to Highway 49 and Cold Springs Road intersection.
- Highway 49 is dangerous on a bike currently. I agree that the number one priority should be for a roundabout and it would be less confusing.

Jeff Schwein, President at Green DOT Transportation

- I like all of the paths for safety.
- The roundabout at the intersection of Highway 49 and Church Street appears to have too many issues with grade and line of sight. I feel there needs to be other options.
- Public transportation in Europe makes driving unnecessary. No marginal drivers.
- I like option 10 B better than 10 A at Highway 49 and Coloma Heights Way.
- For the intersection of Coloma Heights and Highway 49, please reconfigure Hwy 49 using Figure 10b instead of installing yet another roundabout, which is not necessary. The fatal accident there was caused by brake failure arising from the very steep grade on Cold Springs Road, which a roundabout would not mitigate. Do not stripe French Garden Road, which as far as I know does not lead to an approved parking lot or anywhere that a car should reasonably go. Please add a crosswalk so that pedestrians walking from Coloma Heights Way can safely cross over to the 10’ walkway on the other side of Highway 49 and walk to Sutter Market. For Figure 11, eliminate the speed feedback signs coming into Coloma on Highway 49 and Cold Springs Road. These should be unnecessary with a roundabout at the Cold Springs Road and Highway 49 intersection.
- I like the roundabout at Highway 49 and Church Street.

Station 3: State Route 49: Marshall Gold Discovery State Historic Park

The purpose of this station was to provide an overview of the proposed improvements along State Route 49 through Marshall Gold Discovery State Historic Park. Proposed improvements include a 4-foot shoulder, a multi-purpose path, potential connection to North Beach, centerline rumble strip with high visibility striping and a vehicle speed feedback sign, proposed 25 mile per hour traffic sign, a crosswalk with pedestrian activated flashing beacons, formalized parallel and diagonal parking stalls along Highway 49, and a multi-purpose path.



Proposed Improvements along State Route 49 at Marshall Gold Discovery State Historic Park

Public Comments

- The shared use trail and parallel parking stalls are a great idea on Highway 49.
- American River Conservancy staff uses Brewery Street for parking and you would need to accommodate them if you remove it.
- The 8' shared use path on Highway 49 doesn't seem realistic to have bikes and pedestrians.
- Can you separate the bike lane from the walking paths on Highway 49? (1)
- A crosswalk at Mount Murphy and The Grange works well.
- Is there El Dorado Transit overlay?
- Are the rectangular rapid flashing beacons pedestrian activated?
- No flashing beacons.
- No lights. Please create elements that enhance historic park while designing pathways. (2)
- No more lights. A speed limit of 25 is fine.
- The problem with the 25 mile per hour speed limit is that most people don't go 25 miles per hour. This goes for locals and tourists alike.

Station 4: Lotus Road: State Route 49 to Bassi Road

The purpose of this station was to provide an overview of the proposed improvements along Lotus Road from State Route 49 to Bassi Road. Proposed improvements include a centerline rumble strip with high visibility striping, a 25 mile per hour zone sign, a 10-foot shared use path, high visibility crosswalk with pedestrian activated hybrid beacons, future parking lot at El Dorado County Fire Station 74, replace existing vehicle speed feedback sign, 4-foot Class II bike lanes (Option A), a 10-foot Class I multi-purposed path (Option B) and a proposed retaining wall.

Proposed Improvements along Lotus Road from State Route 49 to Bassi Road

<u>Public Comments</u>

- Are the class bike routes for transportation or recreation? It makes a difference of how you address this.
- Move the stop sign on Lotus Road so people can see it as they approaching Highway 49.
- A rumble strip median on Lotus Road is needed. Keeping cars in their lane reduces speeding.
- No rumble strip, it is fine as it is.
- I like the high visibility striping on the centerline rumble strip on Lotus Road.
- Keep the bike trail separate from the walking trail in Henningsen Lotus Park.
- I love the pedestrian bridge from Beach Court to Henningsen, but design the concept only and bid out to corporate sponsors in exchange for their name on bridge and Whitewater Park. Also, include gated protection for residents of Beach View neighborhood.
- Yes, to the pedestrian bridge, but no parking on Beach Street.
- I like the pedestrian bridge.
- I like the bridge, but replicate it after a historic bridge.
- I prefer the pedestrian hybrid beacon at Henningsen Lotus Park.
- How about a walking bridge instead of a crosswalk at Lotus Road? I like the path located on Figure 15b as a walking path and not a bike path.
- I much prefer the 10' alternative B multi-purpose path away from the road for kids.
- Do not make a bike connection to help loop direct traffic on the alternative B proposed 10' Class I path.
- Paths set off from the roads are great.

- Alternative B proposed 10' Class I multi-purpose path is a great way to separate bikes and pedestrians.
- I like the multi-use path.
- The alternative A proposed Class II bike lanes don't seem like enough room for a bike lane on both sides. Alternative B seems like a better option.
- The 4' bike lane is too narrow based on speed of traffic.
- A family member was struck by a vehicle in the mixed-use path, please move it off the road.
- What does the buffer on Lotus Road look like?
- Please put a roundabout at Lotus Road over the South Fork American River because it's safer and slows traffic.
- Roundabouts are dangerous when drivers are older. My father was merged into on his bike.
- I do not like the roundabout as it takes too much real estate and not necessary.
- No parking lot next to the El Dorado County Fire Station 74.
- Why does the multi-use path just end abruptly at Lotus Road and Firehouse Road?
- I like the speed feedback signs and not all flashing beacons.
- No to the flashing beacon on Lotus Road.
- No more signals, the lights are okay as is.
- Please try to limit signage and lights. The State Park as an example has way too much of the above. I'm all about safety first.
- Is there El Dorado Transit overlay at Lotus Road and Henningsen Lotus Park?
- Keep bicycles off the sidewalks, there needs to be a separate trail.
- Keep in mind the Monroe Ridge Trail connector will eventually come through Lotus Road.
- Do not pave the riverside trail, it is cheaper to maintain it as it is.
- Option B is much better than Option A.

Gladys Cornell, Principal at AIM Consulting

- Option C = Option B + Option A.
- Use Alternative B with the 10’ multipurpose path, which will be safer and more scenic, also depicted in Figures 15b, 16b, 17b and 18b. For Figure 12, extend the project to Mountain View Drive to include more direct residential access in the project install a roundabout at the intersection of Lotus Road and Bassi Road to replace the 3 way stop. This intersection gets congested, especially in the summer when Camp Lotus visitation is in full swing. I really like this plan, but maybe reduce the speed limit to 35 on Lotus Road then down to 25 in front of Henningsen Lotus Park then back up to 35 miles per hour to Bassi Road.

Comment Cards

Below is a summary of all feedback received through comment cards.

El Dorado County District 4 Supervisor Lori Parlin

- We need to retain ambiance of the park while creating solutions for connecting the parks with the business areas. Stay away from fast flowing traffic / bike solutions and create more recreational safe connecting paths for residents and tourists. Most of the roundabouts are a distraction from the issue of each problem situation where real solutions may not be considered. Find other solutions to slow traffic through the park – roundabouts are to increase movement. Perhaps look at simply adding stop signs or lights while having a separate bike route and walking paths. Please don’t put in roundabouts just because people like them.
- Please provide roundabouts. Every long-term study show that they reduce accidents.
- Station 1: I am not a fan of the pedestrian bridge. It is disruptive to residents of Beach Court and invites poaching of facilities at Henningsen Lotus Park. Station 2: Roundabouts at Coloma Heights seems like overkill. I prefer design of Figure 10 as a more natural configuration. I also prefer the 10’ foot path. Station 3: I love the shared use paths and pedestrian beacons. Also, developed parking stalls would be a great addition. Station 4: Alternative B would be a much better plan. I love the 10-foot path off-set from the roadway along Highway 49 and Lotus Road. As a father of young kids, this is the only path I would feel comfortable on. The 4’ next to the road is not enough. Flashing red beacons are a great idea as well.
- I believe it’s critical to maintain the 25 mile per hour limits through the State Park.

- Please include a pedestrian walkway or at least improve the shoulder from Amoloc Lane to the Marshall Road interchange. Many of us on Amoloc and Lodestar walk and would love to have safe walking along Highway 49.
- Charter buses, rafting buses with trailers and rafts piled high and lots of tourists will go through the roundabout that don't know the area and this is unsafe. I am a bus driver and find roundabouts difficult. I work in the rafting industry as a bus driver. Too many tourists do not know the area and it will be dangerous. Correct the stop signs at the intersection and it will be fine. People who inner tube Coloma pool between North Beach and the bridge are not likely to cross the road at the designated area. They will walk the shortest distance, making pedestrian crossing unsafe. Have you talked to the rafting companies to see the economic impacts to their businesses? The potential difficulty of getting through the intersection many times per day?
- I would like to see a 55 mile per hour speed limit between Lotus Road and Marshall Road on Highway 49. I would also like to have brush cleared along Highway 49 between Marshall Road and Greenwood Creek.
- As a resident who has suffered through multiple projects which in the end, benefited few people to none, I would prefer solutions that are quick, easy and inexpensive. In my opinion, the best solutions at all of these problem points would involve better, bigger and flashier signage. Roundabouts are very confusing to people who have not experienced them. They are abused by bully driver. They are dangerous in these areas given the character of local drivers.

Community members at the open house providing input on the interactive boards

- If you are concerned with safety on long-term. I suggest you put a road down Amoloc Lane across the river to Lotus Road. Bypass all of this area and it would eliminate all of Georgetown divide traffic coming down the hill to Sacramento. You don't look far enough ahead.
- My family is a long-time resident of Lotus on Little Road, and commuter out of the area often. We absolutely oppose any and all roundabouts to be incorporated into the mobility plan. I've had many experiences with roundabouts and in certain areas they work great, but the traffic issues in our town are so minimal as to not need them. And for tourism drivers it's a hazard for locals. Egress from Little Road onto Highway 49 at Lotus Road takes at most 15-20 seconds, and most often, even in commute times it's a very short time. The longest line I've ever seen at Lotus Road and Highway 49 is maybe 15 cars unless following a very slow RV – newbie into our area. And at night a

roundabout would be a traffic accident waiting to happen. Also, so many 18 wheelers travel Lotus Road and Highway 49 that any roundabout would be crazy.

- Roundabouts make the most sense for safety, aesthetics and overall environmental efficiency. Cold Springs Road and Lotus Road should be first priorities for roundabouts. Both are unsafe for bikes and pedestrians currently. I like trail option B in flowing around the Lotus Road roundabout. A fence between trail and roundabout on Little Road side would help. This is a great plan.
- The plan does a great job of incorporating community comments and ideas. This will be a transformational project for resident and visitors alike. For new restrictions imposed by the plan, in particular the right turn/right-in only restrictions, please figure out and note how drivers will realistically be able to execute a legal U turn to gain access to their desired route. This will be particularly important to Little Road residents, who will not be enthusiastic about having to travel to a Marshall Road roundabout (1/2 mile away) in order to make a U turn and return to gain access to Lotus Road. Please minimize the installation of flashing lights, especially speed feedback signs, to the greatest extent possible. These may be needed in selective areas for safety reasons, but personally I find them to be inconsistent with the rural character of the Coloma Lotus Valley. If possible, please use updated satellite images for your diagrams such as those found at Google Earth.
- I like the plan as presented. I do favor the roundabout option for the Coloma Heights intersection. I also strongly favor sidewalks that extend from Marshall Grade to Amoloc Lane along Highway 49. I look forward to enjoying the ability to walk, bike and drive safely in my community. I believe this plan adds greatly to the quality of life here. Thank you.

Notification

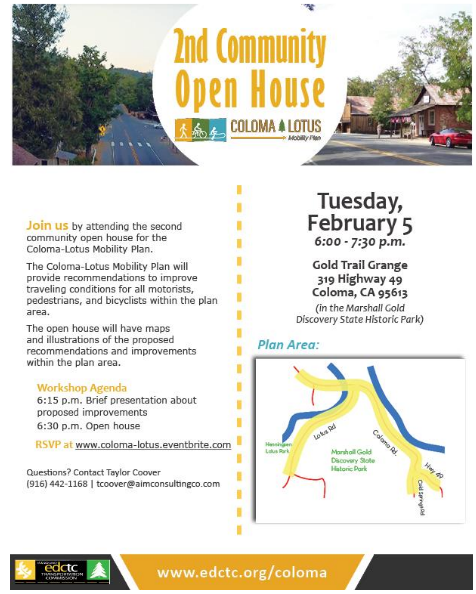
An email notification and reminder email were sent to more than 120 community members regarding the second community open house for the Coloma Lotus Mobility Plan.

Fliers were posted at the following locations in the Coloma-Lotus area:

- Gold Trail Grange
- California State Parks
- Coloma Post Office
- Lotus Post Office
- Sierra Rizing Bakery

A news release including information about the Coloma-Lotus Community Open House were sent to the following news sources.

- Coloma Lotus News
- Gold Country Media
- The Mountain Democrat
- Village Life Newspapers
- Sacramento Bee
- KCRA Channel 3
- KOVR Channel 13
- CBS Channel 13
- ABC Channel 10
- El Dorado Hills Telegraph
- The Clipper

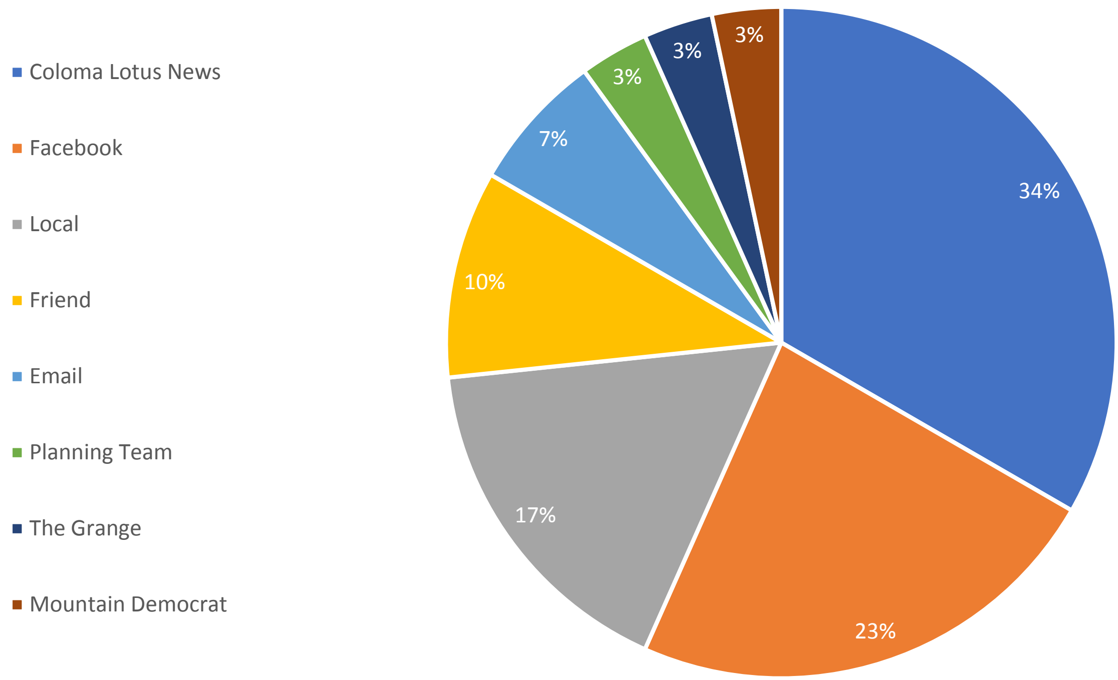


Community Open House Flier

Below are the community leaders, community-based organizations, neighborhood associations, and local agencies who shared the community open house information on their media platforms or through e-newsletters.

- Gold Trail Union High School District
- El Dorado County
- Coloma Lotus Business Council
- Coloma Lotus News
- El Dorado County Supervisor Lori Parlin, District 4
- Gold Trail Grange
- El Dorado County Chamber of Commerce
- Coloma Resort
- The Mountain Democrat
- Coloma Lotus Chamber of Commerce
- American River Recreation Association
- South Fork Arts and Recreation

Attendees were asked to share how they heard about the event. Below is a summary of their responses.



Appendix

- Interactive Boards / Improvement Concepts
- Notification Flier
- Comment Card

COLOMA LOTUS Mobility Plan

GHD

El Dorado County Transportation Commission
Coloma Sustainable Mobility Plan

VICINITY MAP OF PROPOSED IMPROVEMENTS

Project No. **11180327**
Report No. **001**
Date **02.04.19**

FIGURE 1a

Filename: K:\PRJ\2544\2544EX002.dwg Plot Date: 4 February 2019 - 7:08 PM

Source:

COLOMA LOTUS Mobility Plan

0 0 1,400'
1 inch = 700 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Community Mobility Plan

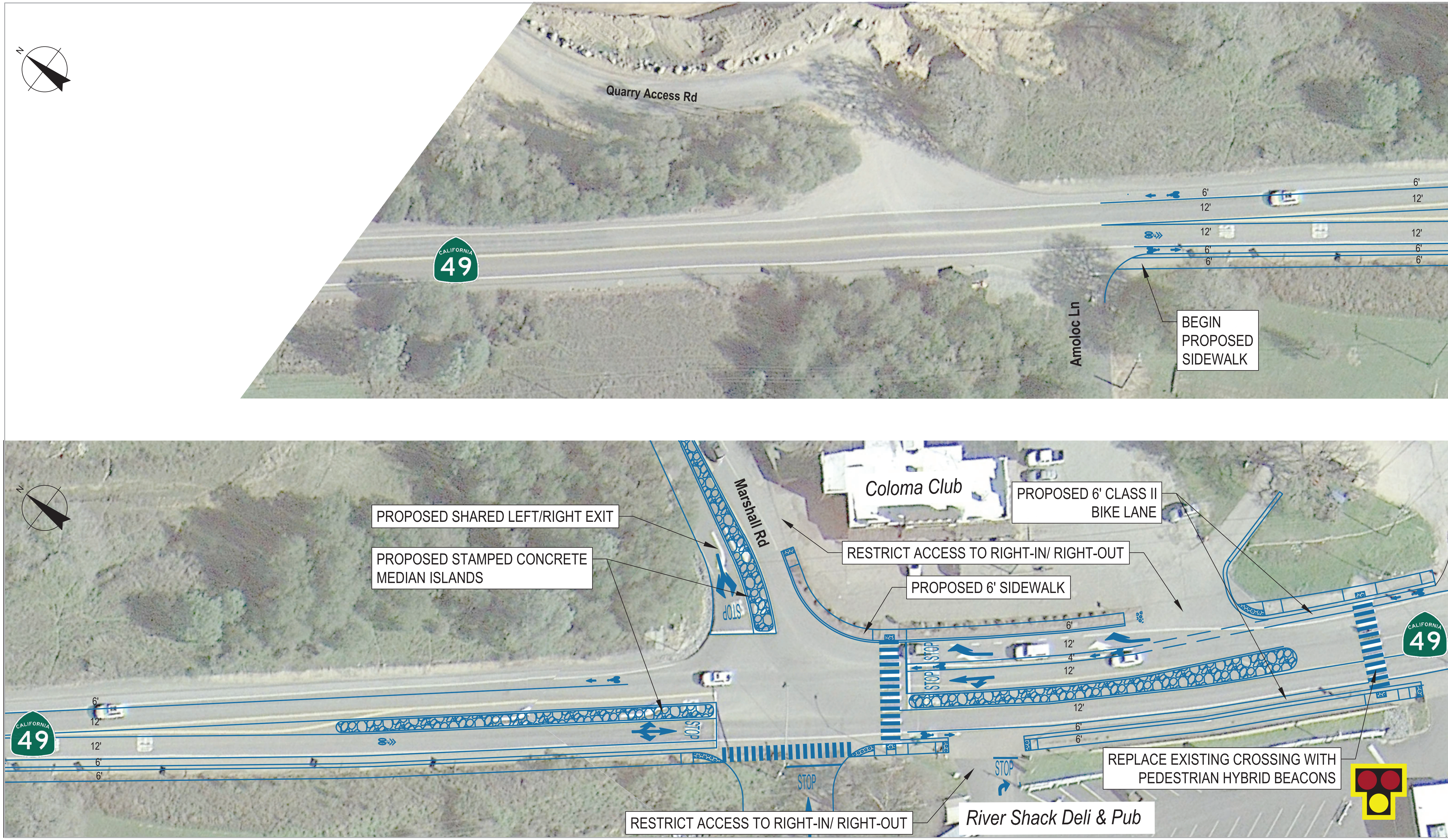
VICINITY MAP OF PROPOSED IMPROVEMENTS

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 1b

Source:

Filename: K:\PRJ\2544\2544EX002.dwg Plot Date: 4 February 2019 - 7:03 PM



COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

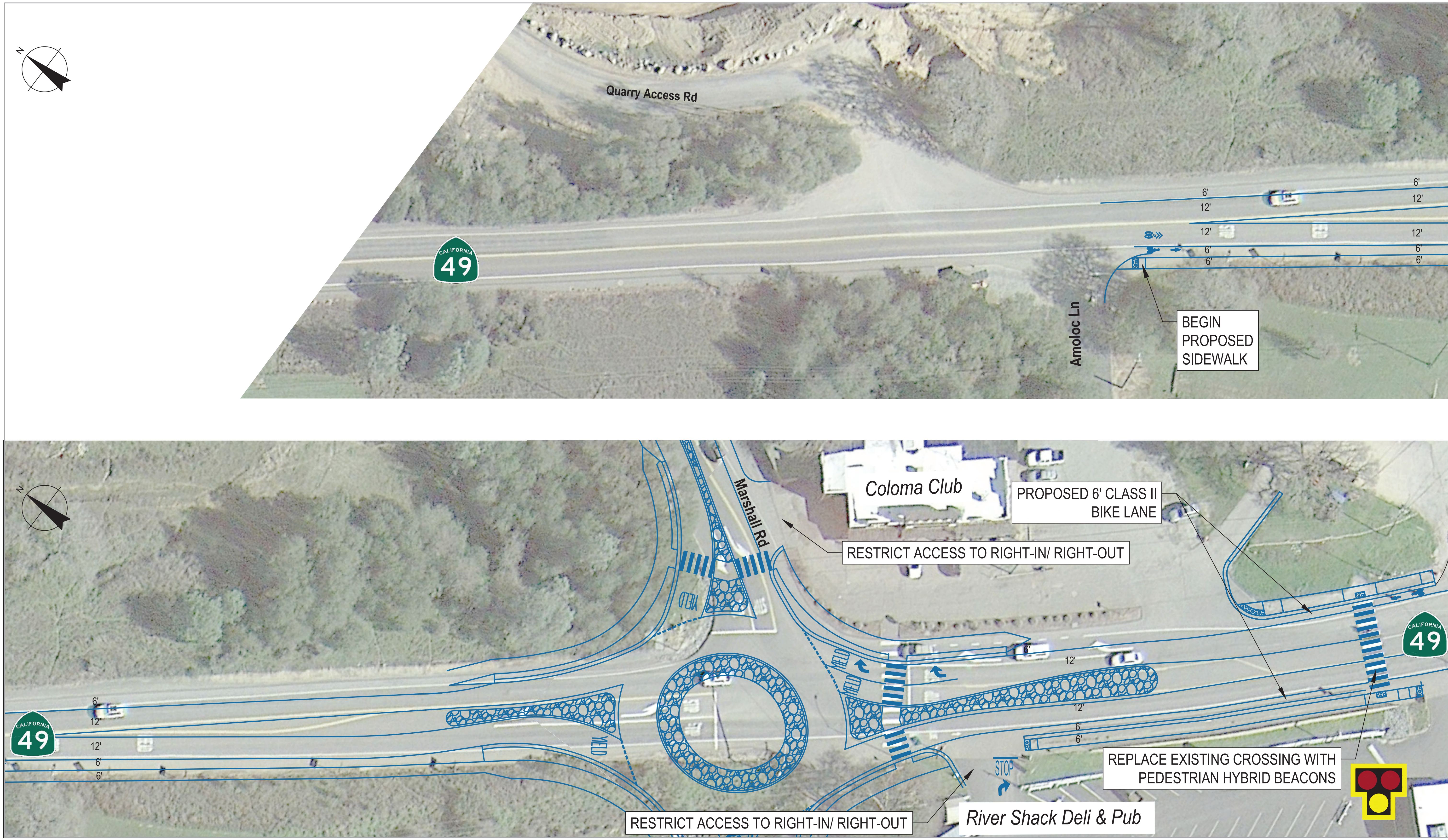
MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 2a

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 5 February 2019 - 9:20 AM



COLOMA LOTUS
Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

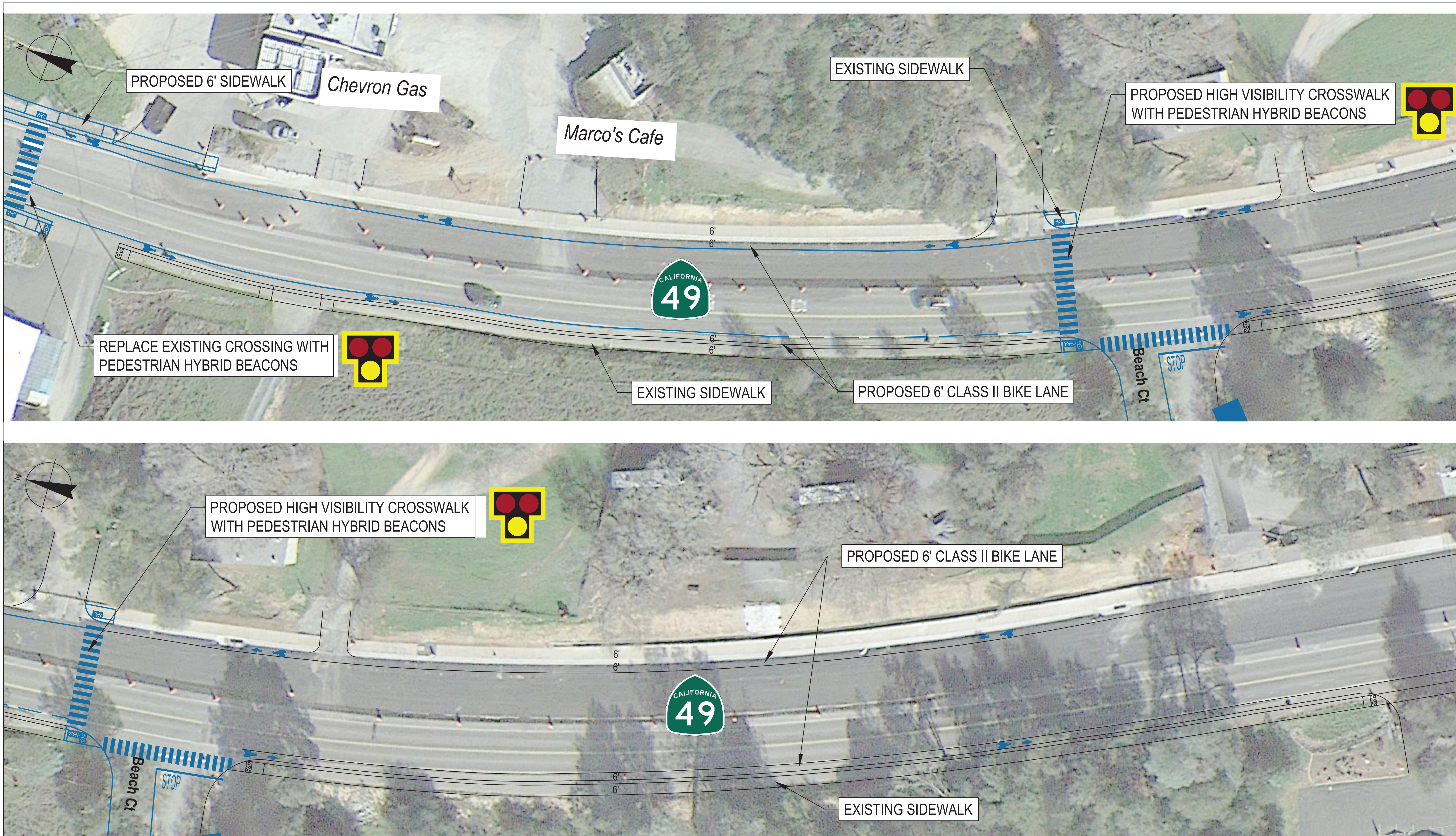
MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 2b

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 5 February 2019 - 9:27 AM



COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

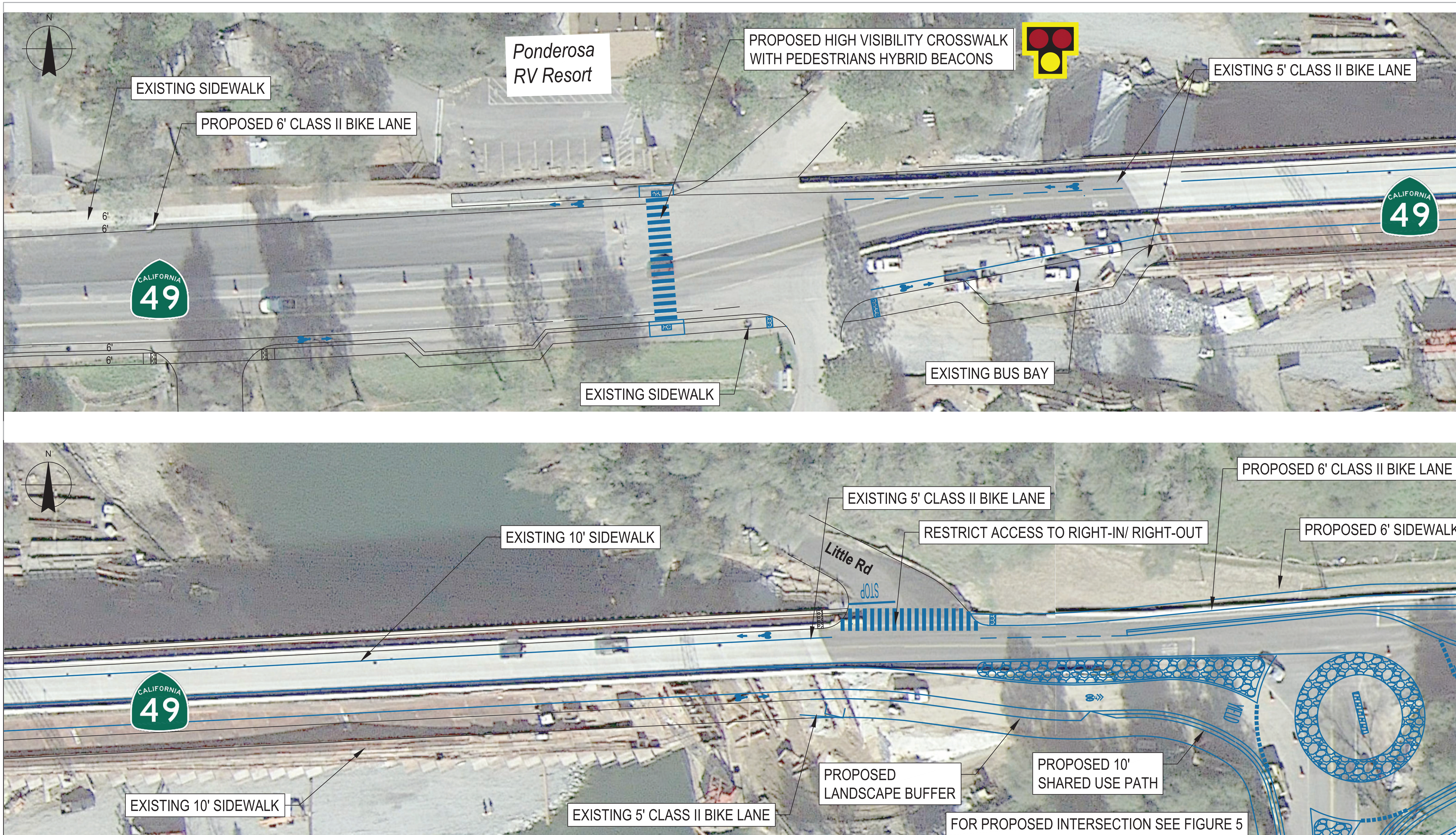
El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 3

Source:



COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

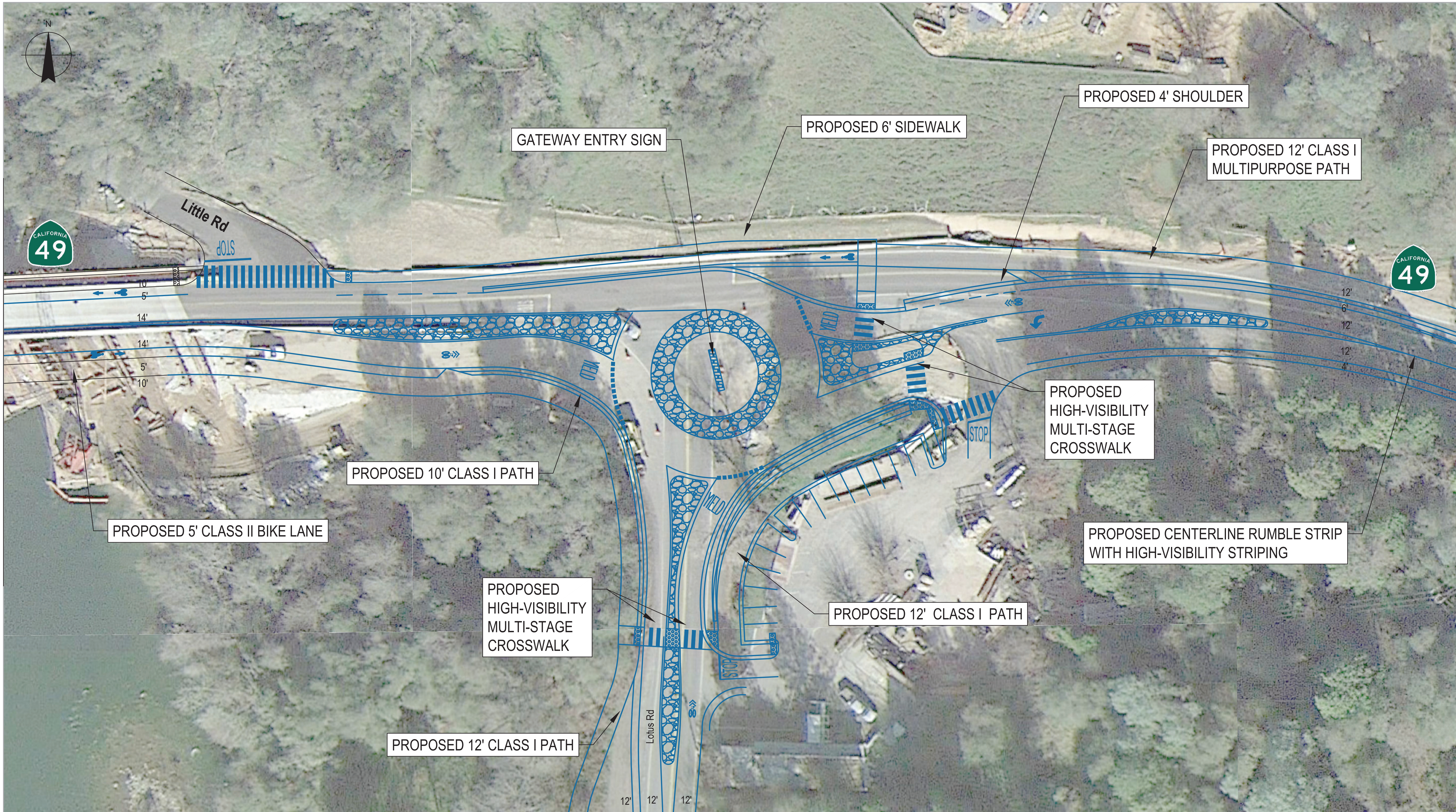
MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 4

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 7:34 PM



SEE FIG 18

COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 5

Source:

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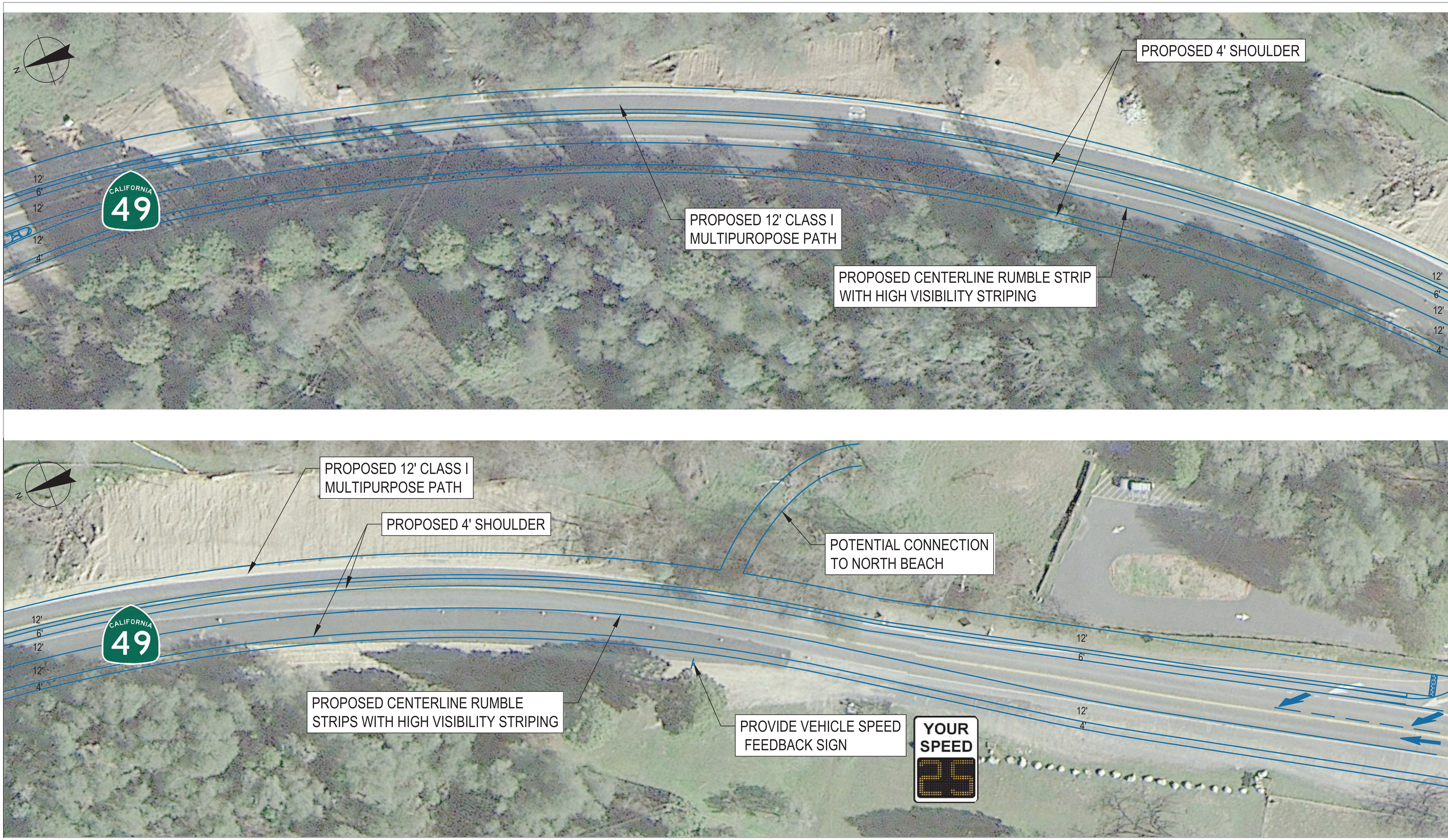


COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

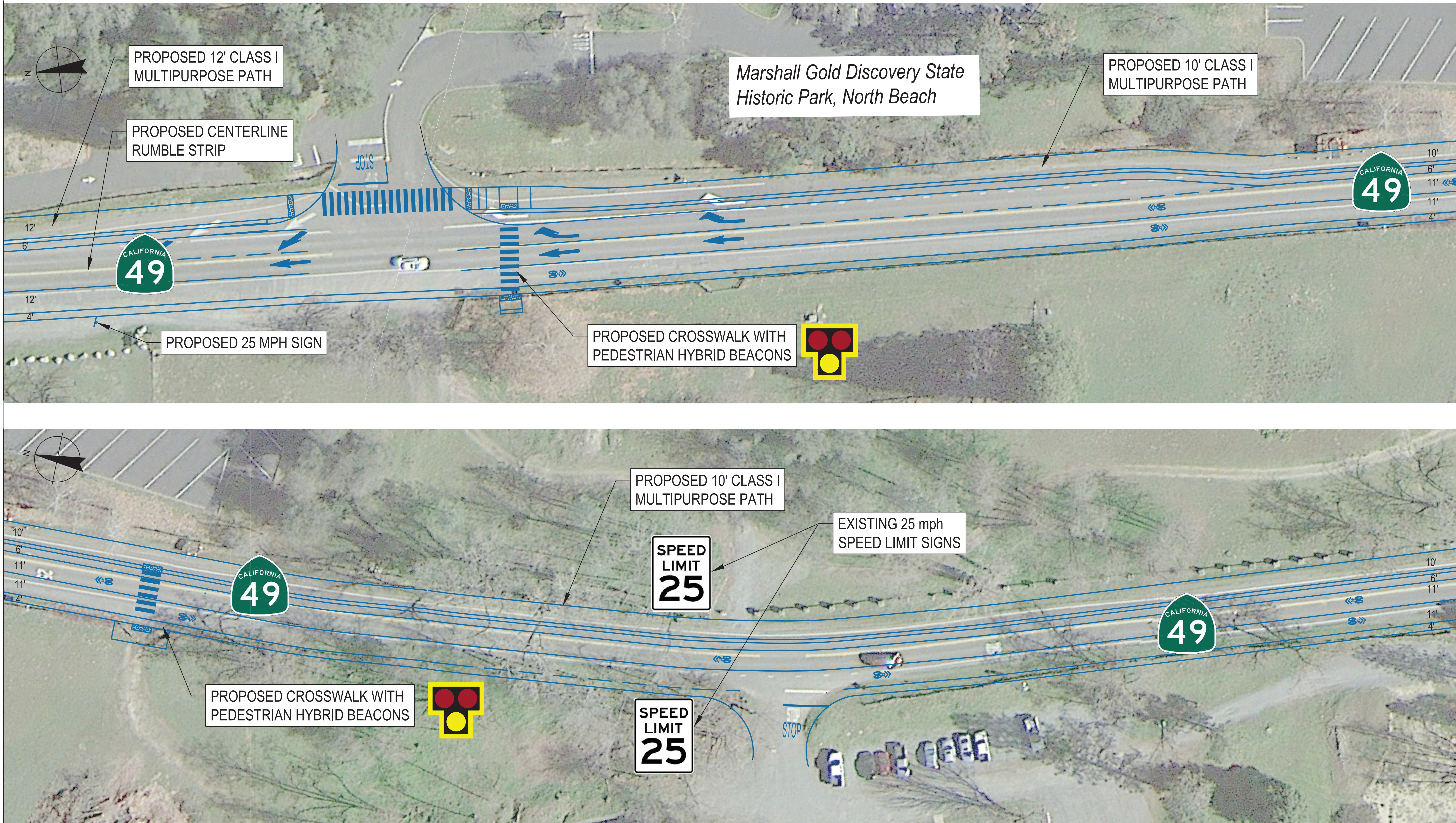
MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 6

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 7:45 PM



COLOMA LOTUS Mobility Plan

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

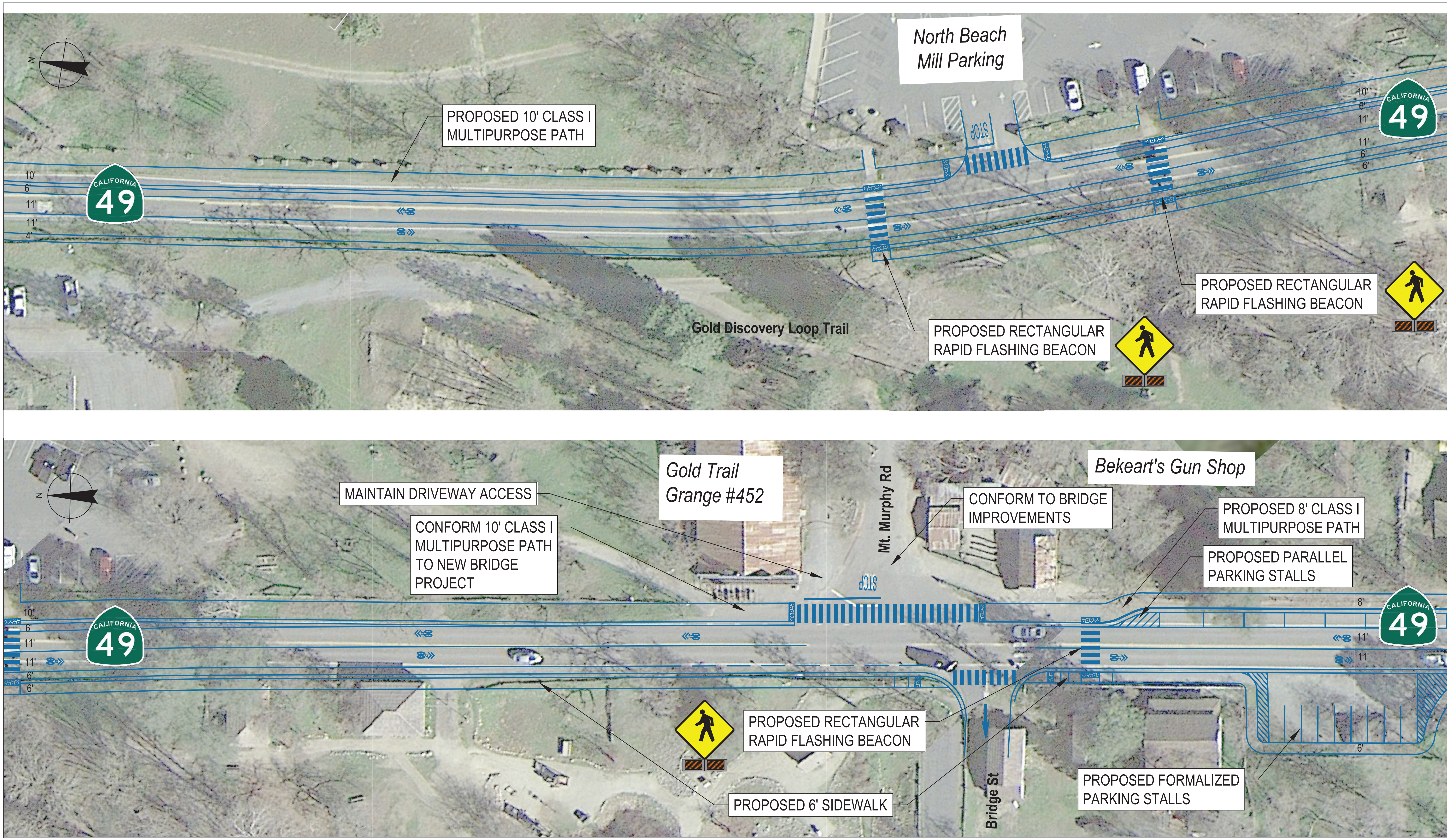
MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 7

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 7:52 PM



COLOMA LOTUS
Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

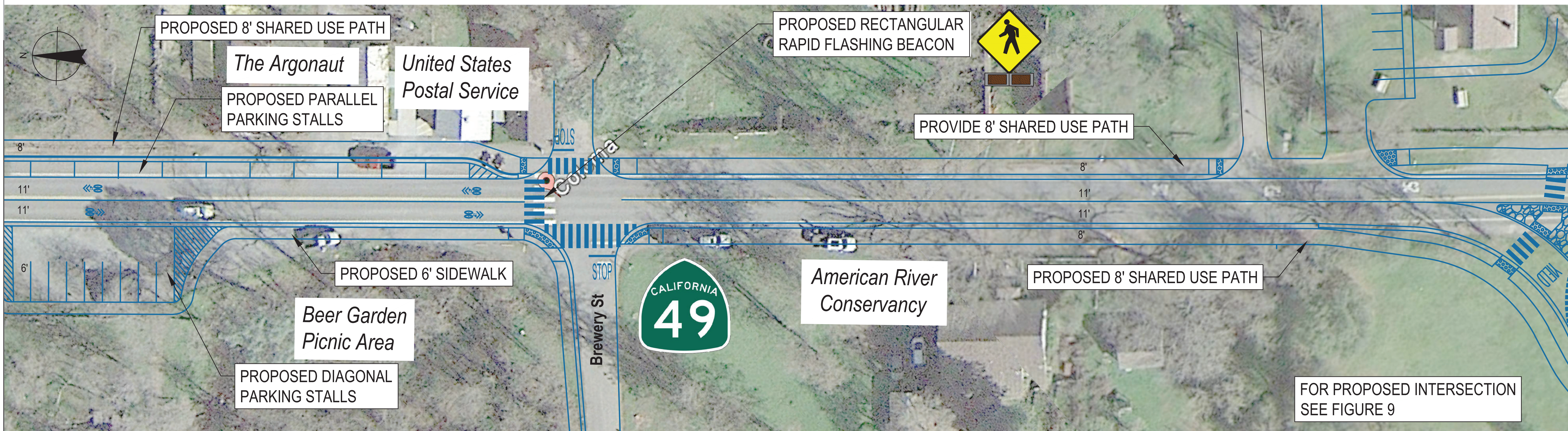
El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 8

Source:



COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 9

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:08 PM

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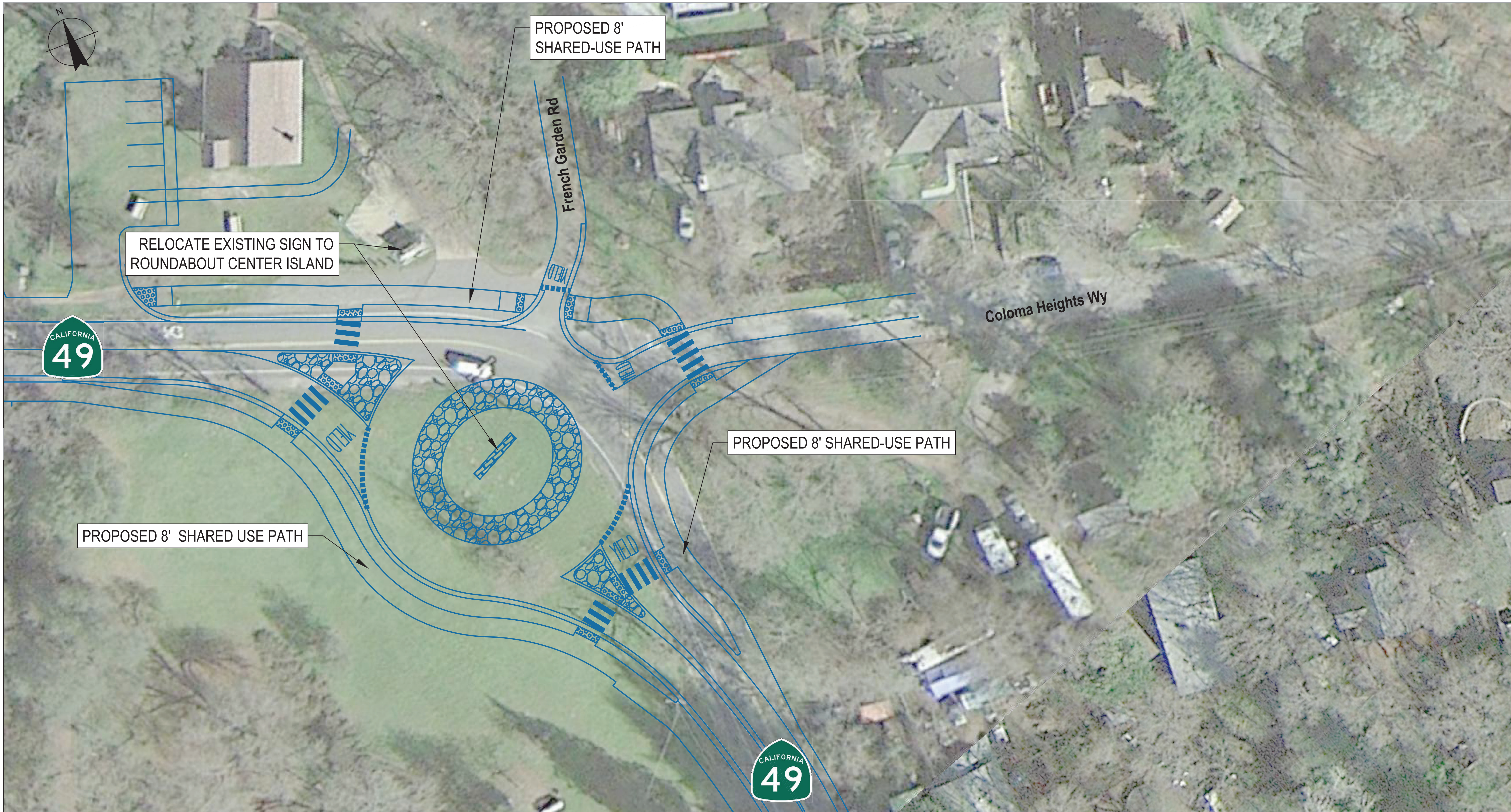


SEE FIG 9

SEE FIG 11

COLOMA LOTUS
Mobility Plan

0 0 80
1 inch = 40 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 10a

Source:

SEE FIG 9

SEE FIG 11

COLOMA LOTUS Mobility Plan

0 0 80
1 inch = 40 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

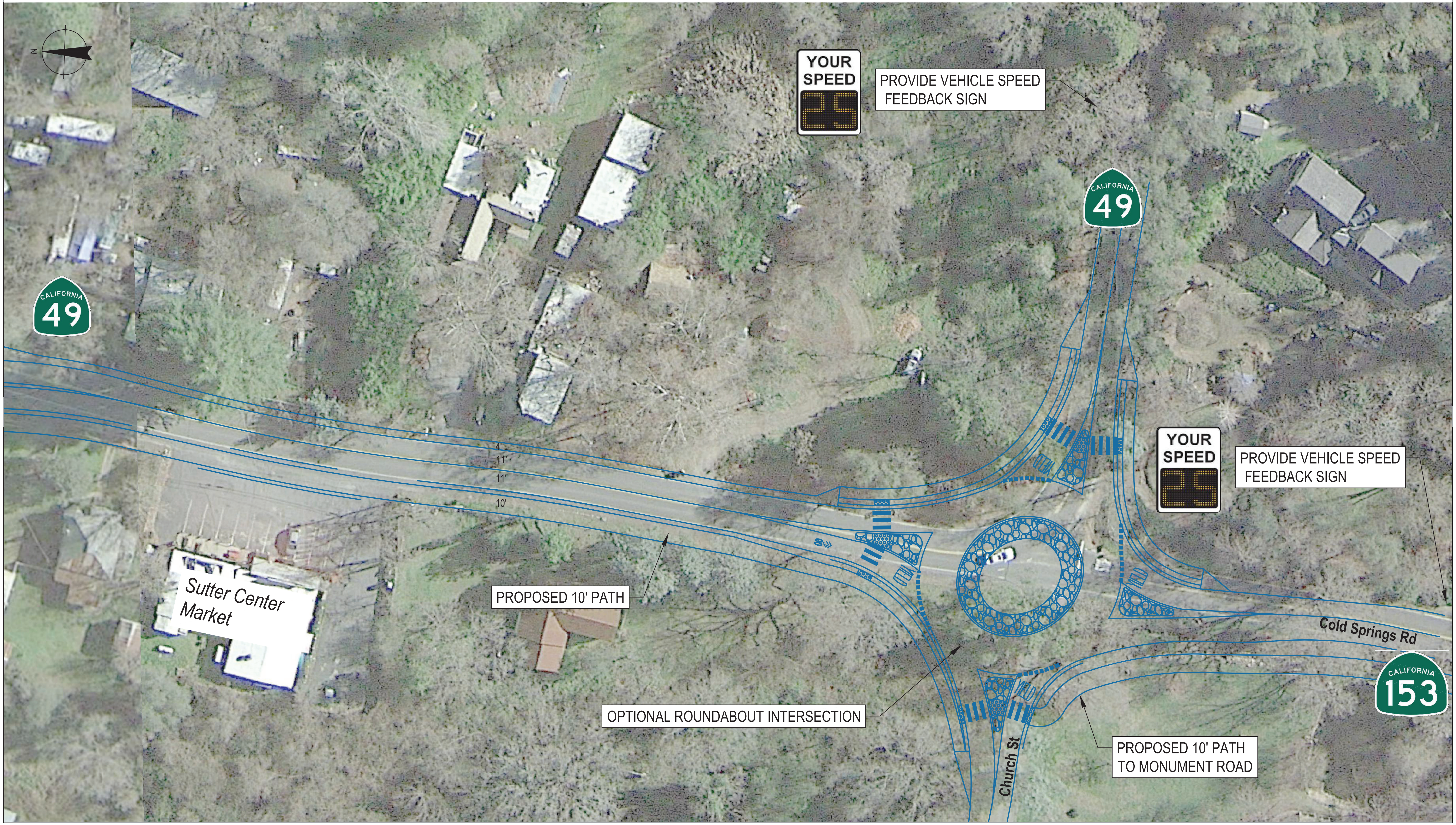
Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 10b

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:15 PM

SEE FIG 10



COLOMA LOTUS
Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 11

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:53 PM

Source:

COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

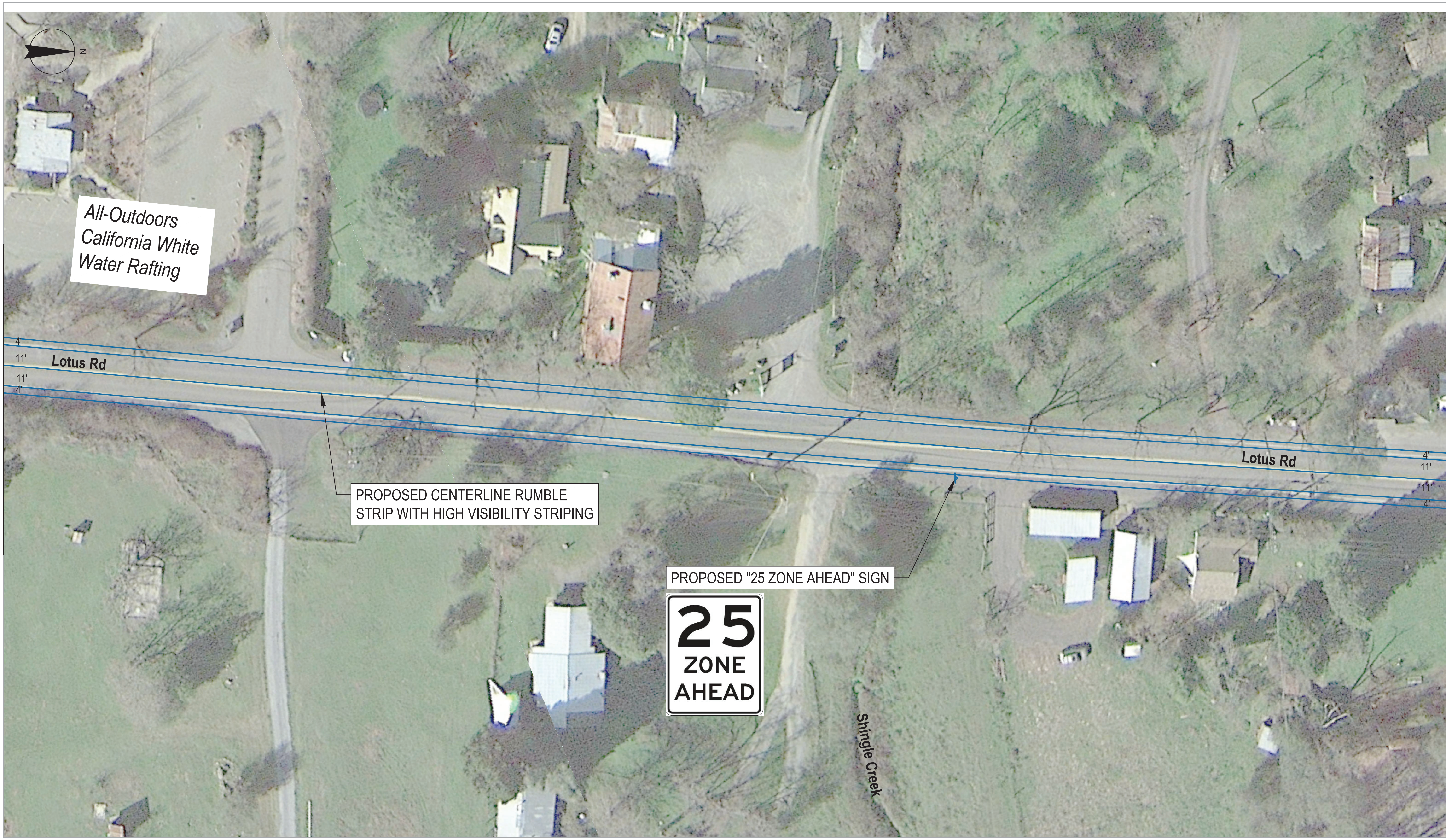
MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 12

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:28 PM

Source:



COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

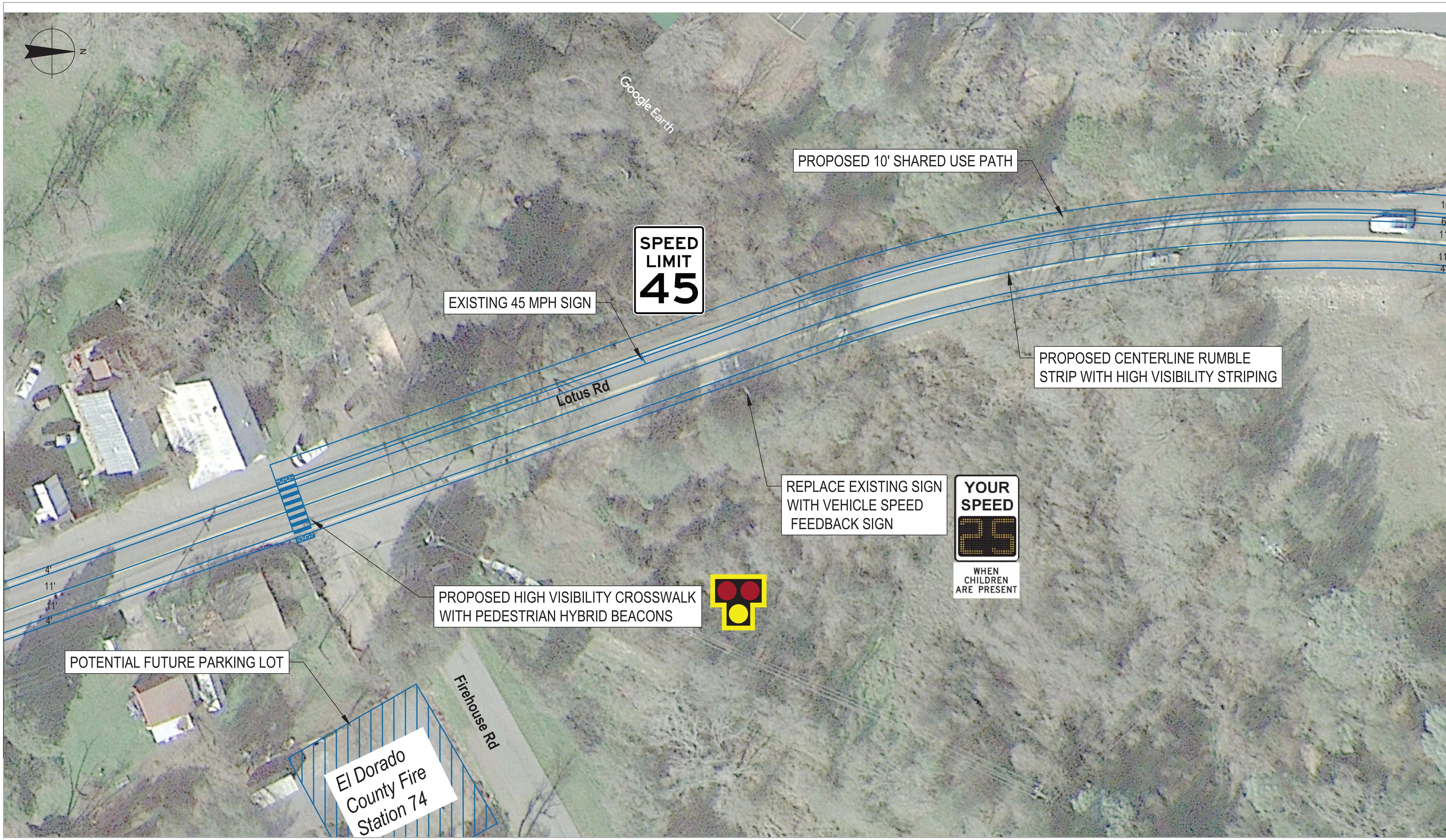
MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 13

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:30 PM



COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
LOTUS ROAD

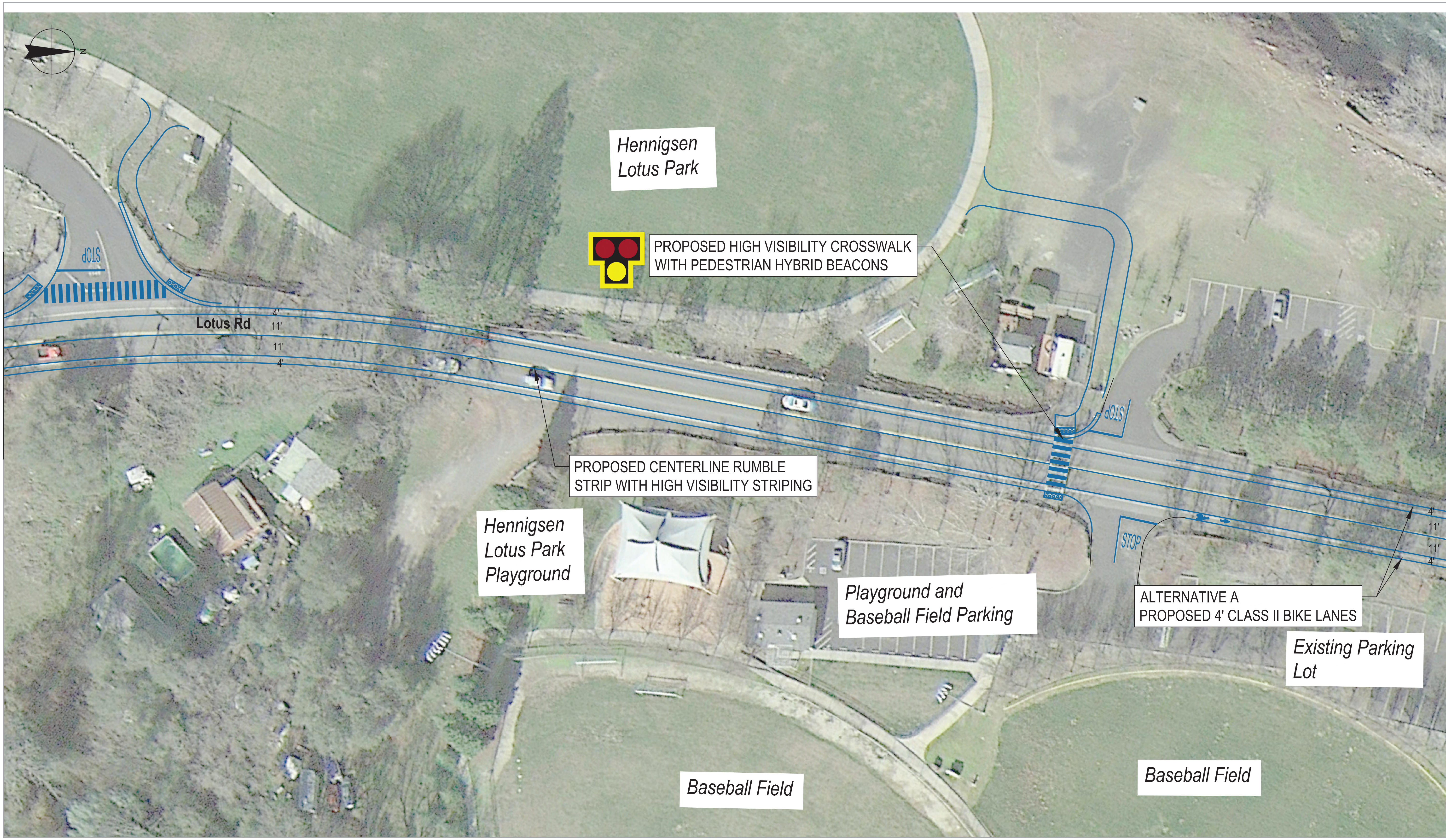
Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 14

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:31 PM

SEE FIG 14



SEE FIG 16

COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 15a

Source:

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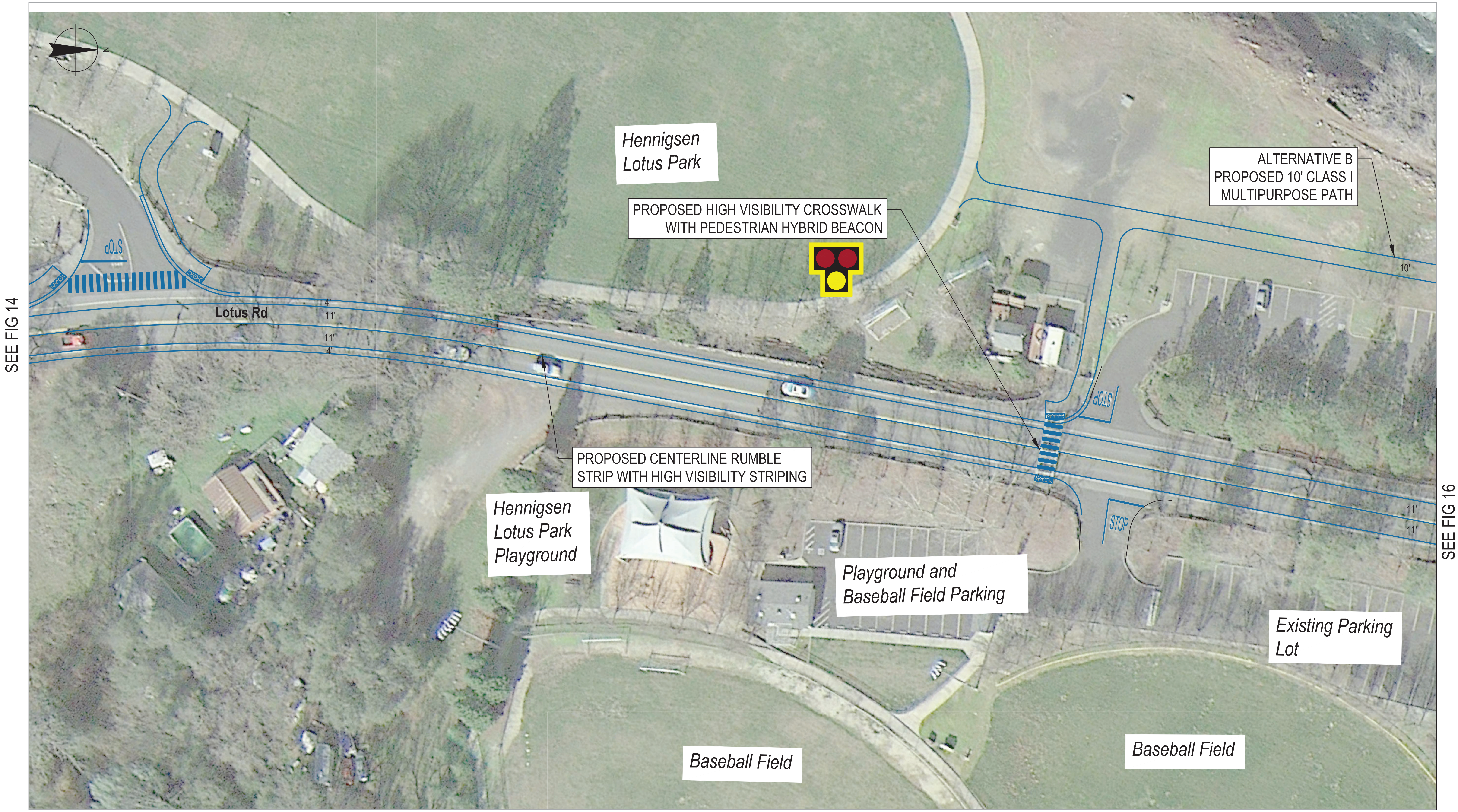

COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
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Date 02.04.19

FIGURE 15b

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:32 PM

Source:

COLOMA LOTUS Mobility Plan

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 16a

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:33 PM

COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

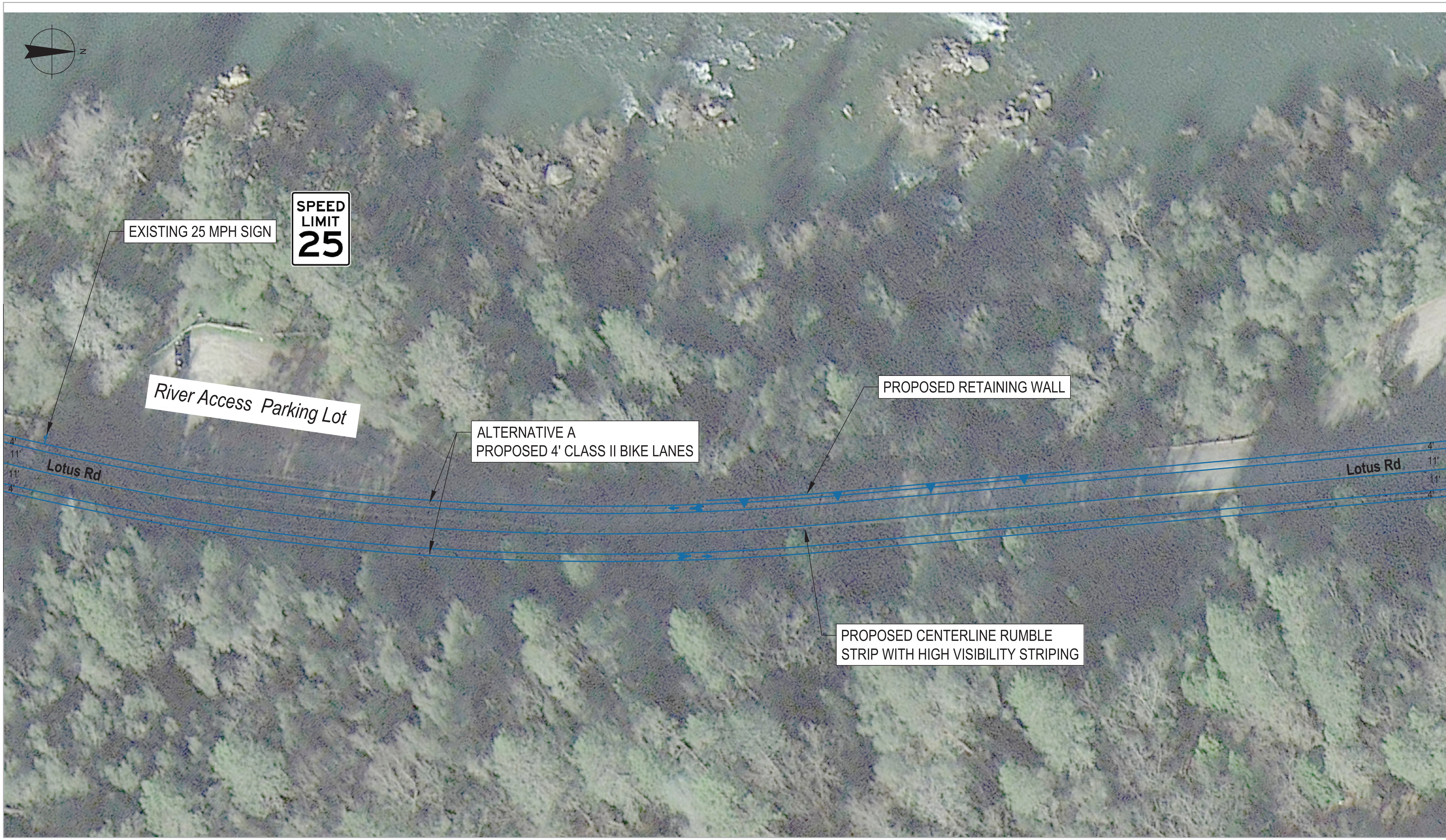
Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 16b

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:34 PM

SEE FIG 16



SEE FIG 18

COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

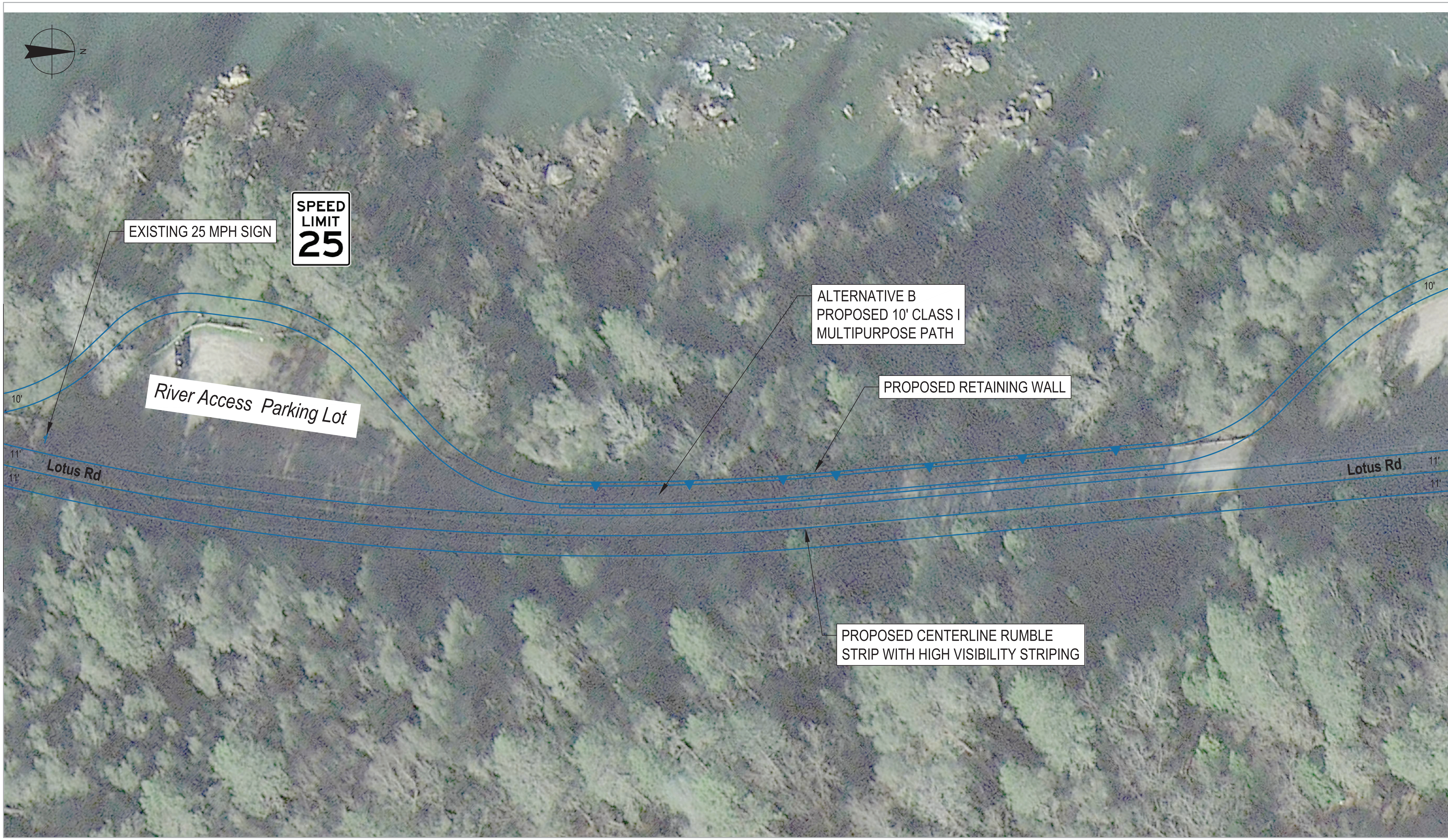
MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 17a

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:35 PM

Source:



COLOMA LOTUS Mobility Plan

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

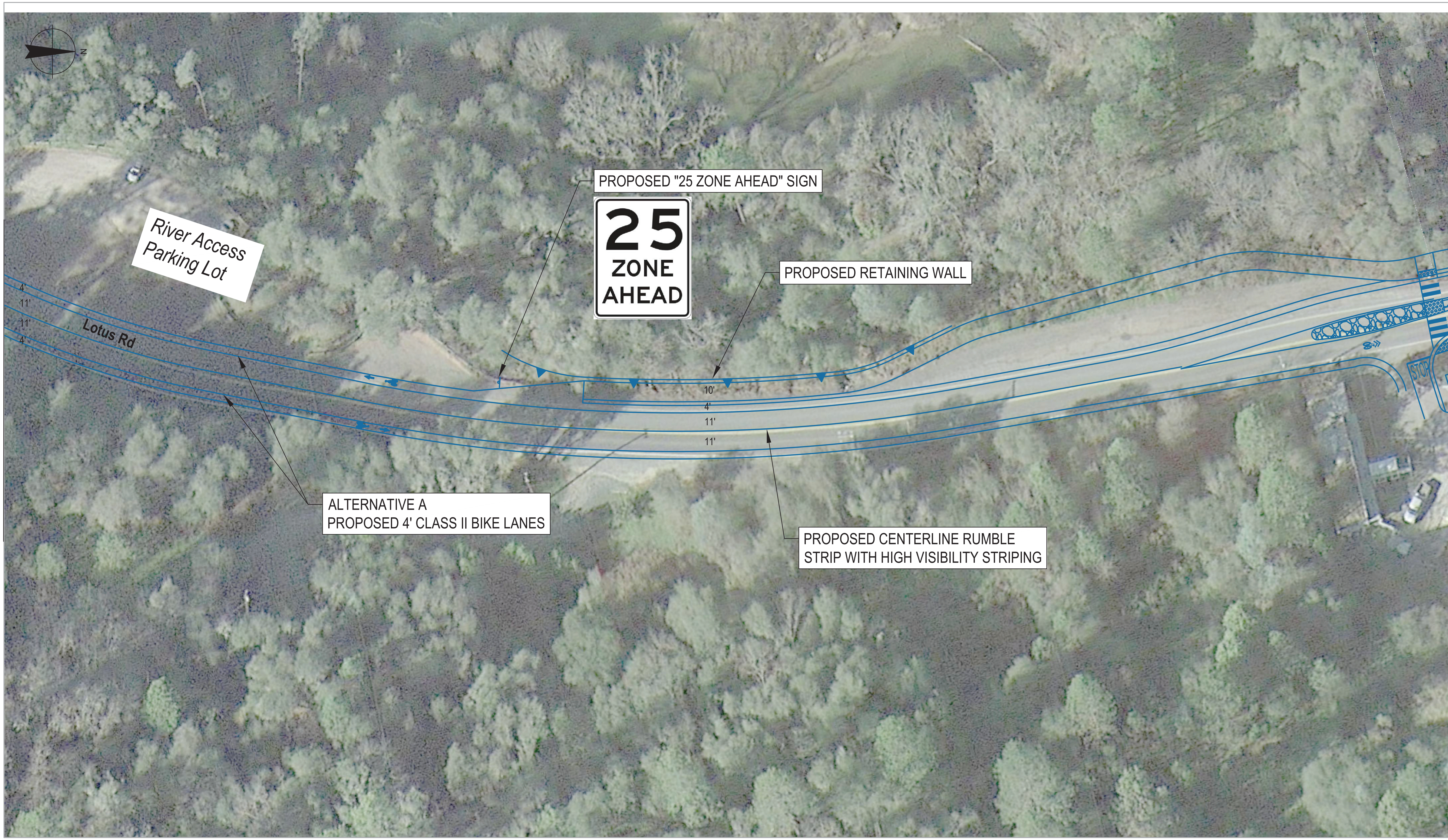
MAP OF PROPOSED IMPROVEMENTS:
LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 17b

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:35 PM



COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

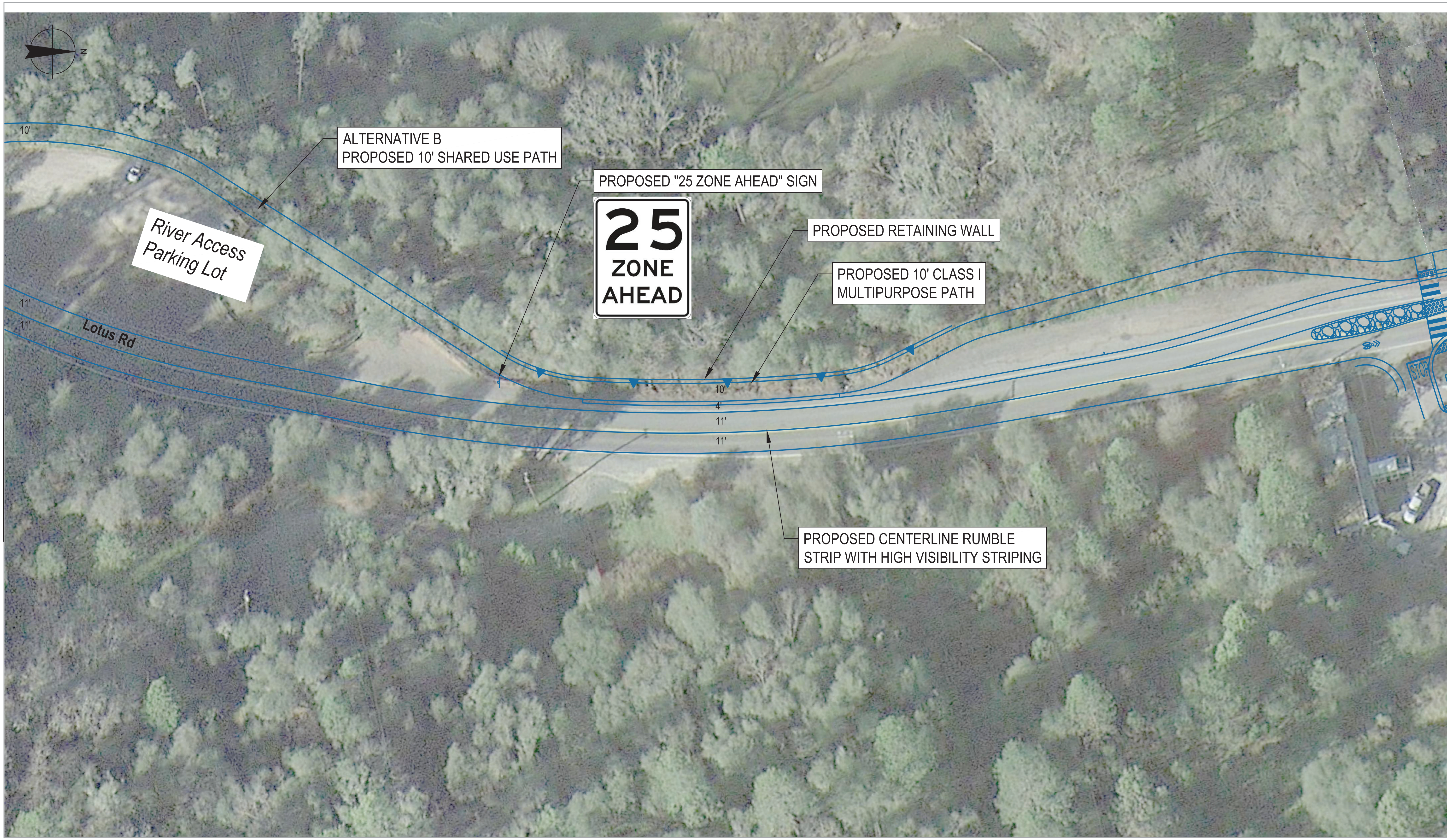
MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 18a

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:36 PM



COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

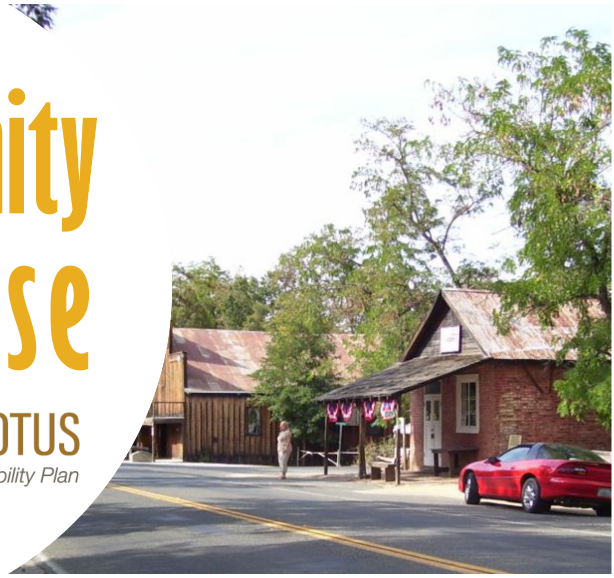
FIGURE 18b

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:37 PM

2nd Community Open House

COLOMA LOTUS Mobility Plan



Join us by attending the second community open house for the Coloma-Lotus Mobility Plan.

The Coloma-Lotus Mobility Plan will provide recommendations to improve traveling conditions for all motorists, pedestrians, and bicyclists within the plan area.

The open house will have maps and illustrations of the proposed recommendations and improvements within the plan area.

Workshop Agenda

6:15 p.m. Brief presentation about proposed improvements

6:30 p.m. Open house

RSVP at www.coloma-lotus.eventbrite.com

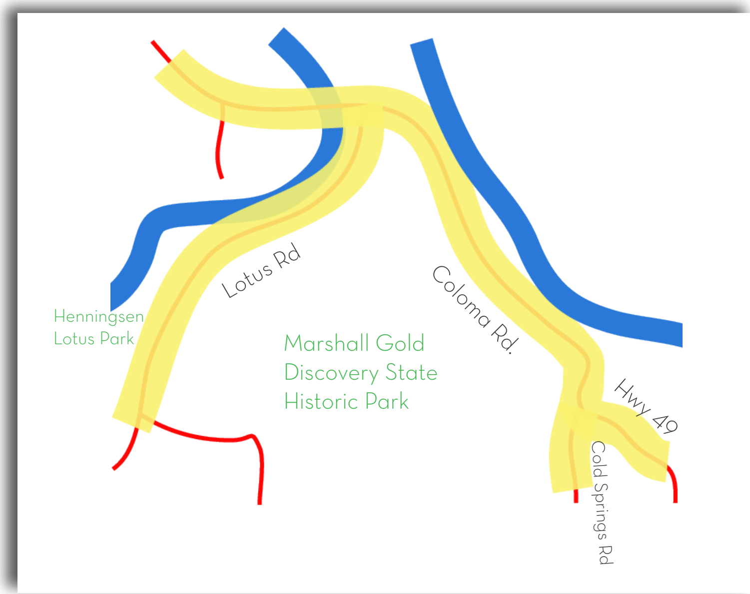
Questions? Contact Taylor Coover
(916) 442-1168 | tcoover@aimconsultingco.com

Tuesday, February 5

6:00 - 7:30 p.m.

Gold Trail Grange
319 Highway 49
Coloma, CA 95613
(in the Marshall Gold Discovery State Historic Park)

Plan Area:



Coloma Lotus Mobility Plan

COMMENT CARD

COLOMA LOTUS
Mobility Plan

Please share any thoughts, comments, or questions you have about the Coloma-Lotus Mobility Plan

Name: ______________________

Email Address: ______________________

Phone Number: ______________________

el dorado county edctc TRANSPORTATION COMMISSION

You may submit your comments to staff today or directly to tcoover@aimconsultingco.com

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AIM Consulting
2523 J Street, Suite 202
Sacramento, CA 95816

Coloma-Lotus Mobility Plan Community Workshop Notification Plan

Last Updated – Monday, January 14

COLOMA-LOTUS MOBILITY PLAN	
Date & Time:	Tuesday, February 5, 2019 6:00 – 7:30 p.m.
Location:	Gold Trail Grange, 319 Highway 49, Coloma, CA 95613

	Notification Type	When
☐	Email Notification Email Notification (flyer) • Stakeholder List *Ask to share flyer through email distribution, social media, e-newsletters (if applicable) and at meetings / upcoming events	<u>Initial</u> Tues. 1/15 Tues. 1/29 Mon. 2/4
☐	Email Reminders to Public Database • Three weeks before • One week before • Day before	Tues. 1/15 Tues. 1/29 Mon. 2/4
☐	Electronic Newsletters • Content for local e-newsletters including: o El Dorado County River Management List o El Dorado County Parks Management List o El Dorado County PIO – *Carla Hass* o El Dorado County Transit Authority o Camp Lotus o Coloma Lotus Business Council o Coloma Lotus News Email List o El Dorado County Department of Transportation o El Dorado County Supervisor Lori Parlin, District 4 o Caltrans Distribution List o School District Email Distribution • El Dorado Union High School District • Gold Trail Union High School District	Week of 1/21
☐	Flyers / Posters • Flyers / Posters at key activity centers / businesses o Gold Trail Grange o California State Parks	Mon. 1/21 until workshop

	o Public Libraries ▪ El Dorado County Library o Coloma and Lotus Post Offices o Businesses along corridor ▪ Sierra Rizing Bakery ▪ Argonaut Café	
☐	Social Media • El Dorado County Transportation Commission • El Dorado Transit Authority • Reach out to key stakeholders and encourage to share on their social media pages o Coloma Lotus Chamber of Commerce o El Dorado County Fire Department o El Dorado County Supervisor Lori Parlin, District 4 o El Dorado County Office of Education o American River Conservancy o Camp Lotus o Coloma Heights Homeowners o Coloma Resort o Gold Discovery Park Association o Coloma Lotus Business Council o Coloma Lotus News o El Dorado County Commission on Aging o California State Parks o Social Services Transportation Advisory Council	Tues. 1/15 until workshop
☐	News Release • AIM drafting news release • AIM to send news release to local news sources: o Gold Country Media o The Mountain Democrat o Village Life Newspaper o Sacramento Bee o KCRA Channel 3 o CBS Channel 13 o ABC Channel 10	Tues. 1/29

Meeting Record

Project:	Coloma-Lotus Mobility Plan		
Meeting Date:	September 20, 2018	**Job No.:**	11180327
Location:	SLOCOG Office	**File No:**	Stakehoder Meeting #1
Recorded By:	Jim Damkowitch, GHD	**Record Date:**	October 9, 2018
Participants:	See Sign in		
CC:	Meeting Participants		

The following is GHD's understanding of the discussions and decisions for the above referenced meeting. Please notify GHD immediately of any discrepancies in the information recorded.

The meeting purpose was to bring key stakeholders together and reach general consensus on the project approach. The meeting generally followed the attached agenda.

Discussion Items		**Action Items**
1.	**Introductions**	
	Following self-introductions, Dan Bolster of EDCTC and Jim Damkowitch of GHD provided a brief summary of prior meetings between project staff and key stakeholders including State Parks.	See Check-in list of attendees after summary.
	Mention was made of an upcoming Economic Study being sponsored by El Dorado County that will include the Coloma-Lotus area. Jim Damkowitch of GHD indicated that both CLMP and the Economic Study could complement each other given the strong relationship between infrastructure improvements and economic development. Information related to how a given transportation project incentivizes economic activity is a desired (but not required) feature for many competitive grant programs. This can boost the competitiveness of CLMP related grant applications.	Project team will share data and findings/recommendations of the CLMP with the economic consultant when appropriate.
2.	**Project Goals**	
	Jim Damkowitch of GHD briefly summarized the project goals and the emphasis on community input and the need to generate technical information that can support competitive grant applications for funding.	

3.	**Project Scope**	
	Jim Damkowitch of GHD provided a brief description of the project study area and scope. Mike Bean indicated his desire to have the northern project limit of SR 49 extended north of Marshall Road. He indicated that many rafting outfits are located north of Marshall Road. This portion of SR 49 has similar characteristics as in the study area and experiences similar demand. He requested that improvements identified for SR 49 within the study area be considered outside the study area including shoulder widening, provision of Class I bike trails, or other infrastructure treatments to make biking safer on SR 49 north of Marshall Road. Dan Bolster of EDCTC and Jim Damkowitch of GHD emphasized that improvement needs and recommendations for areas outside the CLMP study area by the SAC and the public are welcome and encouraged. These suggestions will be logged by EDCTC who are in the process of updating the County's Regional Transportation Plan (RTP). The RTP is the appropriate planning document to address improvement needs outside the immediate study area of the CLMP.	Cross reference to RTP update should be kept in mind as both the CLMP and EDCTC' RTP update progress.
4.	**Constraints and Opportunities**	
.	Jim Damkowitch of GHD briefly summarized the project constraints and opportunities – with an emphasis of the State Park and the abundance of historic and cultural resources in the project area. SAC emphasized the need to cite parking as an issue in the study area. Henningsen Lotus Park (HLP) parking reaches capacity approximately 15 times a year. Parking issues are most prevalent on the north end of the study area. With the reduction of free river access points – recreational motorists are searching for nearby parking – activity pressure point. Rafters park illegally on Little Road to access a take-out and put-in under the east end of the bridge. Many rafters and tubers put-in at the North Beach at the State Park float the "horseshoe," then take- out near the bridge and walk back on SR 49 to North Beach to re-launch and repeat. SAC cited that generational connection with the area is declining rapidly – area losing 5% of its local population every few years. Population is rapidly being	Consultant team will analyze parking – from a supply-demand perspective and its effect on bicycle safety.

	replaced by those from outside the area without local ties.	
5.	**Project Schedule**	
	Jim Damkowitch of GHD briefly summarized the project schedule. He emphasized the upcoming scheduled public workshop as the next key project event.	
6.	**Data Collection**	
	Jim Damkowitch of GHD and Jeff Schwein of Green DOT discussed data collection efforts already performed and upcoming data collection scheduled for September. SAC raised the concern that collecting data at the end of August may have been too late to capture the true summer peak. SAC cited that Summer visitation is significantly greater than what is experienced during the Winter. SAC requested to review the origin-destination map developed by the consultant team for accuracy.	Video Data Collection scheduled in late September. SAC to provide EDCTC/Project Team with any needed corrections to the OD Map.
7.	**Community Outreach**	
	Gladys Cornell of AIM provided an overview of the public outreach effort for the study. A brief description of the upcoming September Public Workshop format was provided. SAC concurred with use of Live Click Polling for the workshop. SAC suggested that vehicle speeds should be incorporated into the Polling questions giving that excessive speeding is considered a major issue. A brief discussion of how speed limits are established and the process required to change posted limits.	Consultant team will incorporate vehicular speed into polling questions.
8.	**Next Steps**	

Attendee	Representing	Phone No.	Email
Dan Bolster	EDCTC	530.642.5262	dbolster@edctc.org
Jim Damkowitch	GHD	916.865.0934	jim.damkowitch@ghd.com
Todd Tregenza	GHD	916 782 8688	todd.tregenza@ghd.com
Jeff Schwein	Green DOT	530-895-1109	jeff@greendottransportation.com
Gladys Cornell	AIM Consulting	916.442.1168	gcornell@aimconsultingco.com
Donna Keeler	El Dorado DOT	530-621-2829	donna.keeler@edcgov.org

Matt Smeltzer	El Dorado DOT	530-621-5912	mattsmeltzer@edcgov.org
Daniella Faieta	Coloma Outdoor Discovery School and Coloma Resort	530-919-5405	daniella@colomaresor.com
Traci Sheehan	Coloma Heights Homeowners	530-919-3219	traci.sheehan@gmail.com
Keith Merson	South Fork Arts and Recreation	530-368-2581	keithmerson@mac.com
Howard Penn	Coloma Lotus Chamber of Commerce	530-626-7373	howard@lbcomm.com
Mike Bean	Friends of El Dorado Trails	530-903-6464	mike@rivervilla.com

Meeting Record

Project:	Coloma-Lotus Mobility Plan		
Meeting Date:	November 28, 2018	**Job No.:**	11180327
Location:	Gold Trail Grange, Coloma, CA	**File No:**	Stakehoder Meeting #2
Recorded By:	Jim Damkowitch, GHD	**Record Date:**	November 29, 2018
Participants:	See Sign in		
CC:	Meeting Participants		

The following is GHD's understanding of the discussions and decisions for the above referenced meeting. Please notify GHD immediately of any discrepancies in the information recorded.

The meeting purpose was to bring key stakeholders together and reach general consensus on the project approach. The meeting generally followed the attached agenda.

Discussion Items		**Action Items**
1.	**Introductions**	
	Following self-introductions, Dan Bolster of EDCTC and Jim Damkowitch of GHD provided a brief summary of the Coloma-Lotus Mobility Plan (CLMP) and the purpose of the meeting.	See Check-in list of attendees after summary.
2.	**Summary of SAC Meeting #1**	
	The meeting summary was circulated to the SAC.	Posted on Project Website
3.	**Workshop #1 Summary Report**	
	The Workshop #1 Summary was circulated to the SAC.	Posted on Project Website
4.	**Web-Page On-Line Survey Results Summary**	
.	Jim Damkowitch of GHD briefly summarized the On-Line Survey Results Summary. Indicated that the results were commensurate with the Workshop #1 Live Click Polling sample results.	Posted on Project Website
5.	**Existing Condition Assessments**	
	Jim Damkowitch of GHD briefly summarized the Existing Condition Assessments. Although the graphic results have been previously circulated, the data and analysis descriptions have not. Also, the intersection operations results were briefly described as those results have yet to be shared with the SAC. Results indicate that no operational deficiencies currently exist	

	during AM/Mid-Day/PM peak hours at any of the study area intersections.	
6.	**Discuss Candidate Improvement Concepts**	
	Heather Anderson, GHD's Project Design Lead led a discussion describing the following improvement concepts under consideration within the Study Area. Depending on location, several potential improvement options were discussed. **SR 49 – Marshall Road to Lotus Road** **West of Marshall Road** (Outside Study Area) 1. Option A: Class II Bicycle Facilities beyond Amoloc to Greenwood Creek. Define shoulders as Class II Bike Lanes to Amoloc Lane 2. Option B: Possible Class I Shared Use Path or widened shoulders 3. Connect Southerly Sidewalk to Amoloc Lane **Marshall Road and SR 49 Intersection** 1. Add sidewalk from Scott Road to Marshall Road 2. Option A: Upgrade Intersection to Roundabout with Bike/Ped Connections 3. Option B: Remove portion of Two-Way-Left-Turn (TWLT) and add Raised Median Islands/Landscaping 4. Add Sidewalks/Class II Bike Lanes 5. Move existing sidewalk closer to deli entrance 6. Consider right-in/right-out access restrictions at deli parking entrance closest to Marshall and widen other deli parking entrance. **Marshall Road to Lotus Road** 1. Extend newly constructed sidewalk from bridge project limits west towards Marshall 2. Upgrade existing crossing to Hybrid Beacons or "HAWK" treatment near River Shack 3. Add crossing at Beach Court (enhanced striping OR Hybrid Beacons/HAWK treatment)	SAC commented on its desire for direct connectivity with existing trail heads (Cronan Ranch and Magnolia Ranch). SAC noted that there is a crossing near the SR 49 bridge that has new curb-cuts but the crosswalk was never formalized with striping.

	4. Stripe shoulders as Class II Bike Lanes from Marshall to existing Class II striping from bridge project. **Lotus Road and SR 49 Intersection** 1. Option A: Upgrade Intersection to Roundabout; 2. Option B: Add flashing beacons, lighting, and narrow lanes **SR 49 – Lotus Road to SR 153** **Lotus Road to Northerly North Beach Entrance** 1. Add Paved Class I Facility along River side of SR 49 (North Beach Parking Lot to Mount Murphy Road in back of split rail fence). 2. Narrow lanes to 11 feet 3. Add rumble strips in striping 4. Add vehicle speed feedback signs and additional 25 mph ahead notifications on SB approach **Northerly North Beach Entrance to Southerly North Beach Mill Parking Ped Access** 1. Narrow lanes to 11 feet 2. Add sharrows for advanced cyclists since speed limit is 25 mph 3. Option A: Add Class I facility on both sides of road, one in park, and one along SR 49. One facility would be a paved Class I bike path and the other would be a DG path 4. Option B: Add Class I facility along SR 49 only 5. Upgrade existing crossings to Hybrid Beacons or “HAWK” treatment **Southerly North Beach Mill Parking Ped Access to Brewery Street** 1. Narrow lanes to 11 feet 2. Add sharrows for advanced cyclists since speed limit is 25 mph	Property Owner expressed support for the RAB concept. SAC discussed the reserve parking across the street on Lotus. Concerns from bicyclist on having the rumble strip in the striping of the fog line (versus centerline) were discussed. State Parks indicated it will submit its recommendations

	3. Formalize parking at the Argonaut 4. Construct sidewalk in lieu of Class I trail. 5. Option A: Add Sidewalk on west side and Class I along east side (would impact parking at postal service) 6. Option B: Add Class I along west side, define parking along postal service and add sidewalk along east side behind parking **SR 49 and Coloma Heights Road Intersection** 1. Upgrade Intersection to Roundabout and gateway feature. 2. Provide Class I facility between Brewery Street and Intersection 3. Add flashing beacons, lighting, and narrow lanes **SR 153 – SR 49 to Monument Road** **SR 153 and SR 49/Church Street Intersection** 1. Option A: Upgrade intersection to Roundabout with gateway feature. 2. Option B: Realign/Upgrade intersection to four-way stop **SR 49/Church Street Intersection to Monument Road** 1. Narrow Lanes to 11 feet to increase shoulder width 2. Option A: Add Class I facility 3. Option B: Add Sidewalks/Class II Bike Lanes 4. Roadside clearing and/or lighting to improve visibility 5. Add wayfinding signage to theatre **Monument Road** (Outside Study Area) 1. Widen shoulders or narrow lanes between Monument and Lakota	SAC discussed which intersection – Coloma Heights or SR 153 and SR 49/Church Street Intersection would be the best location for a RAB.

	2. (Outside Study Area) Extend sidewalk or Class I facility from SR 49 to the theatre **Lotus Road – SR 49 to Bassi Road** **SR 49 to Lotus Park** 1. Option A: Widen Lotus Road to provide Class II facility 2. Option B: Widen Lotus Road to provide shoulders that could act as Class II Bike Lanes 3. Option C: Narrow Lotus Road to 11 foot lanes to provide extra 2 feet of shoulder with existing pavement 4. Add rumble strips in striping 5. Formalize All-Purpose River Trail facility between Lotus Road and River 6. Add vehicle speed feedback signs and additional 25 mph ahead notifications on SB approach **Lotus Park Entrance** 1. Option A: Re-route access and create a central park entrance intersection as a roundabout 2. Option B: Upgrade existing crossing to Hybrid Beacons or “HAWK” treatments 3. Roadside clearing and/or lighting to improve visibility 4. Traffic calming and pedestrian crossing improvements between main HL parking area to east. 5. Pedestrian Bridge connecting from HLP to Beach Crt. **Lotus Park to Bassi Road** 1. Narrow Road to 11 foot lanes 2. Add vehicle speed feedback signs and additional 25 mph ahead notifications on NB approach	SAC discussed issues of washout and usability of path during winter months. Pedestrian bridge washout history discussed.

	3. Add rumble strips in striping	
7.	**Project Schedule**	
	Dan Bolster and Jim Damkowitch of GHD discussed updated project schedule.	
8.	**Next Steps**	

Attendee	Representing	Phone No.	Email
Dan Bolster	EDCTC	530.642.5262	dbolster@edctc.org
Jim Damkowitch	GHD	916.865.0934	jim.damkowitch@ghd.com
Todd Tregenza	GHD	916 782 8688	todd.tregenza@ghd.com
Heather Anderson	GHD		heather.anderson@ghd.com
Traci Sheehan	Coloma Heights Homeowners	530-919-3219	traci.sheehan@gmail.com
Keith Merson	South Fork Arts and Recreation	530-368-2581	keithmerson@mac.com
Mike Bean	Friends of El Dorado Trails	530-903-6464	mike@rivervilla.com
Austin Smith	Gold Trail Grange		
Barry Smith	CA State Parks		
Jim Michaels	CA State Parks	916-988-0513	johnmsimpkin3@gmail.com
Bill Deitchman	CA State Parks		
Amber Moran	Caltrans		
William Crenshaw	RMAC		
John Simpkin	American Whitewater	530-621-1941	

January 30, 2019

Time:	6:00 – 7:30 p.m.
Location:	Gold Trail Grange
	319 CA-49, Coloma, CA 95613

Project: **Coloma-Lotus Mobility Plan**

Subject: Stakeholder Advisory Committee Meeting

I. **Introductions** (5 min)

II. **Summary of SAC Meeting #2 (handout)** (5 min)

III. **Format for 2nd Workshop Scheduled for February 5th** (10 min)

IV. **Discuss Candidate Improvement Concepts** (60 min)

V. **Project Schedule** (5 min)

VI. **Next Steps (handout)** (5 min)

VII. **Adjourn**

Meeting Record

Project: Coloma-Lotus Mobility Plan

Meeting Date:	January 30, 2019	**Job No.:**	11180327
Location:	Gold Trail Grange, Coloma, CA	**File No:**	Stakehoder Meeting #3
Recorded By:	Jim Damkowitch, GHD	**Record Date:**	June 1, 2019
Participants:	See Sign in		
CC:	Meeting Participants		

The following is GHD's understanding of the discussions and decisions for the above referenced meeting. Please notify GHD immediately of any discrepancies in the information recorded.

The meeting purpose was to bring key stakeholders together and reach general consensus on the project approach. The meeting generally followed the attached agenda.

Discussion Items		Action Items
1.	**Introductions**	
	Following self-introductions, Dan Bolster of EDCTC and Jim Damkowitch of GHD reviewed the agenda and purpose of the meeting.	See Check-in list of attendees after summary.
2.	**Summary of SAC Meeting #2**	
	The meeting summary was circulated to the SAC.	Posted on Project Website
3.	**Format Workshop #2 – Scheduled for February 5th**	
	Jim Damkowitch of GHD briefly summarized the proposed open house format for the upcoming workshop.	
4.	**Discuss Candidate Improvement Concepts**	
	Jim Damkowitch of GHD and Daniel Kehrer GHD's Project Design Lead led a discussion describing the following improvement concepts under consideration within the Study Area. Several improvement options were discussed and selected by the SAC. **SR 49 – Marshall Road to Lotus Road** **West of Marshall Road** (Outside Study Area) 1. Option A: Class II Bicycle Facilities beyond Amoloc to Greenwood Creek. Define shoulders as Class II Bike Lanes to Amoloc Lane	SAC expressed its' preference for Option A. The SAC expressed its appreciation for

	2. Option B: Possible Class I Shared Use Path or widened shoulders 3. Connect Southerly Sidewalk to Amoloc Lane	extending to Amoloc and beyond.
	Marshall Road and SR 49 Intersection	
	1. Add sidewalk from Scott Road to Marshall Road	
	2. Option A: Upgrade Intersection to Roundabout with Bike/Ped Connections 3. Option B: Remove portion of Two-Way-Left-Turn (TWLT) and add Raised Median Islands/Landscaping 4. Add Sidewalks/Class II Bike Lanes 5. Move existing sidewalk closer to deli entrance 6. Consider right-in/right-out access restrictions at deli parking entrance closest to Marshall and widen other deli parking entrance.	SAC expressed its' preference for Option B.
	Marshall Road to Lotus Road 1. Extend newly constructed sidewalk from bridge project limits west towards Marshall 2. Upgrade existing crossing to Hybrid Beacons or "HAWK" treatment near River Shack 3. Add crossing at Beach Court (enhanced striping OR Hybrid Beacons/HAWK treatment) 4. Stripe shoulders as Class II Bike Lanes from Marshall to existing Class II striping from bridge project.	
	Lotus Road and SR 49 Intersection 1. Option A: Upgrade Intersection to Roundabout; 2. Option B: Add flashing beacons, lighting, and narrow lanes	SAC expressed its' preference for Option A.

	SR 49 – Lotus Road to SR 153 **Lotus Road to Northerly North Beach Entrance** 1. Add Paved Class I Facility along River side of SR 49 (North Beach Parking Lot to Mount Murphy Road in back of split rail fence). 2. Narrow lanes to 11 feet 3. Add rumble strips in striping 4. Add vehicle speed feedback signs and additional 25 mph ahead notifications on SB approach	SAC expressed concerns from bicyclist on having the rumble strip in the striping of the fog line (versus centerline). GHD agreed to remove rumble strip recommendation.
	Northerly North Beach Entrance to Southerly North Beach Mill Parking Ped Access 1. Narrow lanes to 11 feet 2. Add sharrows for advanced cyclists since speed limit is 25 mph 3. Option A: Add Class I facility on both sides of road, one in park, and one along SR 49. One facility would be a paved Class I bike path and the other would be a DG path 4. Option B: Add Class I facility along east side of SR 49 only 5. Upgrade existing crossings to Hybrid Beacons or “HAWK” treatment	SAC did not feel sharrow markings were necessary. SAC expressed its’ preference for Option B.
	Southerly North Beach Mill Parking Ped Access to Brewery Street 1. Narrow lanes to 11 feet 2. Add sharrows for advanced cyclists since speed limit is 25 mph 3. Formalize parking at the Argonaut 4. Construct sidewalk in lieu of Class I trail. 5. Option A: Add Sidewalk on west side and Class I along east side (would impact parking at postal service)	State Parks indicated that six pedestrian crossing were too many – requested that we reduce to a maximum of four locations with two being the preferred number based on priority. The priority crossings should be outside the historic park area.

	6. Option B: Add Class I along west side, define parking along postal service and add sidewalk along east side behind parking	SAC expressed its' preference for Option B.
	SR 49 and Coloma Heights Road Intersection	
	1. Option A. Upgrade Intersection to Roundabout and gateway feature.	SAC expressed its' preference for Option B.
	2. Option B. Add Raised Median to better channelize approaches to reduce speeds.	
	3. Provide Class I facility between Brewery Street and Intersection	
	4. Add flashing beacons, lighting, and narrow lanes	
	SR 153 – SR 49 to Monument Road	
	SR 153 and SR 49/Church Street Intersection	
	1. Option A: Upgrade intersection to Roundabout with gateway feature.	SAC expressed its' preference for Option A.
	2. Option B: Realign/Upgrade intersection to four-way stop	
	SR 49/Church Street Intersection to Monument Road	
	1. Narrow Lanes to 11 feet to increase shoulder width	SAC expressed its' preference for Option A.
	2. Option A: Add Class I Multi-use DG path	
	3. Option B: Add Sidewalks/Class II Bike Lanes	
	4. Roadside clearing and/or lighting to improve visibility	
	5. Add wayfinding signage to theatre.	
	Monument Road (Outside Study Area)	
	1. Widen shoulders or narrow lanes between Monument and Lakota	
	2. (Outside Study Area) Extend sidewalk or Class I facility from SR 49 to the theatre	

	Lotus Road – SR 49 to Bassi Road **SR 49 to Lotus Park** 1. Option A: Widen Lotus Road to provide Class II facility 2. Option B: Formalize All-Purpose River Trail facility between Lotus Road and River – extend to HLP. 3. Narrow Lotus Road to 11 foot lanes to provide extra 2 feet of shoulder with existing pavement 4. Add rumble strips in striping 5. Add vehicle speed feedback signs and additional 25 mph ahead notifications on SB approach	SAC expressed its' preference for Option B. SAC requested that the rumble strips in striping be removed as a recommendation – too impactful to cyclist and less needed with preference for Option B
	Lotus Park Entrance 1. Option A: Re-route access and create a central park entrance intersection as a roundabout 2. Option B: Upgrade existing crossing to Hybrid Beacons or "HAWK" treatments 3. Roadside clearing and/or lighting to improve visibility 4. Traffic calming and pedestrian crossing improvements between main HL parking area to east. 5. Pedestrian Bridge connecting from HLP to Beach Crt.	SAC expressed its' preference for Option B. SAC supported the pedestrian bridge as a recommended improvement.
	Lotus Park to Bassi Road 1. Narrow Road to 11 foot lanes 2. Add vehicle speed feedback signs and additional 25 mph ahead notifications on NB approach 3. Add rumble strips in striping 4. Add pedestrian crossing and Pedestrian Hybrid Beacon (HAWK) at El Dorado County Fire Station 74.	SAC requested that the rumble strips in striping be removed as a recommendation. Dan Bolster informed the SAC of the meeting with County Parks regarding the potential relocation of County Fire Station 74 and conversion of this property to additional HLP parking capacity. This information prompted

	5. Add Shared Use Path connecting the pedestrian crossing to HLP access driveway.	Improvement recommendation 4 and 5
5.	**Project Schedule**	
	Dan Bolster and Jim Damkowitch of GHD discussed updated project schedule.	
8.	**Next Steps**	
	Dan Bolster and Jim Damkowitch of GHD discussed preparations for next workshop and encouraged the SAC to notify its' constituencies.	

Attendee	Representing	Phone No.	Email
Dan Bolster	EDCTC	530.642.5262	dbolster@edctc.org
Jim Damkowitch	GHD	916.865.0934	jim.damkowitch@ghd.com
Todd Tregenza	GHD	916 782 8688	todd.tregenza@ghd.com
Dan Kehrer	GHD		heather.anderson@ghd.com
Traci Sheehan	Coloma Heights Homeowners	530-919-3219	traci.sheehan@gmail.com
Keith Merson	South Fork Arts and Recreation	530-368-2581	keithmerson@mac.com
Mike Bean	Friends of El Dorado Trails	530-903-6464	mike@rivervilla.com
Austin Smith	Gold Trail Grange		
Barry Smith	CA State Parks		
Jim Michaels	CA State Parks	916-988-0513	johnmsimpkin3@gmail.com
Bill Deitchman	CA State Parks		
Amber Moran	Caltrans		
William Crenshaw	RMAC		
John Simpkin	American Whitewater	530-621-1941	

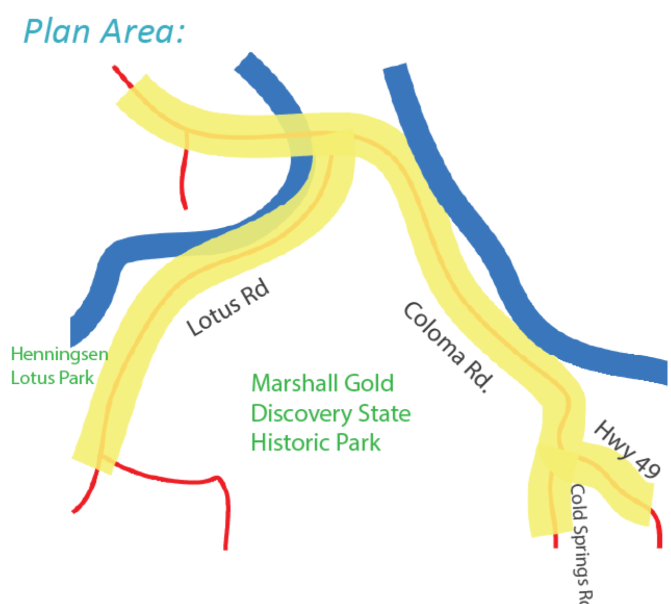
Coloma Sustainable Community Mobility Plan

Stakeholder Advisory Committee (SAC) – Ratified by EDCTC Board on June 7, 2018

- American River Conservancy
- American River Recreation Association
- American Whitewater
- Assistance League of Sierra Foothills
- California Outdoors
- California State Parks
- Caltrans
- Coloma Heights Homeowners
- Coloma Lotus Business Council
- Coloma-Lotus Chamber of Commerce
- Coloma Outdoor Discovery School
- El Dorado County Commission on Aging
- El Dorado County Senior Services
- El Dorado County Winery Association
- El Dorado County Youth Commission
- El Dorado County River Management Advisory Committee
- El Dorado Union High School District
- Friends of El Dorado Trails
- Gold Discovery Park Association
- Gold Trail Grange
- Gold Trail Union School District
- Marshall Gold Discovery State Historic Park
- Social Services Transportation Advisory Council
- South Fork Arts and Recreation

Coloma-Lotus Mobility Plan
Online Questionnaire

The Coloma-Lotus Mobility Plan will evaluate existing conditions and provide recommendations to improve circulation for all travelers in the Coloma-Lotus area. Proposed improvements will be selected based on performance to ensure expected benefits are proportionate with costs.



Information gathered from this study will be used to pursue grant funding for future project implementation.

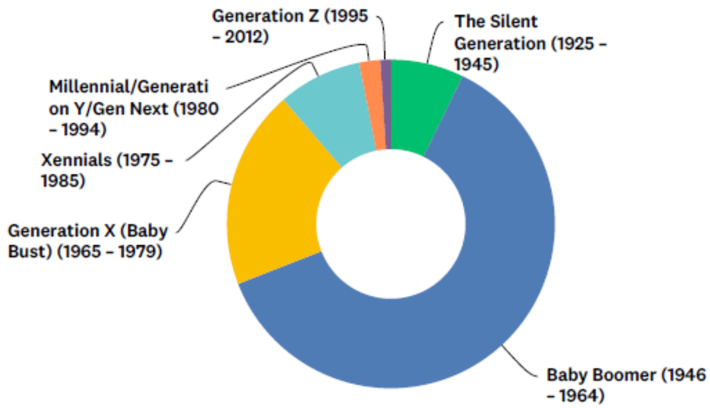
The Coloma-Lotus Mobility Plan Team hosted an online questionnaire from October 25 through November 25. The online questionnaire provided the Coloma-Lotus community an opportunity to provide their thoughts on what they consider some of the biggest challenges/concerns within the study area and their opinion on potential solutions. This report provides a compilation of community responses received throughout the month-long period that the questionnaire was open.

Email notifications were sent to more than 120 community members, including those that attended the first community open house. A link to the questionnaire was posted on the EDCTC website and social media platforms, as well as shared multiple times by other organizations, including CL News.
Below is a compilation of 97 respondents' feedback in graph form to depict community responses.

COLOMA LOTUS Mobility Plan

Q3 What age group do you belong to?

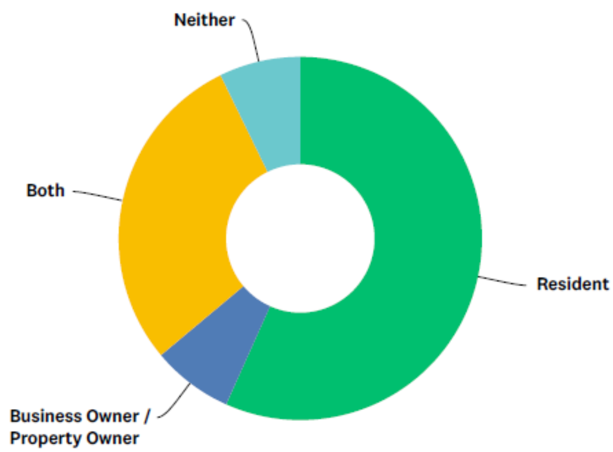
Answered: 97   Skipped: 0



ANSWER CHOICES	RESPONSES	
The Silent Generation (1925 – 1945)	7.22%	7
Baby Boomer (1946 – 1964)	61.86%	60
Generation X (Baby Bust) (1965 – 1979)	19.59%	19
Xennials (1975 – 1985)	8.25%	8
Millennial/Generation Y/Gen Next (1980 – 1994)	2.06%	2
Generation Z (1995 – 2012)	1.03%	1
TOTAL		97

Q4 I am a (BLANK) in the Coloma-Lotus Area.

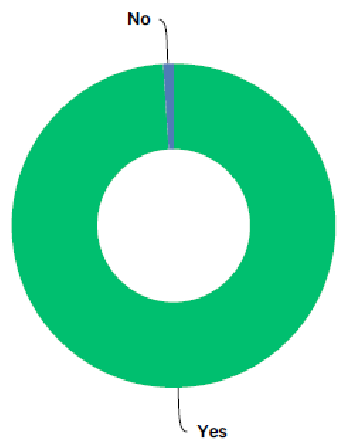
Answered: 97   Skipped: 0



ANSWER CHOICES	RESPONSES	
Resident	56.70%	55
Business Owner / Property Owner	7.22%	7
Both	28.87%	28
Neither	7.22%	7
TOTAL		97

Q5 Do you participate in recreational opportunities in the Coloma-Lotus Area?

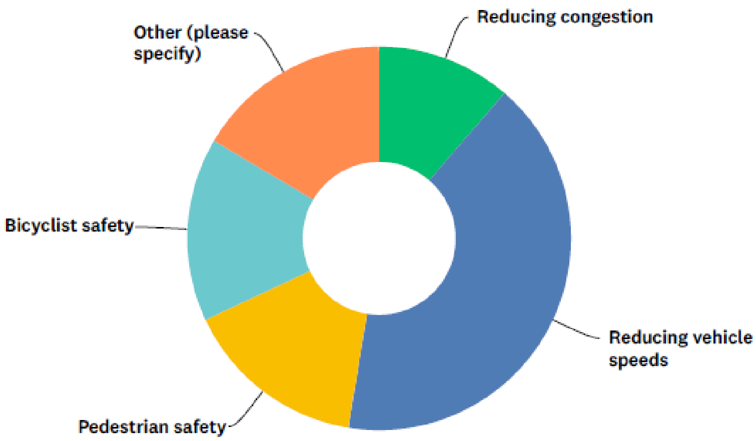
Answered: 97   Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	98.97%	96
No	1.03%	1
TOTAL		97

Q6 (1 of 2) What is your biggest concern in Segment 1: SR 49: Marshal Road to Marshal Gold Discovery State Park?

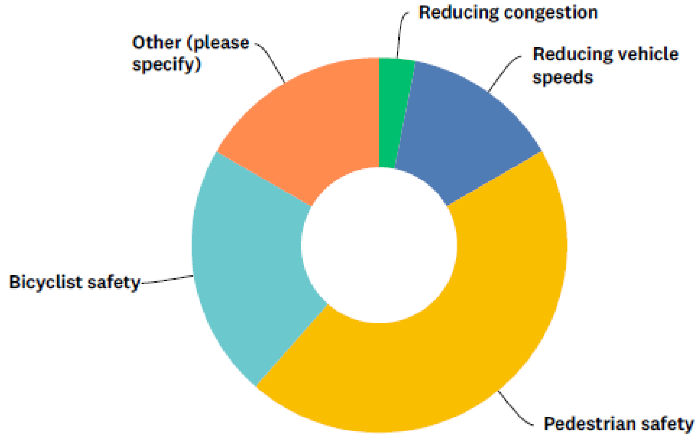
Answered: 97 Skipped: 0



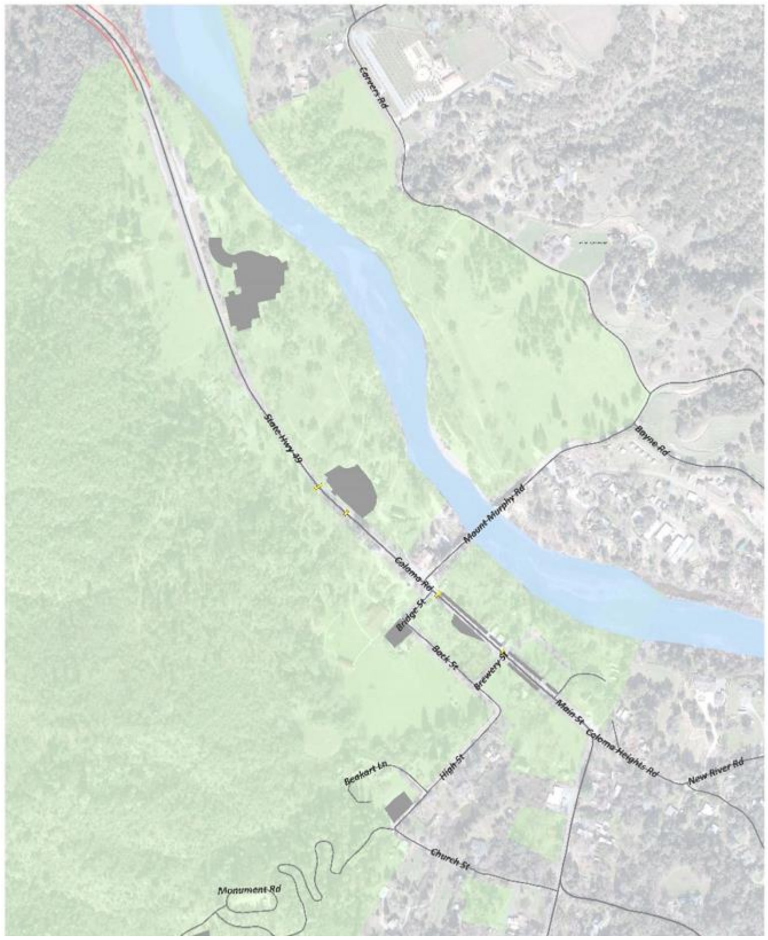
ANSWER CHOICES	RESPONSES	
Reducing congestion	11.34%	11
Reducing vehicle speeds	41.24%	40
Pedestrian safety	15.46%	15
Bicyclist safety	15.46%	15
Other (please specify)	16.49%	16
TOTAL		97

Q7 (2 of 2) What is your second biggest concern in Segment 1: SR 49: Marshal Road to Marshal Gold Discovery State Park?

Answered: 96   Skipped: 1

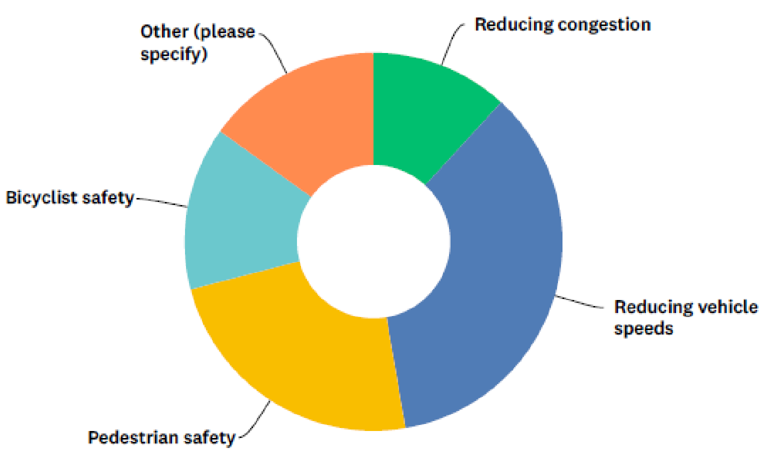


ANSWER CHOICES	RESPONSES	
Reducing congestion	3.13%	3
Reducing vehicle speeds	13.54%	13
Pedestrian safety	44.79%	43
Bicyclist safety	21.88%	21
Other (please specify)	16.67%	16
TOTAL		96



Q8 (1 of 2) What is your biggest concern in Segment 2. SR 49: Marshal Gold Discovery State Park?

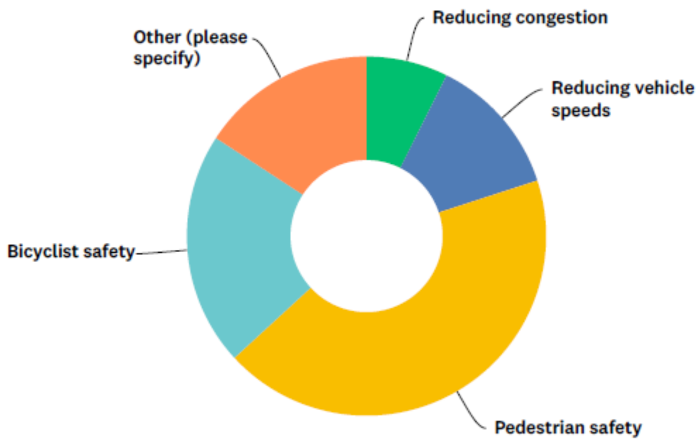
Answered: 93   Skipped: 4



ANSWER CHOICES	RESPONSES	
Reducing congestion	11.83%	11
Reducing vehicle speeds	35.48%	33
Pedestrian safety	23.66%	22
Bicyclist safety	13.98%	13
Other (please specify)	15.05%	14
TOTAL		93

Q9 (2 of 2) What is your second biggest concern in Segment 2. SR 49: Marshal Gold Discovery State Park?

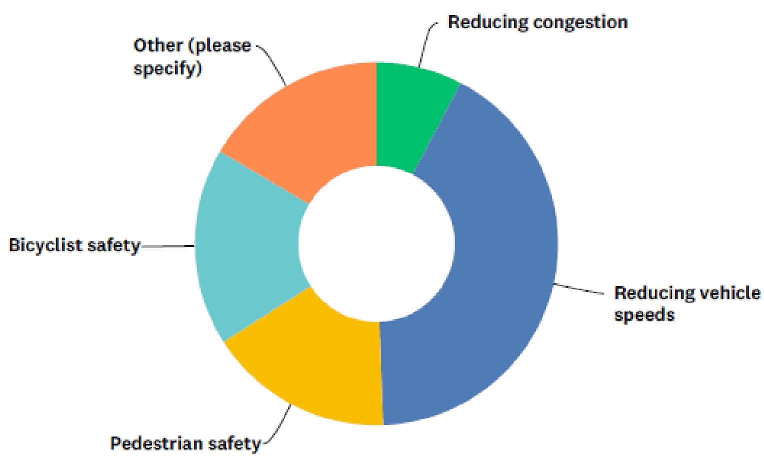
Answered: 95   Skipped: 2



ANSWER CHOICES	RESPONSES	
Reducing congestion	7.37%	7
Reducing vehicle speeds	12.63%	12
Pedestrian safety	43.16%	41
Bicyclist safety	21.05%	20
Other (please specify)	15.79%	15
TOTAL		95

Q10 (1 of 2) What is your biggest concern in Segment 3. Cold Springs Road: Church Street to Lakotah Lane?

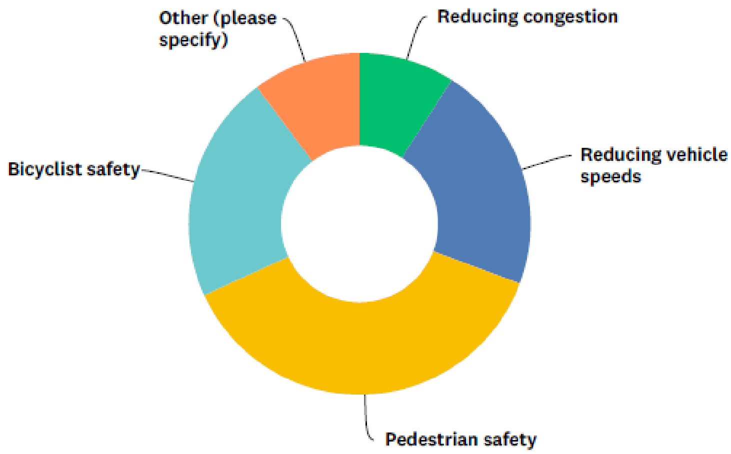
Answered: 91 Skipped: 6



ANSWER CHOICES	RESPONSES	
Reducing congestion	7.69%	7
Reducing vehicle speeds	41.76%	38
Pedestrian safety	16.48%	15
Bicyclist safety	17.58%	16
Other (please specify)	16.48%	15
TOTAL		91

Q11 (2 of 2) What is your second biggest concern in Segment 3. Cold Springs Road: Church Street to Lakotah Lane?

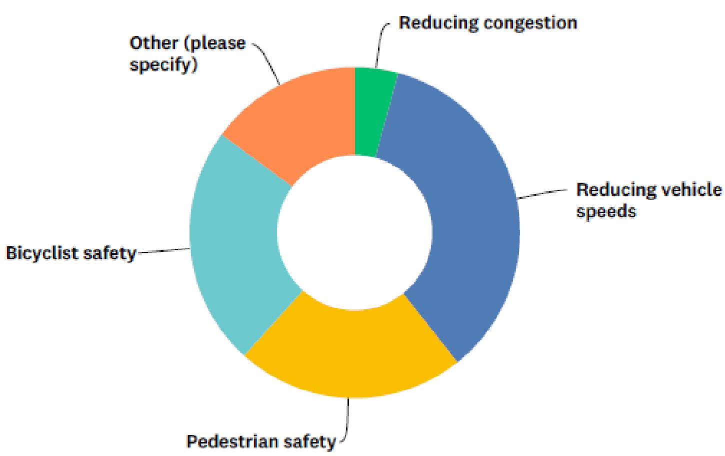
Answered: 88   Skipped: 9



ANSWER CHOICES	RESPONSES	
Reducing congestion	9.09%	8
Reducing vehicle speeds	21.59%	19
Pedestrian safety	37.50%	33
Bicyclist safety	21.59%	19
Other (please specify)	10.23%	9
TOTAL		88

Q12 (1 of 2) What is your biggest concern in Segment 4. Lotus Road: SR 49 to Bassi Road?

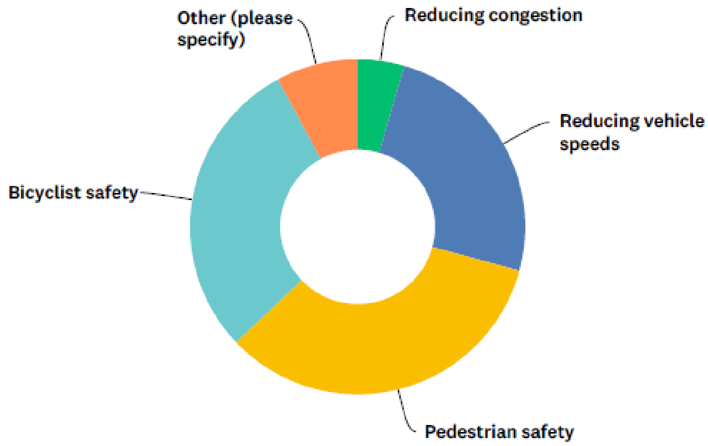
Answered: 94 Skipped: 3



ANSWER CHOICES	RESPONSES	
Reducing congestion	4.26%	4
Reducing vehicle speeds	35.11%	33
Pedestrian safety	22.34%	21
Bicyclist safety	23.40%	22
Other (please specify)	14.89%	14
TOTAL		94

Q13 (2 of 2) What is your second biggest concern in Segment 4. Lotus Road: SR 49 to Bassi Road?

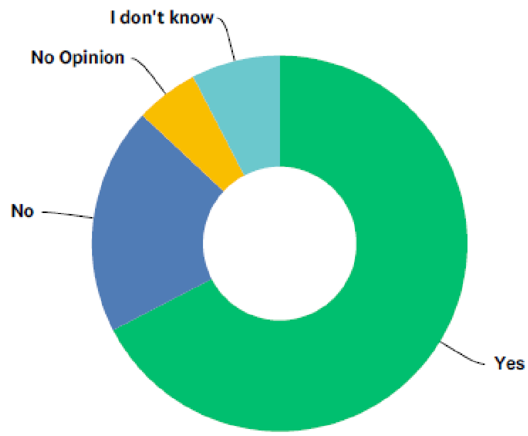
Answered: 89 Skipped: 8



ANSWER CHOICES	RESPONSES	
Reducing congestion	4.49%	4
Reducing vehicle speeds	24.72%	22
Pedestrian safety	33.71%	30
Bicyclist safety	29.21%	26
Other (please specify)	7.87%	7
TOTAL		89

Q14 Would you want reduced speeds on SR 49?

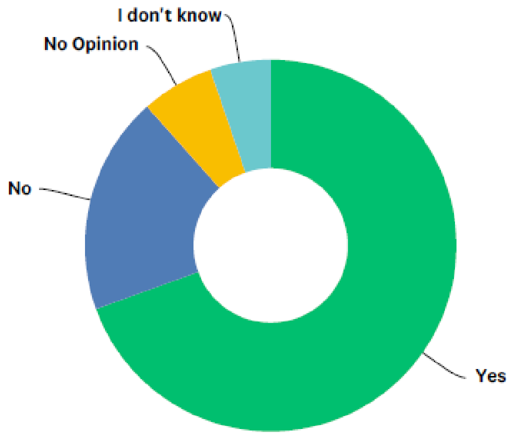
Answered: 92   Skipped: 5



ANSWER CHOICES	RESPONSES	
Yes	67.39%	62
No	19.57%	18
No Opinion	5.43%	5
I don't know	7.61%	7
TOTAL		92

Q15 Would you want reduced speeds on Lotus Road?

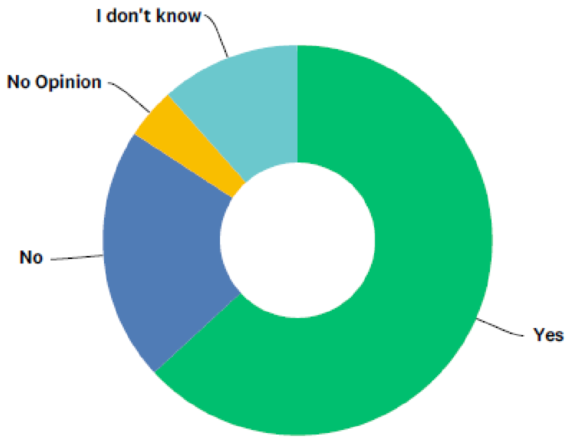
Answered: 95   Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes	69.47%	66
No	18.95%	18
No Opinion	6.32%	6
I don't know	5.26%	5
TOTAL		95

Q16 Would you consider controlled crosswalks with flashing beacons as a potential safety solution?

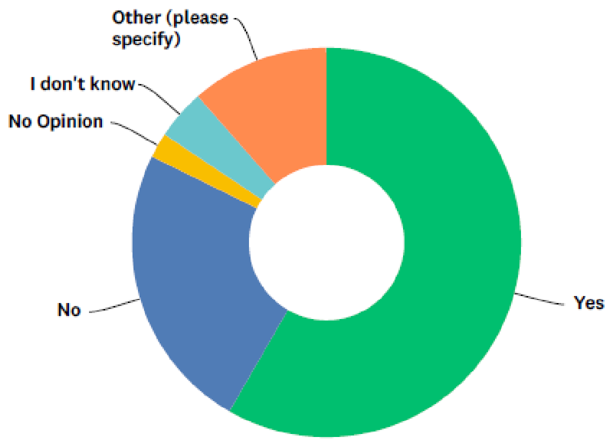
Answered: 95   Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes	63.16%	60
No	21.05%	20
No Opinion	4.21%	4
I don't know	11.58%	11
TOTAL		95

Q17 Would you consider a roundabout as a potential traffic control measure?

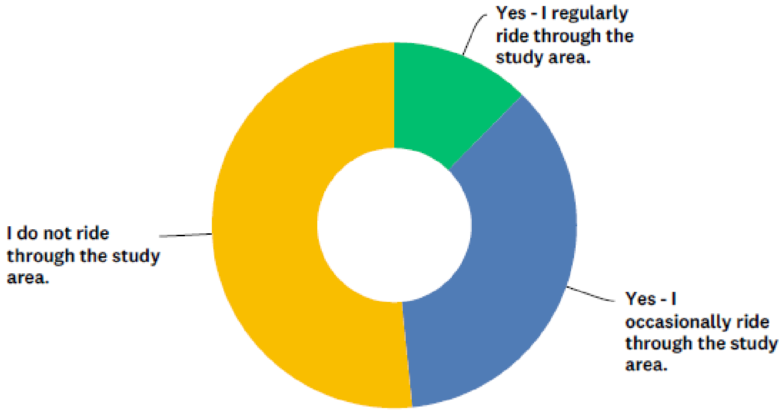
Answered: 96   Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	58.33%	56
No	23.96%	23
No Opinion	2.08%	2
I don't know	4.17%	4
Other (please specify)	11.46%	11
TOTAL		96

Q18 Do you ride your bike on SR 49 and/or Lotus Road in our study area?

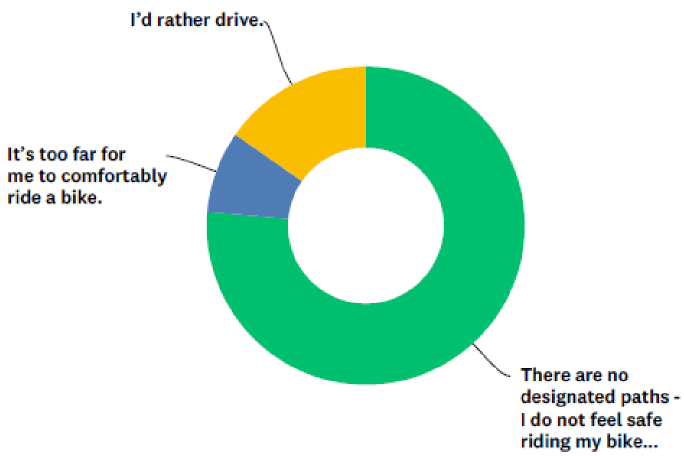
Answered: 97   Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes - I regularly ride through the study area.	12.37%	12
Yes - I occasionally ride through the study area.	36.08%	35
I do not ride through the study area.	51.55%	50
TOTAL		97

Q19 For those who choose not to ride a bike – what is the primary reason?

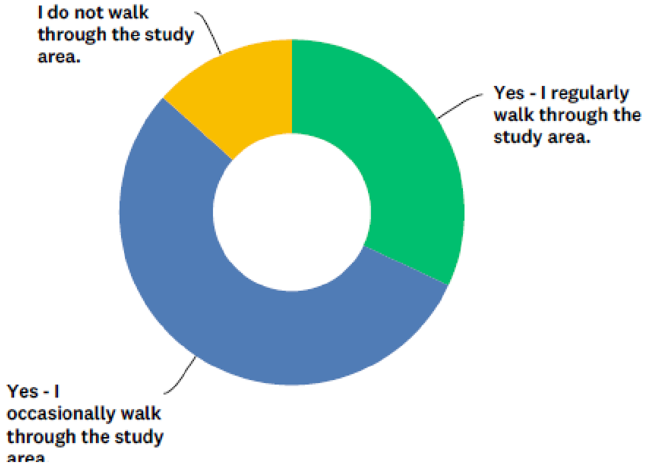
Answered: 72   Skipped: 25



ANSWER CHOICES	RESPONSES	
There are no designated paths - I do not feel safe riding my bike through the study area.	76.39%	55
It's too far for me to comfortably ride a bike.	8.33%	6
I'd rather drive.	15.28%	11
TOTAL		72

Q20 Do you walk on SR 49 and/or Lotus Road in our study area?

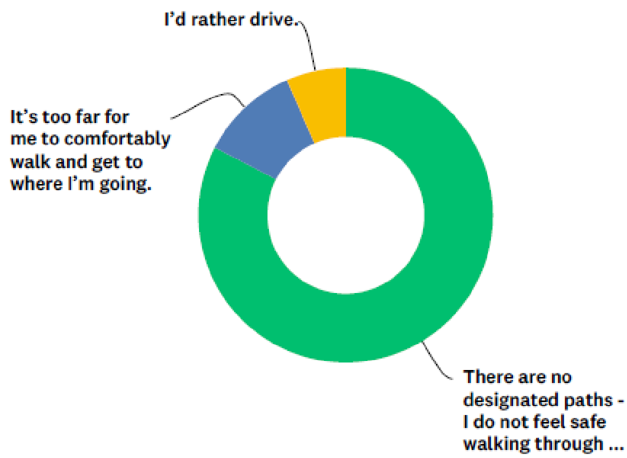
Answered: 97 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes - I regularly walk through the study area.	31.96%	31
Yes - I occasionally walk through the study area.	54.64%	53
I do not walk through the study area.	13.40%	13
TOTAL		97

Q21 For those who choose not to walk – what is the primary reason?

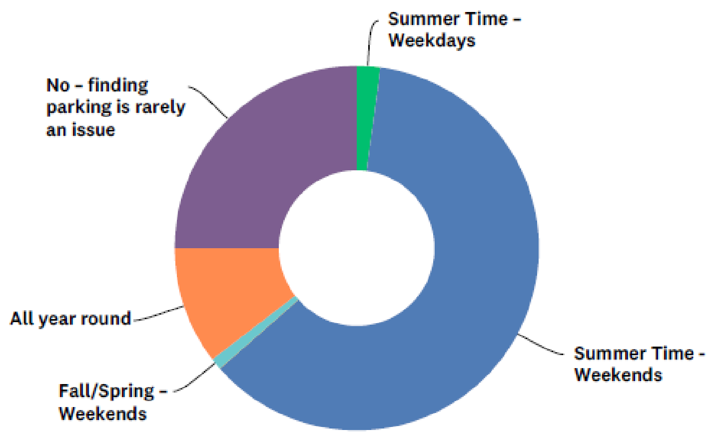
Answered: 46   Skipped: 51



ANSWER CHOICES	RESPONSES	
There are no designated paths - I do not feel safe walking through the study area.	82.61%	38
It's too far for me to comfortably walk and get to where I'm going.	10.87%	5
I'd rather drive.	6.52%	3
TOTAL		46

Q22 When do you consider parking becomes an issue in the Study Area?

Answered: 96 Skipped: 1



ANSWER CHOICES	RESPONSES	
Summer Time – Weekdays	2.08%	2
Summer Time - Weekends	61.46%	59
Fall/Spring – Weekdays	0.00%	0
Fall/Spring – Weekends	1.04%	1
All year round	10.42%	10
No – finding parking is rarely an issue	25.00%	24
TOTAL		96

09/06/19 – Mike Bean – Feedback Coloma-Lotus Mobility Study

I could not find the possibility of "park and ride" lot or spaces in study, seems like that could help with congestion. I was thinking somewhere between Marshall Rd and Lotus Rd off of SR-49, perhaps combine with transit stop.

Also I know hard to fund but I would love to see the paved width of Lotus Rd extended by a minimum of two feet (add a foot to each shoulder) from Bassi Rd to SR-49. I think topology allows (perhaps shifting centerline a foot in some spots), I just don't know how to fund. Could be done as part of resurfacing project. Shrinking lane to 11 feet as plan suggests may clam traffic but double long gravel trucks and RVs passing cyclists will not be more comfortable as width of road is still the same, they rarely slow down or give much space. I know full class II is difficult and therefore expensive but two foot shoulders (three foot shoulders where lanes decreased to 11 feet) could really help bikes and peds and make it easier for vehicles to get by both. I wonder if a short section of storm drains could be installed on south side (hillside ditch) near informal HLP parking to add width. Ideally all roads in study area would have a minimum paved width of 28 feet. My concern is that the proposed class I path from SR-49 to HLP along Lotus Rd does not address bike/ped access to HLP from Bassi Rd and Mountain View Dr. Also there will be a number of cyclists that would prefer to ride from HLP entrance to SR-49 intersection on Lotus Rd. These cyclists travel at a speed that could create conflicts for those using class I path. Someday it would be nice to have shared use paved paths from Bassi Rd (perhaps Mountain View Rd) to as recommended in:

http://ruraldesignguide.com/visually-separated/paved-shoulder

For now just an extra foot of pavement on each shoulder might be a lower cost interim solution. Yes I have walked and ridden a bicycle from Bassi Rd to SR-49 along Lotus Rd many times. Any bike/ped improvements welcomed.

Thanks, Mike Bean, Coloma, CA

Response:

- The request for a park and ride lot and / or transit stop on SR 49 between Marshall Road and Lotus Road has been forwarded to El Dorado Transit Authority for their consideration.
- The suggestion/request to widen Lotus Road to provide for 6-8 feet Class II bike facilities was discussed with the Stakeholder Advisory Committee. Providing a Class I multipurpose path was the preferred option. To widen Lotus Road to add just one additional foot of shoulder in each direction was not considered cost-effective.

09/6/19- Robert Smay - 5 September 2019 Meeting, EDC Mobility Plan

I attended the meeting yesterday, and thought about getting up during public comments, but restrained myself, as most of the issues concerning me were covered. I definitely am against the traffic circles, but most of the rest of the plan seemed reasonable. I was curious about why the traffic circle at Coloma Heights Rd And SR 49 was discarded, but since I am against traffic circles anyway, I held my peace.

The “actual speed” trailer at the north end of the park has been effective in slowing at least some of the traffic. Seeing how fast you are going outside your vehicle is quite sobering! I wonder if installing one at the south end of the park might help also. I also wonder whether such a device could be attached to a traffic cam to photograph license plates and issue citations? I believe most of the people who hurry through the park are local and speed because of familiarity, while visitors are either on tour busses or are proceeding cautiously because of unfamiliarity. Even those visitors who are regulars might take notice if cited once or twice! I am not sure of the legality thereof, but the county attorney would know or be able to find out.

I appreciated Supervisor Parlin’s concerns over the participation of interested parties and how they were selected. I was aware of the mobility planning, but never saw a notice of the meetings. Also, RMAC was listed as one of the groups consulted, but I don’t recall it coming up during my tenure. Perhaps that’s my error, but I wonder.

Thank you for your consideration of my comments.
Robert Smay

Response:

- The roundabouts proposed in the plan are considered to be sufficient to slow traffic and improve safety with the existing and proposed traffic volumes and speeds, without the additional roundabout at SR 49 and Coloma Heights Road. Should traffic volumes increase and safety of that intersection degrade, Caltrans and El Dorado County would likely revisit proposing a roundabout or some other improvement to resolve the issue.
- Figure 8.13 shows the location of two Vehicle Speed Feedback Signs at the "south end of the park"; one on northbound Cold Springs Road / SR 153 and one on northbound SR 49.
- The Coloma Sustainable Community Mobility Plan used best practices to conduct public outreach and utilized existing community links and consultation with El Dorado County, California State Parks, and the public to develop a list of 22 groups/entities representing a broad range of interests to be members of the Stakeholder Advisory Committee (SAC). At their regularly scheduled Board meeting on June 7, 2018, the El Dorado County Transportation Commission (EDCTC) ratified 22 groups/entities as SAC members (see Ratified SAC in Appendix A).
- See "Coloma-Lotus Mobility Plan Community Workshop Notification Plan" in Appendix A for the details on where flyers / posters were placed at key activity centers and businesses in the Coloma-Lotus area and how social media, email notification, electronic newsletters, email reminders to public data bases and news releases were used to notify the public of an upcoming workshop and planning effort.

The River Management Advisory Committee (RMAC) was a ratified member of the Stakeholder Advisory Committee (SAC). A member of RMAC attended the SAC meetings as the RMAC representative and was provided with a digital copy of meeting materials and was on the project email notification list. SAC members were asked to forward SAC meeting information to the members of their respective group.

09/05/19 – Kary Danielson – Round a bout

I fully support the proposed round a bout at highway 49 and lotus road. There are round a bouts in Grass Valley, Truckee, Meyers and Gardenerville Nv. They work really well and we need a safe steady traffic flow here in coloma /Lotus. Thank you

Response:

Comment noted.

09/03/19 - Karen Mulvany, Resident - Re: Public Comment on Coloma Lotus Mobility Plan

The Coloma Lotus Mobility Plan will be transformational for our community and for local businesses. Walking and biking locally in the vicinity of the scenic South Fork American River will change from infeasible or unsafe to strikingly beautiful and safe. The pedestrian bridge will create a loop between scenic river pedestrian and biking trails across the heart of old Lotus, also restoring a historic route. As for businesses, at present, many if not most of our local restaurants shut down between September and May, after the peak summertime crowds have faded away. I hope that this Mobility Plan will help to draw tourist visitation during the milder shoulder seasons in the spring and fall, when the river is often too high or low for whitewater outfitters, and lengthen the season for local businesses.

This was a well executed planning effort, with comprehensive public communications and genuine consideration and inclusion of public input. Though I was initially skeptical of the proposed roundabouts, the single lane design, safety and flow rationales for them were compelling and well supported by data, and I have come around to fully support them, as recommended by staff and consultants.

Having provided public comment previously, I am commenting only on changes from the immediately prior Plan recommendations, focusing on the Hwy 49 and Marshall Road intersection (see Figure. 8.3.):

1. Southbound Hwy 49 exit route from Coloma Club. The previously proposed roundabout has been eliminated, but there are right in/right out restrictions placed on the Coloma Club venue, which is the only venue in the area with a hard liquor license. With the loss of the roundabout, there seems to be no way for

exiting Coloma Club patrons to make a nearby U turn to proceed southbound on Hwy 49. Please identify a safe, clearly marked route for exiting Coloma Club patrons who need to proceed southbound on Hwy 49.

2. Loss of left turn lane on Southbound Hwy 49 at Marshall Road. Traffic currently piles up at this intersection on weekends and during commute hours, and the loss of the left turn lane will add to this congestion. The reason for the loss of the left turn land is to accommodate a new northbound Hwy 49 bike lane. From the County GOTNET map at https://gem.edcgov.us/ugotnet/, it appears that there may be significant unused Highway 49 easement available to widen the exiting roadway to accommodate the northbound bike lane. Please consider options, including making use of existing Highway 49 easement, or a boundary line adjustment or easement on the quarry parcel 088460004 and the BLM parcel 006341024, that would keep the southbound left turn lane.
3. Loss of right hand turn lane at the end of Marshall road at Hwy 49. Similarly, traffic piles up at this intersection during commute hours, and the loss of the right turn lane will add to this congestion. Please consider other options, including a boundary line adjustment or easement on the BLM parcel 006341024, that would keep the right turn lane. Note that the county online GOTNET map does not depict any separately county-owned land upon which Marshall Road sits as it passes through the BLM parcel, although the Marshall Road county-owned land is depicted as it passes through subsequent privately owned parcels.

Response:

- Right-in right-out access control will work for southbound out-going patrons of the Coloma Club by using the shared access with Cullumah Village Books and the Chevron Station (consolidating access). However, if this restricted access is a concern the raised median can be shortened to allow for full access at the existing Coloma Club driveway on SR 49. The turn restriction onto Marshall Road would remain.
- Based on the AM/Midday/PM peak hour intersection operations analysis the eastbound left turn volume is light during all three peak hours (less than 25 vehicles per peak hour) and currently operates at LOS A (minimal delay). Based on the new configuration the intersection will continue to operate efficiently and within adopted thresholds. The added channelization also indicates to motorists to reduce speeds. Conversely, any opportunity to provide the proposed bike lane through available easements or other means should be explored.
- The southbound approach currently operates at LOS B (minimal delay). Given the right-turn volume is so light at this approach during peak hours (less than 18 vehicles per peak hour), this approach acts primarily as a left-turn lane. Therefore, intersection operations at this approach are not projected to degrade by consolidating these movements. Again, any opportunity to use available easements or other means should be explored.

09/03/19 - Cece Walrond – Roundabouts - Coloma

We expect to be out of town on the 5th; here are my thoughts.

Lotus Rd/Highway 49
1. I like and favor roundabouts over flashing lights, or stop lights. There is a learning curve for people unfamiliar with roundabouts; we met one in England for the first time. After a day or two we mastered the process. Who cares if one had to go around a couple of times in order to get out! This is not an issue here.
2. How will the residents of Little Road get out and head south on 49 during peak commute times is a concern.
3. Tearing out the tax funded new 'wall' is a waste! Not certain that is a consideration.
4. Already this intersection is in a semi commercial/commercial area and the current traffic through it needs some improvement for sure.

Response:

- #1 - Comment noted.#2 – A roundabout would be designed to ensure that residents of Little Road maintain their current right-in / right-out and left-in and left-out access.
- #3 – The roundabout would be designed so it did not impact or require any change to the "wall.".
- #4 – Comment noted.

- Highway 49/Cold Springs

  1. I still like roundabouts, but in this intersection I do not favor one.
  2. The intersection is in a more rural, neighborhood setting. To remove chunks of people's front or side yards seems too bad and very intrusive.
  3. How do roundabouts work when the entrance to it is at the end of a steepish hill? Both 49 and Cold Springs would be of that type of road entering that roundabout from the south and from the west.
  4. Less damaging to the private properties that abut the intersection might be to cut back the corner lot on the ?southwest of the intersection so that the line of sight up Highway 49 would improve.

For what its worth these are our two cents worth.
cece and frank (howdy) walrond

Response:

- Standard design practices for roundabout design advise limiting the approaching roadway grades to 6%; upon a cursory review of the area, neither approaching roadway (SR 49 or Cold Springs Road) will exceed this threshold. To address the grade on SR 49 a speed feedback sign is proposed upstream of the roundabout to indicate to motorists to reduce their speeds. Additionally, a roundabout advisory sign will be placed. The roundabout itself will be designed with the proper deflection and sight line to the center island which will include gateway sign welcoming motorists to Marshall Gold Discovery Park. These features will naturally reduce motorist speeds as they approach and enter the circulatory lanes.

09/02/19 – Hilde Schweitzer - Re: CLMP

It seems that there are a dedicated and solid group of landowners in the valley that always try to be involved in things like this—myself included. I had the same argument with the Stakeholders chosen for the HLP Plan update-the same people representing similar interests with mostly business or tourism biases.

While tourism and commercial ventures are important to the valley, ultimately it is the people who own property and live here year round that everything impacts the greatest.

To continually choose the same stakeholders, many of whom are duplicates or made up of the same people (ex: CL Chamber, South Fork Arts and Recreation Council, CL Business Council, American River Recreation Association for example) does not indicate inclusiveness to me and certainly doesn't represent diversity.

I am glad to see that the bridge to Beach Court will still require a great deal of buy-in and study before it proceeds but am curious as to why it is shown as necessary in the first place given all of the trail, bike, and ped improvements on both 49 and Lotus Rd to move people from say Beach Court to HLP. Those improvements are stand alone benefits to move people safely for this relatively short distance. I did not get the sense of any overwhelming public interest in the bridge across the river at HLP aside from one landowner at the 2 meetings that I attended and am curious to how the decision to include it came about.

Last, these comments are meant to be constructive and in no way reflect my lack of appreciation for all the benefit that the community gain from this plan.

Best, hilde schweitzer

Response:

- The Coloma Sustainable Community Mobility Plan used best practices to conduct public outreach and utilized existing community links and consultation with El Dorado County, California State Parks, and the public to develop a list of 22 groups/entities representing a broad range of interests to be members of the Stakeholder Advisory Committee (SAC). At their regularly scheduled Board meeting on June 7, 2018, the El Dorado County Transportation Commission (EDCTC) ratified 22 groups/entities as SAC members (see Ratified SAC in Appendix A). Inclusion of the pedestrian and bike bridge provides a direct low-stress connection between SR 49 and HLP which obviates the need for pedestrians and bicyclists to access HLP from the more circuitous and high-stress Lotus Road.

09/02/19 - Dave Bishop – roundabout in coloma

to whom it may concern,

this roundabout idea is a money wasting folly. to begin with the traffic does not warrant it...period.

Also, there is talk of a 5million dollar walking bridge over the river...another extreme waste of money.

if we HAVE to use this money, how about repaving Bayne road? or Greenwood road... roads that are in serious need of repair.

There is literally no need for this in Coloma . At the presentation I went to, they said it was to provide safety for pedestrians. Riddle me this...is it safer to go 15-20 miles per hour, or to stop at the stop sign? (answer...come to a complete stop is safer)

Second point, as for improving traffic, this is not a high traffic area. only occasionally is there cars backed up, and that is usually because, A) there is work being done or, B) there is a big rig going through. finally,during this past winter freeze, on two occasions, the poor drainage at that intersection (froze up) caused me to slide through the intersection ... hows THAT gonna work if you dont come to a stop?(i can already see cars impacting that wall). and lastly, didn't the county JUST spend a (expletive deleted) of money on this area? And now they want to BLOW some more, when there is real issues with Bayne road, and Greenwood road, just to name two.

OH...lest we forget...you ALSO want to spend five million dollars to put a walking bridge across the river, a mere three hundred yards down stream from the bridge that ALREADY has a sidewalk on it.I don't know WHOSE idea this was, but they need to rethink their priorities. I am 100% against this project, and wish for that to be conveyed, and hope that my concerns prompt this project to be canceled in favor of more worthy and much needed projects in this area.(the divide.

respectfully, Dave Bishop
Garden Valley (wife and I drive this route daily)

Response:

- Congestion Mitigation and Air Quality (CMAQ) and Highway Safety Improvement Program (HSIP) funds are the most likely source of funds that would be used to construct a roundabout. CMAQ and HSIP funds cannot be used for road maintenance.

8/31/19 - Chad Richards – roundabout

Honestly I do not think place a roundabout at the corner of Highway 49 and Lotus is a good idea or use of funds. While I understand the concern due to vehicles running the stop sign at the intersection, and have seen it myself, I do not feel that it is a common enough occurrence to warrant such a large project. Placing a roundabout here will negatively impact the environment of our small community unnecessarily. We have already been subject to large projects that have resulted in questionable benefits to the area with many negative impacts. Additionally, with the number of large buses that come into our valley, a roundabout will only cause more traffic congestion as these drivers, most of whom are unfamiliar with roundabouts, negotiate them.

There are times when the "solution" only causes more of a problem and is a waste of money. In my opinion this is 1 of those cases.

Sincerely, Chad Richards

Response:

The roundabouts proposed in the plan are single lane roundabouts. At single lane roundabouts, the California Highway Design Manual states that the size of the inscribed circle is largely dependent upon the turning requirements of the design vehicle. At both roundabouts the design vehicle would be a California Legal Truck Tractor – Semitrailer, which has a maximum overall length of 65 feet and a king-pin-to-rear-axel (KPRA) length of 40 feet for two or more axels and 38 feet for single-axel trailers. SR 49 from Placerville to the El Dorado / Placer County line is designated as Segment Type A – KPRA Advisory Route (Only CA Legal Allowed – 65 feet long and 38 feet KPRA and with a King Pin to Rear Axel Advisory 30; KPRA over 30 feet not advised). Therefore, the inscribed circle diameter (ICD) on the two proposed roundabouts must be large enough to accommodate the California Legal design vehicle on the California Legal KPRA Advisory route while maintaining adequate deflection curvature to ensure appropriate travel speeds for smaller vehicles. 45-foot buses and motorhomes will not have difficulty negotiating a roundabout when it has been designed using the California Legal design vehicle.

08/29/19 - David Hammond - roundabouts

I am in favor of them where ever we can get them

Response: Comment noted

08/29/19 – Howard Fitzhugh - Roundabout and 245 Campsites

I strongly oppose this plan. The infrastructure in this part of the county cannot support this proposal. It will overload traffic in the canyon between Auburn and Cool, add additional burden on law enforcement, water supply, and increase the risks of fires. Please do not support this proposal.

Thank you, Howard Fitzhugh, Cool, CA

Response:

Improvements proposed in this Plan will be further analyzed through CEQA and NEPA to ensure the constructed projects do not increase traffic, impose additional burdens, or increase fire danger or environmental impact.

08/29/19 – jakendeb – round about

Please do not build round about. Use funds to repair our canyon road. It is in need of constant repair due to over use by logging and gravel trucks. Round abouts are confusing in my opinion and the 3 way stop is adequate for the traffic flow.

R. And D. Jacobs

Response:

Congestion Mitigation and Air Quality (CMAQ) and Highway Safety Improvement Program (HSIP) funds are the most likely source of funding for construction of a roundabout and cannot be used for road maintenance. No local road fund or road maintenance funding would be allocated to roundabout construction. When improvements are being developed, all alternatives will be evaluated to determine which provides adequate capacity for the traffic volumes.

08/28/19 – Kera Alexander – roundabout

Dear Mr. Bolster,

I am writing to voice my strong support for the concept of a roundabout at Highway 49 and Lotus Road. While traveling in Europe, I have encountered many roundabouts and find them easy to navigate, faster than stop signs or lights and safe. An added bonus is that cars aren't idling while waiting for other cars to move which I suspect saves fuel.

Thank you for the opportunity to comment on this topic.

Sincerely, Kera Alexander

Response:

You are correct, roundabouts are proven to reduce idling of vehicles and thus reducing fuel consumption and emissions.

08/28/19 – Dannymike – roundabout

Who thought up this ridiculous idea? It will create bottlenecks for traffic when done and create another mess during the construction phase. You must be looking to waste our money.

Response:

Roundabouts proposed in the Plan are only two of many solutions proposed to improve safety, mobility, and connectivity within the Coloma/Lotus community. This plan was initiated by California State Parks, EDCTC, Caltrans, and El Dorado County through a desire to improve transportation and safety in the area.

08/28/19 - Barb lee – Coloma-Lotus Mobility Plan

Hi Dan,

First, thanks for leading this planning effort. I just wanted to provide a couple of comments on the C-L Mobility Plan and express my general support of the assessment of existing traffic/pedestrian/bicycle conditions as well as the concepts suggested for future improvements throughout the planning area. Here are a couple of specific comments, as well.

By way of context, we travel through Marshall State Park daily and walk our dog there almost every evening. I am very supportive of the kinds of physical modifications identified, aimed at traffic calming and bringing speeds down. Pedestrian and bicycle safety improvements are certainly warranted.

Assuming there will be a fair amount of discussion, in particular, about the two round-abouts suggested to address safety issues at two of the study area's intersections, count me as a supporter. Setting up drivers to make a merge maneuver, all travel in the same direction, and simply choose an "out" is clearly a safer bet for all of us. Compare that to meeting a driver coming at us when when making a left turn from HWY 49 onto Lotus Road and not knowing if that oncoming driver is going to stop at the three way stop— and they don't always. The round about alternative seems much safer.

Additionally, I frequently make a dicey left turn at the Hwy 49/Church Street/Cold Springs Road Intersection. That is a left from Hwy 49 northbound, onto Cold Springs. Cold Springs drivers (on the left in this example) have a stop and they're visible, but it's very hard to see approaching vehicles (from the right in this example) that are continuing on 49, at that curve. Visibility to make that maneuver is a challenge to say the least, made worse by the vegetation at the Hwy 49 inside curve. And while I support the round about suggested in the future, I'm wondering if there are any interim measures that might simply address the ongoing issue of vegetation blocking lines of sight. That is, interim measures a little more lasting than a CalTrans maintenance crew (although that's always appreciated).

Again, thank you. Barbara Lee, Coloma

Response:

The issue of vegetation impairing sight distance at the intersection of SR 49 / Cold Springs Road / SR 153 has been forwarded to Caltrans.

08/23/19 - Thank you so much for your quick turnaround! My that is a high price tag us in it. If we run short of funds for all of our plans, is it possible to do some fundraising as well? I know we're not going to get to that amount but I know we've been raising some money for the artwork.

Great illustration last night of a traffic circle versus an intersection. Traffic circles definitely do what you all said they do, slow down traffic and improve safety.

Respectfully, Jacqui

Response: Segment 1: SR 49 – Marshall Road to Lotus Road does include the extension of existing sidewalks and bike lanes to Amaloc Lane.

08/23/19 – Hilde Schweitzer -- CLMP

Hi Dan

Thanks for the comprehensive review of the Plan.

A couple questions/concerns I have with just a quick review:

The Stakeholder Advisory Committee seemed to me to be extremely biased toward the tourism/commercial makeup of the community. It appears that the only resident group represented is the Coloma Heights Homeowners.

Example:

American River Conservancy
American River Recreation Association American Whitewater
Assistance League of Sierra Foothills
California Outdoors
California State Parks
Caltrans
Coloma Heights Homeowners
Coloma Lotus Business Council
Coloma-Lotus Chamber of Commerce
Coloma Outdoor Discovery School
El Dorado County Commission on Aging El Dorado County Senior Services
El Dorado County Winery Association

El Dorado Youth Commission

El Dorado River Management Advisory Committee

El Dorado Union High School District

Friends of El Dorado Trails

Gold Discovery Park Association

Gold Trail Grange

Gold Trail Union School District

Marshall Gold Discovery Park

Social Services Transportation Advisory Council

South Fork Arts and Recreation

Reviewing the proposed bridge across the river:

I believe the cost associated with all benefits in this segment including ped/bike improvement, a round about, and the bridge are listed as over $15 million. The bridge would channel people onto a road that exclusively abuts private property. Is there a land purchase included in the price and if so, whose land does this include? Given all the improvements to both HW 49 and Lotus Rd for pedestrians and bikes, and given the relatively short distance of travel to access these areas, I am not comfortable with the cost associated with the bridge. I am also against channeling HLP park users onto the other side of the river to potentially increase noise, trash, trespass, etc. If the Thomas land is to be purchased and turned into a Park that is a different story but to add a bridge that feeds people onto a residential area is not in the best interest of that neighborhood IMO. It is also a visual/aesthetic concern to me any time something like this is added in the river corridor.

The cost for this segment alone is the highest of all the areas studied and I believe the bridge contributes to this cost.

I will provide more comments once I have had time to review.

Thanks again for all you do for the community,

Respectfully, hilde schweitzer

Response:

- The Coloma Sustainable Community Mobility Plan used best practices to conduct public outreach and utilized existing community links and consultation with El Dorado County, California State Parks, and the public to develop a list of 22 groups/entities representing a broad range of interests to be members of the Stakeholder Advisory Committee (SAC). At their regularly scheduled Board meeting on June 7, 2018, the El Dorado County Transportation Commission (EDCTC) ratified 22 groups/entities as SAC members (see Ratified SAC in Appendix A). At SAC meetings and at the two Community Workshops, EDCTC staff invited any groups/entities that wanted to participate in the SAC to provide EDCTC with their point of contact and email address and they would be added to the SAC.

The location shown for a new bridge across the South Fork of the American River at Henningsen Lotus Park is a planning concept and has not been vetted through an environmental review and related public review process. Tasks such as environmental documentation, design, and identification of and acquisition of needed right-of-way would be part of a project undertaken by the implementing agency with jurisdiction to do so should the project receive funding and move forward.

08/15/19- J Moore - The sidewalk to Amoloc Lane, Lotus

Good evening Dan,

All of us in the Coloma Lotus area truly love what Caltrans has done with the road the bridges etc. It seems the northern end of the area is being a bit neglected. And I can certainly understand why. My husband and I, and our neighbors all love the new mobility plan because it includes sidewalks to keep us all safe as we travel from our road to walk to the post office or a place to eat.

Sidewalks especially on the highway like 49, provide safety for us and encourages us to be part of the neighborhood. Amoloc Neighbor does not just include that I'm sure you know there's also quite a long a road called lodestar off of that and tomorrow it's off of lodestar all of her mom use Amoloc Neighbor as ingress and egress since it is paved. Many people currently walk on Highway 49 between Amoloc Neighbor and the hardware store. But they do so at some risk. Please let us know what we might do to help in this endeavor. Many thanks for your continued work with our local mobility plan.

Response:

SR 49 to Marshall Road does include the extension of sidewalks and bike lanes to Amaloc Lane.

08/14/19 – Alice Butler – Draft CLMP

Hi Dan,

I can be more specific. In Figure 8.11 it shows the proposed path ending at the driveway downstream of the historic school on the river side of the highway. On figure 8.12 the proposed path on the other side of the highway widens from 8' to 10 '. It is not as heavily traversed on that side of the highway from the State Park around the corner, but everyone walks from Coloma Heights Road to the State Park on the river side. Why not extend the proposed path to Coloma Heights Road or at least French Garden Road. My experience is that people rounding the curve on North Bound Hwy 49 often over shoot that curve and when we are walking there it is scary. I was nearly struck one time when a girl was driving through the curve and taking a picture of the school with her phone at the same time. It would be safer to have a designated path from Coloma Heights Road on the school side of the road.

I think what I remember while not taking the time to go back and find it, was that when the diagram was showing a proposed round-a-bout at the intersection of Hwy 49 and Coloma Heights Road, there was also a proposed path on that side. Now that this has changed, we lost the path.

Thanks Dan. I have a backpacking trip planned for Sept 4th through the 8th and won't be able to attend the meeting with the EDCTC.

Response:

Figure 8.12 has been updated to include a pedestrian facility on the river side of SR 49 from the intersection of Coloma Heights Road to the proposed parking lot on the west side of the old school house where it will connect to the 8-foot shared use path shown on Figure 8.11.

08/14/19- Mike Bean – Draft Coloma Lotus Mobility Plan

I have not read every page in study but I have seen a few typos. Specifically there are a few places where Marshall Rd is missing the second 'L', Marshall Rd.

Not sure if I missed but any chance of "Share the Road" signs on Lotus Rd, near bridge for southbound traffic and one near bottom of grade where shoulder narrows for northbound traffic. Same would help on SR-49 between Marshall Rd and Greenwood Creek. Not sure what is threshold of observed bicycle traffic and conflict to justify signage. I understand you can't sign every road.

I happy to see bicycles locked at the bicycle rack BLM recently installed at Greenwood Creek River Access. I assume bicycle shuttles for river users.

Would be nice to see more bicycle racks around town. I believe the Lotus Post Office is only location with rack in community. I have talked with Barry about racks in State Park. I'm not sure if there is a bicycle rack in HL Park.

Mike Bean

Response:

- The request for "Share the Road" signs on Lotus Road and SR 49 was forwarded to El Dorado County Department of Transportation.
- The request for a bike rack at Henningsen Lotus Park was forwarded to El Dorado County Parks and Recreation.

08/13/19 – J Moore wrote:

It looks like the sidewalk plan is not going to extend Amoloc Lane? It would be a great way to get people in the Amoloc/Lodestar area safely down to the restaurants, stores, and our post office.

Jacqui

Response:

Segment 1: SR 49 – Marshall Road to Lotus Road does include the extension of existing sidewalks and bike lanes to Amoloc Lane.

08/13/19 Alice Butler – Draft CLMP

Wow, what a job preparing this document! Thank you and all the other people who worked so hard on it.

I looked over the majority of the figures included and like what I see. My main concern is that there is nothing planned for pedestrians walking out of Coloma Heights Road to connect with the path on the south side of Hwy 49. (unless I missed it) I saw the path on the north (east?) side of Hwy 49 through the park and for some reason I thought it was going to continue at least to Coloma Heights Road. I spend a lot of time in my front yard and see many pedestrians walk out from American River Resort headed to Sutter Market and make mad dashes across 49 in the curve. Fortunately, most of the south bound crashes occur at night when people are not walking across the highway in the curve. There are structures to channel the traffic and slow it down, but nothing to designate a safe place to cross.

My 2 cents!

Alice Butler

Response:

Figure 8.12 has been updated to include a pedestrian facility on the river side of SR 49 from the intersection of Coloma Heights Road to the proposed parking lot on the west side of the old school house where it will connect to the 8-foot shared use path shown on Figure 8.11.

08/05/19 – joe Tassinari – comment – RE: Draft CLMP

"Left hand turn lane" HWY 49 (northbound, from 49 bridge to Marshall Way direction) into Lotus Post office parking lot. This would help with traffic flow.

You and your team have done a terrific job with this project, keep up the great work!

Joe Tassinari

Response:

Comment noted.

08/04/19 – Dave R – Draft CLMP

This doesn't meet my needs. I am interested in what the county is doing to clean up the roads for fire evacuation. Ie. Paradise. This is a of money when we have other critical needs.

Dave

Response:

The roadway improvements identified in the plan are eligible for various local, state and federal transportation fund sources (see section 9.2 for an overview of the funds). These funds are specifically dedicated to active transportation and projects that improve safety and/or reduce vehicle emissions, none of which can be used for evacuation planning or vegetation removal.

08/01/19 – Howard Penn – Re: Draft CLMP

Is this going out to clnews or do you want this only to the participants? Do you want the new Coloma Lotus Advisory Committee to look at this?

Howard

Response:

The Draft Coloma Sustainable Community Mobility Plan was presented to the Coloma Lotus Advisory Committee on August 22, 2019.

Karen Mulvany
February 25, 2019

Subject: Coloma Lotus Mobility Plan Comments

Thank you for taking public comment on the Coloma Lotus Mobility Plan. Below are my comments.

Much appreciated,

Karen Mulvany

A. General comments:

- The plan does a great job of incorporating community comments and ideas.
- This will be a transformational project for resident and visitors alike.
- For new restrictions imposed by the plan, in particular the right turn/right-in only restrictions, please figure out and note how drivers will realistically be able to execute a legal U turn to gain access to their desired route. This will be particularly important to Little Road residents, who will not be enthusiastic about having to travel to a Marshall Road roundabout (1/2 mile away) in order to make a U turn and return to gain access to Lotus Road.

- Please minimize the installation of flashing lights, especially speed feedback signs, to the greatest extent possible. These may be needed in selective areas for safety reasons, but personally I find them to be inconsistent with the rural character of the Coloma Lotus Valley.
- If possible please use updated satellite images for your diagrams such as those found at Google Earth.

B. For Figure 1b, follow the proposed recommendations with the following revisions:

1. Thank you for including the proposed Pedestrian bridge from Beach Court to Henningsen Lotus Park! Please also consider including the following design options:
    a. The elevation of the Bridge will likely need to be high enough to remain above 1997 flood levels, meaning that the HLP end of the bridge may need to be sited nearer to Lotus Road. This may mean bisecting the ball field with the bridge, to a greater degree than the PG&E power lines do at present, or it may mean pushing the HLP end of the bridge to the upstream end of the ball field, nearer to Lotus Road.
    b. Include as an option the potential acquisition of the two parcels (APN 00601141 and 00634115, zoned Recreational Facilities and Community Commercial, respectively) which together with a new public easement could serve as the site for an alternative terminus of the bridge upstream of the proposed site, and the headquarters for an adjacent whitewater park.
    c. Include as an option solar powered gates on Beach View (located at the end of commercially zoned parcels) to protect the neighborhood privacy of Beach View residents

C. For Station 1, please follow the proposed recommendations with the following revisions/choices:

1. Use Figure 2b, installing the roundabout for the intersection of Marshall Road with Hwy 49. This is preferable to the channelized intersection update because the alternative proposed loss of the left hand turn land from southbound 49 onto Marshall Road would impact ongoing 49 traffic.
    a. Thank you for extending the sidewalk to Amoloc Lane!
    b. Please ensure that Southbound Hwy 49 traffic can make a left turn into the Coloma Club/old Highway 49. Turning onto Marshall Road and making a right-in turn to the Coloma Club will be too tight a turn for 2 way driveway traffic (the setback is inadequate).
2. For Figure 5, the intersection of Lotus Road and Hwy 49, please consider the following:

Summertime tubers take out at the 49 Bridge and walk back to North Beach at Marshall Gold to put in again. Though the 12' class 1 multipurpose path that begins at Little Road is ideal for this walk, this requires river-to-walkway access from the upstream side of the 49 Bridge, where pedestrian access to the river is currently blocked by a field of large boulders. At present river-to-walkway access is restricted to the downstream side of the

    a. 49 Bridge. In order for tubers to walk from the downstream side of the 49 Bridge to North Beach at Marshall Gold, the currently proposed pedestrian crosswalks would require tubers to take a circuitous route that will likely result instead in jaywalking in a very busy intersection. Please address this tuber pedestrian need.
    b. The local community has been designing an art project for the past two years for installation on the high retaining wall at this intersection. The proposed gateway entry sign in the roundabout could potentially interfere visually with this project, and should be sized to prevent this problem. The proposed sidewalk adjacent to this wall may also force the art project to be moved higher (by the height of the sidewalk) due to CalTrans height requirements. Tight coordination between the CL Mobility Plan staff and the community art project group will be needed.

3. For Figure 6, please construct the pedestrian connection to North Beach in order to divert tuber foot traffic away from Hwy 49 at the first opportunity.

D. For Station 2, please follow the proposed recommendations with the following revisions/choices:

1. For the intersection of Coloma Heights and Highway 49, please reconfigure Hwy 49 using Figure 10b instead of installing yet another roundabout, which is not necessary. The fatal accident there was caused by brake failure arising from the very steep grade on Cold Springs Road, which a roundabout would not mitigate.

   a. Do not stripe French Garden Road, which as far as I know does not lead to an approved parking lot or anywhere that a car should reasonably go.
   b. Please add a crosswalk so that pedestrians walking from Coloma Heights can safely cross over to the 10' walkway on the other side of Hwy 49 (and walk to Sutter Market).
2. For Figure 11, eliminate the speed feedback signs coming into Coloma on Hwy 49 and Cold Springs Road. These should be unnecessary with a roundabout at the Cold Springs Road/Hwy 49 intersection.

E. For Station 3, please follow the proposed recommendations.

F. For Station 4, parts 1 and 2, on Lotus Road, please follow the proposed recommendations with the following revisions/choices:

1. Please use Alternative B with the 10' multipurpose path, which will be safer and more scenic, also depicted in Figures 15b, 16b, 17b and 18b.
2. For Figure 12, Please:
   a. extend the project to Mountain View Drive to include more direct residential access in the project
   b. install a roundabout at the intersection of Lotus Road and Bassi Road to replace the 3 way stop.This intersection gets congested, especially in the summer when Camp Lotus visitation is in full swing.

Response:

- In response to Comment A, there will be no access controls on Little Road - the restriction was included in error in the draft rendering. This will be corrected in the final. Limiting the amount of lighting was a common theme heard during the community engagement process. Comment noted.
- In response to Comment B, comment noted. The suggestions B.a - B.c are appreciated and will be considered if/when the pedestrian and bicycle bridge advances for funding.
- In response to Comment C, comment noted. Right-in right-out access control will work for southbound out-going patrons of the Coloma Club by using the shared access with Cullumah Village Books and the Chevron Station (consolidating access). However, if this restricted access is a concern the raised median can be shortened to allow for full access at the existing Coloma Club driveway on SR 49. The turn restriction onto Marshall Road would remain. The "horseshoe" repeat tube runs was considered. The potential for uncontrolled crossings will be examined if/when the improvements advance for funding. Close coordination with Caltrans will be required for highway improvements considered as part of this plan – comment noted.
- In response to Comment D, based on input from the Stakeholder Advisory Committee, the proposed conversion to roundabout control at the intersection of SR 49 and Coloma Heights Road was revised to maintaining the current two-way stop control with additional channelization. Comment suggesting a high visibility crosswalk across SR 49 at Coloma Market is noted.

Transcription of Public Comments

Note: Names may not be correctly spelled. Transcribed comments are dependent on clarity of recording. An ellipsis is used where the words were inaudible.

Sue Taylor: I've been involved in two of these types of studies; one I actually helped to get funding for, and after it was approved for funding the whole course changed. And I don't think either of those projects were ever approved in the final stage, because I feel like they never … and this is coming on like a done deal, and I know you get all the studies done, you get shelf ready, you approve it, you know the public is told, well, we're not there yet, don't worry about it, and then the next thing, the next step is its coming before the Board and getting final approval because it's shelf ready. When does the public actually have to have that much input that they missed out on. As far as I know there was one public meeting that Lori was gracious enough to put it out on Facebook. I never knew that this was going on. That park means a lot to me. I'm, since I was 15 years old, there's a memory there that I've been really involved as a docent in the park, I do a lot of events down there and no one I'm surrounded with didn't even know this was going to happen. So, I care about a lot of the historic integrity of these places. This is a state historic park and there's a lot of stuff going on in that park and Barry's done a great job being in charge of it and there's a lot of great things happening. And roundabouts are too different and one of them at …. Cold Springs, and the topography is so crazy there to stick a roundabout in that pit. I don't know how, without destroying a lot of landscape or, you know, scenic there, and right now there's a stop sign, and there's a stop sign on the other end. So how much more can you stop traffic than stop signs, and I understand that roundabouts are going to slow down traffic. So, this is not just adjacent residents' park or area. I feel like this belongs to a lot of people. People care, and when I'm in the park there are hundreds of people from all over the world. I appreciate having better paths for walking, bicycle riding. I'd like to see those two things not compete with each other. There's a lot of people walking in that park. You have bike riders that are traversing and ... a transportation corridor and also people that are trying to walk so um I would like to keep the gateways, because that's an issue, because why does it have to be roundabouts. Use gateways and put them where it's more appropriate, … with cobblestone, if you want to slow traffic coming into the park, put in cobblestone, they've done that in Sacramento. And I would like to see more input and more understanding of what's happening and not see this move forward and shovel ready ... and not all the parts done before you can you know the whole place has changed and really nobody has anything to say about it . So go and rework and go back and get this done and …

Response:

- Comment noted.

Karen Bartholomew: I'm from Garden Valley, and I frequent Marshall Road and Highway 49 probably every day. I agree with everything that Sue had to say for the record. I was told that a place that really needs to have a calming area is up by Gold Trail School; that they have a problem up there. I don't know how big rigs and people who deliver to our area, coming down Lotus Road are going to make a roundabout, you know they're not supposed to come through the canyon to service our area, so I think that, that could pose a problem. I don't like the idea of taking a foot from each side of the road on Lotus Road because I think it makes it more dangerous for big rigs that are bringing products to our area, trucking companies and gravel trucks, etc. And I was wondering on the study, they were talking about accidents on the 49 and one death. I'm just wondering what time of the day it was that these accidents might have occurred. If it was during the day when children were playing in the park or after hours; for safety reasons, that raises a little concern to me. The other thing is, if you really want to calm something down, just put undulation speed bumps. They work and they're a lot cheaper. I know that's for roundabouts and not for the road but to me that's the best way to calm anything down. It's worked for me for years on my private road. And when all this gets said and done, if it does, who's going to pick up the bill for it? Is it all going to be funded or who's going to pay for this. I mean we're talking about a lot of expense here. I don't like the idea of putting in the roundabout at Marshall Road. I think the stop sign works perfectly well. I mean, I wouldn't mind, I don't know, I'm familiar with the State Park. I do 25 going through there and almost all the time several times a week going to Placerville. I have never seen problems there. I went there in the fourth grade as a kid too. And people are very, it seems like people are very patient with crosswalkers and where the crosswalks are and people seem to be very concerned about the children, and the teachers and the people walking on the road. And as far as bicycles go, it seems to me, if you want to make paths wider for bicycles fine, but I don't see cost-effective putting money in roundabouts when our roads. I know this doesn't cover roads, thank you. I hope you all think about it.

Response:
CA Legal semitrucks and trailers and 45-foot buses and motorhomes can safely navigate a roundabout when it has been designed using the California Legal design vehicle standards.

While speed bumps might seem like a good way to slow down traffic, they have several disadvantages on a state highway:

- Can cause problems for emergency response vehicles (e.g. an ambulance carrying an injured person or fire engine responding at high speed to a call)
- Can be hazardous to bicycles and motorcycles
- Can actually encourage some drivers to speed up
- Can cause vehicle damage
- Encourages drivers to speed up excessively between speed bumps
- Cars going over bumps cause unnecessary noise

Funding for any of the proposed improvements would be funded through State and Federal transportation funding programs.

Matt Semonsen: I'm sure none of you live in Coloma or Lotus. I live on one of the most stressful, and I want to say it's not stressful, roads to live on which is Little Road. It comes right out of, next to the 49 and the Lotus Road stop. So in looking at the proposal, it talks about stress and red lines. There are no red lines in Coloma/Lotus. If you want to talk red lines, just go through Placerville to get here, go through Davis, go to the Bay area, go to Sacramento. Coloma/Lotus has no red lines. With the proposed solutions, it goes to green lines. We are already at green lines. We don't need, that was a very misinformed piece of information as far as I'm concerned. I am 100% opposed to roundabouts. I've lived there since 1994. I've never had any trouble getting out of probably the most stressful road either egress or egress going out to Highway 49 not one time. The longest I might wait would be 30 seconds, okay? A roundabout at Lotus Road and Highway 49 will really confuse me because I don't know how I'm going to get in and out of there. And it's completely unnecessary. The only risk when you look at the proposal, there've been many collisions. There's only been one collision at Lotus Road and Highway 49. There have been many more up in the commercial area by the gas station. There've been many more up toward the park coming toward Placerville. Only one in my stressful intersection, and in my view, it's not stressful, because I live there. The one real place in being a boater, a bicyclist, I'm a boater, I ride bikes, I drive all the time, I run, is Lotus Road to Bassi, it's very narrow and people speed. That speed needs to be reduced, and the speed going north out of the state park to the stop sign since it's a fairly blind run, needs to be reduced. It's at 40 miles an hour, people exit 25, they see this beautiful highway and they gun it. And it's a blind curve. If you reduce that speed and you put in one of those speed sign indicators, you will solve any problem there. Thank you very much.

Response:

Slide 22 in the Draft Plan PowerPoint presentation showed a side by side comparison of Bicycle Level of Traffic Stress on SR 49 and Lotus Road under existing conditions (the left-hand side of Slide 22) and after improvements to the bicycle infrastructure (right-hand side of Slide 22). Existing bicycle conditions for the study area were analyzed based on Bicycle Level of Traffic Stress (LTS). The methodology for

Bicycle LTS can be obtained from the paper, Low Stress Bicycling and Network Connectivity (Report 11-19, Mineta Transportation Institute, May 2012).

It appears the information in Slide 22 was misunderstood as a traffic congestion heat map which displays real time congested traffic as a red line and clear traffic as a green line on common mobile device travel applications. Existing traffic volumes in the study area are not severe enough that it would display red on any segment of roadway on such a heat map. The maps on Slide 22 were only displaying the Bicycle Level of Stress.

Ron Murphy: Our property is directly involved at Cold Springs and Highway 49 property; there are four of us there. Talk about being engaged, we just heard about this. I've never heard anything about it until this last week. And all my neighbors, we hadn't heard about it. So as far as that being a congested area, the traffic comes down Highway 49, it's usually through traffic. There's never a bottleneck there. The people go right on through. The only bottleneck we have there is maybe five cars at the stop coming down Cold Springs Road from people coming back from work or Garden Valley or whatever, so you know as far as engaging and the public saying we ought to do this and that none of us have been involved. Anybody I've talked to hasn't been involved in any of this stuff until right now. So, I think, and most of my neighbors think, that these roundabouts just ruin the historic significance of Coloma and is changing Coloma, and we don't want any part of it, thank you.

Response:
While EDCTC strives to reach everyone that might be impacted by a plan or study, we are not always successful. When a project moves forward to consider improvements at the intersection of SR 49 and SR 153 (Cold Springs Road), EDCTC will work with the implementing agency to ensure that the parcels adjacent to the intersection improvements are involved early and throughout the project development process.
Based on the results of the existing conditions analyses, along with input received during the public engagement process, SR 49 within the State Park between SR 153 / Cold Springs Road and Bridge Street was identified as an area of greatest concern for traffic safety and operations. Issues cited by the public included high vehicular speeds; disregard for posted speed limits and intersection controls by the motoring public; pedestrian safety at crossings and bicycle safety.

Patty Boyer: from Lotus. Lori, thank you very much for all of your support. I'm pretty much saying, dittoing what everybody else has said. I am also opposed to roundabouts. I go over to Rocklin, to my dentist, and they have two roundabouts that I go through, very confusing. I've gone through there enough that I kind of know what I'm supposed to do and know where people are coming and going, and you'll have people coming down Lotus during the summer, don't know anything. They're coming for vacations down the river and they're not going to know what to do. They're going to get confused, and it's going to get backed up, and I don't know where you have people to be able to cross at the roundabout and like at Lotus and 49, so, um, the one part I find a little iffy is when you're coming down 49 and you have your first stop sign before you enter the park and say people are coming through the park and then they go through 49 or you may go up Cold Springs when you come down Cold Springs and stop, you don't know what these people coming this way are going to do because most of them don't put on their flashers. So, you sit here and wait. You're not going to go forward but that's the only place that I can find a little confusing, but I'm definitely against roundabouts. We have people coming here that haven't been here all summer, you know they're coming for vacations. I think they're confusing and also to put them over on 49 on Lotus and 49 after you spent all that money on the bridge and on that street and everything and then you're going to tear it all up again to put in a roundabout that takes up so much room. I also didn't know about any of those meetings. I was out of town I didn't know it cost 10,000 just for that and thank you for standing up for us, and I think input for this study is important.

Response:
The goal of the Coloma Sustainable Community Mobility Plan is to plan a safer transportation network throughout the study area. The overall improvement strategy developed to meet that goal was to reduce

travel speeds in the plan area through design modifications to SR 49 and Lotus Road (i.e., reduced lane widths, speed warning signs, intersection channelization and control modifications). Roundabouts are proven to reduce travel speeds and increase safety for walking, biking and driving.

The Coloma Sustainable Community Mobility Plan used best practices to conduct public outreach and utilized existing community links and consultation with El Dorado County, California State Parks, and the public to develop a list of 22 groups/entities representing a broad range of interests to be members of the Stakeholder Advisory Committee (SAC). At their regularly scheduled Board meeting on June 7, 2018, the El Dorado County Transportation Commission (EDCTC) ratified 22 groups/entities as SAC members (see Ratified SAC in Appendix A).

Judy Ryeland: I just wanted to agree with Patty Boyer here about the Rocklin roundabout. After I heard about this thing I went to Rocklin and believe me I don't want roundabouts. Do you know those little fast cars that go really fast around here, they sound really loud. Those things will go around roundabouts really fast, and so can motorcycles. My son is a truck driver, totally opposed to roundabouts. How about the stock trailers in Coloma. Are they going to be able to get around the roundabout? So, I have an issue with roundabouts. I have an issue with changing Coloma too much. We need to have safety with pedestrians like that ... turn in the road. I'm not sure what that's for but it's like you have to go to the state park and then stop. So, I like the strips across the road to slow them down, and I like the idea of a stop sign at 49 and coming down past the cemetery and down in that area, slow 49 down. Stops signs work great, and to have a roundabout on the littlest highway in the world is kind of like, I don't know, more parking for the Coloma Theater. Yea, I'm sorry, I've been here for 40 years, up in Garden Valley, and I've never had a problem with a stop sign at Marshall and 49. My kids just sold a house across the street from the Sutter Center. They lived there for 20 years, they had a half a dozen drunks and two people that lost brakes, that's it. So that's my stats for 20 years, I don't see what we have anything more to do but one more stop sign and slow down strips. … Thank you Lori for doing your help. Thank you guys too.

Response:
The California Highway Design Manual states that the size of the inscribed circle is largely dependent upon the turning requirements of the design vehicle. At both roundabouts proposed in the Plan the design vehicle would be a California Legal Truck Tractor – Semitrailer, which has a maximum overall length of 65 feet and a king-pin-to-rear-axel (KPRA) length of 40 feet for two or more axels and 38 feet for single-axel trailers. SR 49 from Placerville to the El Dorado / Placer County line is designated as Segment Type A – KPRA Advisory Route (Only CA Legal Allowed – 65 feet long and 38 feet KPRA and with a King Pin to Rear Axel Advisory 30; KPRA over 30 feet not advised). Therefore, CA Legal semittrucks and trailers and 45-foot buses and motorhomes
can safely navigate a roundabout when it has been designed using the California Legal design vehicle standards.

While speed bumps might seem like a good way to slow down traffic, they have several disadvantages on state highways:

- Can cause problems for emergency response vehicles (e.g. an ambulance carrying an injured person or fire engine responding at high speed to a call)
- Can be hazardous to bicycles and motorcycles
- Can actually encourage some drivers to speed up
- Can cause vehicle damage
- Encourages drivers to speed up excessively between speed bumps
- Cars going over bumps cause unnecessary noise

Karen Mulveyney: So, I'm going to say something different. First of all I want to say this is just a transformational plan for pedestrian and bicyclists and you're going to create some extraordinarily beautiful, world class grounds for people to walk to the river that you don't have now. And I also have to say that I was not included in the original steering committee but was invited to on Coloma Lotus Community and was invited to attend two informational meetings for this plan. I wrote in and reviewed the materials. My comments were included in the Amoloc Plan and … road. So, the team was extraordinarily responsive, and this includes my public comment, and I assume everyone else's as well … their drafts and initials on, so I'm sorry that everyone didn't attend all of those meetings because the opportunity was there. And for us, we kind of feel like we're on an island, living where we live, because we can't safely walk into town at present, so the ability to walk into town would truly be transformational, and I would also say that this economically, would create an opportunity to create in this, not ... Plan already, but also … Coloma is such a beautiful place for visitors to come and walk around ... And for businesses that normally shut down ... On the shoulders, … and as far as the roundabouts go, I was also originally against them as well, but I was persuaded by the data and by the historical … by them and to say this is a way to stop or slow down traffic, it was explained to the community many times, you can't just arbitrarily reduce the speed limit. And if people are speeding, unfortunately, the way California law works, they can raise the speed limit. You have to do so artificially, not artificially, but through other means, roundabouts being one of them, and so I believe that is an opportunity to do that. I remember when I lived in the Bay area and I was driving across the Golden Gate Bridge every day and you go through those toll bridges and every day, utter chaos, and merging chaos. I never in 20 years saw an accident there. I mean when it is confusing, people slow down and pay attention. And I'm not a traffic expert, but that tells me … Thanks.

Response:
You are correct that a speed survey would need to be done in order to reduce the posted speed limit. However, this does not ensure the speed would be reduced as often when a speed survey is completed speed limits are increased due to the percentage of vehicles travelling above posted limits.

Sue Luenga: 47 years. Thank you so much Lori for speaking up for us. At the meetings and at the Grange Hall, most of the people were for, or not for the roundabouts. I don't know where they got the numbers, but there were a lot of us that do not want the roundabouts. In my personal opinion, it's about the dumbest idea in the world. If people don't have enough common sense or brains to stop at a sign or a red light, they're not going to know what to do in a roundabout. Is there a plan that tells them how to use a roundabout, who has the right of way and who doesn't? I think it's going to be a free for all. I'd like to know where the studies were done that says roundabouts are safer; exactly when they were done and how many numbers were included. And one of the men said there were 22 comments on the survey and you said 122. So the numbers, that is not a majority of people in Coloma. That is not the majority of people. In my opinion that is not enough numbers in Coloma and Lotus. The speed bumps I believe are a better way to slow down traffic. I think the Murphy Bridge, I believe have more important problems, on Murphy Bridge because it's been going on for years and still hasn't come to a solution, and I'd like to know what the numbers are. We walk every day, on the far side of the river. We walk across the Murphy Bridge. We get our mail. Every day, we go through the park; every day for 47 years. We've never had a problem with safety or the traffic. Saying that there were 5, 35, collisions in 5 years, those numbers are pretty low, considering in 5 years. The flashing light buttons for pedestrians has been such chaos for traffic trying to come through with every student every person coming through pushing that button you're going to have traffic stopped all the way up to Placerville and to Cool. So, against the, totally against the roundabouts. I think it's a waste of money and a dumb idea, my opinion. Thank you Lori for speaking up for us.

Response:
On Wednesday, October 3, the El Dorado County Transportation Commission held a community workshop for the Coloma Sustainable Community Mobility Plan. The community workshop was held from 6:00 to 7:30 p.m. at the Gold Trail Grange located at 319 CA-49 in Coloma, California. More than 50 people attended the community workshop. During the community workshop, attendees were asked to

participate in an interactive live-polling activity (see Appendix A for a summary of the workshop and interactive live-polling). One of the questions asked during the live-polling was: "Would you consider a roundabout as a potential traffic control measure?" Seventy-five percent of respondents said "Yes."

From October 25, 2018 through November 25, 2018, EDCTC hosted an online questionnaire that contained the same questions that were asked during the live-polling session at the October 3, 2018 community workshop.

During the month the online questionnaire was available, 57 out of 97, or 58.33% of respondents said "Yes" to "Would you consider a roundabout as a potential traffic control measure?"
When any of the proposed improvements are considered for funding, design, and construction all possible alternatives will be considered including not only roundabouts but stop controlled and signalized intersections.

Roundabouts have proven to be a safer and more efficient type of intersection. State and Federal research and case studies supporting this conclusion are listed below:

- Evaluation of Safety and Mobility of Two-Lane Roundabouts (Minnesota, 2017) [PDF]
- Strategies for Effective Roundabout Approach Speed Reduction (Minnesota, 2017) [PDF]
- Roundabout Practices (NCHRP Synthesis 488) (2016) [PDF]
- Estimating the Life-Cycle Cost of Intersection Designs (NCHRP Web-Only Document 220) (2016) [PDF] and Tool [XLS]
- Evaluation of Heavy Vehicles on Capacity Analysis for Roundabout Design (Nextrans, 2016) [PDF]
- Roundabout Design Training for Alaska's Engineers (PacTrans, 2015) [PDF]
- Evaluation of Alternative Intersections and Interchanges Volume I - Roundabout Capacity and Rollover Analysis for Heavy Vehicles (Indiana, 2015) [PDF]
- Evaluating the Performance of Corridors with Roundabouts (NCHRP Report 772) (2014) [PDF]
- Accelerating Roundabout Implementation in the United States (Seven Volume Series) (FHWA, 2015)
    - Volume I – Evaluation of Rectangular Rapid-Flashing Beacons (RRFB) at Multilane Roundabouts – Final Report [PDF]
    - Volume II – Assessment of Roundabout Capacity Models for the Highway Capacity Manual – Final Report [PDF]
    - Volume III – Assessment of the Environmental Characteristics of Roundabouts – Final Report [PDF]
    - Volume IV – Review of Fatal and Severe Injury Crashes at Roundabouts – Final Report [PDF]
    - Volume V – Evaluation of Geometric Parameters that Affect Truck Maneuvering and Stability – Final Report [PDF]
    - Volume VI – Investigation of Crosswalk Design and Driver Behaviors – Final Report [PDF]
    - Volume VII – Human Factor Assessment of Traffic Control Device Effectiveness – Final Report [PDF]
- Evaluating the Performance of Corridors with Roundabouts (published as NCHRP Report 772) (2014) Report [PDF] – Appendices B-J [PDF] – Appendix K [PDF] – Appendices L-O [PDF] – Overview Presentation [PPT]
- Kansas Roundabout Guide, Second Edition (A Companion to NCHRP Report 672) (Kansas, 2014) [PDF]
- Implementation, Driver Behavior and Simulation: Issues Related to Roundabouts in Northern New England (Vermont, 2014) [PDF]
- Roundabouts and Access Management (Florida, 2014) [PDF]
- Effect of Signing and Lane Markings on the Safety of a Two-Lane Roundabout (Minnesota, 2014) [PDF]

- Information/Education Synthesis on Roundabouts (Montana, 2013) [PDF]
- Best Practices for Roundabouts on State Highways (Indiana, 2013) [PDF]
- Wisconsin Roundabout Guide (Wisconsin, 2013) [PDF]
- Statewide Roundabout Operations Monitoring and Evaluation (Wisconsin, 2013) [HTML]
- Developing Safety Performance Measures for Roundabout Applications in the State of Oregon (Oregon, 2013) [PDF]
- Accommodating Oversize/Overweight (OSOW) Vehicles at Roundabouts (Kansas, 2013) [PDF]
- Investigation of Pedestrian/Bicycle Risk in Minnesota Roundabout Crossings (Minnesota, 2012) [PDF]
- Demonstration of Roundabout Lighting Based on the Ecoluminance Approach (New York, 2012) [PDF]
- Joint Roundabout Truck Study (Minnesota/Wisconsin, 2012) [PDF]
- A Study of the Impact of Roundabouts on Traffic Flows and Business (Kansas, 2012) [PDF]
- Texas Roundabout Guidelines (Texas, 2011) [PDF]
- Evaluating the Performance and Safety Effectiveness of Roundabouts (Michigan, 2011) [PDF]
- Improving Drivers' Ability to Safely and Effectively Use Roundabouts: Educating the Public to Negotiate Roundabouts Final Report (Michigan, 2011) [PDF]
- Roundabouts in the United States (published as NCHRP Report 572) (2007) Report [PDF] – Appendices [PDF]
- Lane Restriction Signing and Markings for Double Lane Roundabouts (Multistate Pooled Fund Study, 2007) [PDF]
- Operational Performance of Kansas Roundabouts (Kansas, 2004) [PDF]
- Modern Roundabout Practice in the United States (published as NCHRP Synthesis 264) (1998) [PDF]

Jerry Mormon: I've lived in Coloma for 40 years. I'm in the travel business and have travelled all through Europe. This is historic California and most of the modern motor coaches I'm in all over the United States and throughout Europe are 45 footers. The problem with 45 footers going around a roundabout is challenging. The new offramp from Lotus Road onto 49 is, as established, is fantastic. My 45 footer, coaches come down perfect. There is no problem getting into Coloma, and I'm one of those involved in bringing thousands of kids here among other folks. Leave it the country. Leave it historic. We don't need a roundabout at either end of the park.

Response:
The roundabouts proposed in the plan are single lane roundabouts. At single lane roundabouts, the California Highway Design Manual states that the size of the inscribed circle is largely dependent upon the turning requirements of the design vehicle. At both roundabouts the design vehicle would be a California Legal Truck Tractor – Semitrailer, which has a maximum overall length of 65 feet and a king-pin-to-rear-axel (KPRA) length of 40 feet for two or more axels and 38 feet for single-axel trailers. SR 49 from Placerville to the El Dorado / Placer County line is designated as Segment Type A – KPRA Advisory Route (Only CA Legal Allowed – 65 feet long and 38 feet KPRA and with a King Pin to Rear Axel Advisory 30; KPRA over 30 feet not advised). Therefore, 45-foot buses and motorhomes can safely navigatea roundabout when it has been designed using the California Legal design vehicle standards.

Dani Pool: I live in Lotus. My dad has been here for 35 years so I've seen it grow. And if you want to see traffic, go down south. I've seen it; or go to L.A. or San Bernardino. It's a joke. I come up here, and my cousin goes, hey, we've got traffic, there's five cars in line you know, and I agree, and I think everybody here agrees. We do want safety, you know. Put the trails in. Make the ... safer. We do not need roundabouts, and I agree because it is an historical place, and I agree that we need speed bumps. They work. Just make 'em bigger, you know. They do stop you, and people will learn, and I think it's the out of towners, they are not agreeing with this. So it's not going to stop it. Safety is important, and I think that would bring people and people would be outdoors more for that reason. But my question is, if they are put in, how long is it going to be before they're torn up. How long is it going to be? Where does the traffic go? You're putting it right in the intersection, so how is traffic going to get around. So, you're going to have to go out that way to get around to where we're going. So, I live off Ponderosa and Bay Street, so it's just on the other side, and I use Lotus all the time and go up through Garden Valley. There's no back up, you know, and we've seen runners, yeah, they have a lot of … out there running and walking and really, but can't we start the project where we wanted to, where we agreed to. We do need some trails ... So can we start there and then broaden, because I feel like, people will give us, project started, and everyone is saying we'll do this, and then we see how did this come up, and that's how I feel about the roundabouts. That was not in the initial; we need to go back to the basic of what we need here. Thank you.

Response:
The proposed improvements in the plan focus on safety, operations, and connectivity of the study area, not congestion or high traffic volumes.

While speed bumps might seem like a good way to slow down traffic, they have several disadvantages on state highways:

- Can cause problems for emergency response vehicles (e.g. an ambulance carrying an injured person or fire engine responding at high speed to a call)
- Can be hazardous to bicycles and motorcycles
- Can actually encourage some drivers to speed up
- Can cause vehicle damage
- Encourages drivers to speed up excessively between speed bumps
- Cars going over bumps cause unnecessary noise

The proposed improvements in the plan have been developed in conjunction with the State Park Master Plan to connect with planned and existing trails and walking and biking routes.

Brian Bartholemew: Garden Valley. I was on the highway going through Plymouth not long ago and at the roundabout and pulling up to the thing … and it's out of place and people, you know, don't want to stop, and they might yield, and people quickly turned into the roundabouts. And also we talked about walkers and bicyclists about, I could see that … also used the roundabouts and tried to share those corners with a vehicle which creates another safety problem. I was also concerned about the, saw the … and people trying to get through those … in a hard area. I think it's a hard area and a poor place, I think that speed bumps or those cobblestone type of roads might be a better fit for our needs

Response:
Roundabouts can be a little intimidating when approached for the first time. But cars, trucks, cyclists and pedestrians can all make it through safely by following a few simple rules. As you approach a roundabout in your car, you'll notice a yellow, diamond-shaped sign with a circle of arrows denoting the roundabout ahead. It will also have a suggested speed, usually around 20 miles per hour. Slow to that speed and look for pedestrians in the crosswalk. If the walk is clear, continue to the yield sign, checking to your left for any traffic in the circular roadway. If it's occupied, stop at the dashed yield line; otherwise, you're good to enter the roundabout. Once in the roundabout you have the right-of-way, so don't stop or you will disrupt the flow of traffic. Once you reach your chosen exit, signal to indicate your intention to turn and check again for pedestrians. The only thing that should stop you now is if the crosswalk is occupied. When walking through a roundabout, pedestrians should never cross the circular roadway. Instead, they should cross the legs about one vehicle-length from the circle, preferably at a crosswalk. Even though pedestrians have the right-of-way, they should make sure drivers see them before stepping out into the road. If necessary, pedestrians can use the splitter islands for refuge. Bicyclists can choose to ride though a roundabout like a car or pull over and walk it like a pedestrian. If a bicyclist decides to ride through the roundabout they should occupy the center of the lane in order to discourage cars from passing and then signal before exiting.

Roadway surfacing choices are known to affect the intensity and spectrum of sound emanating from the tire and surface. Replacing asphalt roads in the plan area with cobblestone would increase noise and make for an uneven and bumpy driving experience. Cobblestones are also slippery when wet, increasing the stopping distance for vehicles. Wet cobblestones also make slippery, unsafe conditions for pedestrians and bicyclists.

Joanne Thornton: I've been listening to everybody and I agree with most. Okay, those big rigs that come down Lotus Road that would hit the proposed roundabout. They have to take that road. They cannot come up Highway 80 and go up Highway 49 to get on ... They absolutely cannot do it by state law. Their only route is to come up 50 to Lotus Road and down and coming up 49 the access ... I know for a fact. I wanted to hire a local, big pieces of equipment, and I said, well I live closer to Auburn, and he said well we can't come up Auburn. We can't come up 80 and go through the canyon. We have to go all the way around and come up 50. That is the issue. You try to put a roundabout in and a big low boy comes in, that's not going to happen very well. Your intersection is going to come through, and they're going to run over it. I've heard some other comments that drive big rigs that have to come that way. They're going to plow right over it because they can't make that turn. That wasn't addressed in the study as far as I can tell. And one fatality in four years; I'm sorry that doesn't create such a catastrophe that we need a roundabout Thank you Lori for getting this out to us in the north county because nobody knew, and as a lot of people in the north county are working. They can't attend these meetings. So since you were such a focused group and only focused on getting comments from a small area, you failed to expand the area when you expanded your scope. One hundred and twenty two comments is nothing. A lot of these people were never even notified so, um, that's a problem. Um, it almost sounds like you guys are using the roundabouts as a guise to get grant money and possibly use the excess to improve the trails along Lotus Road and safety, and I totally can see why you would do that. It's not right. Lotus Road does need more trails. I fully agree with that, walking trails, biking trails. What you guys have done, the bridge is awesome. I just agree with everybody and please don't give the comments no credit for comments. Lori's comments on Facebook regarding, well everybody wants to use that money for potholes. No, we don't. Yeah, there were a few comments about that but for the majority of those people that are commenting, comes very clear concerns and should be taken seriously. Thank you.

Response:
The roundabouts proposed in the plan are single lane roundabouts. At single lane roundabouts, the California Highway Design Manual states that the size of the inscribed circle is largely dependent upon the turning requirements of the design vehicle. At both roundabouts the design vehicle would be a California Legal Truck Tractor – Semitrailer, which has a maximum overall length of 65 feet and a king-pin-to-rear-axel (KPRA) length of 40 feet for two or more axels and 38 feet for single-axel trailers. SR 49 from Placerville to the El Dorado / Placer County line is designated as Segment Type A – KPRA Advisory Route (Only CA Legal Allowed – 65 feet long and 38 feet KPRA and with a King Pin to Rear Axel Advisory 30; KPRA over 30 feet not advised). Therefore, the inscribed circle diameter (ICD) on the two proposed roundabouts must be large enough to accommodate the California Legal design vehicle on the California Legal KPRA Advisory route while maintaining adequate deflection curvature to ensure appropriate travel speeds for smaller vehicles. A California Legal Truck Tractor – Semitrailer can safely navigate a roundabout when it has been designed using the California Legal design vehicle standards.

To notify residents of Georgetown, Cool, Garden Valley, Coloma and Lotus of the availability of the Draft Coloma Sustainable Community Mobility Plan for public review and the presentation of the draft plan at the September 5, 2019 EDCTC Board meeting, a press release was published in the Mountain Democrat on July 31, 2019 and in the Georgetown Gazette on August 1, 2019.

Notice of the availability of the draft plan for public review and the September 5, 2019 EDCTC Board meeting was also posted to the EDCTC project website - https://www.edctc.org/coloma - and EDCTC Facebook page, was sent out via email to the project email list and the project SAC.

Terry Keyes: … I'll make this quick, those of you on the City Council don't know me very well at all. I hope you make … today. I come from a family of top-notch engineers. The head engineer that built the Oroville dam, not the spillway, but the Oroville dam, who said it would fail, as did I in 1967, when I was working on the dam. I have three cousins who served as (request by Chair to move forward on subject matter) Okay, but the point is, this is relevant, because this is science. Engineers, scientists in every profession go through what I call the Bandwagon affect. There are statistics about this. Roundabouts work extraordinarily well where they are built in as part of an integrated plan into a much larger system to retroactively go back in and put a roundabout into a place where roundabouts weren't ever going to be built, tends not to work. I've had cousins in Humboldt County, Oregon, Montana, who put in roundabouts, as heads of counties, then put more roundabouts in certain places where they fit and worked well. But they always built them so they could modify them and change them, but at the same token they often took out roundabouts because they realized that, after the fact, they had fallen into the trap of the bandwagon affect. Any decision by this Board needs to be made carefully. One final point is; this county is already on the major front about funding for highway and road improvements. You should only be funding road improvements, I don't care if the funding comes from grants, only in situations where your best judgement, absolute best judgement, and from talking with the people who have to live and work in that area, what they have to say. If it's not a green line all the way, there are other places to spend the money believe me. Thank you.

Response:
Comment noted.

Rafael Martinez: Director of Transportation. I just wanted to say that I'm a registered traffic engineer, and I too am uncomfortable going into a roundabout, but statistically, that is, in part, why they do work. I just went to Tahoe this past weekend, and as many of you know Caltrans is building a roundabout at 50 and 89 and with a partially constructed roundabout, thousands of vehicles went through it, and I just finished speaking to the Lieutenant, CHP officer, and he told me there was not one reported accident at the location. And there were several trailer trucks that did go through it without any trouble, and that is with a 50% constructed roundabout. But nevertheless I do understand the concerns of my relevance back here because roundabouts are a nuisance, they are uncomfortable, and they are not typical of the standard design in this county, so it is something that my staff and I have tried to put effort to try to educate as to the benefit and the negatives, because there are negatives, and every roundabout is not beneficial at every location and that's why we create plans like what El Dorado County Transportation Commission is creating. They are creating a plan for the future. Ten years ago, when we started the planning for the Ponderosa Interchange, people were afraid because the traffic wasn't there, but if we hadn't started that process back then, today, we wouldn't be finishing the environmental for that project. that's where we are here today. We are trying to come up with a plan for potential improvement for traffic that will help the traffic alleviate some of the conditions that we anticipate and improve safety eventually. I haven't had an opportunity to find out more about the outreach that was done for this project, but I would love to engage with El Dorado County Transportation Commission as well as some of the residents to see further see the pluses and the minuses for a roundabout as well as talk about some of the other recommendations that some of the public had such as speed bumps. Some municipalities and other organizations including Fire and Caltrans and others, but none the less, I do understand the residents' concerns and getting to the CEQA process, but you do realize you must make a decision whether it's going to be a roundabout or a signal, and having that healthy constructive conversation. Thank you.

Response:
Comment noted.

Mike Bean: Coloma, I'm one of the crazy people you see out walking or running out on the side of the road. I just hate to see this whole plan get shelved or to not go anywhere. Lotus Road is kind of sketchy on a bike, moving the fog lines in really won't make it safer for me when a gravel truck is going by. Widen it by a foot … If I lived on Bassi Road, I actually live on Scott Road, but if I lived on Mountain View I would like to be able to walk over to Henningsen/Lotus Park. I can't do that right now. I can't ride a bike. It would be nice to do those things. Thanks.
Response:
Comment noted.

Barry Smith: Chief Ranger Gold Hill District. I have been very involved in this plan. I kind of, you know, the Marshall Gold Discovery Park is the heartbeat of the county, heartbeat of the community, heartbeat of the state, heartbeat of the world. The reason why we're sitting here today is because of Marshall Gold State Historic Discovery Park. I've spent the last five, six years there. I've looked at people moving about and seeing the very unsafe ways in which it happens. At times I've walked through the park at night and envision about how we can make this park safe. I look at this plan in a much bigger picture. I have plans throughout the entire park to improve the safety and accessibility. This plan allows us to tell more history. It allows us to tell history that we're not telling now. It doesn't matter where you come from around the world; you can find your relevance in early California history, and I think that is very important. And many times, I've watched the campgrounds throughout the park and the ... In the park and I've watched the children ride through and they really have roads to nowhere. How wonderful would it be to camp at the Coloma Resort or the American River Resort and be able to ride with your family safely through the park to Lotus and have pizza and then to ride with your family back in a safe manner. That to me is what we are really here talking about. It's about accessibility to the thousands of kids and thousands of visitors that come yearly to this park. And I know we are talking about the roundabouts, and that seems to be the focal point. but let's look at the big picture of this plan in bringing the community together. I think that is really important, and I appreciate Dan working with Jim and having a meeting with Caltrans in being able to bring these safety concerns up and finding some sort of plan or some resolution for the future. The general plan dates back to 1978 about the park. That plan actually moved Highway 49 out of the park. I think that would be a topic we would have difficulty in discussing. And so that was the plan, and I don't see that ever coming to fruition. So thank you again for your time and thank you for listening. And if anyone ever wants to come out to the park and see all of the wonderful things we are doing please, but this plan is a much bigger picture. And I hope you all understand that. Thank you everybody and for all the comments today.

Response:
Comment noted.

Matt Smeltzer: El Dorado County DOT. I have been a participant in this study. I have been a participant in many studies and the ... Bridge that Caltrans did, and these are all safety projects. Mount Murphy Bridge, one my projects, was a very important safety project also. One of the things in common with all of these projects that I've heard in many public meetings, that I've heard, are about pedestrian safety, vehicle speeds, vehicle pedestrian conduit. And I was happy to be involved in some of the catalyst that got this going in two bridge projects and getting together with Parks and Caltrans, the Commission to help bring this next study to help advance and improve … in this community. And I think the Commission has done a great job, in picking the right consultant, who is definitely an expert in the field, one of the best that I know, in this type of study, and I think has done an excellent job in addressing the concerns of the community and the advisory committee and the public and I'd like to commend them on the great job they've done.

Response:
Comment noted.

Appendix B: Level of Service Thresholds

Level of Service (LOS) criteria

Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay/Vehicle		
				Signalized	Un-signalized	All-Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	<10.0	<10.0	<10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and <20.0	>10.0 and <15.0	>10.0 and <15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20.0 and <35.0	>15.0 and <25.0	>15.0 and <25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and <55.0	>25.0 and <35.0	>25.0 and <35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and <80.0	>35.0 and <50.0	>35.0 and <50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	>80.0	>50.0	>50.0

Appendix C: Planning Level Cost Estimates

Coloma Sustainable Community Mobility Plan

Opinion of Probable Construction Cost

Overall Project Cost (All Four Segments)

Item #	Item Description	Unit	Quantity	Unit Cost	Total
1	High Visibility Striping	LF	5,600	$1.25	$7,000
2	High Visibility Striping with Runbmlestrips	LF	9,580	$2.25	$21,555
3	Resurface Roadway and New High Visibility Striping	SQFT	327,510	$10	$3,275,100
4	Reconstruct Roadway/Roadway Widening	SQFT	3,140	$25	$78,500
5	Class 1 Path (Paved)	SQFT	81,330	$12	$975,960
6	Retaining Walls	LF	2,500	$350	$875,000
7	Concrete Sidewalk/Path (Includes Curb and Gutter)	SQFT	25,910	$17	$440,470
8	Decomposed Granite Path	SQFT	9,000	$8	$72,000
9	Pedestrian Crosswalk (High Visibility Markings Only)	EA	7	$4,000	$28,000
10	Pedestrian Activated Rectangular Rapid Flashing Beacon (RRFB)	EA	6	$15,000	$90,000
11	Pedestrian Hybrid Beacon System	EA	7	$35,000	$245,000
12	Speed Feedback Sign	EA	2	$12,500	$25,000
13	Stop Controlled Intersection	EA	7	$25,000	$175,000
14	Roundabout Intersection	LS	1	$2,800,000	$2,800,000
15	Coloma Heights Intersection Improvements + ROW	EA	1	$128,000	$128,000
16	Pedestrian Bridge	EA	1	$5,000,000	$5,000,000
17	Contingency/Miscelaneous Items (50%)	LS	1	$7,118,300.00	$7,118,300
				Rounded Total (Construction Cost)	**$21,355,000**
				Project Administration (5%)	$1,068,000
				Preliminary Alternatives / Environmental Document (12%)	$2,563,000
				Design Cost (15%)	$3,204,000
				Construction Suport (8%)	$1,709,000
				Total Project Cost	**$29,899,000**

Coloma Sustainable Community Mobility Plan

Opinion of Probable Construction Cost

Segment One (SR49 - Amoloc to Lotus)

Item #	Item Description	Unit	Quantity	Unit Cost	Total
1	High Visibility Striping	LF	5,600	$1.25	$7,000
2	High Visibility Striping with Rumblestrips	LF	0	$2.25	$0
3	Resurface Roadway and New High Visibility Striping	SQFT	0	$10.00	$0
4	Reconstruct Roadway/Roadway Widening	SQFT	1,100	$25.00	$27,500
5	Class 1 Path (Paved)	SQFT	0	$12.00	$0
6	Retaining Walls	LF	0	$350.00	$0
7	Concrete Sidewalk/Path (Includes Curb and Gutter)	SQFT	9,160	$17.00	$155,720
8	Decomposed Granite Path	SQFT	0	$8.00	$0
9	Pedestrian Crosswalk (High Visibility Markings Only)	EA	1	$4,000.00	$4,000
10	Pedestrian Activated Rectangular Rapid Flashing Beacon (RRFB)	EA	0	$15,000.00	$0
11	Pedestrian Hybrid Beacon System	EA	3	$35,000.00	$105,000
12	Speed Feedback Sign	EA	0	$12,500.00	$0
13	Stop Controlled Intersection	EA	2	$25,000.00	$50,000
14	Roundabout Intersection	EA	1	$2,000,000.00	$2,000,000
15	Pedestrian Bridge	EA	1	$5,000,000.00	$5,000,000
16	Contingency/Miscellaneous Items (50%)	LS	1	$3,674,700.00	$3,674,700
				Rounded Total (Construction Cost)	**$11,024,000**
				Project Administration (5%)	$552,000
				Preliminary Alternatives / Environmental Document (12%)	$1,323,000
				Design Cost (15%)	$1,654,000
				Construction Suport (8%)	$882,000
				Total Project Cost	**$15,435,000**

Coloma Sustainable Community Mobility Plan

Opinion of Probable Construction Cost

Segment Two (SR 49 - Lotus to Coloma Heights)

Item #	Item Description	Unit	Quantity	Unit Cost	Total
1	High Visibility Striping	LF	0	$1.25	$0
2	High Visibility Striping with Rumblestrips	LF	4,580	$2.25	$10,305
3	Resurface Roadway and New High Visibility Striping	SQFT	157,150	$10	$1,571,500
4	Reconstruct Roadway/Roadway Widening	SQFT	0	$25	$0
5	Class 1 Path (Paved)	SQFT	47,130	$12	$565,560
6	Retaining Walls	LF	0	$350	$0
7	Concrete Sidewalk/Path (Includes Curb and Gutter)	SQFT	16,600	$17	$282,200
8	Decomposed Granite Path	SQFT	0	$8	$0
9	Pedestrian Crosswalk (High Visibility Markings Only)	EA	5	$4,000	$20,000
10	Pedestrian Activated Rectangular Rapid Flashing Beacon (RRFB)	EA	6	$15,000	$90,000
11	Pedestrian Hybrid Beacon System	EA	2	$35,000	$70,000
12	Speed Feedback Sign	EA	0	$12,500	$0
13	Stop Controlled Intersection	EA	3	$25,000	$75,000
14	Coloma Heights Intersection Improvements + ROW	EA	1	$128,000	$128,000
15	Pedestrian Bridge	EA	0	$0	$0
16	Contingency/Miscelaneous Items (50%)	LS	1	$1,406,300.00	$1,406,300
				Rounded Total (Construction Cost)	**$4,219,000**
				Project Administration (5%)	$211,000
				Preliminary Alternatives / Environmental Document (12%)	$507,000
				Design Cost (15%)	$633,000
				Construction Suport (8%)	$338,000
				Total Project Cost	**$5,908,000**

Coloma Sustainable Community Mobility Plan

Opinion of Probable Construction Cost

Segment Three (SR49 / Cold Springs Road - Coloma Heights Rd to Monument Rd)

Item #	Item Description	Unit	Quantity	Unit Cost	Total
1	High Visibility Striping	LF	0	$1.25	$0
2	High Visibility Striping with Rumblestrips	LF	0	$2.25	$0
3	Resurface Roadway and New High Visibility Striping	SQFT	13,260	$10	$132,600
4	Reconstruct Roadway/Roadway Widening	SQFT	2,040	$25	$51,000
5	Class 1 Path (Paved)	SQFT	0	$12	$0
6	Retaining Walls	LF	0	$350	$0
7	Concrete Sidewalk/Path (Includes Curb and Gutter)	SQFT	150	$17	$2,550
8	Decomposed Granite Path	SQFT	9,000	$8	$72,000
9	Pedestrian Crosswalk (High Visibility Markings Only)	EA	0	$4,000	$0
10	Pedestrian Activated Rectangular Rapid Flashing Beacon (RRFB)	EA	0	$15,000	$0
11	Pedestrian Hybrid Beacon System	EA	0	$35,000	$0
12	Speed Feedback Sign	EA	0	$12,500	$0
13	Stop Controlled Intersection	EA	0	$25,000	$0
14	Roundabout Intersection	EA	1	$800,000	$800,000
15	Pedestrian Bridge	EA	0	$0	$0
16	Contingency/Miscelaneous Items (50%)	LS	1	$529,100.00	$529,100
				Rounded Total (Construction Cost)	**$1,588,000**
				Project Administration (5%)	$80,000
				Preliminary Alternatives / Environmental Document (12%)	$191,000
				Design Cost (15%)	$239,000
				Construction Suport (8%)	$128,000
				Total Project Cost	**$2,226,000**

Coloma Sustainable Community Mobility Plan

Opinion of Probable Construction Cost

Segment Four (Lotus Rd - Bassi Rd to SR49)

Item #	Item Description	Unit	Quantity	Unit Cost	Total
1	High Visibility Striping	LF	0	$1.25	$0
2	High Visibility Striping with Rumblestrips	LF	5,000	$2.25	$11,250
3	Resurface Roadway and New High Visibility Striping	SQFT	157,100	$10	$1,571,000
4	Reconstruct Roadway/Roadway Widening	SQFT	0	$25	$0
5	Class 1 Path (Paved)	SQFT	34,200	$12	$410,400
6	Retaining Walls	LF	2,500	$350	$875,000
7	Concrete Sidewalk/Path (Includes Curb and Gutter)	SQFT	0	$17	$0
8	Decomposed Granite Path	SQFT	0	$8	$0
9	Pedestrian Crosswalk (High Visibility Markings Only)	EA	1	$4,000	$4,000
10	Pedestrian Activated Rectangular Rapid Flashing Beacon (RRFB)	EA	0	$15,000	$0
11	Pedestrian Hybrid Beacon System	EA	2	$35,000	$70,000
12	Speed Feedback Sign	EA	2	$12,500	$25,000
13	Stop Controlled Intersection	EA	2	$25,000	$50,000
14	Roundabout Intersection	EA	0	$0	$0
15	Pedestrian Bridge	EA	0	$0	$0
16	Contingency/Miscelaneous Items (50%)	LS	1	$1,508,400.00	$1,508,400
		Rounded Total (Construction Cost)			**$4,526,000**
		Project Administration (5%)			$227,000
		Preliminary Alternatives / Environmental Document (12%)			$544,000
		Design Cost (15%)			$679,000
		Construction Suport (8%)			$363,000
		Total Project Cost			**$6,339,000**

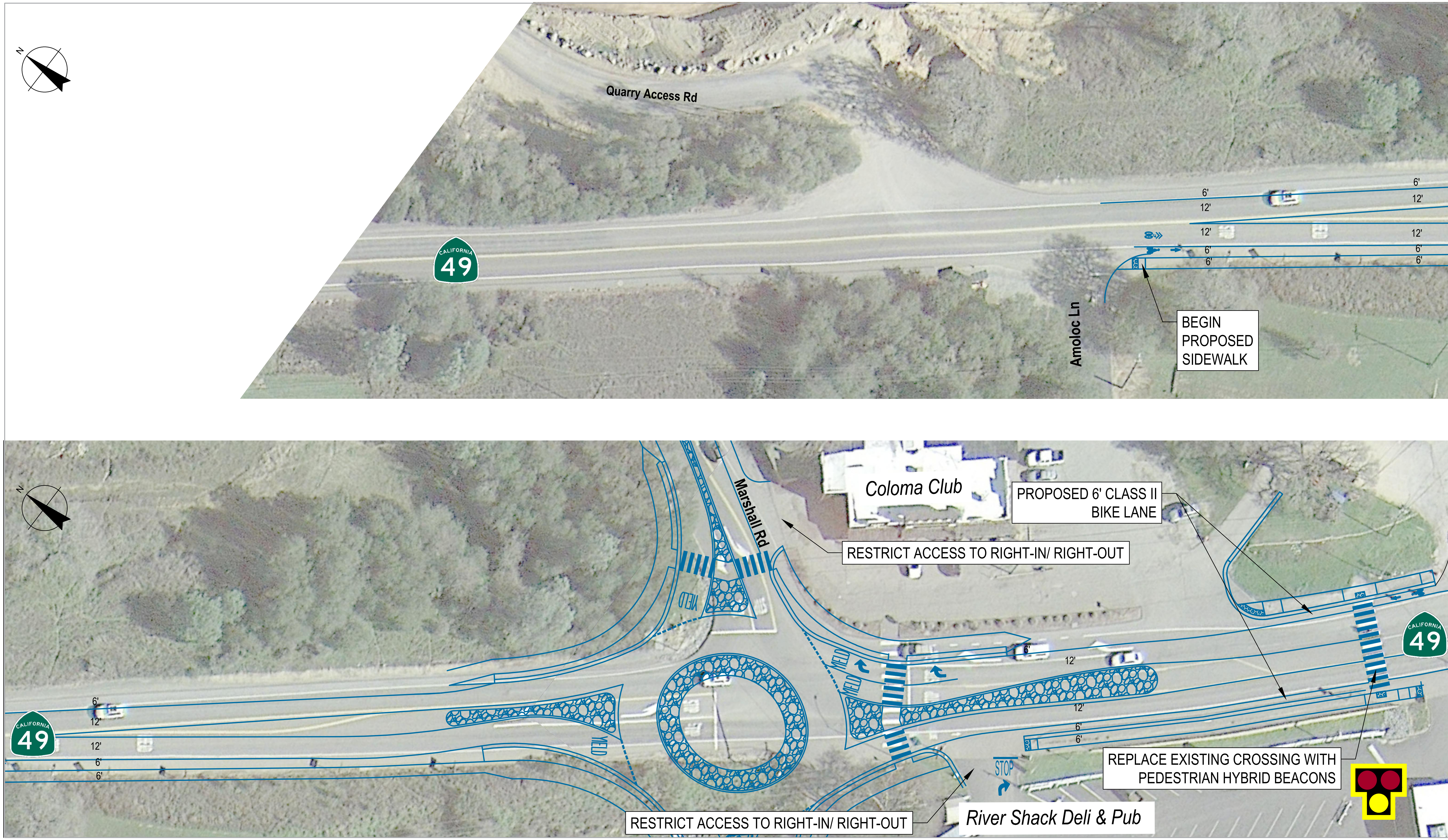
Appendix D: Alternative Improvements

Table of Contents

Figure Index

1.1 SR 49/ Marshall Road

Two intersection improvement concepts were presented for study at SR 49/ Marshall Road to reduce approaching vehicular speeds and improve safety. Alternative A includes channelization, the installation of raised medians, and right-in/ right-out access restriction was advanced for further study. Alternative B, depicted in Figure A-1, includes roundabout installation, and right-in/ right-out access restriction was not selected for further study in the CLMP.



COLOMA LOTUS
Mobility Plan

0 0 100
1 inch = 50 ft.

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 2b

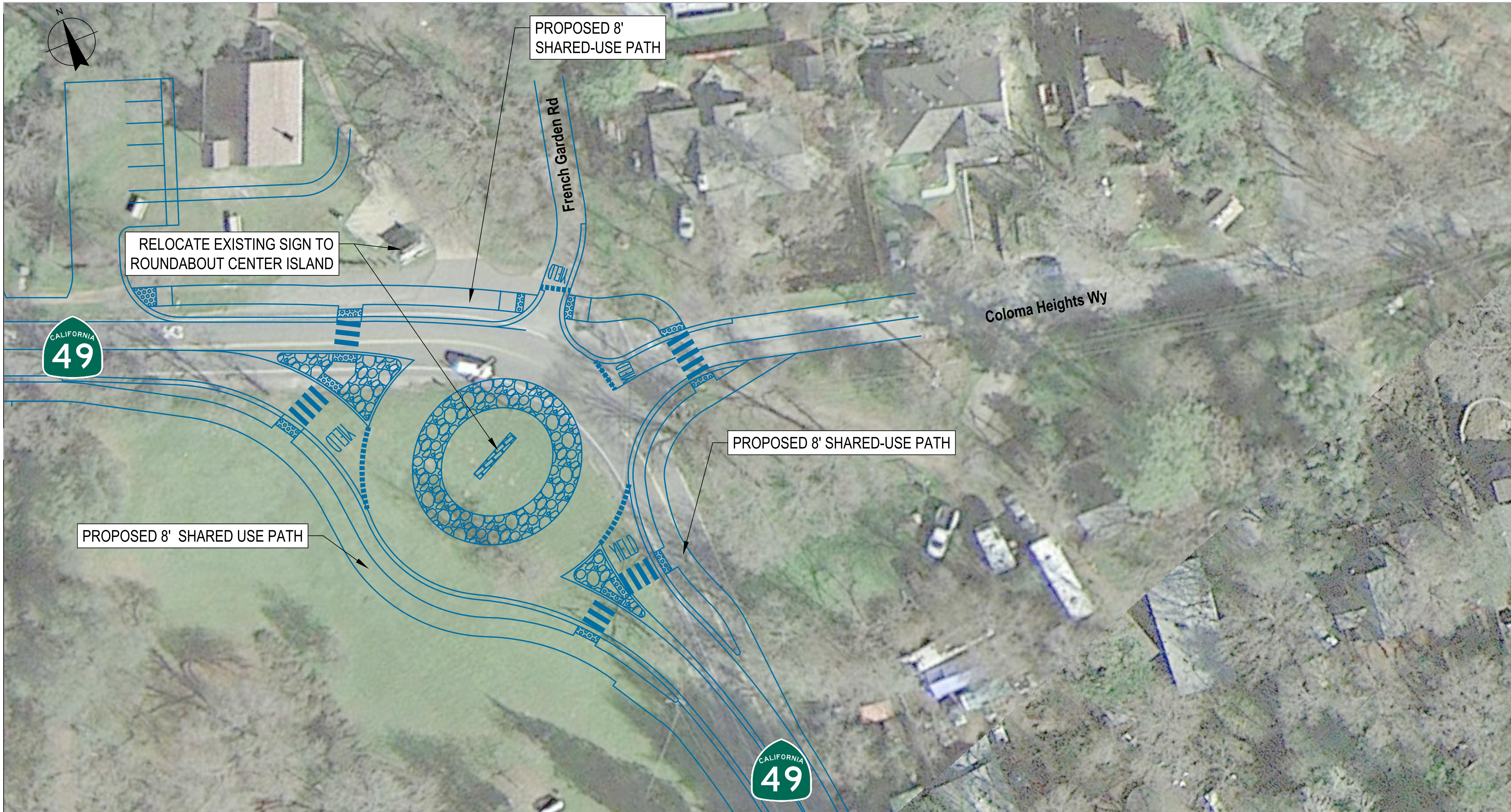
Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 5 February 2019 - 9:27 AM

Source:

1.2 SR 49/Coloma Heights Road – Alternative B

A roundabout was also considered at the corner of SR 49 and Coloma Heights Road. A graphic displaying the alternative is provided in Figure A-2. Based on collision data spanning 2013 to 2017, this intersection recorded the most collisions in the study area and is considered the top collision hot-spot. Converting this intersection to roundabout control with ample deflection to reduce vehicle speeds and improve motorists' line of sight at each approach is the most effective strategy for addressing the safety issues at the intersection[1]. This alternative would work in conjunction with the proposed roundabout at SR 49/SR 153 to moderate vehicular speeds and provide safer crossings for both pedestrians and bicyclists. However, given the alternative's needed southward orientation, the removal of a large oak tree and taking a portion of the meadow on State Park property for needed right-of-way would be required. Given those concerns and the fact that the proposed roundabout at SR 49/SR 153 would ostensibly achieve the desired vehicular speed reductions, a roundabout at SR 49/Coloma Heights Road was not fully supported during the stakeholder and public engagement process or by State Parks. Therefore, the alternative for roundabout control at the intersection of SR 49 and Coloma Heights Road, was not advanced for more detailed quantitative analysis.

[1] Two serious collisions have occurred at this intersection during the development of this report. The collisions are not reflected in the technical safety analysis, and are presented herein.



SEE FIG 9

SEE FIG 11

COLOMA LOTUS Mobility Plan

0 0 80
1 inch = 40 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: STATE HIGHWAY 49

Project No. 11180327
Report No. 001
Date 02.04.19

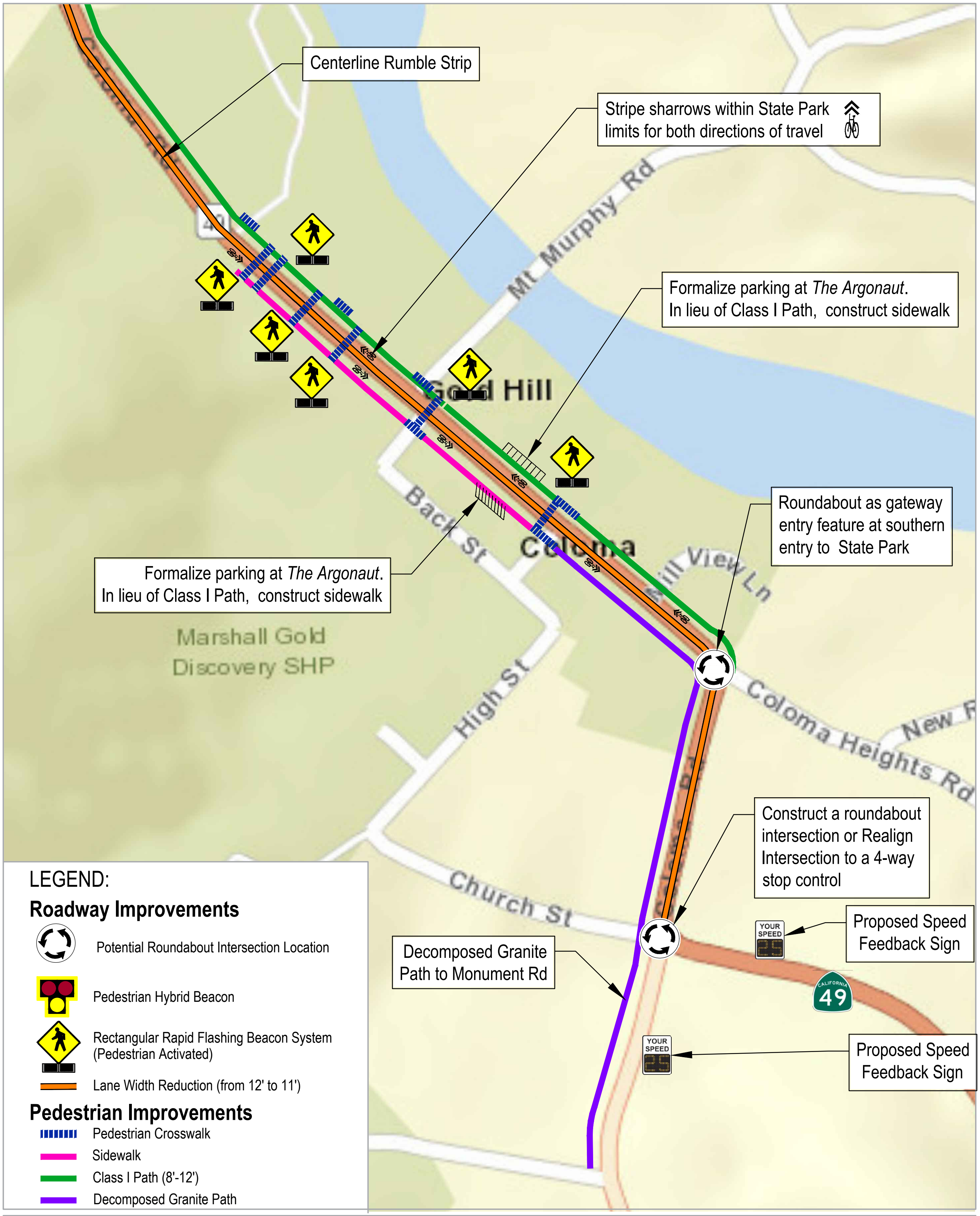
FIGURE 10a

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:10 PM

Source:

1.3 Pedestrian Activated Rectangular Flashing Beacon (RRFB) System

Pedestrian Activated Flashing Beacons were proposed in multiple locations within Segment Two: SR 49 – Lotus Road to Coloma Heights Road. During the stakeholder and public engagement process, concerns over light pollution from the flashing beacons impacting the rural and historic character of the State Park and Coloma were voiced. Based on this input, the number of proposed pedestrian activated rectangular flashing beacons in Segment Two was reduced from six to four. Potential locations for the additional two pedestrian activated rectangular flashing beacons can be considered in the future. Figure A-3 displays the location of the six proposed beacons.



COLOMA LOTUS Mobility Plan

GHD

El Dorado County Transportation Commission
Coloma Sustainable Mobility Plan

VICINITY MAP OF PROPOSED IMPROVEMENTS

Project No. **11180327**
Report No. **001**
Date **02.04.19**

FIGURE 1a

Filename: K:\PRJ\2544\2544EX002.dwg Plot Date: 4 February 2019 - 7:08 PM

Source:

1.4 Lotus Road Bicycle Lanes

Two alternatives were presented for Lotus Road between Bassi Road and SR 49. Alternative A includes the installation of Class II bicycle lanes on Lotus Road, while Alternative B includes a Class I Path extending connecting Henningsen Lotus Park to SR 49 near Lotus Road. Due to the high speeds on Lotus Road, Class II bike lanes would not improve the Level of Traffic Stress and connectivity for the Lotus Road segment area. Thus, the improvement was deferred for later consideration, and a conceptual rendering of the alternative is presented in Figure A-4. A Class I path is the preferred proposed improvement, as it provides the lowest stress connectivity by physically separating bicyclists and pedestrians from vehicular traffic.

SEE FIG 13

COLOMA LOTUS
Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

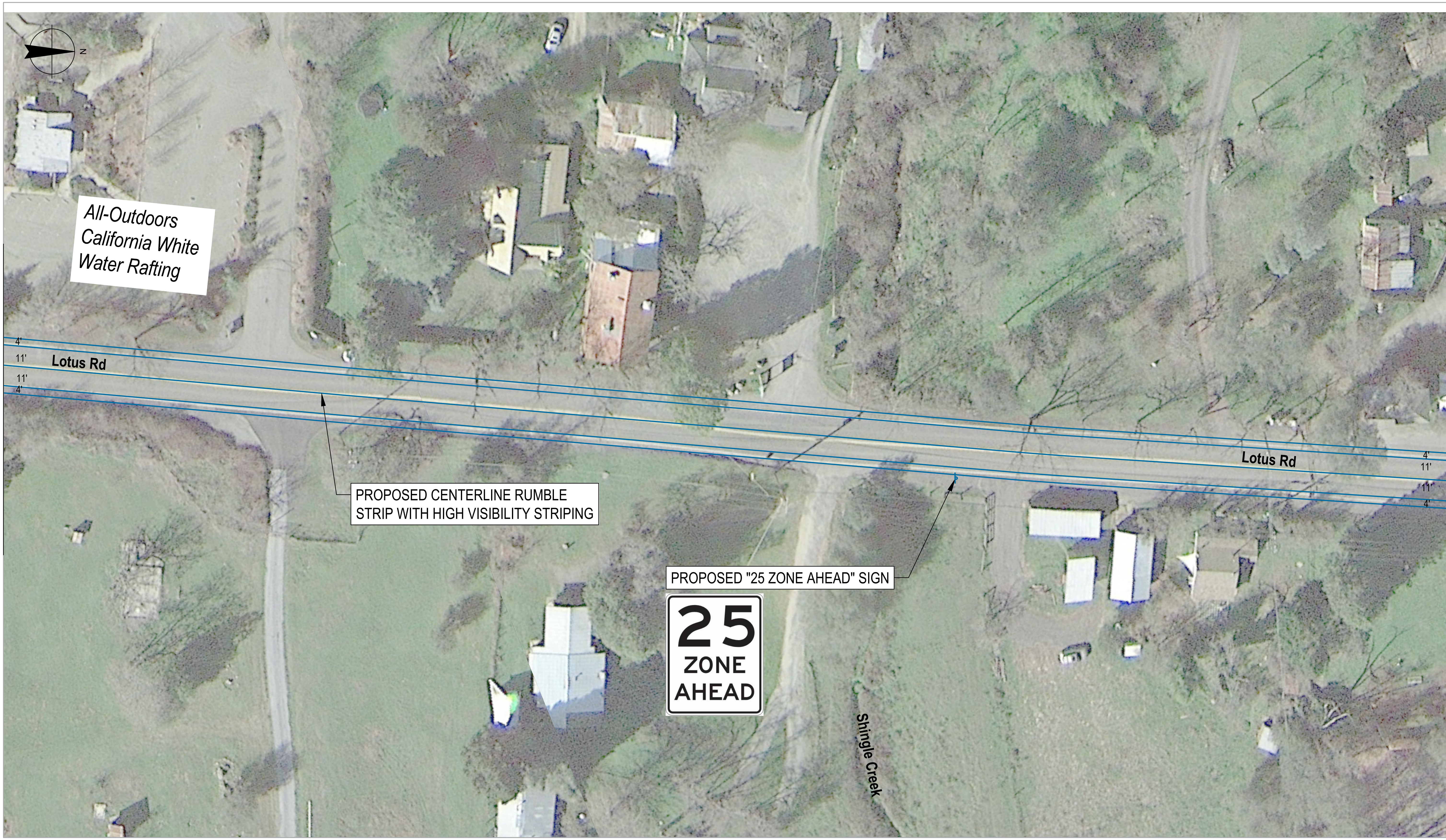
Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 12

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:28 PM

Source:

SEE FIG 12



SEE FIG 14

COLOMA LOTUS
Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

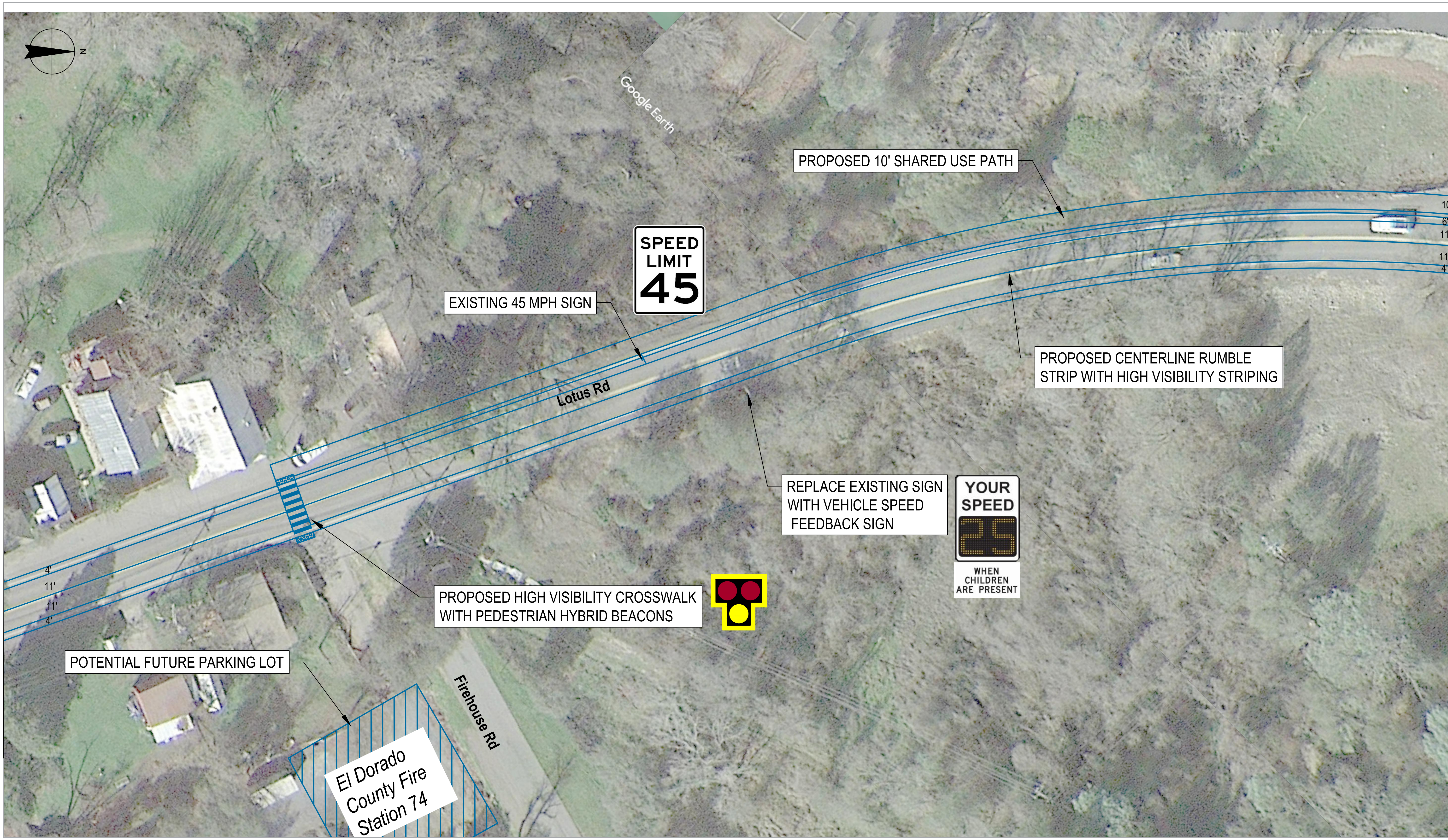
MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 13

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:30 PM

Source:



COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

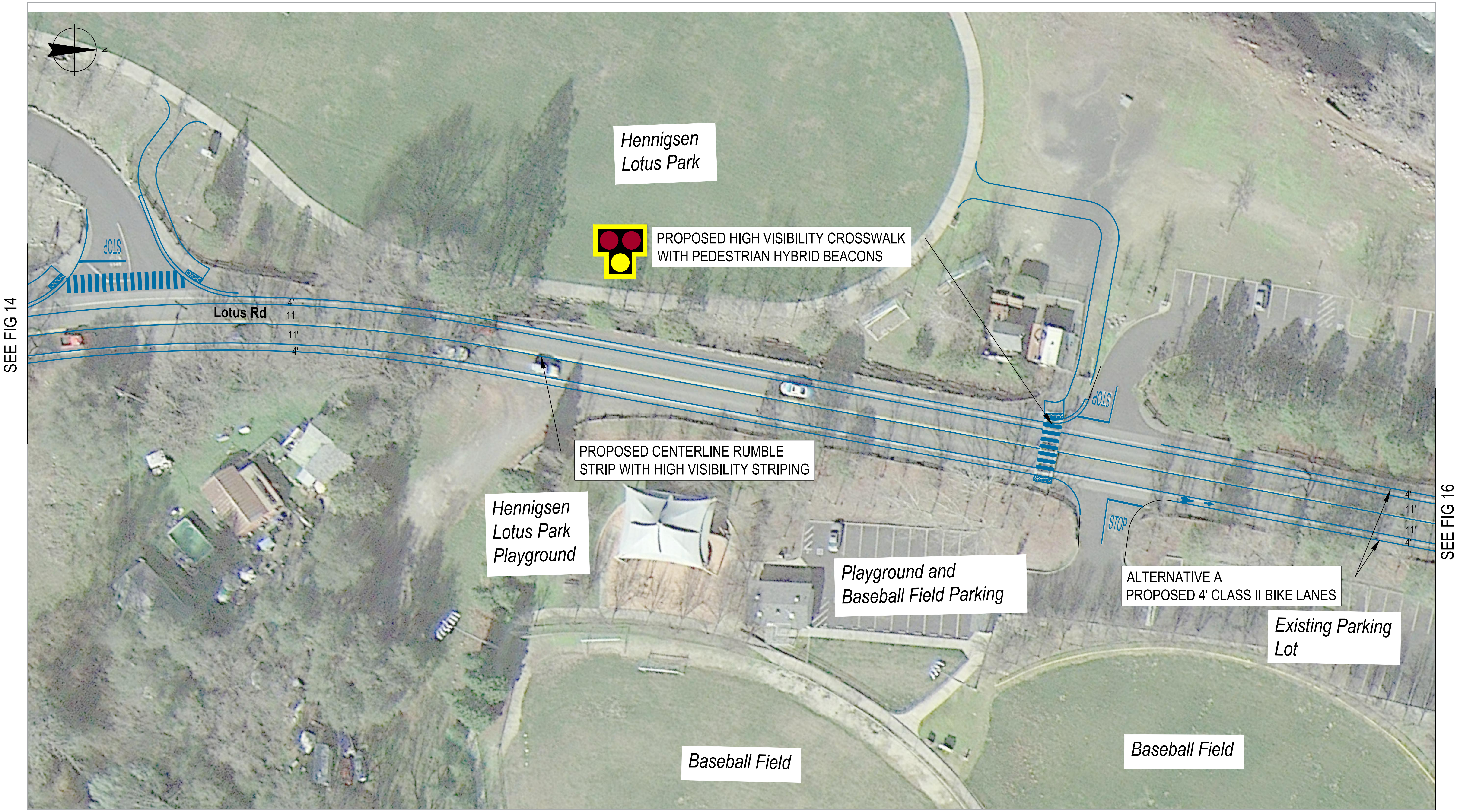
MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 14

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:31 PM



COLOMA LOTUS Mobility Plan

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

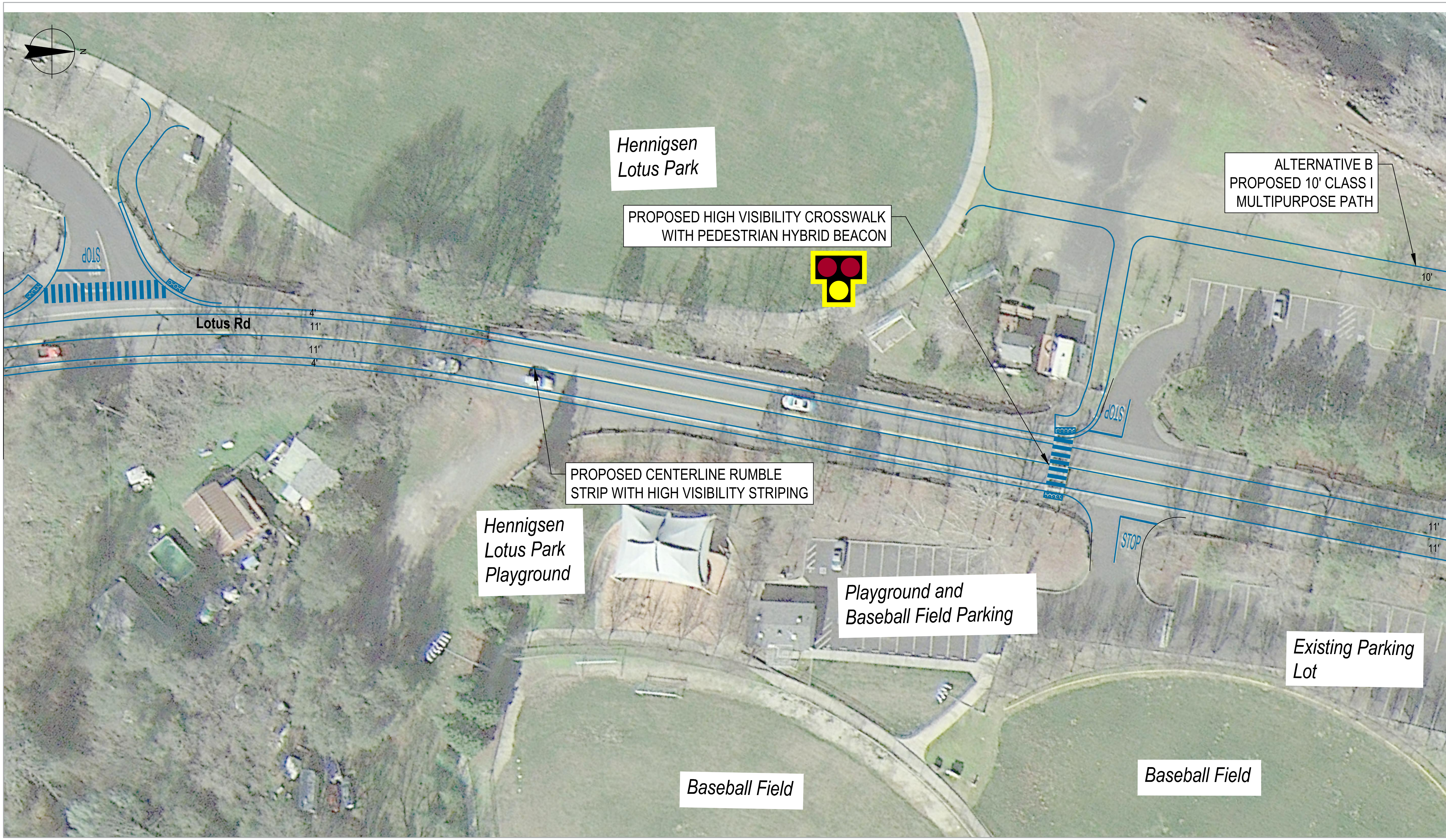
MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 15a

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:31 PM

Source:



COLOMA LOTUS Mobility Plan

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 15b

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:32 PM

Source:

COLOMA LOTUS Mobility Plan

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

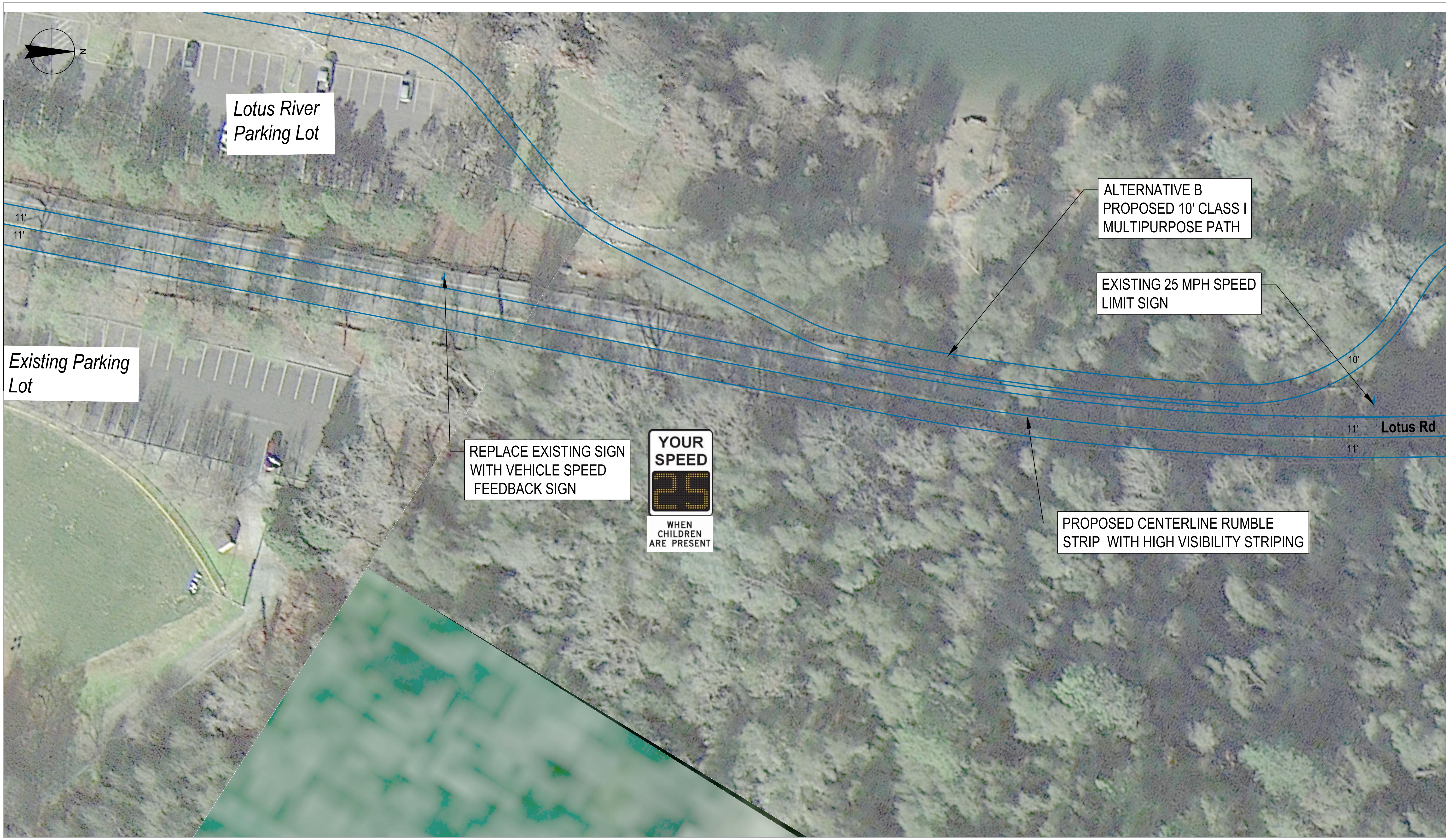
Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 16a

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:33 PM

SEE FIG 15



SEE FIG 17

COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

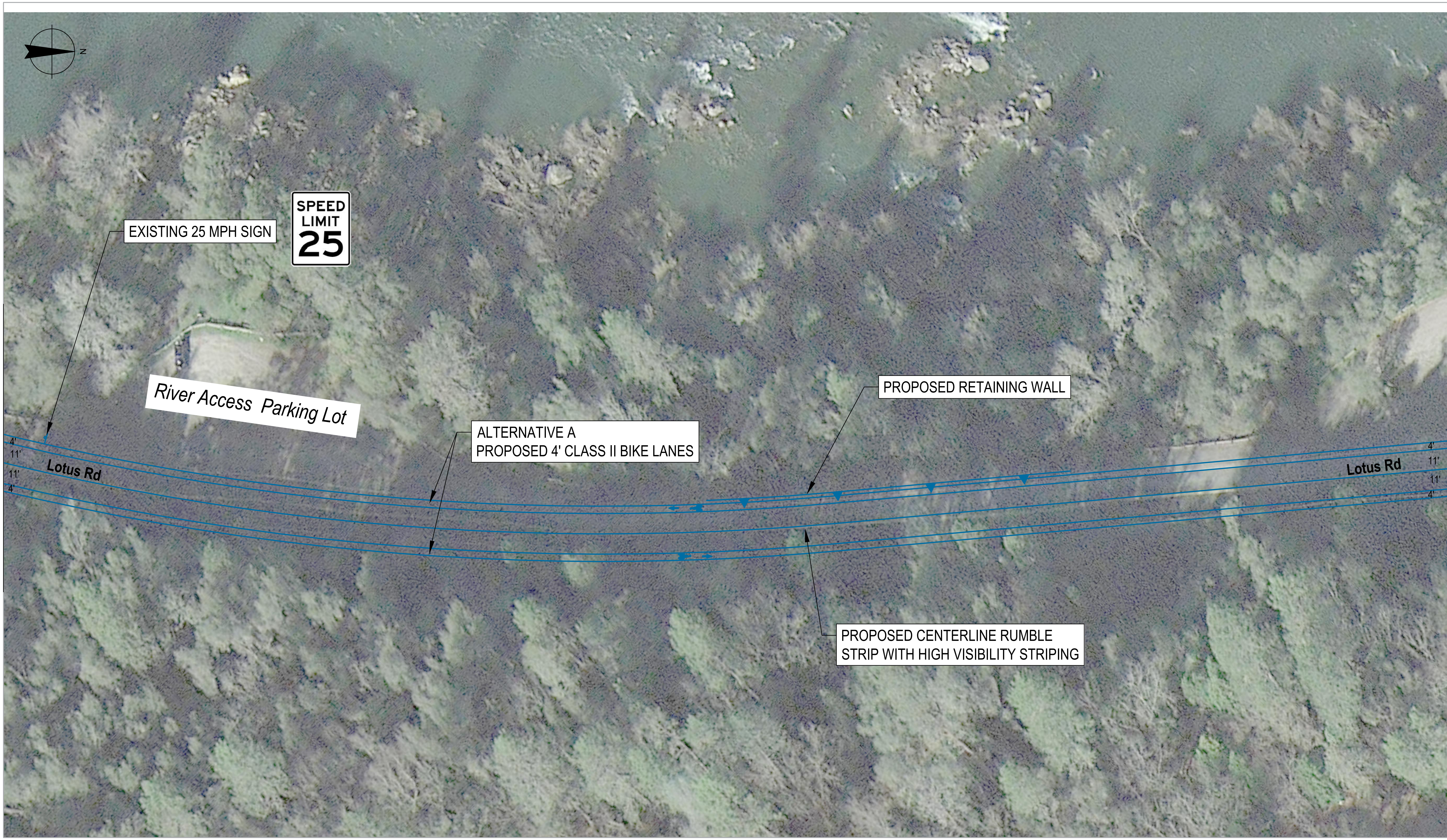
MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 16b

Source:

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:34 PM



SEE FIG 16

SEE FIG 18

COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 17a

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:35 PM
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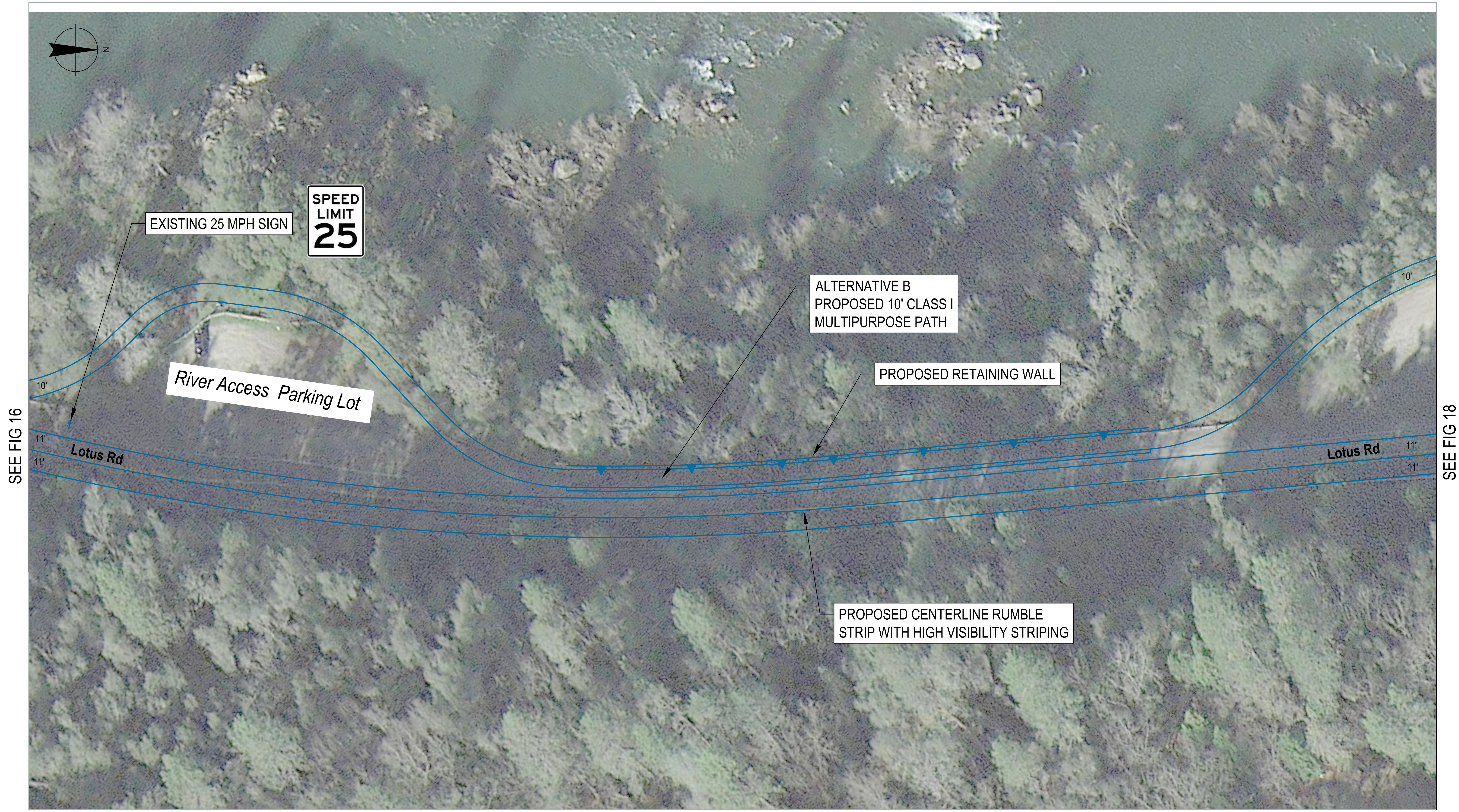


COLOMA LOTUS Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

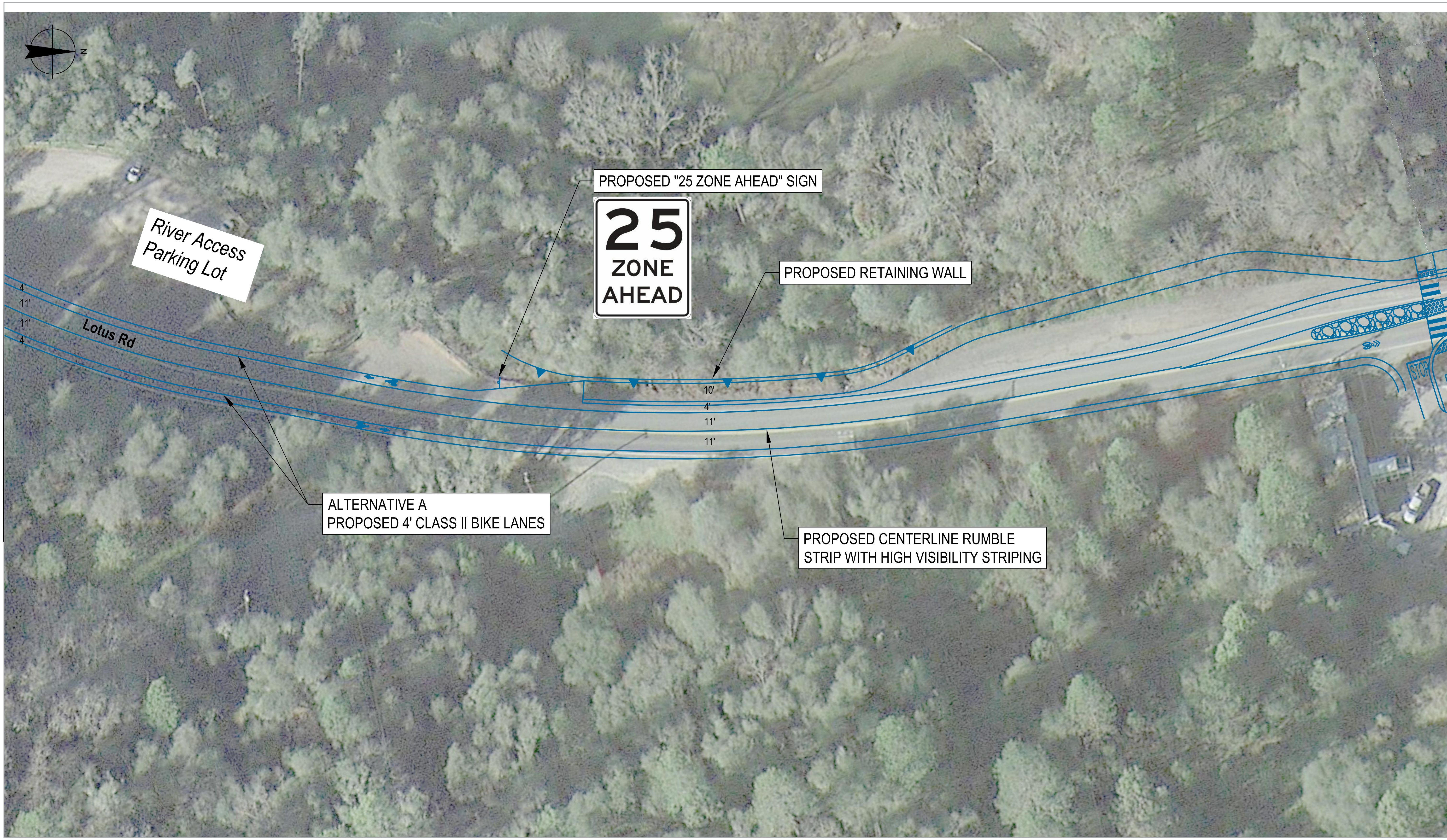
MAP OF PROPOSED IMPROVEMENTS:
LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 17b

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:35 PM

Source:



COLOMA LOTUS
Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS:
LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 18a

Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:36 PM

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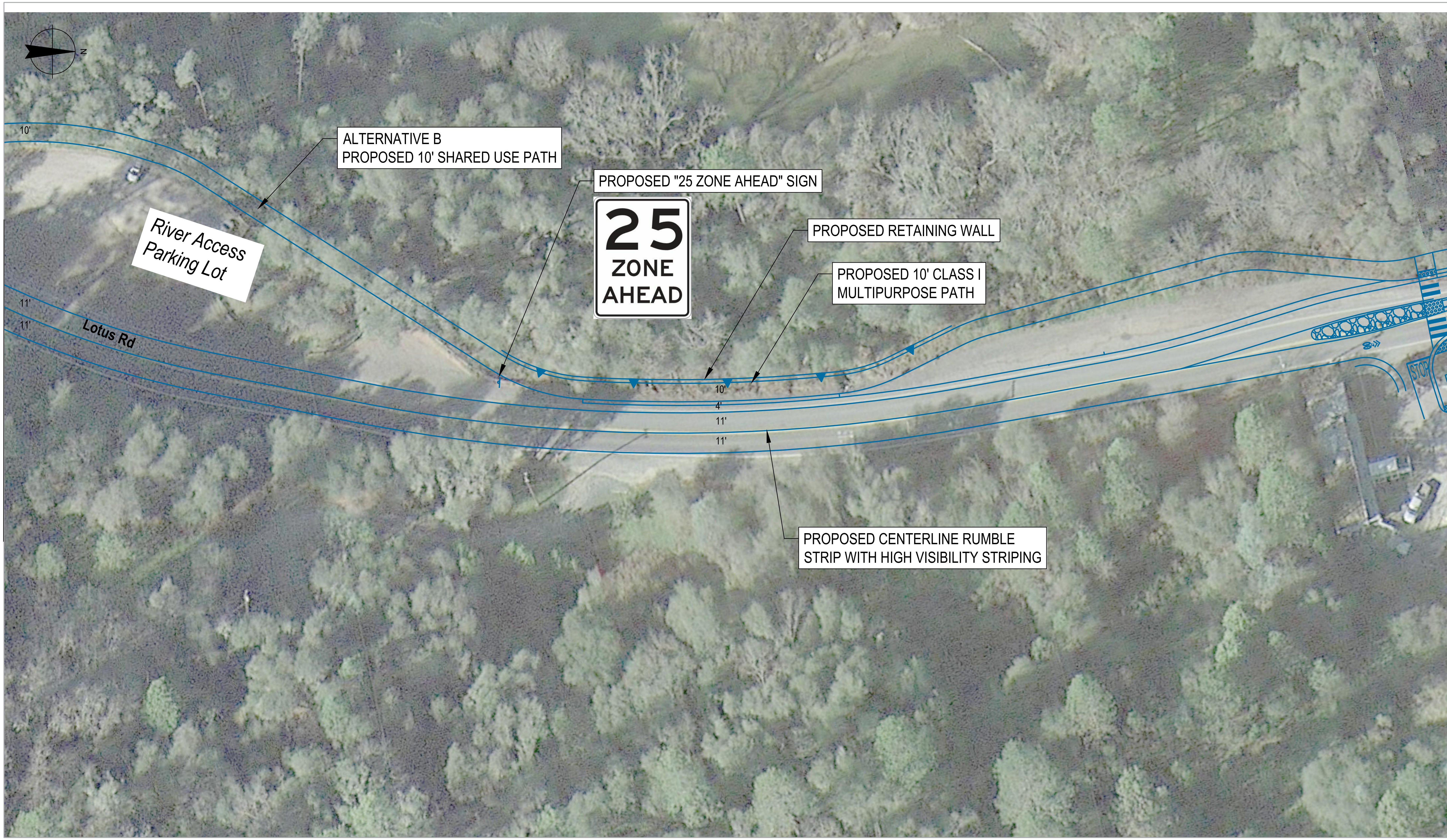
SEE FIG 17



SEE FIG 5

COLOMA LOTUS
Mobility Plan

0 0 100
1 inch = 50 ft.

GHD

El Dorado County Transportation Commission
Coloma Sustainable Commmunity
Mobility Plan

MAP OF PROPOSED IMPROVEMENTS: LOTUS ROAD

Project No. 11180327
Report No. 001
Date 02.04.19

FIGURE 18b

Source:

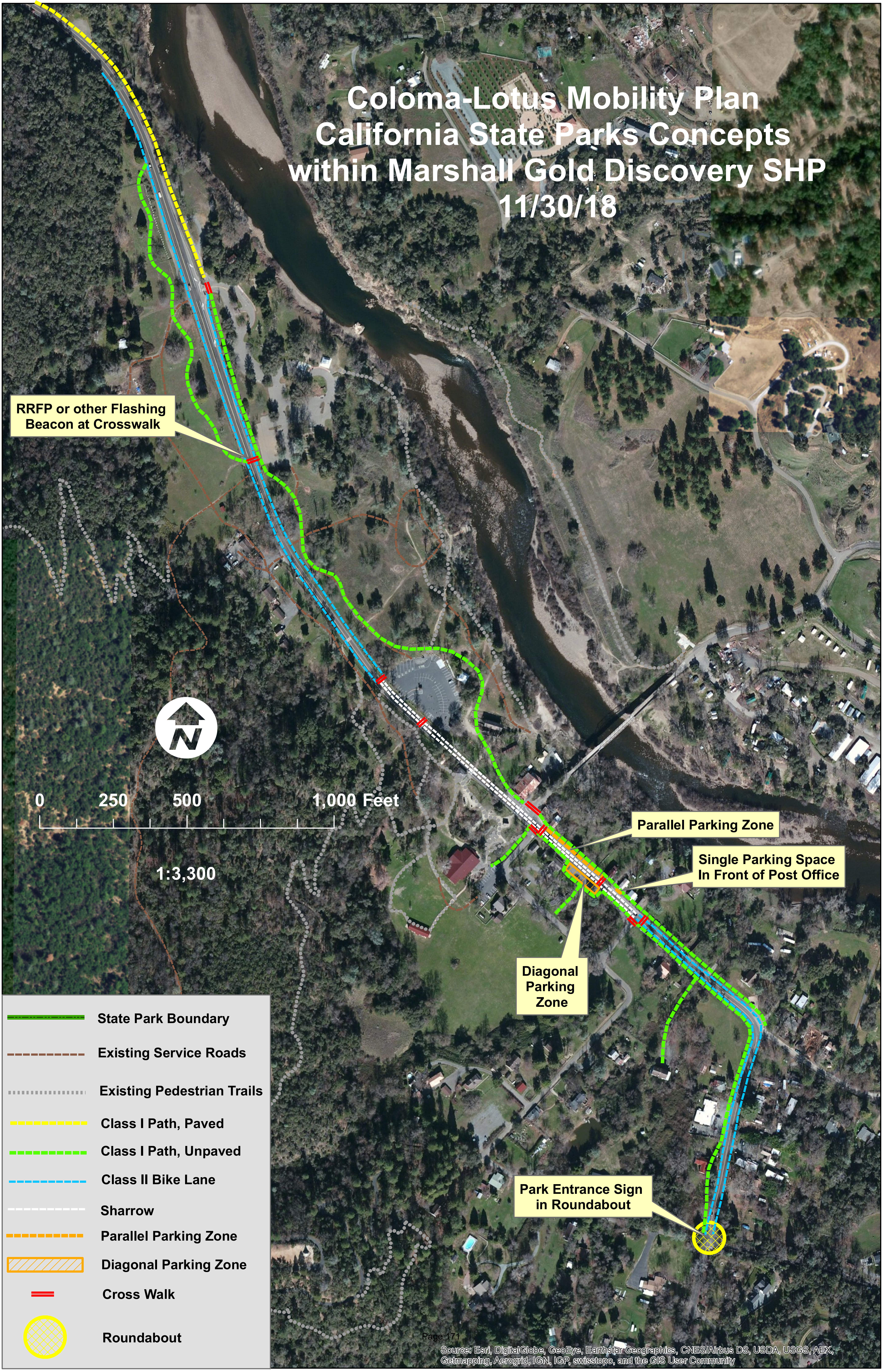
Filename: K:\PRJ\2544\2544EX001.dwg Plot Date: 4 February 2019 - 8:37 PM

1.5 State Park Improvement Concepts

During development of the CLMP, several meetings were held with State Parks staff to discuss improvement concepts within the State Park. As part of this process State Parks staff developed their own improvement recommendations for the project area within Marshall Gold Discovery State Historic Park and for areas outside the State Park that provide connections to the park. These improvement recommendations are provided in graphic form in Figure A-5.

Many of the improvements identified by State Parks relate to completing the trail system within the Marshall Gold Discovery State Park. Although this study supports all the off-system, typically decomposed granite trail improvements identified by State Parks, they are not formally included in the study's recommendations given that a key goal of the CLMP is to apply a performance-based analysis approach that will facilitate and inform the development of competitive state and federal transportation grant applications for transportation projects. Most of the trail improvements identified by State Parks do not meet the state or federal definition of a transportation facility and therefore are not eligible to receive state or federal transportation funds described in Section 9.2 of the study.

However, any improvements identified by State Parks that are on or along SR 49 that would be eligible for state or federal transportation funding were considered as part of the CLMP. Many of the improvements were formally included in the CLMP improvement recommendations. For those improvements that were not included in the CLMP, the primary reasons were: the proposed improvement's benefits were redundant to benefits of improvements already identified in the CLMP; and/or the improvement would add costs without a commensurate improvement in benefit (i.e., the improvement would potentially compromise the benefit-cost of the improvement package as a whole).


Coloma-Lotus Mobility Plan
California State Parks Concepts
within Marshall Gold Discovery SHP
11/30/18
RRFP or other Flashing
Beacon at Crosswalk
0
250
500
1,000 Feet
1:3,300
Parallel Parking Zone
Single Parking Space
In Front of Post Office
Diagonal
Parking
Zone
Park Entrance Sign
in Roundabout
State Park Boundary
Existing Service Roads
Existing Pedestrian Trails
Class I Path, Paved
Class I Path, Unpaved
Class II Bike Lane
Sharrow
Parallel Parking Zone
Diagonal Parking Zone
Cross Walk
Roundabout
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Appendix E: Safety Benefits Calculations

1. Safety Benefit Analysis

The following tables summarize the safety analysis completed using Caltrans' HSIP Analyzer tool, which are provided in the section 2. Tables 1.1, 1.2, 1.3 and 1.4 display the analysis summary by segment. Table 1.5 displays the aggregated safety benefit-cost for the entire study area. HSIP allows a maximum of three selected countermeasures per study area. However, the cost reflects the whole project cost for the segment or study area, by incorporating additional improvements as "Other-Safety" related costs. This can be seen in further detail within the construction cost section of each segment's HSIP Analyzer tool document in section 2.

The safety benefits associated with the roundabout at Lotus Road, and roadway reconstruction/widening buttress the overall safety benefit for Segment One; however, Table 1.1 shows a robust benefit cost ratio of 2.59. Table 1.2 displays an overall benefit-cost of .79. However, improvements at the Coloma Heights Road/ SR 49 intersection offer a promising B/C of 2.90. Table 1.3 displays an encouraging B/C associated with the roundabout improvement at the intersection of SR 49/ Church Street/ SR 153. Table 1.4 displays a B/C of .94. Taken together, the benefit-cost analysis all four segments within the study area offer an encouraging B/C of 1.8. Furthermore, the maximum federal reimbursement ratio three segments is 100% of the project cost associated with the segment. The following information is intended to assist with the process of obtaining HSIP funding for the proposed improvements.

1.1 Segment One

Table 1.1 Segment One Safety Benefit-Cost Summary

Countermeasure	Benefit	Cost	B/C
Roundabout at Lotus/SR 49 (NS4A)	$ 37,661,760	$ 14,859,109	2.50
Intersection Improvements at SR 49/ Marshall (NS12)	$ 143,800	$ 371,478	0.39
Reconstruct Roadway/Roadway Widening (R24)	$ 2,239,300	$ 204,313	10.70
Total Project	$ 40,044,860	$ 15,434,900	2.59
HSIP Funds Requested			$ 13,891,410
Maximum Federal Reimbursement Ratio			90%
Total Expected Benefit			$ 40,044,860

1.2 Segment Two

Table 1.2 Segment Two Safety Benefit-Cost Summary

Countermeasure	Benefit	Cost	B/C
Resurface Roadway and New High Visibility Striping - Entire Segment (R24)	$ 3,400,000	$ 5,462,939	0.60
Coloma Heights/ SR-49 Intersection Improvements (NS6)	$ 1,268,200	$ 444,961	2.90
Total Project	$ 4,668,200	$ 5,907,900	0.79
HSIP Funds Requested			$ 5,907,900
Maximum Federal Reimbursement Ratio			100%
Total Expected Benefit			$ 4,668,200

1.3 Segment Three

Table 1.3 Segment Three Safety Benefit-Cost Summary

Countermeasure	Benefit	Cost	B/C
Roundabout (NS4B)	$ 4,017,924	$ 2,225,300	2.16
Total Project	$ 4,017,924	$ 2,225,300	2.16
HSIP Funds Requested			$ 2,225,300
Maximum Federal Reimbursement Ratio			100%
Total Expected Benefit			$ 4,017,924

1.4 Segment Four

Table 1.4 Segment Four Safety Benefit-Cost Summary

Countermeasure	Benefit	Cost	B/C
Rumble Strips - Entire Segment (R34)	$ 1,987,094	$ 45,064	44.1
Reconstruct Roadway/Roadway Widening (R24)	$ 3,974,187	$ 6,292,936	0.6
Total Project	$ 5,961,281	$ 6,338,000	0.94
HSIP Funds Requested			$ 6,338,000
Maximum Federal Reimbursement Ratio			100%
Total Expected Benefit			$ 5,961,281

1.5 1.5 Comprehensive Study Area

Table 1.5 Comprehensive Benefit-Cost Summary

Countermeasure	Benefit	Cost	B/C
All Selected Countermeasures	$ 54,692,265	$ 29,906,100	1.8
Total Expected Benefit		$ 54,692,265	

2. HSIP Analyzer Documents

The following documents reflect the calculations of the safety cost-benefit analysis within each segment, and provide the information necessary for HSIP funding applications.

HSIP ANALYZER

Cost Estimate, Crash Data and Benefit Cost Ratio (BCR) Calculation for Highway Safety Improvement Program (HSIP) Application

Important: Review and follow the step-by-step instructions in "Manual for HSIP Analyzer". Completing the HSIP Analyzer without referencing to the manual may result in an application with fatal flaws that will be disqualified from the ranking and selection process.

All yellow highlighted fields must be filled in. The gray fields are calculated and read-only. This is a dynamic form (later steps vary depending on the data entered in earlier steps). If any error messages in red appear, fix the errors prior to proceeding to the next steps.

1. Application ID, Project Location and Project Description (copy from the HSIP Application Form):

Application ID:

Save this file using the Application ID plus "Calc" as the file name (e.g. "07-Los Angeles-01Calc.pdf").

Project Location: (limited to 250 characters) Coloma-Lotus CLMP Segment 1

Project Description: (limited to 250 characters) SR-49 - Amoloc to Lotus

2. Application Category (Check one):

Application Categories that require a Benefit Cost Ratio (BCR):

☐ Common BCR Application ☐ Set-aside for High Friction Surface Treatment

Application Categories that do NOT require a Benefit Cost Ratio (BCR):

☐ Set-aside for Guardrail Upgrades ☐ Set-aside for Horizontal Curve Signing

☒ Set-aside for Pedestrian Crossing Enhancements ☐ Set-aside for Tribes

☑ **Dual consideration?**
If an Application Category that does not require a BCR is selected above, check this box to indicate your desire that this application will be considered as a Common BCR Application as well in case it does not get selected for funding under the set-aside category. If this box is checked, a benefit cost analysis is required so the project will have a BCR.

A safety benefit cost analysis is required for this application. This tool will guide through cost estimate, safety benefit evaluation and Benefit Cost Ratio (BCR) calculation.

Section I. Construction Cost Estimate and Cost Breakdown

The purpose of this section is to:

- Provide detailed engineer's estimate (for construction items only). The costs for other phases (PE, ROW, and CE) will be included in Section II.
- Test if countermeasures (CMs) (up to 3) are eligible for being used in the project benefit calculation. For a CM to be used in the project benefit calculation, the construction cost of the CM must be at least 15% of the project's total construction cost, unless an exception is requested. And
- Determine the project's maximum Federal Reimbursement Ratio (FRR).

I.1 Select up to 3 countermeasures (CMs) to be tested in the Engineer's Estimate:

Number of CMs to be used in this project: 3

CM No. 1:	NS4A: Convert intersection to roundabout (from all way stop)
CM No. 2:	R24: Improve pavement friction (High Friction Surface Treatments)
CM No. 3:	NS12: Install raised median on approaches (NS.I.)

I.2 Detailed Engineer's Estimate for Construction Items:

Cost breakdown by CMs. For each item, enter a cost percentage for each of the CMs and "Other Safety-Related" (OS) components. (e.g. enter 10 for 10%). The cost % for "Non-Safety-Related" (NS) components is calculated.

	No.	Item Description	Unit	Quantity	Unit Cost	Total	% for CM#1 (NS4A)	% for CM#2 (R24)	% for CM#3 (NS12)	% for OS*	% for NS**
+ -	1	High Visibility Striping	LF	5,600	$1.25	7,000	%	0%	%	100%	0
+ -	2	Reconstruct Roadway/Roadway Widening	SQSF	1,100	$25.00	27,500	0%	100%	%	%	0
+ -	3	Concrete Sidewalk/Path (Includes Curb and Gutter)	SQSF	9,160	$17.00	155,720	%	%	%	100%	0
+ -	4	Pedestrian Crosswalk (High Visibility Markings Only)	EA	1	$4000.00	4,000	%	%	%	100%	0
+ -	5	Pedestrian Hybrid Beacon System	EA	3	$35000.00	105,000	%	%	%	100%	0
+ -	6	Stop Controlled Intersection	EA	2	$25000.00	50,000	0%	0%	100%	0%	0
+ -	7	Roundabout Intersection	EA	1	2,000,000	2,000,000	100%	%	%	%	0
+ -	8	Pedestrian Bridge/ Class I Path	EA	1	5,000,000	5,000,000	%	%	%	100%	0
		Weighted Average (%) Total ($)				$7,349,220	27%	0%	1%	72%	

* % for OS: Cost % for Other Safety-Related components;
** % for NS: Cost % for Non Safety-Related components.

Contingencies, as % of the above "Total" of the construction items: (e.g. enter 10 for 10%) | 50 % | $3,674,610

Total Construction Cost (Con Items & Contingencies): (Rounded up to the nearest hundreds) | 11,023,900

I.3 Summary

3 CM(s) are eligible to be used in the project benefit calculation.

Countermeasure ID	Federal Funding Eligibility (FFE)	Cost %	Eligible to be used in benefit calculation?	Request exception to the 15% rule*
NS4A	100%	27.21%	Yes (>=15% cost)	☐
R24	100%	0.37%	Yes (<15% cost) (Exception being requested)	☒
NS12	90%	0.68%	Yes (<15% cost) (Exception being requested)	☒

*By requesting an exception to the 15% rule, the CM with less than 15% of the construction cost will then be eligible to be used in the benefit calculation. if an exception is requested for any CM(s) above, please provide the reason (low cost treatment with significant safety benefits, etc.):

Road condition is poor. Reconstruction/ widening necessary to improve road safety conditions, and implement pedestrian improvements along with roundabout installation. Installation of raised medians would act as traffic calming measure at Marshall Road, where accidents have occurred due to unsafe speeds.

Project's Maximum Federal Reimbursement Ratio = 90.0%

The project's Maximum Federal Reimbursement Ratio is calculated as the least of the FFEs of the above countermeasures, minus the percentage of the non-safety related costs in excess of 10%. **This is the maximum value allowed to be entered in "HSIP/Total (%)" column in Section II (Project Cost Estimate).**

Section II. Project Cost Estimate

All project costs, <u>for all phases and by all funding sources</u>, must be accounted for on this form.

i. "<u>Total Cost</u>": Round all costs up to the nearest hundred dollars.

ii. "<u>HSIP/Total (%)</u>": The maximum allowed is the project's Federal Reimbursement Ratio (FRR) as determined in Section I. Click the button to assign the maximum to all, OR enter if not the maximum.

iii. "<u>HSIP Funds</u>" and "<u>Local/Other Funds</u>" are calculated.

Pay attention to the interactive warning/error messages below the table. The messages, if any, must be fixed, or exceptions should be justified in Question No. 5 in Section II of the HSIP Application Form.

Project's maximum Federal Reimbursement Ratio (FRR) (from Section I, rounded up to integer): 90 %

To set all "HSIP/Total (%)" in the below table to the above maximum FRR, click "Set": Set

Description	Total Cost	HISP/Total (%)	HSIP Funds	Local/Other Funds
Preliminary Engineering (PE) Phase				
Environmental	$1,323,000	90 %	$1,190,700	$132,300
PS&E	$1,654,000	90 %	$1,488,600	$165,400
Subtotal - PE	**$2,977,000**	**90** %	**$2,679,300**	**$297,700**
Right of Way (ROW) Phase				
Right of Way Engineering	$0	90 %	$0	$0
Appraisals, Acquisitions & Utilities	$552,000	90 %	$496,800	$55,200
Subtotal - Right of Way (ROW)	**$552,000**	**90** %	**$496,800**	**$55,200**
Construction (CON) Phase				
Construction Engineering (CE)	$882,000	90 %	$793,800	$88,200
Construction Items	11,023,900 (Read only - from Section I)	90 %	$9,921,510	$1,102,390
Subtotal - Construction	**11,905,900**	**90** %	**10,715,310**	**$1,190,590**
PROJECT TOTAL	15,434,900	90 %	13,891,410	$1,543,490

☐ Agency does NOT request **HSIP** funds for PE Phase (automatically checked if PE - HSIP funds is $0).

Interactive Warning/Error Messages:

If there are any messages in the below box, please fix OR explain justification for exceptions in Question No 5, Section II in the HSIP Application.

1. The HSIP amount requested exceeds $10 million.
2. The HSIP amount for PE exceeds 25% of the HSIP amount for Construction Items.

Section III. Project Location Groups, Countermeasures and Crash Data

The benefit of an HSIP safety project is achieved by reducing potential future crashes due to the application of the safety countermeasures (CMs). In this section, you will need to provide information regarding the project's safety CMs and historical crash data at the project sites. The data will be used to estimate the project benefit in Section IV.

1. Divide the project locations into groups.

It is quite often that an HSIP project has multiple locations. Theoretically the benefit for every single location may be calculated separately and then sum them up. However, that may be time consuming or almost impossible when there are a lot of locations. It is more efficient that the project locations with exactly the same safety countermeasures are combined into a group. The benefits of the locations in the same group can then be calculated at once.

When only one group is needed:

If your project consists of only one location or multiple locations that have similar features, address similar safety issues and utilize the same countermeasure(s). The crash data of all the locations can be combined and only one group is needed.

When multiple groups are needed:

If your project include multiple locations that have various safety issues and the proposed safety improvements (countermeasures) are not exactly the same for all the locations. The locations must be divided into different groups. The project benefits are then calculated multiple times, once for each location group. The project total benefit is the sum of the benefits from the different groups.

It should be noted that within a group, all locations should be of the same type: Signalized Intersection (S), Non-Signalized Intersection (NS), or Roadway (R).

If necessary, you may explain the location grouping for your project in details in Question No. 3 (Crash Data Evaluation), Section II in the HSIP Application Form.

2. After the number of location groups is entered, one subform will be populated for each location group. **For each location group:**

1) First, select the applicable CMs. *Note: If a Roundabout CM (S18 or NS4A or NS4B) is selected, additional information is required.*

For each group, only the CMs of the same type as the group location type can be used. For example, if a group consists of 5 signalized intersections, only "Signalized Intersection" CMs may be used for this group.

2) Based on the selected CMs, crash data tables of the required types are displayed for data entry.

Different CMs will reduce crashes of different types during the life of the safety improvements. Depending on the selected CMs for the group, you will be required to fill in one or more crash data tables, for any combination of the five crash types (datasets): "All" , "Night" , Ped & Bike", "Emergency Vehicle", and "Animal" (Each of the later four datasets is a sub-dataset of the "All" dataset.)

For more information regarding grouping project locations and examples, please refer to the Manual for HSIP Analyzer.

III.1 List of Project Locations and Location Groups

List all locations/sites included in this project by groups. The locations entered in Table III.1 below will be automatically populated in the crash data tables in III.2.

Based on the criteria described on the last page, the locations/sites need to be divided into 3 groups.

Table III.1 List of Project Locations by Groups

Highlighted fields must be filled in. For each group:
1) Must select a Location Type;
2) Initially each group has one location line. Click "+"/"-" to add a new line/delete an existing line;
3) Enter location description for each line. The same descriptions will be auto-populated in III.2.

*Note: If your project has a large number of locations, please aggregate some locations into one description, e.g. 10 stop controlled intersections, 5 horizontal curves, etc., as long as they have similar features and the safety improvements to be implemented are the same.

	No.	No. in Group	Location Description (Intersection Name or Road Limit or General Description)	
GROUP 1			Select Location Type:	NS (Non-signalized Intersections)
+ -	1	G1-1	Roundabout at Lotus Rd/ SR 49	
GROUP 2			Select Location Type:	R (Roadways)
+ -	2	G2-1	Roadway improvements	
GROUP 3			Select Location Type:	NS (Non-signalized Intersections)
+ -	3	G3-1	Raised medians at Marshall/ SR 49	

III.2: Countermeasures and Crash Data

(Repeats for each location group)

Countermeasures and Crash Data -Location Group No. 1 of 3

Hide Group Details

Step 1: Select countermeasure(s) to be applied to this location group

This group's location type: NS (Non-signalized Intersections)

Please check the CMs for this location group. All the CMs that have passed the test in Section I AND match the location type of this group are listed below.

	No.	Countermeasure (CM) Name	CM Type*	Crash Reduction Factor (CRF)	Expected Life (Years)	Crash Type	Federal Funding Eligibility
☒	1	NS4A: Convert intersection to roundabout (from all way stop)	NS	0.5	20	All	100%
☐	2	NS12: Install raised median on approaches (NS.I.)	NS	0.25	20	All	90%
	*CM Type: S-Signalized Intersection; NS-Non-Signalized Intersection; R-Roadway.						

Additional information is required:

Since Roundabout is selected, the below additional information is required for calculating Roundabout benefit.

Roundabout Location	Please select:	Rural				
Intersection Type	Please select:	T Intersection				
Roundabout Lanes	Please select:	1 Lane				
ADT	Major Road:	4,100	Minor Road:	2,500	**Total**	**6,600**

Step 2: Provide crash data.

2.1 Crash Data Period: must be between 3 and 5 years.

from (MM/DD/YYYY): 01/01/2013 To (MM/DD/YYYY): 12/31/2017 Crash Data Period (years) = 5

2.2 Fill out the crash data table(s) for the crash type(s) as required by the selected countermeasure(s) in Step 1.

Based on the countermeasures selected in Step 1 , the crash data types to be provided are:

(1) All

Crash Data Table for Crash Type: ALL

No.	Location (from Table III.1)	Fatal (ALL)	Severe Injury (ALL)	Other Visible Injury (ALL)	Complaint of Pain (ALL)	PDO (ALL)	Total
1	Roundabout at Lotus Rd/ SR 49	0	1	0	2	3	6
	Total	0	1	0	2	3	6

III.2: Countermeasures and Crash Data

(Repeats for each location group)

Countermeasures and Crash Data -Location Group No. 2 of 3

Hide Group Details

Step 1: Select countermeasure(s) to be applied to this location group

This group's location type: R (Roadways)

Please check the CMs for this location group. All the CMs that have passed the test in Section I AND match the location type of this group are listed below.

	No.	Countermeasure (CM) Name	CM Type*	Crash Reduction Factor (CRF)	Expected Life (Years)	Crash Type	Federal Funding Eligibility
☒	1	R24: Improve pavement friction (High Friction Surface Treatments)	R	0.4	10	All	100%
	*CM Type: S-Signalized Intersection; NS-Non-Signalized Intersection; R-Roadway.						

Step 2: Provide crash data.

2.1 Crash Data Period: must be between 3 and 5 years.

from (MM/DD/YYYY): 01/01/2014 To (MM/DD/YYYY): 12/31/2017 Crash Data Period (years) = 4

2.2 Fill out the crash data table(s) for the crash type(s) as required by the selected countermeasure(s) in Step 1.

Based on the countermeasures selected in Step 1 , the crash data types to be provided are:

(1) All

Crash Data Table for Crash Type: ALL

No.	Location (from Table III.1)	Fatal (ALL)	Severe Injury (ALL)	Other Visible Injury (ALL)	Complaint of Pain (ALL)	PDO (ALL)	Total
1	Roadway improvements	0	1	0	3	2	6
	Total	0	1	0	3	2	6

III.2: Countermeasures and Crash Data

(Repeats for each location group)

Countermeasures and Crash Data -Location Group No. 3 of 3

Hide Group Details

Step 1: Select countermeasure(s) to be applied to this location group

This group's location type: NS (Non-signalized Intersections)

Please check the CMs for this location group. All the CMs that have passed the test in Section I AND match the location type of this group are listed below.

	No.	Countermeasure (CM) Name	CM Type*	Crash Reduction Factor (CRF)	Expected Life (Years)	Crash Type	Federal Funding Eligibility
☐	1	NS4A: Convert intersection to roundabout (from all way stop)	NS	0.5	20	All	100%
☒	2	NS12: Install raised median on approaches (NS.I.)	NS	0.25	20	All	90%
	*CM Type: S-Signalized Intersection; NS-Non-Signalized Intersection; R-Roadway.						

Step 2: Provide crash data.

2.1 Crash Data Period: must be between 3 and 5 years.

from (MM/DD/YYYY): 01/01/2013 To (MM/DD/YYYY): 12/31/2017 Crash Data Period (years) = 5

2.2 Fill out the crash data table(s) for the crash type(s) as required by the selected countermeasure(s) in Step 1.

Based on the countermeasures selected in Step 1 , the crash data types to be provided are:

(1) All

Crash Data Table for Crash Type: ALL

No.	Location (from Table III.1)	Fatal (ALL)	Severe Injury (ALL)	Other Visible Injury (ALL)	Complaint of Pain (ALL)	PDO (ALL)	Total
1	Raised medians at Marshall/ SR 49	0	0	0	2	0	2
	Total	0	0	0	2	0	2

Section IV. Calculation and Results

Click the "Calculate" button to calculate. The script will first check if there are any errors or inconsistencies in the countermeasure selections and crash data. If errors are detected and displayed below, the errors must be fixed first before you click the "Calculate" button again. If no errors are displayed, the calculation results are provided in this section. Please refer to the Manual for HSIP Analyzer for details regarding possible errors.

Calculate

Project Summary Information:

Project Total Cost: 15434900
3 countermeasures are eligible in benefit calculation. (NS4A R24 NS12)
Project location(s) are divided into 3 group(s) for calculating the benefits.

IV.1 Benefit Summary by location groups

Group No.	Group Info/Data*	Benefit from CM #1	Benefit from CM #2	Benefit from CM #3	Total Benefit of the group
1	Location type: NS (Non-signalized Intersections) Number of location(s): 1 Number of selected countermeasure(s): 1 (NS4A) Crash Data Information: Crash data period (years): 5 Number of crashes(F/SI/OVI/I-CP/PDO)*: All: 0,1,0,2,3	$37,661,760	$0	$0	$37,661,760
2	Location type: R (Roadways) Number of location(s): 1 Number of selected countermeasure(s): 1 (R24) Crash Data Information: Crash data period (years): 4 Number of crashes(F/SI/OVI/I-CP/PDO)*: All: 0,1,0,3,2	$0	$2,239,300	$0	$2,239,300
3	Location type: NS (Non-signalized Intersections) Number of location(s): 1 Number of selected countermeasure(s): 1 (NS12) Crash Data Information: Crash data period (years): 5 Number of crashes(F/SI/OVI/I-CP/PDO)*: All: 0,0,0,2,0	$0	$0	$143,800	$143,800
Sum		**$37,661,760**	**$2,239,300**	**$143,800**	**$40,044,860**

*Number of crashes: five crash numbers are for Fatal (F), Severe Injury (SI), Other Visible Injury (OVI), Injury - Complaint of Pain (I-CP), and Property Damage Only (PDO), respectively.

IV.2. Project Benefit and BCR Summary

No.	Countermeasure Name	Benefit	Cost	Resulting B/C
1	NS4A	37,661,760	14,859,109.856172	2.5
2	R24	$2,239,300	$204,313	11
3	NS12	$143,800	$371,478	0.4
	Entire Project	**40,044,860**	**15,434,900**	2.6

Data to be transferred to the HSIP Application Form

This section is generated automatically once the data entry and calculation have been completed. Transfer the data on this page to Section III of the HSIP Application Form.

Safety Countermeasure Information

Number of countermeasures: 3
NS4A: Convert intersection to roundabout (from all way stop)
R24: Improve pavement friction (High Friction Surface Treatments)
NS12: Install raised median on approaches (NS.I.)

Cost, FRR, Benefit and BCR:

Total Project Cost:	15,434,900
HSIP Funds Requested:	13,891,410
Max. Federal Reimbursement Ratio (FRR):	90%
Total Expected Benefit:	40,044,860
Benefit Cost Ratio:	2.59

HSIP ANALYZER

Cost Estimate, Crash Data and Benefit Cost Ratio (BCR) Calculation for Highway Safety Improvement Program (HSIP) Application

Important: Review and follow the step-by-step instructions in "Manual for HSIP Analyzer". Completing the HSIP Analyzer without referencing to the manual may result in an application with fatal flaws that will be disqualified from the ranking and selection process.

All yellow highlighted fields must be filled in. The gray fields are calculated and read-only. This is a dynamic form (later steps vary depending on the data entered in earlier steps). If any error messages in red appear, fix the errors prior to proceeding to the next steps.

1. Application ID, Project Location and Project Description (copy from the HSIP Application Form):

Application ID:

Save this file using the Application ID plus "Calc" as the file name (e.g. "07-Los Angeles-01Calc.pdf").

Project Location: (limited to 250 characters) Coloma-Lotus CLMP Segment 2

Project Description: (limited to 250 characters) SR-49 -Lotus to Coloma Heights

2. Application Category (Check one):

Application Categories that require a Benefit Cost Ratio (BCR):

☐ Common BCR Application ☐ Set-aside for High Friction Surface Treatment

Application Categories that do NOT require a Benefit Cost Ratio (BCR):

☐ Set-aside for Guardrail Upgrades ☐ Set-aside for Horizontal Curve Signing

☒ Set-aside for Pedestrian Crossing Enhancements ☐ Set-aside for Tribes

☑ **Dual consideration?**
If an Application Category that does not require a BCR is selected above, check this box to indicate your desire that this application will be considered as a Common BCR Application as well in case it does not get selected for funding under the set-aside category. If this box is checked, a benefit cost analysis is required so the project will have a BCR.

A safety benefit cost analysis is required for this application. This tool will guide through cost estimate, safety benefit evaluation and Benefit Cost Ratio (BCR) calculation.

Section I. Construction Cost Estimate and Cost Breakdown

The purpose of this section is to:

- Provide detailed engineer's estimate (for construction items only). The costs for other phases (PE, ROW, and CE) will be included in Section II.
- Test if countermeasures (CMs) (up to 3) are eligible for being used in the project benefit calculation. For a CM to be used in the project benefit calculation, the construction cost of the CM must be at least 15% of the project's total construction cost, unless an exception is requested. And
- Determine the project's maximum Federal Reimbursement Ratio (FRR).

I.1 Select up to 3 countermeasures (CMs) to be tested in the Engineer's Estimate:

Number of CMs to be used in this project: 2

CM No. 1:	R24: Improve pavement friction (High Friction Surface Treatments)
CM No. 2:	NS6: Upgrade intersection pavement markings (NS.I.)

I.2 Detailed Engineer's Estimate for Construction Items:

Cost breakdown by CMs. For each item, enter a cost percentage for each of the CMs and "Other Safety-Related" (OS) components. (e.g. enter 10 for 10%). The cost % for "Non-Safety-Related" (NS) components is calculated.

	No.	Item Description	Unit	Quantity	Unit Cost	Total	% for CM#1 (R24)	% for CM#2 (NS6)	% for OS*	% for NS**
+ -	1	High Visibility Striping with Rumblestrips	LF	4,580	$2.25	10,305	%	%	100%	0
+ -	2	Resurface Roadway and New High Visibility Striping	SQFT	157,150	$10.00	1,571,500	100%	0%	0%	0
+ -	3	Class I Path (Paved)	SQFT	47,130	$12.00	565,560	%	%	100%	0
+ -	4	Concrete Sidwalk/Path (Includes Curb and Gutter)	SQFT	16,600	$17.00	282,200	%	%	100%	0
+ -	5	Pedestrian Crosswalk (High Visibility Markings Only)	EA	5	$4000.00	20,000	%	%	100%	0
+ -	6	Pedestrian Activated Rectangular Rapid Flashing Beacon (RRFB)	EA	6	$15000.00	90,000	%	%	100%	0
+ -	7	Pedestrian Hybrid Beacon System	EA	2	$35000.00	70,000	%	%	100%	0
+ -	8	Stop Controlled Intersection	EA	3	$25000.00	75,000	%	%	100%	0
+ -	9	Coloma Heights Intersection	EA	1	128,000	128,000	0%	100%	0%	0
					Weighted Average (%) Total ($)	$2,812,565	56%	5%	40%	

* % for OS: Cost % for Other Safety-Related components;
** % for NS: Cost % for Non Safety-Related components.

Contingencies, as % of the above "Total" of the construction items: (e.g. enter 10 for 10%) 50 % $1,406,283

Total Construction Cost (Con Items & Contingencies): (Rounded up to the nearest hundreds) $4,218,900

I.3 Summary

2 CM(s) are eligible to be used in the project benefit calculation.

Countermeasure ID	Federal Funding Eligibility (FFE)	Cost %	Eligible to be used in benefit calculation?	Request exception to the 15% rule*
R24	100%	55.87%	Yes (>=15% cost)	☐
NS6	100%	4.55%	Yes (<15% cost) (Exception being requested)	☒

*By requesting an exception to the 15% rule, the CM with less than 15% of the construction cost will then be eligible to be used in the benefit calculation. if an exception is requested for any CM(s) above, please provide the reason (low cost treatment with significant safety benefits, etc.):

Severe injury occurred within limits the limits of new rumble strips/stripes. Fatal injury occurred at intersection where upgraded pavement markings would be installed.

Project's Maximum Federal Reimbursement Ratio = 100.0%

The project's Maximum Federal Reimbursement Ratio is calculated as the least of the FFEs of the above countermeasures, minus the percentage of the non-safety related costs in excess of 10%. **This is the maximum value allowed to be entered in "HSIP/Total (%)" column in Section II (Project Cost Estimate).**

Section II. Project Cost Estimate

All project costs, <u>for all phases and by all funding sources</u>, must be accounted for on this form.

i. "<u>Total Cost</u>": Round all costs up to the nearest hundred dollars.

ii. "<u>HSIP/Total (%)</u>": The maximum allowed is the project's Federal Reimbursement Ratio (FRR) as determined in Section I. Click the button to assign the maximum to all, OR enter if not the maximum.

iii. "<u>HSIP Funds</u>" and "<u>Local/Other Funds</u>" are calculated.

Pay attention to the interactive warning/error messages below the table. The messages, if any, must be fixed, or exceptions should be justified in Question No. 5 in Section II of the HSIP Application Form.

Project's maximum Federal Reimbursement Ratio (FRR) (from Section I, rounded up to integer) 100 %

To set all "HSIP/Total (%)" in the below table to the above maximum FRR, click "Set": Set

Description	Total Cost	HISP/Total (%)	HSIP Funds	Local/Other Funds
Preliminary Engineering (PE) Phase				
Environmental	$507,000	100 %	$507,000	$0
PS&E	$633,000	100 %	$633,000	$0
Subtotal - PE	**$1,140,000**	**100 %**	**$1,140,000**	**$0**
Right of Way (ROW) Phase				
Right of Way Engineering	$0	100 %	$0	$0
Appraisals, Acquisitions & Utilities	$211,000	100 %	$211,000	$0
Subtotal - Right of Way (ROW)	**$211,000**	**100 %**	**$211,000**	**$0**
Construction (CON) Phase				
Construction Engineering (CE)	$338,000	100 %	$338,000	$0
Construction Items	$4,218,900 (Read only - from Section I)	100 %	$4,218,900	$0
Subtotal - Construction	**$4,556,900**	**100 %**	**$4,556,900**	**$0**
PROJECT TOTAL	$5,907,900	100 %	$5,907,900	$0

☐ Agency does NOT request **HSIP** funds for PE Phase (automatically checked if PE - HSIP funds is $0).

Interactive Warning/Error Messages:
If there are any messages in the below box, please fix OR explain justification for exceptions in Question No 5, Section II in the HSIP Application.

1. The HSIP amount for PE exceeds 25% of the HSIP amount for Construction Items.

Section III. Project Location Groups, Countermeasures and Crash Data

The benefit of an HSIP safety project is achieved by reducing potential future crashes due to the application of the safety countermeasures (CMs). In this section, you will need to provide information regarding the project's safety CMs and historical crash data at the project sites. The data will be used to estimate the project benefit in Section IV.

1. Divide the project locations into groups.

It is quite often that an HSIP project has multiple locations. Theoretically the benefit for every single location may be calculated separately and then sum them up. However, that may be time consuming or almost impossible when there are a lot of locations. It is more efficient that the project locations with exactly the same safety countermeasures are combined into a group. The benefits of the locations in the same group can then be calculated at once.

When only one group is needed:

If your project consists of only one location or multiple locations that have similar features, address similar safety issues and utilize the same countermeasure(s). The crash data of all the locations can be combined and only one group is needed.

When multiple groups are needed:

If your project include multiple locations that have various safety issues and the proposed safety improvements (countermeasures) are not exactly the same for all the locations. The locations must be divided into different groups. The project benefits are then calculated multiple times, once for each location group. The project total benefit is the sum of the benefits from the different groups.

It should be noted that within a group, all locations should be of the same type: Signalized Intersection (S), Non-Signalized Intersection (NS), or Roadway (R).

If necessary, you may explain the location grouping for your project in details in Question No. 3 (Crash Data Evaluation), Section II in the HSIP Application Form.

2. After the number of location groups is entered, one subform will be populated for each location group. **For each location group:**

1) First, select the applicable CMs. *Note: If a Roundabout CM (S18 or NS4A or NS4B) is selected, additional information is required.*

For each group, only the CMs of the same type as the group location type can be used. For example, if a group consists of 5 signalized intersections, only "Signalized Intersection" CMs may be used for this group.

2) Based on the selected CMs, crash data tables of the required types are displayed for data entry.

Different CMs will reduce crashes of different types during the life of the safety improvements. Depending on the selected CMs for the group, you will be required to fill in one or more crash data tables, for any combination of the five crash types (datasets): "All" , "Night" , Ped & Bike", "Emergency Vehicle", and "Animal" (Each of the later four datasets is a sub-dataset of the "All" dataset.)

For more information regarding grouping project locations and examples, please refer to the Manual for HSIP Analyzer.

III.1 List of Project Locations and Location Groups

List all locations/sites included in this project by groups. The locations entered in Table III.1 below will be automatically populated in the crash data tables in III.2.

Based on the criteria described on the last page, the locations/sites need to be divided into 2 groups.

Table III.1 List of Project Locations by Groups

Highlighted fields must be filled in. For each group:
1) Must select a Location Type;
2) Initially each group has one location line. Click "+"/"-" to add a new line/delete an existing line;
3) Enter location description for each line. The same descriptions will be auto-populated in III.2.

*Note: If your project has a large number of locations, please aggregate some locations into one description, e.g. 10 stop controlled intersections, 5 horizontal curves, etc., as long as they have similar features and the safety improvements to be implemented are the same.

	No.	No. in Group	Location Description (Intersection Name or Road Limit or General Description)	
GROUP 1			Select Location Type:	NS (Non-signalized Intersections)
+ -	1	G1-1	Coloma Heights Intersection Improvements	
GROUP 2			Select Location Type:	R (Roadways)
+ -	2	G2-1	Resurface Roadway and New High Visibility Striping - Entire Segment (improve pavement friction)	

III.2: Countermeasures and Crash Data

(Repeats for each location group)

Countermeasures and Crash Data -Location Group No. 1 of 2

Hide Group Details

Step 1: Select countermeasure(s) to be applied to this location group

This group's location type: NS (Non-signalized Intersections)

Please check the CMs for this location group. All the CMs that have passed the test in Section I AND match the location type of this group are listed below.

	No.	Countermeasure (CM) Name	CM Type*	Crash Reduction Factor (CRF)	Expected Life (Years)	Crash Type	Federal Funding Eligibility
☒	1	NS6: Upgrade intersection pavement markings (NS.I.)	NS	0.25	10	All	100%
	*CM Type: S-Signalized Intersection; NS-Non-Signalized Intersection; R-Roadway.						

Step 2: Provide crash data.

2.1 Crash Data Period: must be between 3 and 5 years.

from (MM/DD/YYYY): 01/01/2013 To (MM/DD/YYYY): 12/31/2017 Crash Data Period (years) = 5

2.2 Fill out the crash data table(s) for the crash type(s) as required by the selected countermeasure(s) in Step 1.

Based on the countermeasures selected in Step 1 , the crash data types to be provided are:

(1) All

Crash Data Table for Crash Type: ALL

No.	Location (from Table III.1)	Fatal (ALL)	Severe Injury (ALL)	Other Visible Injury (ALL)	Complaint of Pain (ALL)	PDO (ALL)	Total
1	Coloma Heights Intersection Improvements	1	0	0	2	7	10
	Total	1	0	0	2	7	10

III.2: Countermeasures and Crash Data

(Repeats for each location group)

Countermeasures and Crash Data -Location Group No. 2 of 2

Hide Group Details

Step 1: Select countermeasure(s) to be applied to this location group

This group's location type: R (Roadways)

Please check the CMs for this location group. All the CMs that have passed the test in Section I AND match the location type of this group are listed below.

	No.	Countermeasure (CM) Name	CM Type*	Crash Reduction Factor (CRF)	Expected Life (Years)	Crash Type	Federal Funding Eligibility
☒	1	R24: Improve pavement friction (High Friction Surface Treatments)	R	0.4	10	All	100%
	*CM Type: S-Signalized Intersection; NS-Non-Signalized Intersection; R-Roadway.						

Step 2: Provide crash data.

2.1 Crash Data Period: must be between 3 and 5 years.

from (MM/DD/YYYY): 01/01/2013 To (MM/DD/YYYY): 12/31/2017 Crash Data Period (years) = 5

2.2 Fill out the crash data table(s) for the crash type(s) as required by the selected countermeasure(s) in Step 1.

Based on the countermeasures selected in Step 1 , the crash data types to be provided are:

(1) All

Crash Data Table for Crash Type: ALL

No.	Location (from Table III.1)	Fatal (ALL)	Severe Injury (ALL)	Other Visible Injury (ALL)	Complaint of Pain (ALL)	PDO (ALL)	Total
1	Resurface Roadway and New High Visibility Striping - Entire Segment (improve pavement friction)	1	1	0	2	9	13
	Total	1	1	0	2	9	13

Section IV. Calculation and Results

Click the "Calculate" button to calculate. The script will first check if there are any errors or inconsistencies in the countermeasure selections and crash data. If errors are detected and displayed below, the errors must be fixed first before you click the "Calculate" button again. If no errors are displayed, the calculation results are provided in this section. Please refer to the Manual for HSIP Analyzer for details regarding possible errors.

Calculate

Project Summary Information:

Project Total Cost: 5907900
2 countermeasures are eligible in benefit calculation. (R24 NS6)
Project location(s) are divided into 2 group(s) for calculating the benefits.

IV.1 Benefit Summary by location groups

Group No.	Group Info/Data*	Benefit from CM #1	Benefit from CM #2	Benefit from CM #3	Total Benefit of the group
1	Location type: NS (Non-signalized Intersections) Number of location(s): 1 Number of selected countermeasure(s): 1 (NS6) Crash Data Information: Crash data period (years): 5 Number of crashes(F/SI/OVI/I-CP/PDO)*: All: 1,0,0,2,7	$0	$1,268,200	$0	$1,268,200
2	Location type: R (Roadways) Number of location(s): 1 Number of selected countermeasure(s): 1 (R24) Crash Data Information: Crash data period (years): 5 Number of crashes(F/SI/OVI/I-CP/PDO)*: All: 1,1,0,2,9	$3,400,000	$0	$0	$3,400,000
Sum		**$3,400,000**	**$1,268,200**	**$0**	**$4,668,200**

*Number of crashes: five crash numbers are for Fatal (F), Severe Injury (SI), Other Visible Injury (OVI), Injury - Complaint of Pain (I-CP), and Property Damage Only (PDO), respectively.

IV.2. Project Benefit and BCR Summary

No.	Countermeasure Name	Benefit	Cost	Resulting B/C
1	R24	$3,400,000	$5,462,939	0.6
2	NS6	$1,268,200	$444,961	2.9
3		$0	$0	0
	Entire Project	**$4,668,200**	**$5,907,900**	**0.8**

Data to be transferred to the HSIP Application Form

This section is generated automatically once the data entry and calculation have been completed. Transfer the data on this page to Section III of the HSIP Application Form.

Safety Countermeasure Information

Number of countermeasures: 2
R24: Improve pavement friction (High Friction Surface Treatments)
NS6: Upgrade intersection pavement markings (NS.I.)

Cost, FRR, Benefit and BCR:

Total Project Cost:	$5,907,900
HSIP Funds Requested:	$5,907,900
Max. Federal Reimbursement Ratio (FRR):	100%
Total Expected Benefit:	$4,668,200
Benefit Cost Ratio:	0.79

HSIP ANALYZER

Cost Estimate, Crash Data and Benefit Cost Ratio (BCR) Calculation for Highway Safety Improvement Program (HSIP) Application

Important: Review and follow the step-by-step instructions in "Manual for HSIP Analyzer". Completing the HSIP Analyzer without referencing to the manual may result in an application with fatal flaws that will be disqualified from the ranking and selection process.

All yellow highlighted fields must be filled in. The gray fields are calculated and read-only. This is a dynamic form (later steps vary depending on the data entered in earlier steps). If any error messages in red appear, fix the errors prior to proceeding to the next steps.

1. Application ID, Project Location and Project Description (copy from the HSIP Application Form):

Application ID:

Save this file using the Application ID plus "Calc" as the file name (e.g. "07-Los Angeles-01Calc.pdf").

Project Location: (limited to 250 characters) Coloma-Lotus CLMP Segment 3

Project Description: (limited to 250 characters) SR49/ Cold Springs Road - Coloma Heights Rd to Monument Rd

2. Application Category (Check one):

Application Categories that require a Benefit Cost Ratio (BCR):

- ☐ Common BCR Application
- ☐ Set-aside for High Friction Surface Treatment

Application Categories that do NOT require a Benefit Cost Ratio (BCR):

- ☐ Set-aside for Guardrail Upgrades
- ☐ Set-aside for Horizontal Curve Signing
- ☒ Set-aside for Pedestrian Crossing Enhancements
- ☐ Set-aside for Tribes

☑ **Dual consideration?**
If an Application Category that does not require a BCR is selected above, check this box to indicate your desire that this application will be considered as a Common BCR Application as well in case it does not get selected for funding under the set-aside category. If this box is checked, a benefit cost analysis is required so the project will have a BCR.

A safety benefit cost analysis is required for this application. This tool will guide through cost estimate, safety benefit evaluation and Benefit Cost Ratio (BCR) calculation.

Section I. Construction Cost Estimate and Cost Breakdown

The purpose of this section is to:

- Provide detailed engineer's estimate (for construction items only). The costs for other phases (PE, ROW, and CE) will be included in Section II.
- Test if countermeasures (CMs) (up to 3) are eligible for being used in the project benefit calculation. For a CM to be used in the project benefit calculation, the construction cost of the CM must be at least 15% of the project's total construction cost, unless an exception is requested. And
- Determine the project's maximum Federal Reimbursement Ratio (FRR).

I.1 Select up to 3 countermeasures (CMs) to be tested in the Engineer's Estimate:

Number of CMs to be used in this project: 1

CM No. 1: NS4B: Convert intersection to roundabout (from stop or yield control on minor road)

I.2 Detailed Engineer's Estimate for Construction Items:

Cost breakdown by CMs. For each item, enter a cost percentage for each of the CMs and "Other Safety-Related" (OS) components. (e.g. enter 10 for 10%). The cost % for "Non-Safety-Related" (NS) components is calculated.

	No.	Item Description	Unit	Quantity	Unit Cost	Total	% for CM#1 (NS4B)	% for OS*	% for NS**
+ -	1	Resurface Roadway and New High Visibility Striping	SQFT	13,260	$10.00	132,600	%	100%	0
+ -	2	Reconstruct Roadway/Roadway Widening	SQFT	2,040	$25.00	51,000	%	100%	0
+ -	3	Concrete Sidewalk/Path (Includes Curb and Gutter)	SQFT	150	$17.00	2,550	%	100%	0
+ -	4	Decomposed Granite Path	SQFT	9,000	$8.00	72,000	%	100%	0
+ -	5	Roundabout Intersection	EA	1	800,000	800,000	100%	%	0
		Weighted Average (%) Total ($)				$1,058,150	76%	24%	

* % for OS: Cost % for Other Safety-Related components;
** % for NS: Cost % for Non Safety-Related components.

Contingencies, as % of the above "Total" of the construction items: (e.g. enter 10 for 10%) 50 % $529,075

Total Construction Cost (Con Items & Contingencies): (Rounded up to the nearest hundreds) $1,587,300

I.3 Summary

1 CM(s) are eligible to be used in the project benefit calculation.

Countermeasure ID	Federal Funding Eligibility (FFE)	Cost %	Eligible to be used in benefit calculation?	Request exception to the 15% rule*
NS4B	100%	75.60%	Yes (>=15% cost)	☐

*By requesting an exception to the 15% rule, the CM with less than 15% of the construction cost will then be eligible to be used in the benefit calculation. if an exception is requested for any CM(s) above, please provide the reason (low cost treatment with significant safety benefits, etc.):

Project's Maximum Federal Reimbursement Ratio = 100.0%

The project's Maximum Federal Reimbursement Ratio is calculated as the least of the FFEs of the above countermeasures, minus the percentage of the non-safety related costs in excess of 10%. **This is the maximum value allowed to be entered in "HSIP/Total (%)" column in Section II (Project Cost Estimate).**

Section II. Project Cost Estimate

All project costs, <u>for all phases and by all funding sources</u>, must be accounted for on this form.

i. "<u>Total Cost</u>": Round all costs up to the nearest hundred dollars.
ii. "<u>HSIP/Total (%)</u>": The maximum allowed is the project's Federal Reimbursement Ratio (FRR) as determined in Section I. Click the button to assign the maximum to all, OR enter if not the maximum.
iii. "<u>HSIP Funds</u>" and "<u>Local/Other Funds</u>" are calculated.

Pay attention to the interactive warning/error messages below the table. The messages, if any, must be fixed, or exceptions should be justified in Question No. 5 in Section II of the HSIP Application Form.

Project's maximum Federal Reimbursement Ratio (FRR) (from Section I, rounded up to integer): 100 %

To set all "HSIP/Total (%)" in the below table to the above maximum FRR, click "Set": Set

Description	Total Cost	HISP/Total (%)	HSIP Funds	Local/Other Funds
Preliminary Engineering (PE) Phase				
Environmental	$191,000	100 %	$191,000	$0
PS&E	$0	100 %	$0	$0
Subtotal - PE	**$191,000**	**100 %**	**$191,000**	**$0**
Right of Way (ROW) Phase				
Right of Way Engineering	$0	100 %	$0	$0
Appraisals, Acquisitions & Utilities	$80,000	100 %	$80,000	$0
Subtotal - Right of Way (ROW)	**$80,000**	**100 %**	**$80,000**	**$0**
Construction (CON) Phase				
Construction Engineering (CE)	$0	100 %	$0	$0
Construction Items	$1,587,300 (Read only - from Section I)	100 %	$1,587,300	$0
Subtotal - Construction	**$1,587,300**	**100 %**	**$1,587,300**	**$0**
PROJECT TOTAL	$1,858,300	100 %	$1,858,300	$0

☐ Agency does NOT request **HSIP** funds for PE Phase (automatically checked if PE - HSIP funds is $0).

Interactive Warning/Error Messages:
If there are any messages in the below box, please fix OR explain justification for exceptions in Question No 5, Section II in the HSIP Application.

Section III. Project Location Groups, Countermeasures and Crash Data

The benefit of an HSIP safety project is achieved by reducing potential future crashes due to the application of the safety countermeasures (CMs). In this section, you will need to provide information regarding the project's safety CMs and historical crash data at the project sites. The data will be used to estimate the project benefit in Section IV.

1. Divide the project locations into groups.

It is quite often that an HSIP project has multiple locations. Theoretically the benefit for every single location may be calculated separately and then sum them up. However, that may be time consuming or almost impossible when there are a lot of locations. It is more efficient that the project locations with exactly the same safety countermeasures are combined into a group. The benefits of the locations in the same group can then be calculated at once.

When only one group is needed:

If your project consists of only one location or multiple locations that have similar features, address similar safety issues and utilize the same countermeasure(s). The crash data of all the locations can be combined and only one group is needed.

When multiple groups are needed:

If your project include multiple locations that have various safety issues and the proposed safety improvements (countermeasures) are not exactly the same for all the locations. The locations must be divided into different groups. The project benefits are then calculated multiple times, once for each location group. The project total benefit is the sum of the benefits from the different groups.

It should be noted that within a group, all locations should be of the same type: Signalized Intersection (S), Non-Signalized Intersection (NS), or Roadway (R).

If necessary, you may explain the location grouping for your project in details in Question No. 3 (Crash Data Evaluation), Section II in the HSIP Application Form.

2. After the number of location groups is entered, one subform will be populated for each location group. **For each location group:**

1) First, select the applicable CMs. *Note: If a Roundabout CM (S18 or NS4A or NS4B) is selected, additional information is required.*

For each group, only the CMs of the same type as the group location type can be used. For example, if a group consists of 5 signalized intersections, only "Signalized Intersection" CMs may be used for this group.

2) Based on the selected CMs, crash data tables of the required types are displayed for data entry.

Different CMs will reduce crashes of different types during the life of the safety improvements. Depending on the selected CMs for the group, you will be required to fill in one or more crash data tables, for any combination of the five crash types (datasets): "All" , "Night" , Ped & Bike", "Emergency Vehicle", and "Animal" (Each of the later four datasets is a sub-dataset of the "All" dataset.)

For more information regarding grouping project locations and examples, please refer to the Manual for HSIP Analyzer.

III.1 List of Project Locations and Location Groups

List all locations/sites included in this project by groups. The locations entered in Table III.1 below will be automatically populated in the crash data tables in III.2.

Based on the criteria described on the last page, the locations/sites need to be divided into 1 groups.

Table III.1 List of Project Locations by Groups

Highlighted fields must be filled in. For each group:
1) Must select a Location Type;
2) Initially each group has one location line. Click "+"/"-" to add a new line/delete an existing line;
3) Enter location description for each line. The same descriptions will be auto-populated in III.2.

*Note: If your project has a large number of locations, please aggregate some locations into one description, e.g. 10 stop controlled intersections, 5 horizontal curves, etc., as long as they have similar features and the safety improvements to be implemented are the same.

	No.	No. in Group	Location Description (Intersection Name or Road Limit or General Description)	
GROUP 1			Select Location Type:	NS (Non-signalized Intersections)
+ -	1	G1-1	Roundabout	

III.2: Countermeasures and Crash Data

(Repeats for each location group)

Countermeasures and Crash Data -Location Group No. 1 of 1

Hide Group Details

Step 1: Select countermeasure(s) to be applied to this location group

This group's location type: NS (Non-signalized Intersections)

Please check the CMs for this location group. All the CMs that have passed the test in Section I AND match the location type of this group are listed below.

	No.	Countermeasure (CM) Name	CM Type*	Crash Reduction Factor (CRF)	Expected Life (Years)	Crash Type	Federal Funding Eligibility
☒	1	NS4B: Convert intersection to roundabout (from stop or yield control on minor road)	NS	0.5	20	All	100%
	*CM Type: S-Signalized Intersection; NS-Non-Signalized Intersection; R-Roadway.						

Additional information is required:

Since Roundabout is selected, the below additional information is required for calculating Roundabout benefit.

Roundabout Location	Please select:	Rural			
Intersection Type	Please select:	T Intersection			
Roundabout Lanes	Please select:	1 Lane			
ADT	Major Road:	4,750	Minor Road: 3,000	**Total**	**7,750**

Step 2: Provide crash data.

2.1 Crash Data Period: must be between 3 and 5 years.

from (MM/DD/YYYY): 01/01/2014 To (MM/DD/YYYY): 12/31/2017 Crash Data Period (years) = 4

2.2 Fill out the crash data table(s) for the crash type(s) as required by the selected countermeasure(s) in Step 1.

Based on the countermeasures selected in Step 1 , the crash data types to be provided are:

(1) All

Crash Data Table for Crash Type: ALL

No.	Location (from Table III.1)	Fatal (ALL)	Severe Injury (ALL)	Other Visible Injury (ALL)	Complaint of Pain (ALL)	PDO (ALL)	Total
1	Roundabout	0	0	1	0	2	3
	Total	0	0	1	0	2	3

Section IV. Calculation and Results

Click the "Calculate" button to calculate. The script will first check if there are any errors or inconsistencies in the countermeasure selections and crash data. If errors are detected and displayed below, the errors must be fixed first before you click the "Calculate" button again. If no errors are displayed, the calculation results are provided in this section. Please refer to the Manual for HSIP Analyzer for details regarding possible errors.

Calculate

Project Summary Information:

Project Total Cost: 1858300
1 countermeasures are eligible in benefit calculation. (NS4B)
Project location(s) are divided into 1 group(s) for calculating the benefits.

IV.1 Benefit Summary by location groups

Group No.	Group Info/Data*	Benefit from CM #1	Benefit from CM #2	Benefit from CM #3	Total Benefit of the group
1	Location type: NS (Non-signalized Intersections) Number of location(s): 1 Number of selected countermeasure(s): 1 (NS4B) Crash Data Information: Crash data period (years): 4 Number of crashes(F/SI/OVI/I-CP/PDO)*: All: 0,0,1,0,2	$4,017,924	$0	$0	$4,017,924
Sum		**$4,017,924**	**$0**	**$0**	**$4,017,924**

*Number of crashes: five crash numbers are for Fatal (F), Severe Injury (SI), Other Visible Injury (OVI), Injury - Complaint of Pain (I-CP), and Property Damage Only (PDO), respectively.

IV.2. Project Benefit and BCR Summary

No.	Countermeasure Name	Benefit	Cost	Resulting B/C
1	NS4B	$4,017,924	$1,858,300	2.2
2		$0	$0	0
3		$0	$0	0
	Entire Project	**$4,017,924**	**$1,858,300**	**2.2**

Data to be transferred to the HSIP Application Form

This section is generated automatically once the data entry and calculation have been completed. Transfer the data on this page to Section III of the HSIP Application Form.

Safety Countermeasure Information

Number of countermeasures: 1
NS4B: Convert intersection to roundabout (from stop or yield control on minor road)

Cost, FRR, Benefit and BCR:

Total Project Cost:	$1,858,300
HSIP Funds Requested:	$1,858,300
Max. Federal Reimbursement Ratio (FRR):	100%
Total Expected Benefit:	$4,017,924
Benefit Cost Ratio:	2.16

HSIP ANALYZER

Cost Estimate, Crash Data and Benefit Cost Ratio (BCR) Calculation for Highway Safety Improvement Program (HSIP) Application

Important: Review and follow the step-by-step instructions in "Manual for HSIP Analyzer". Completing the HSIP Analyzer without referencing to the manual may result in an application with fatal flaws that will be disqualified from the ranking and selection process.

All yellow highlighted fields must be filled in. The gray fields are calculated and read-only. This is a dynamic form (later steps vary depending on the data entered in earlier steps). If any error messages in red appear, fix the errors prior to proceeding to the next steps.

1. Application ID, Project Location and Project Description (copy from the HSIP Application Form):

Application ID:

Save this file using the Application ID plus "Calc" as the file name (e.g. "07-Los Angeles-01Calc.pdf").

Project Location: (limited to 250 characters) Coloma-Lotus CLMP Segment 4

Project Description: (limited to 250 characters) SR-49/ Lotus Rd - Bassi Rd to SR-49

2. Application Category (Check one):

Application Categories that require a Benefit Cost Ratio (BCR):

☐ Common BCR Application ☐ Set-aside for High Friction Surface Treatment

Application Categories that do NOT require a Benefit Cost Ratio (BCR):

☐ Set-aside for Guardrail Upgrades ☐ Set-aside for Horizontal Curve Signing

☒ Set-aside for Pedestrian Crossing Enhancements ☐ Set-aside for Tribes

☑ **Dual consideration?**
If an Application Category that does not require a BCR is selected above, check this box to indicate your desire that this application will be considered as a Common BCR Application as well in case it does not get selected for funding under the set-aside category. If this box is checked, a benefit cost analysis is required so the project will have a BCR.

A safety benefit cost analysis is required for this application. This tool will guide through cost estimate, safety benefit evaluation and Benefit Cost Ratio (BCR) calculation.

Section I. Construction Cost Estimate and Cost Breakdown

The purpose of this section is to:

- Provide detailed engineer's estimate (for construction items only). The costs for other phases (PE, ROW, and CE) will be included in Section II.
- Test if countermeasures (CMs) (up to 3) are eligible for being used in the project benefit calculation. For a CM to be used in the project benefit calculation, the construction cost of the CM must be at least 15% of the project's total construction cost, unless an exception is requested. And
- Determine the project's maximum Federal Reimbursement Ratio (FRR).

I.1 Select up to 3 countermeasures (CMs) to be tested in the Engineer's Estimate:

Number of CMs to be used in this project: 2

CM No. 1:	R34: Install centerline rumble strips/stripes
CM No. 2:	R24: Improve pavement friction (High Friction Surface Treatments)

I.2 Detailed Engineer's Estimate for Construction Items:

Cost breakdown by CMs. For each item, enter a cost percentage for each of the CMs and "Other Safety-Related" (OS) components. (e.g. enter 10 for 10%). The cost % for "Non-Safety-Related" (NS) components is calculated.

	No.	Item Description	Unit	Quantity	Unit Cost	Total	% for CM#1 (R34)	% for CM#2 (R24)	% for OS*	% for NS**
+ -	1	High Visibility Striping with Rumblestrips	LF	5,000	$2.25	11,250	100%	%	%	0
+ -	2	Resurface Roadway and New High Visibility Striping	SQFT	157,100	$10.00	1,571,000	0%	100%	0%	0
+ -	3	Class 1 Path (Paved)	SQFT	34,200	$12.00	410,400	%	%	100%	0
+ -	4	Retaining Walls	LF	2,500	$350.00	875,000	%	%	100%	0
+ -	5	Pedestrian Crosswalk (High Visibility Markings Only)	EA	1	$4000.00	4,000	%	%	100%	0
+ -	6	Pedestrian Hybrid Beacon System	EA	2	$35000.00	70,000	%	%	100%	0
+ -	7	Speed Feedback Sign	EA	2	$12500.00	25,000	%	%	100%	0
+ -	8	Stop Controlled Intersection	EA	2	$25000.00	50,000	%	%	100%	0
		Weighted Average (%) Total ($)				$3,016,650	0%	52%	48%	

* % for OS: Cost % for Other Safety-Related components;
** % for NS: Cost % for Non Safety-Related components.

Contingencies, as % of the above "Total" of the construction items: 50 % $1,508,325
(e.g. enter 10 for 10%)

Total Construction Cost (Con Items & Contingencies): $4,525,000
(Rounded up to the nearest hundreds)

I.3 Summary

2 CM(s) are eligible to be used in the project benefit calculation.

Countermeasure ID	Federal Funding Eligibility (FFE)	Cost %	Eligible to be used in benefit calculation?	Request exception to the 15% rule*
R34	100%	0.37%	Yes (<15% cost) (Exception being requested)	☒
R24	100%	52.08%	Yes (>=15% cost)	☐

*By requesting an exception to the 15% rule, the CM with less than 15% of the construction cost will then be eligible to be used in the benefit calculation. if an exception is requested for any CM(s) above, please provide the reason (low cost treatment with significant safety benefits, etc.):

rumple strips along the entire segment would provide a cost effective safety countermeasure

Project's Maximum Federal Reimbursement Ratio = 100.0%

The project's Maximum Federal Reimbursement Ratio is calculated as the least of the FFEs of the above countermeasures, minus the percentage of the non-safety related costs in excess of 10%. **This is the maximum value allowed to be entered in "HSIP/Total (%)" column in Section II (Project Cost Estimate).**

Section II. Project Cost Estimate

All project costs, <u>for all phases and by all funding sources</u>, must be accounted for on this form.

i. "<u>Total Cost</u>": Round all costs up to the nearest hundred dollars.

ii. "<u>HSIP/Total (%)</u>": The maximum allowed is the project's Federal Reimbursement Ratio (FRR) as determined in Section I. Click the button to assign the maximum to all, OR enter if not the maximum.

iii. "<u>HSIP Funds</u>" and "<u>Local/Other Funds</u>" are calculated.

Pay attention to the interactive warning/error messages below the table. The messages, if any, must be fixed, or exceptions should be justified in Question No. 5 in Section II of the HSIP Application Form.

Project's maximum Federal Reimbursement Ratio (FRR) (from Section I, rounded up to integer) 100 %

To set all "HSIP/Total (%)" in the below table to the above maximum FRR, click "Set": Set

Description	Total Cost	HISP/Total (%)	HSIP Funds	Local/Other Funds
Preliminary Engineering (PE) Phase				
Environmental	$544,000	100 %	$544,000	$0
PS&E	$679,000	100 %	$679,000	$0
Subtotal - PE	**$1,223,000**	**100 %**	**$1,223,000**	**$0**
Right of Way (ROW) Phase				
Right of Way Engineering	$0	100 %	$0	$0
Appraisals, Acquisitions & Utilities	$227,000	100 %	$227,000	$0
Subtotal - Right of Way (ROW)	**$227,000**	**100 %**	**$227,000**	**$0**
Construction (CON) Phase				
Construction Engineering (CE)	$363,000	100 %	$363,000	$0
Construction Items	$4,525,000 (Read only - from Section I)	100 %	$4,525,000	$0
Subtotal - Construction	**$4,888,000**	**100 %**	**$4,888,000**	**$0**
PROJECT TOTAL	$6,338,000	100 %	$6,338,000	$0

☐ Agency does NOT request **HSIP** funds for PE Phase (automatically checked if PE - HSIP funds is $0).

Interactive Warning/Error Messages:
If there are any messages in the below box, please fix OR explain justification for exceptions in Question No 5, Section II in the HSIP Application.

1. The HSIP amount for PE exceeds 25% of the HSIP amount for Construction Items.

Section III. Project Location Groups, Countermeasures and Crash Data

The benefit of an HSIP safety project is achieved by reducing potential future crashes due to the application of the safety countermeasures (CMs). In this section, you will need to provide information regarding the project's safety CMs and historical crash data at the project sites. The data will be used to estimate the project benefit in Section IV.

1. Divide the project locations into groups.

It is quite often that an HSIP project has multiple locations. Theoretically the benefit for every single location may be calculated separately and then sum them up. However, that may be time consuming or almost impossible when there are a lot of locations. It is more efficient that the project locations with exactly the same safety countermeasures are combined into a group. The benefits of the locations in the same group can then be calculated at once.

<u>When only one group is needed:</u>

If your project consists of only one location or multiple locations that have similar features, address similar safety issues and utilize the same countermeasure(s). The crash data of all the locations can be combined and only one group is needed.

<u>When multiple groups are needed:</u>

If your project include multiple locations that have various safety issues and the proposed safety improvements (countermeasures) are not exactly the same for all the locations. The locations must be divided into different groups. The project benefits are then calculated multiple times, once for each location group. The project total benefit is the sum of the benefits from the different groups.

It should be noted that within a group, all locations should be of the same type: Signalized Intersection (S), Non-Signalized Intersection (NS), or Roadway (R).

If necessary, you may explain the location grouping for your project in details in Question No. 3 (Crash Data Evaluation), Section II in the HSIP Application Form.

2. After the number of location groups is entered, one subform will be populated for each location group. **For each location group:**

1) First, select the applicable CMs. *Note: If a Roundabout CM (S18 or NS4A or NS4B) is selected, additional information is required.*

For each group, only the CMs of the same type as the group location type can be used. For example, if a group consists of 5 signalized intersections, only "Signalized Intersection" CMs may be used for this group.

2) Based on the selected CMs, crash data tables of the required types are displayed for data entry.

Different CMs will reduce crashes of different types during the life of the safety improvements. Depending on the selected CMs for the group, you will be required to fill in one or more crash data tables, for any combination of the five crash types (datasets): "All" , "Night" , Ped & Bike", "Emergency Vehicle", and "Animal" (Each of the later four datasets is a sub-dataset of the "All" dataset.)

For more information regarding grouping project locations and examples, please refer to the Manual for HSIP Analyzer.

III.1 List of Project Locations and Location Groups

List all locations/sites included in this project by groups. The locations entered in Table III.1 below will be automatically populated in the crash data tables in III.2.

Based on the criteria described on the last page, the locations/sites need to be divided into 1 groups.

Table III.1 List of Project Locations by Groups

Highlighted fields must be filled in. For each group:
1) Must select a Location Type;
2) Initially each group has one location line. Click "+"/"-" to add a new line/delete an existing line;
3) Enter location description for each line. The same descriptions will be auto-populated in III.2.

*Note: If your project has a large number of locations, please aggregate some locations into one description, e.g. 10 stop controlled intersections, 5 horizontal curves, etc., as long as they have similar features and the safety improvements to be implemented are the same.

	No.	No. in Group	Location Description (Intersection Name or Road Limit or General Description)	
GROUP 1			Select Location Type:	R (Roadways)
+ -	1	G1-1	Rumblestrips along entire segment	
+ -	2	G1-2	Resurface Roadway, New High Visability Striping	

III.2: Countermeasures and Crash Data

(Repeats for each location group)

Countermeasures and Crash Data -Location Group No. 1 of 1

Hide Group Details

Step 1: Select countermeasure(s) to be applied to this location group

This group's location type: R (Roadways)

Please check the CMs for this location group. All the CMs that have passed the test in Section I AND match the location type of this group are listed below.

	No.	Countermeasure (CM) Name	CM Type*	Crash Reduction Factor (CRF)	Expected Life (Years)	Crash Type	Federal Funding Eligibility
☒	1	R34: Install centerline rumble strips/stripes	R	0.2	10	All	100%
☒	2	R24: Improve pavement friction (High Friction Surface Treatments)	R	0.4	10	All	100%
	*CM Type: S-Signalized Intersection; NS-Non-Signalized Intersection; R-Roadway.						

Step 2: Provide crash data.

2.1 Crash Data Period: must be between 3 and 5 years.

from (MM/DD/YYYY): 01/01/2014 To (MM/DD/YYYY): 12/31/2017 Crash Data Period (years) = 4

2.2 Fill out the crash data table(s) for the crash type(s) as required by the selected countermeasure(s) in Step 1.

Based on the countermeasures selected in Step 1 , the crash data types to be provided are:

(1) All

Crash Data Table for Crash Type: ALL

No.	Location (from Table III.1)	Fatal (ALL)	Severe Injury (ALL)	Other Visible Injury (ALL)	Complaint of Pain (ALL)	PDO (ALL)	Total
1	Rumblestrips along entire segment	0	1	1	1	8	11
2	Resurface Roadway, New High Visability Striping	0	1	1	1	8	11
	Total	0	2	2	2	16	22

Section IV. Calculation and Results

Click the "Calculate" button to calculate. The script will first check if there are any errors or inconsistencies in the countermeasure selections and crash data. If errors are detected and displayed below, the errors must be fixed first before you click the "Calculate" button again. If no errors are displayed, the calculation results are provided in this section. Please refer to the Manual for HSIP Analyzer for details regarding possible errors.

Calculate

Project Summary Information:

Project Total Cost: 6338000
2 countermeasures are eligible in benefit calculation. (R34 R24)
Project location(s) are divided into 1 group(s) for calculating the benefits.

IV.1 Benefit Summary by location groups

Group No.	Group Info/Data*	Benefit from CM #1	Benefit from CM #2	Benefit from CM #3	Total Benefit of the group
1	Location type: R (Roadways) Number of location(s): 2 Number of selected countermeasure(s): 2 (R34 R24) Crash Data Information: Crash data period (years): 4 Number of crashes(F/SI/OVI/I-CP/PDO)*: All: 0,2,2,2,16	$1,987,094	$3,974,187	$0	$5,961,281
Sum		**$1,987,094**	**$3,974,187**	**$0**	**$5,961,281**

*Number of crashes: five crash numbers are for Fatal (F), Severe Injury (SI), Other Visible Injury (OVI), Injury - Complaint of Pain (I-CP), and Property Damage Only (PDO), respectively.

IV.2. Project Benefit and BCR Summary

No.	Countermeasure Name	Benefit	Cost	Resulting B/C
1	R34	$1,987,094	$45,064	44.1
2	R24	$3,974,187	$6,292,936	0.6
3		$0	$0	0
	Entire Project	**$5,961,281**	**$6,338,000**	0.9

Data to be transferred to the HSIP Application Form

This section is generated automatically once the data entry and calculation have been completed. Transfer the data on this page to Section III of the HSIP Application Form.

Safety Countermeasure Information

Number of countermeasures: 2
R34: Install centerline rumble strips/stripes
R24: Improve pavement friction (High Friction Surface Treatments)

Cost, FRR, Benefit and BCR:

Total Project Cost:	$6,338,000
HSIP Funds Requested:	$6,338,000
Max. Federal Reimbursement Ratio (FRR):	100%
Total Expected Benefit:	$5,961,281
Benefit Cost Ratio:	0.94

Appendix F: Induced Demand and Benefits Calculations

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1. Induced Demand

The induced demand for bicycle facilities associated with proposed improvements was estimated using the National Cooperative Highway Research Program (NCHRP) 552 methodology provided in the *Guidelines for Analysis of Investment in Bicycle Facilities*. The full methodology was used to estimate the induced demand associated with the local population. The methodology was modified to estimate the induced demand associated with the visitor population based on assumptions of bicycle mode share cited in the 2018 Visitor Travel Survey for the Lake Tahoe Region[1]. Sections 1.1 displays a summary of demand associated with the local population, while Section 1.2 displays those associated with the visitor population. This information is provided for the comprehensive study area and by segment for each population.

1.1 Local Population

Table 1.1 displays the bicycle commute mode share used to compute induced demand using the methodology presented in NCHRP 552.

Table 1.1 Bicycle Rates Used Calculations

Estimated Bicycling Rates	
Bicycle Commute Mode Share[1]	0.60%
Children Bicycle Percentage[3]	5.00%
Adult Bicycling Rate, High[4]	1.62%
Adult Bicycling Rate, Moderate[4]	0.81%
Adult Bicycling Rate, Low[4]	0.34%

[1] El Dorado County Bicycle Commute Share, 2010 U.S. Census
[3] NCHRP 552; 2001 NHTS
[4] NCHRP 552

The following tables present the existing population analysis and estimates of induced demand associated with each segment and the comprehensive study area.

[1] Source: Tahoe Regional Planning Agency

Comprehensive Study Area
Induced Demand

Existing Population Analysis	
Total Population (within 1.5 miles)	1,270
Existing Bicycle Commuters	7
Population near Facility, 2400m	1,270
Population near Facility, 1600m	1,060
Population near Facility, 800m	690
Total Bicyclist Commuters, 2400m	1
Total Bicyclist Commuters, 1600m	2
Total Bicyclist Commuters, 800m	4
Adult Population near Facility, 2400m	202
Adult Population near Facility, 1600m	355
Adult Population near Facility, 800m	662
Total Adult Bicycling Rates, High 2400m	5
Total Adult Bicycling Rates, High 1600m	8
Total Adult Bicycling Rates, High 800m	15
Total Adult Bicycling Rates, Moderate 2400m	2
Total Adult Bicycling Rates, Moderate 1600m	4
Total Adult Bicycling Rates, Moderate 800m	7
Total Adult Bicycling Rates, Low 2400m	1
Total Adult Bicycling Rates, Low 1600m	2
Total Adult Bicycling Rates, Low 800m	4
Total Adult Bicyclists, High	28
Total Adult Bicyclists, Moderate	13
Total Adult Bicyclists, Low	7
Total Child Cyclists, 2400m	0
Total Child Cyclists, 1600m	0
Total Child Cyclists, 800m	1
Likelihood Multiplier, 2400m	0.15
Likelihood Multiplier, 1600m	0.44
Likelihood Multiplier, 800m	0.51
Total New Commuters, 2400m	0
Total New Commuters, 1600m	1
Total New Commuters, 800m	2
Total New Adult Cyclists, High 2400m	1
Total New Adult Cyclists, High 1600m	4
Total New Adult Cyclists, High 800m	8
Total New Adult Cyclists, Moderate 2400m	0
Total New Adult Cyclists, Moderate 1600m	2
Total New Adult Cyclists, Moderate 800m	4
Total New Adult Cyclists, Low 2400m	0
Total New Adult Cyclists, Low 1600m	1
Total New Adult Cyclists, Low 800m	2
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	1
Induced Demand Estimates	
Total New Adult Cyclists	
High Estimate	12
Moderate Estimate	6
Low Estimate	3
Total New Commuter Cyclists	**3**
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	1
Total New Child Cyclists	**1**
Total New Cyclists	
High Estimate	**16**
Moderate Estimate	**10**
Low Estimate	**7**

Segment One Induced Demand Summary

Existing Population Analysis	
Total Population (1.5 miles)	768
Existing Bicycle Commuters	4
Population near Facility, 2400m	351
Population near Facility, 1600m	195
Population near Facility, 800m	222
Total Bicyclist Commuters, 2400m	2
Total Bicyclist Commuters, 1600m	1
Total Bicyclist Commuters, 800m	1
Adult Population near Facility, 2400m	336
Adult Population near Facility, 1600m	186
Adult Population near Facility, 800m	212
Total Adult Bicycling Rates, High 2400m	8
Total Adult Bicycling Rates, High 1600m	4
Total Adult Bicycling Rates, High 800m	5
Total Adult Bicycling Rates, Moderate 2400m	4
Total Adult Bicycling Rates, Moderate 1600m	2
Total Adult Bicycling Rates, Moderate 800m	2
Total Adult Bicycling Rates, Low 2400m	2
Total Adult Bicycling Rates, Low 1600m	1
Total Adult Bicycling Rates, Low 800m	1
Total Adult Bicyclists, High	17
Total Adult Bicyclists, Moderate	8
Total Adult Bicyclists, Low	4
Total Child Cyclists, 2400m	0
Total Child Cyclists, 1600m	0
Total Child Cyclists, 800m	0
Likelihood Multiplier, 2400m	0.15
Likelihood Multiplier, 1600m	0.44
Likelihood Multiplier, 800m	0.51
Total New Commuters, 2400m	0
Total New Commuters, 1600m	0
Total New Commuters, 800m	1
Total New Adult Cyclists, High 2400m	1
Total New Adult Cyclists, High 1600m	2
Total New Adult Cyclists, High 800m	2
Total New Adult Cyclists, Moderate 2400m	1
Total New Adult Cyclists, Moderate 1600m	1
Total New Adult Cyclists, Moderate 800m	1
Total New Adult Cyclists, Low 2400m	0
Total New Adult Cyclists, Low 1600m	0
Total New Adult Cyclists, Low 800m	1
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0
Induced Demand Estimates	
Total New Adult Cyclists	
High Estimate	6
Moderate Estimate	3
Low Estimate	1
Total New Commuter Cyclists	**1**
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0
Total New Child Cyclists	**1**
Total New Cyclists	
High Estimate	**7**
Moderate Estimate	**4**
Low Estimate	**3**

Segment Two Induced Demand Summary

Existing Population Analysis	
Total Population (1.5 miles)	916
Existing Bicycle Commuters	5
Population near Facility, 2400m	303
Population near Facility, 1600m	288
Population near Facility, 800m	325
Total Bicyclist Commuters, 2400m	2
Total Bicyclist Commuters, 1600m	2
Total Bicyclist Commuters, 800m	2
Adult Population near Facility, 2400m	290
Adult Population near Facility, 1600m	275
Adult Population near Facility, 800m	311
Total Adult Bicycling Rates, High 2400m	7
Total Adult Bicycling Rates, High 1600m	6
Total Adult Bicycling Rates, High 800m	7
Total Adult Bicycling Rates, Moderate 2400m	3
Total Adult Bicycling Rates, Moderate 1600m	3
Total Adult Bicycling Rates, Moderate 800m	3
Total Adult Bicycling Rates, Low 2400m	2
Total Adult Bicycling Rates, Low 1600m	2
Total Adult Bicycling Rates, Low 800m	2
Total Adult Bicyclists, High	20
Total Adult Bicyclists, Moderate	9
Total Adult Bicyclists, Low	5
Total Child Cyclists, 2400m	0
Total Child Cyclists, 1600m	0
Total Child Cyclists, 800m	0
Likelihood Multiplier, 2400m	0.15
Likelihood Multiplier, 1600m	0.44
Likelihood Multiplier, 800m	0.51
Total New Commuters, 2400m	0
Total New Commuters, 1600m	1
Total New Commuters, 800m	1
Total New Adult Cyclists, High 2400m	1
Total New Adult Cyclists, High 1600m	3
Total New Adult Cyclists, High 800m	4
Total New Adult Cyclists, Moderate 2400m	0
Total New Adult Cyclists, Moderate 1600m	1
Total New Adult Cyclists, Moderate 800m	2
Total New Adult Cyclists, Low 2400m	0
Total New Adult Cyclists, Low 1600m	1
Total New Adult Cyclists, Low 800m	1
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0
Induced Demand Estimates	
Total New Adult Cyclists[5]	
High Estimate	7
Moderate Estimate	3
Low Estimate	2
Total New Commuter Cyclists[6]	**2**
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0
Total New Child Cyclists[7]	**1**
Total New Cyclists[8]	
High Estimate	**10**
Moderate Estimate	**6**
Low Estimate	**4**

Segment Three Induced Demand Summary

Existing Population Analysis	
Total Population	549
Existing Bicycle Commuters	3
Population near Facility, 2400m	126
Population near Facility, 1600m	279
Population near Facility, 800m	144
Total Bicyclist Commuters, 2400m	1
Total Bicyclist Commuters, 1600m	1
Total Bicyclist Commuters, 800m	1
Adult Population near Facility, 2400m	120
Adult Population near Facility, 1600m	267
Adult Population near Facility, 800m	138
Total Adult Bicycling Rates, High 2400m	3
Total Adult Bicycling Rates, High 1600m	6
Total Adult Bicycling Rates, High 800m	3
Total Adult Bicycling Rates, Moderate 2400m	1
Total Adult Bicycling Rates, Moderate 1600m	3
Total Adult Bicycling Rates, Moderate 800m	1
Total Adult Bicycling Rates, Low 2400m	1
Total Adult Bicycling Rates, Low 1600m	2
Total Adult Bicycling Rates, Low 800m	1
Total Adult Bicyclists, High	12
Total Adult Bicyclists, Moderate	6
Total Adult Bicyclists, Low	3
Total Child Cyclists, 2400m	0
Total Child Cyclists, 1600m	0
Total Child Cyclists, 800m	0
Likelihood Multiplier, 2400m	0.15
Likelihood Multiplier, 1600m	0.44
Likelihood Multiplier, 800m	0.51
Total New Commuters, 2400m	0
Total New Commuters, 1600m	1
Total New Commuters, 800m	0
Total New Adult Cyclists, High 2400m	0
Total New Adult Cyclists, High 1600m	3
Total New Adult Cyclists, High 800m	2
Total New Adult Cyclists, Moderate 2400m	0
Total New Adult Cyclists, Moderate 1600m	1
Total New Adult Cyclists, Moderate 800m	1
Total New Adult Cyclists, Low 2400m	0
Total New Adult Cyclists, Low 1600m	1
Total New Adult Cyclists, Low 800m	0
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0

Induced Demand Estimates	
Total New Adult Cyclists[5]	
High Estimate	5
Moderate Estimate	2
Low Estimate	1
Total New Commuter Cyclists[6]	**1**
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0
Total New Child Cyclists[7]	**0**
Total New Cyclists[8]	
High Estimate	**6**
Moderate Estimate	**4**
Low Estimate	**3**

Segment Four Induced Demand Summary

Existing Population Analysis	
Total Population	1,027
Existing Bicycle Commuters	5
Population near Facility, 2400m	741
Population near Facility, 1600m	142
Population near Facility, 800m	144
Total Bicyclist Commuters, 2400m	4
Total Bicyclist Commuters, 1600m	1
Total Bicyclist Commuters, 800m	1
Adult Population near Facility, 2400m	708
Adult Population near Facility, 1600m	136
Adult Population near Facility, 800m	138
Total Adult Bicycling Rates, High 2400m	16
Total Adult Bicycling Rates, High 1600m	3
Total Adult Bicycling Rates, High 800m	3
Total Adult Bicycling Rates, Moderate 2400m	8
Total Adult Bicycling Rates, Moderate 1600m	1
Total Adult Bicycling Rates, Moderate 800m	1
Total Adult Bicycling Rates, Low 2400m	4
Total Adult Bicycling Rates, Low 1600m	1
Total Adult Bicycling Rates, Low 800m	1
Total Adult Bicyclists, High	23
Total Adult Bicyclists, Moderate	11
Total Adult Bicyclists, Low	6
Total Child Cyclists, 2400m	0
Total Child Cyclists, 1600m	0
Total Child Cyclists, 800m	0
Likelihood Multiplier, 2400m	0.15
Likelihood Multiplier, 1600m	0.44
Likelihood Multiplier, 800m	0.51
Total New Commuters, 2400m	1
Total New Commuters, 1600m	0
Total New Commuters, 800m	0
Total New Adult Cyclists, High 2400m	2
Total New Adult Cyclists, High 1600m	1
Total New Adult Cyclists, High 800m	2
Total New Adult Cyclists, Moderate 2400m	1
Total New Adult Cyclists, Moderate 1600m	1
Total New Adult Cyclists, Moderate 800m	1
Total New Adult Cyclists, Low 2400m	1
Total New Adult Cyclists, Low 1600m	0
Total New Adult Cyclists, Low 800m	0
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0
Induced Demand Estimates	
Total New Adult Cyclists[5]	
High Estimate	5
Moderate Estimate	3
Low Estimate	1
Total New Commuter Cyclists[6]	**1**
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0
Total New Child Cyclists[7]	**1**
Total New Cyclists[8]	
High Estimate	**7**
Moderate Estimate	**4**
Low Estimate	**3**

1.2 Visitor Population

Comprehensive Induced Demand Summary

Total Annual Population:	185,974
Total Annual Population Under 18 Years Old	39,426
Adult Population Percentage	79%
Visitor Bicycle Mode Share:	10.00%
Children Bicycle Percentage (NHTS 2001)	5.00%
Annual Visitation Population near Facility, 2400m	5,564
Annual Visitation Population near Facility, 1600m	3,574
Annual Visitation Population near Facility,800m	185,974
Daily Visitation population near Facility, 2400m	31
Daily Visitation population near Facility, 1600m	20
Daily Visitation population near Facility, 800m	1,033
Total Visitor Bicyclists, 2400m	3
Total Visitor Bicyclists, 1600m	2
Total Visitor Bicyclists, 800m	103
Adult Population near Facility, 2400m	4,384
Adult Population near Facility, 1600m	2,816
Adult Population near Facility, 800m	146,548
Daily Adult Population Near Facility, 2400m	24
Daily Adult Population Near Facility, 1600m	16
Daily Adult Population Near Facility, 800m	814
Adult Bicycling Rate, High	30.60%
Adult Bicycling Rate, Moderate	12.40%
Adult Bicycling Rate, Low	10.00%
Total Adult Bicycling Rates, High 2400m	7
Total Adult Bicycling Rates, High 1600m	5
Total Adult Bicycling Rates, High 800m	249
Total Adult Bicycling Rates, Moderate 2400m	3
Total Adult Bicycling Rates, Moderate 1600m	2
Total Adult Bicycling Rates, Moderate 800m	101
Total Adult Bicycling Rates, Low 2400m	2
Total Adult Bicycling Rates, Low 1600m	2
Total Adult Bicycling Rates, Low 800m	81
Total Child Cyclists, 2400m	0
Total Child Cyclists, 1600m	0
Total Child Cyclists, 800m	11
Likelihood Multiplier, 2400m	0.15
Likelihood Multiplier, 1600m	0.44
Likelihood Multiplier, 800m	0.51
Total New Visitor Bicyclists, 2400m	0
Total New Visitor Bicyclists, 1600m	1
Total New Visitor Bicyclists, 800m	53
Total New Adult Cyclists, High 2400m	1
Total New Adult Cyclists, High 1600m	2
Total New Adult Cyclists, High 800m	127
Total New Adult Cyclists, Moderate 2400m	0
Total New Adult Cyclists, Moderate 1600m	1
Total New Adult Cyclists, Moderate 800m	51
Total New Adult Cyclists, Low 2400m	0
Total New Adult Cyclists, Low 1600m	1
Total New Adult Cyclists, Low 800m	42
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	6
Total New Cyclists, High	**190**
Total New Cyclists, Moderate	**113**
Total New Cyclists, Low	**102**

Segment One Induced Demand Summary

Total Population:	20,575
Total Population Under 18 Years Old	4,362
Adult Population Percentage	79%
Visitor Bicycle Mode Share:	10.00%
Children Bicycle Percentage (NHTS 2001)	5.00%
Annual Visitation Population near Facility, 2400m	6,883
Annual Visitation Population near Facility, 1600m	2,282
Annual Visitation Population near Facility, 800m	11,410
Daily Visitation population near Facility, 2400m	38.24
Daily Visitation population near Facility, 1600m	12.68
Daily Visitation population near Facility, 800m	63.39
Total Visitor Bicyclists, 2400m	4
Total Visitor Bicyclists, 1600m	1
Total Visitor Bicyclists, 800m	6
Adult Population near Facility, 2400m	5,424
Adult Population near Facility, 1600m	1,798
Adult Population near Facility, 800m	8,991
Daily Adult Population Near Facility, 2400m	30
Daily Adult Population Near Facility, 1600m	10
Daily Adult Population Near Facility, 800m	50
Adult Bicycling Rate, High	30.60%
Adult Bicycling Rate, Moderate	12.40%
Adult Bicycling Rate, Low	10.00%
Total Adult Bicycling Rates, High 2400m	9
Total Adult Bicycling Rates, High 1600m	3
Total Adult Bicycling Rates, High 800m	15
Total Adult Bicycling Rates, Moderate 2400m	4
Total Adult Bicycling Rates, Moderate 1600m	1
Total Adult Bicycling Rates, Moderate 800m	6
Total Adult Bicycling Rates, Low 2400m	3
Total Adult Bicycling Rates, Low 1600m	1
Total Adult Bicycling Rates, Low 800m	5
Total Child Cyclists, 2400m	0
Total Child Cyclists, 1600m	0
Total Child Cyclists, 800m	1
Likelihood Multiplier, 2400m	0.15
Likelihood Multiplier, 1600m	0.44
Likelihood Multiplier, 800m	0.51
Total New Visitor Bicyclists, 2400m	1
Total New Visitor Bicyclists, 1600m	1
Total New Visitor Bicyclists, 800m	3
Total New Adult Cyclists, High 2400m	1
Total New Adult Cyclists, High 1600m	1
Total New Adult Cyclists, High 800m	8
Total New Adult Cyclists, Moderate 2400m	1
Total New Adult Cyclists, Moderate 1600m	1
Total New Adult Cyclists, Moderate 800m	3
Total New Adult Cyclists, Low 2400m	0
Total New Adult Cyclists, Low 1600m	0
Total New Adult Cyclists, Low 800m	3
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0
Total New Cyclists, High	**15**
Total New Cyclists, Moderate	**9**
Total New Cyclists, Low	**8**

Segment Three Induced Demand Summary

Total Population:	181,417
Total Population Under 18 Years Old	38,460
Adult Population Percentage	79%
Visitor Bicycle Mode Share:	10.00%
Children Bicycle Percentage (NHTS 2001)	5.00%
Population near Facility, 2400m	6,853
Population near Facility, 1600m	-
Population near Facility, 800m	174,564
Daily Visitation population near Facility, 2400m	38
Daily Visitation population near Facility, 1600m	-
Daily Visitation population near Facility, 800m	970
Total Visitor Bicyclists, 2400m	4
Total Visitor Bicyclists, 1600m	-
Total Visitor Bicyclists, 800m	97
Adult Population near Facility, 2400m	5400
Adult Population near Facility, 1600m	0
Adult Population near Facility, 800m	137556
Daily Adult Population Near Facility, 2400m	30
Daily Adult Population Near Facility, 1600m	-
Daily Adult Population Near Facility, 800m	764
Adult Bicycling Rate, High	30.60%
Adult Bicycling Rate, Moderate	12.40%
Adult Bicycling Rate, Low	10.00%
Total Adult Bicycling Rates, High 2400m	9
Total Adult Bicycling Rates, High 1600m	0
Total Adult Bicycling Rates, High 800m	234
Total Adult Bicycling Rates, Moderate 2400m	4
Total Adult Bicycling Rates, Moderate 1600m	0
Total Adult Bicycling Rates, Moderate 800m	95
Total Adult Bicycling Rates, Low 2400m	3
Total Adult Bicycling Rates, Low 1600m	0
Total Adult Bicycling Rates, Low 800m	76
Total Child Cyclists, 2400m	0
Total Child Cyclists, 1600m	-
Total Child Cyclists, 800m	10
Likelihood Multiplier, 2400m	0.15
Likelihood Multiplier, 1600m	0.44
Likelihood Multiplier, 800m	0.51
Total New Visitor Bicyclists, 2400m	1
Total New Visitor Bicyclists, 1600m	-
Total New Visitor Bicyclists, 800m	49
Total New Adult Cyclists, High 2400m	1
Total New Adult Cyclists, High 1600m	-
Total New Adult Cyclists, High 800m	119
Total New Adult Cyclists, Moderate 2400m	1
Total New Adult Cyclists, Moderate 1600m	-
Total New Adult Cyclists, Moderate 800m	48
Total New Adult Cyclists, Low 2400m	0
Total New Adult Cyclists, Low 1600m	-
Total New Adult Cyclists, Low 800m	39
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	-
Total New Child Cyclists, 800m	5
Total New Cyclists, High	176
Total New Cyclists, Moderate	104
Total New Cyclists, Low	95

Segment Four Induced Demand Summary

Total Population:	20,545
Total Population Under 18 Years Old	4,356
Adult Population Percentage	79%
Visitor Bicycle Mode Share:	10.00%
Children Bicycle Percentage (NHTS 2001)	5.00%
Annual Visitation Population near Facility, 2400m	15,974
Annual Visitation Population near Facility, 1600m	4,564
Annual Visitation Population near Facility, 800m	6,846
Daily Visitation population near Facility, 2400m	88.74
Daily Visitation population near Facility, 1600m	25.36
Daily Visitation population near Facility, 800m	38.03
Total Visitor Bicyclists, 2400m	9
Total Visitor Bicyclists, 1600m	3
Total Visitor Bicyclists, 800m	4
Adult Population near Facility, 2400m	12,588
Adult Population near Facility, 1600m	3,596.43
Adult Population near Facility, 800m	5,394.65
Daily Adult Population Near Facility, 2400m	69.93
Daily Adult Population Near Facility, 1600m	20
Daily Adult Population Near Facility, 800m	30
Adult Bicycling Rate, High	30.60%
Adult Bicycling Rate, Moderate	12.40%
Adult Bicycling Rate, Low	10.00%
Total Adult Bicycling Rates, High 2400m	21
Total Adult Bicycling Rates, High 1600m	6
Total Adult Bicycling Rates, High 800m	9
Total Adult Bicycling Rates, Moderate 2400m	9
Total Adult Bicycling Rates, Moderate 1600m	2
Total Adult Bicycling Rates, Moderate 800m	4
Total Adult Bicycling Rates, Low 2400m	7
Total Adult Bicycling Rates, Low 1600m	2
Total Adult Bicycling Rates, Low 800m	3
Total Child Cyclists, 2400m	1
Total Child Cyclists, 1600m	0
Total Child Cyclists, 800m	0
Likelihood Multiplier, 2400m	0.15
Likelihood Multiplier, 1600m	0.44
Likelihood Multiplier, 800m	0.51
Total New Visitor Bicyclists, 2400m	1
Total New Visitor Bicyclists, 1600m	1
Total New Visitor Bicyclists, 800m	2
Total New Adult Cyclists, High 2400m	3
Total New Adult Cyclists, High 1600m	3
Total New Adult Cyclists, High 800m	5
Total New Adult Cyclists, Moderate 2400m	1
Total New Adult Cyclists, Moderate 1600m	1
Total New Adult Cyclists, Moderate 800m	2
Total New Adult Cyclists, Low 2400m	1
Total New Adult Cyclists, Low 1600m	1
Total New Adult Cyclists, Low 800m	2
Total New Child Cyclists, 2400m	0
Total New Child Cyclists, 1600m	0
Total New Child Cyclists, 800m	0
Total New Cyclists, High	**15**
Total New Cyclists, Moderate	**9**
Total New Cyclists, Low	**8**

2. Benefits

Benefits were calculated used NCHRP 552 methodology. The tables below display the benefits calculated using these methods.

2.1 Local Population

2.1.1 Comprehensive Study Area

Bicycle Facility Benefits	
Annual Mobility Benefit	
Annual Mobility Benefit, Off-Street Trail	$ 21,791
Annual Mobility Benefit, Bicycle Lane without Parking	$ 19,268
Annual Mobility Benefit, Bicycle Lane with Parking	$ 16,926
Annual Health Benefit	
Annual Health Benefit, High	$ 2,048
Annual Health Benefit, Moderate	$ 1,280
Annual Health Benefit, Low	$ 896
Annual Recreation Benefit	
Annual Recreation Benefit, High	$ 47,450
Annual Recreation Benefit, Moderate	$ 25,550
Annual Recreation Benefit, Low	$ 14,600
Annual Decreased Auto Use Benefit	$ 42.30
Total Annual Benefit, High	**$ 134,182**
Total Annual Benefit, Moderate	$ 111,514
Total Annual Benefit, Low	$ 100,180

Mobility Benefit	
Existing Commuters	7
Total New Commuters	3
Hourly Value of Time (V)	$ 13.65
Weeks per Year	47
Day per Week	5
Trips	2
Off-Street Trail	20.38
Bicycle Lane without Parking	18.02
Bicycle Lane with Parking	15.83
Off-Street Trail per Trip Benefit	$ 4.64
Bicycle Lane without Parking per Trip Benefit	$ 4.10
Bicycle Lane with Parking per Trip Benefit	$ 3.60
Annual Mobility Benefit, Off-Street Trail	$ 21,791

Annual Mobility Benefit, Bicycle Lane without Parking	$ 19,268
Annual Mobility Benefit, Bicycle Lane with Parking	$ 16,926

Health Benefit	
Total New Cyclists, High	16
Total New Cyclists, Moderate	10
Total New Cyclists, Low	7
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$2,048
Annual Health Benefit, Moderate	$1,280
Annual Health Benefit, Low	$896

Recreation Benefit	
Total New Cyclists, High	16
Total New Cyclists, Moderate	10
Total New Cyclists, Low	7
Total New Commuters, 2400m	3
Total New Recreation Cyclists, High	13
Total New Recreation Cyclists, Moderate	7
Total New Recreation Cyclists, Low	4
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 47,450
Annual Recreation Benefit, Moderate	$ 25,550
Annual Recreation Benefit, Low	$ 14,600

Decreased Auto Use Benefit	
Total New Commuters	3
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	47
Days a Week	5
Annual Decreased Auto Use Benefit	$ 42.30

2.1.2 Segment One

Bicycle Facility Benefits	
Annual Mobility Benefit	
Annual Mobility Benefit, Off-Street Trail	$ 10,896
Annual Mobility Benefit, Bicycle Lane without Parking	$ 9,634
Annual Health Benefit	
Annual Health Benefit, High	$ 896
Annual Health Benefit, Moderate	$ 512
Annual Health Benefit, Low	$ 384
Annual Recreation Benefit	
Annual Recreation Benefit, High	$ 21,900
Annual Recreation Benefit, Moderate	$ 10,950
Annual Recreation Benefit, Low	$ 7,300
Annual Decreased Auto Use Benefit	$ 14.10
Total Annual Benefit, High	$ 43,340
Total Annual Benefit, Moderate	$ 32,006
Total Annual Benefit, Low	$ 28,740

Mobility Benefit	
Existing Commuters	4
Total New Commuters	1
Hourly Value of Time (V)	$ 13.65
Weeks per Year	47
Day per Week	5
Trips	2
Off-Street Trail	20.38
Bicycle Lane without Parking	18.02
Bicycle Lane with Parking	15.83
Off-Street Trail per Trip Benefit	$ 4.64
Bicycle Lane without Parking per Trip Benefit	$ 4.10
Bicycle Lane with Parking per Trip Benefit	$ 3.60
Annual Mobility Benefit, Off-Street Trail	$ 10,896
Annual Mobility Benefit, Bicycle Lane without Parking	$ 9,634
Annual Mobility Benefit, Bicycle Lane with Parking	$ 8,463

Health Benefit	
Total New Cyclists, High	7
Total New Cyclists, Moderate	4
Total New Cyclists, Low	3
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$896
Annual Health Benefit, Moderate	$512
Annual Health Benefit, Low	$384

Recreation Benefit	
Total New Cyclists, High	7
Total New Cyclists, Moderate	4
Total New Cyclists, Low	3
Total New Commuters, 2400m	1
Total New Recreation Cyclists, High	6
Total New Recreation Cyclists, Moderate	3
Total New Recreation Cyclists, Low	2
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 21,900
Annual Recreation Benefit, Moderate	$ 10,950
Annual Recreation Benefit, Low	$ 7,300

Decreased Auto Use Benefit	
Total New Commuters	1
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	47
Days a Week	5
Annual Decreased Auto Use Benefit	$ 14.10

2.1.3 Segment Two

Bicycle Facility Benefits	
Annual Mobility Benefit	
Annual Mobility Benefit, Off-Street Trail	$ 15,254
Annual Mobility Benefit, Bicycle Lane without Parking	$ 13,488
Annual Mobility Benefit, Bicycle Lane with Parking	$ 11,848
Annual Health Benefit	
Annual Health Benefit, High	$ 1,280
Annual Health Benefit, Moderate	$ 768
Annual Health Benefit, Low	$ 512
Annual Recreation Benefit	
Annual Recreation Benefit, High	$ 29,200
Annual Recreation Benefit, Moderate	$ 14,600
Annual Recreation Benefit, Low	$ 7,300
Annual Decreased Auto Use Benefit	$ 28
Total Annual Benefit, High	$ 45,762
Total Annual Benefit, Moderate	$ 30,650
Total Annual Benefit, Low	$ 23,862

Mobility Benefit	
Existing Commuters	5
Total New Commuters	2
Hourly Value of Time (V)	$ 13.65
Weeks per Year	47
Day per Week	5
Trips	2
Off-Street Trail	20.38
Bicycle Lane without Parking	18.02
Bicycle Lane with Parking	15.83
Off-Street Trail per Trip Benefit	$ 4.64
Bicycle Lane without Parking per Trip Benefit	$ 4.10
Bicycle Lane with Parking per Trip Benefit	$ 3.60
Annual Mobility Benefit, Off-Street Trail	$ 15,254
Annual Mobility Benefit, Bicycle Lane without Parking	$ 13,488
Annual Mobility Benefit, Bicycle Lane with Parking	$ 11,848

Health Benefit	
Total New Cyclists, High	10
Total New Cyclists, Moderate	6
Total New Cyclists, Low	4
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$1,280
Annual Health Benefit, Moderate	$768
Annual Health Benefit, Low	$512

Recreation Benefit	
Total New Cyclists, High	10
Total New Cyclists, Moderate	6
Total New Cyclists, Low	4
Total New Commuters, 2400m	2
Total New Recreation Cyclists, High	8
Total New Recreation Cyclists, Moderate	4
Total New Recreation Cyclists, Low	2
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 29,200
Annual Recreation Benefit, Moderate	$ 14,600
Annual Recreation Benefit, Low	$ 7,300

Decreased Auto Use Benefit	
Total New Commuters	2
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	47
Days a Week	5
Annual Decreased Auto Use Benefit	$ 28.20

2.1.4 Segment Three

Bicycle Facility Benefits	
Annual Mobility Benefit	
Annual Mobility Benefit, Off-Street Trail	$ 8,717
Annual Health Benefit	
Annual Health Benefit, High	$ 768
Annual Health Benefit, Moderate	$ 512
Annual Health Benefit, Low	$ 384
Annual Recreation Benefit	
Annual Recreation Benefit, High	$ 18,250
Annual Recreation Benefit, Moderate	$ 10,950
Annual Recreation Benefit, Low	$ 7,300
Annual Decreased Auto Use Benefit	$ 14.10
Total Annual Benefit, High	$ 27,749
Total Annual Benefit, Moderate	$ 20,193
Total Annual Benefit, Low	$ 16,799

Mobility Benefit	
Existing Commuters	3
Total New Commuters	1
Hourly Value of Time (V)	$ 13.65
Weeks per Year	47
Day per Week	5
Trips	2
Off-Street Trail	20.38
Bicycle Lane without Parking	18.02
Bicycle Lane with Parking	15.83
Off-Street Trail per Trip Benefit	$ 4.64
Bicycle Lane without Parking per Trip Benefit	$ 4.10
Bicycle Lane with Parking per Trip Benefit	$ 3.60
Annual Mobility Benefit, Off-Street Trail	$ 8,717
Annual Mobility Benefit, Bicycle Lane without Parking	$ 7,707
Annual Mobility Benefit, Bicycle Lane with Parking	$ 6,770

Health Benefit	
Total New Cyclists, High	6
Total New Cyclists, Moderate	4
Total New Cyclists, Low	3
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$768
Annual Health Benefit, Moderate	$512
Annual Health Benefit, Low	$384

Recreation Benefit	
Total New Cyclists, High	6
Total New Cyclists, Moderate	4
Total New Cyclists, Low	3
Total New Commuters, 2400m	1
Total New Recreation Cyclists, High	5
Total New Recreation Cyclists, Moderate	3
Total New Recreation Cyclists, Low	2
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 18,250
Annual Recreation Benefit, Moderate	$ 10,950
Annual Recreation Benefit, Low	$ 7,300

Decreased Auto Use Benefit	
Total New Commuters	1
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	47
Days a Week	5
Annual Decreased Auto Use Benefit	$ 14.10

2.1.5 Segment Four

Bicycle Facility Benefits	
Annual Mobility Benefit	
Annual Mobility Benefit, Off-Street Trail	$ 13,075
Annual Health Benefit	
Annual Health Benefit, High	$ 896
Annual Health Benefit, Moderate	$ 512
Annual Health Benefit, Low	$ 384
Annual Recreation Benefit	
Annual Recreation Benefit, High	$ 21,900
Annual Recreation Benefit, Moderate	$ 10,950
Annual Recreation Benefit, Low	$ 7,300
Annual Decreased Auto Use Benefit	$ 14.10
Total Annual Benefit, High	$ 35,885
Total Annual Benefit, Moderate	$ 24,551
Total Annual Benefit, Low	$ 21,285

Mobility Benefit	
Existing Commuters	5
Total New Commuters	1
Hourly Value of Time (V)	$ 13.65
Weeks per Year	47
Day per Week	5
Trips	2
Off-Street Trail	20.38
Bicycle Lane without Parking	18.02
Bicycle Lane with Parking	15.83
Off-Street Trail per Trip Benefit	$ 4.64
Bicycle Lane without Parking per Trip Benefit	$ 4.10
Bicycle Lane with Parking per Trip Benefit	$ 3.60
Annual Mobility Benefit, Off-Street Trail	$ 13,075
Annual Mobility Benefit, Bicycle Lane without Parking	$ 11,561
Annual Mobility Benefit, Bicycle Lane with Parking	$ 10,156

Health Benefit	
Total New Cyclists, High	7
Total New Cyclists, Moderate	4
Total New Cyclists, Low	3
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$896
Annual Health Benefit, Moderate	$512
Annual Health Benefit, Low	$384

Recreation Benefit	
Total New Cyclists, High	7
Total New Cyclists, Moderate	4
Total New Cyclists, Low	3
Total New Commuters, 2400m	1
Total New Recreation Cyclists, High	6
Total New Recreation Cyclists, Moderate	3
Total New Recreation Cyclists, Low	2
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 21,900
Annual Recreation Benefit, Moderate	$ 10,950
Annual Recreation Benefit, Low	$ 7,300

Decreased Auto Use Benefit	
Total New Commuters	1
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	47
Days a Week	5
Annual Decreased Auto Use Benefit	$ 14.10

2.2 Visitor Population

2.2.1 Comprehensive Study Area

Bicycle Facility Benefits	
Annual Mobility Benefit	
Annual Mobility Benefit, Off-Street Trail	$ 195,800
Annual Mobility Benefit, Bicycle Lane without Parking	$ 173,127
Annual Mobility Benefit, Bicycle Lane with Parking	$ 152,086
Annual Health Benefit	
Annual Health Benefit, High	$ 24,320
Annual Health Benefit, Moderate	$ 14,464
Annual Health Benefit, Low	$ 13,056
Annual Recreation Benefit	
Annual Recreation Benefit, High	$ 244,800
Annual Recreation Benefit, Moderate	$ 106,200
Annual Recreation Benefit, Low	$ 86,400
Annual Decreased Auto Use Benefit	$ 421
Total Annual Benefit, High	$ 1,030,068
Total Annual Benefit, Moderate	$ 881,612
Total Annual Benefit, Low	$ 860,404

Mobility Benefit	
Existing Visitor Bicyclists	108
Total New Visitor Bicyclists	54
Hourly Value of Time (V)	$ 13.65
Weeks per Year	26
Day per Week	5
Trips	2
Off-Street Trail	20.38
Bicycle Lane without Parking	18.02
Bicycle Lane with Parking	15.83
Off-Street Trail per Trip Benefit	$ 4.64
Bicycle Lane without Parking per Trip Benefit	$ 4.10
Bicycle Lane with Parking per Trip Benefit	$ 3.60
Annual Mobility Benefit, Off-Street Trail	$ 195,800
Annual Mobility Benefit, Bicycle Lane without Parking	$ 173,127
Annual Mobility Benefit, Bicycle Lane with Parking	$ 152,086

Health Benefit	
Total New Cyclists, High	190
Total New Cyclists, Moderate	113
Total New Cyclists, Low	102
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$24,320
Annual Health Benefit, Moderate	$14,464
Annual Health Benefit, Low	$13,056

Recreation Benefit	
Total New Cyclists, High	190
Total New Cyclists, Moderate	113
Total New Cyclists, Low	102
Total Bicycle Visitors, 2400m	54
Total New Recreation Cyclists, High	136
Total New Recreation Cyclists, Moderate	59
Total New Recreation Cyclists, Low	48
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 244,800
Annual Recreation Benefit, Moderate	$ 106,200
Annual Recreation Benefit, Low	$ 86,400

Decreased Auto Use Benefit	
Total New Visitors Bicyclists	54
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	26
Days a Week	5
Annual Decreased Auto Use Benefit	$ 421.20

2.2.2 Segment One

Bicycle Facility Benefits	
Annual Mobility Benefit	
Annual Mobility Benefit, Off-Street Trail	$ 19,040
Annual Mobility Benefit, Bicycle Lane without Parking	$ 16,835
Annual Mobility Benefit, Bicycle Lane with Parking	$ 14,789
Annual Health Benefit	
Annual Health Benefit, High	$ 1,920
Annual Health Benefit, Moderate	$ 1,152
Annual Health Benefit, Low	$ 1,024
Annual Recreation Benefit	
Annual Recreation Benefit, High	$ 19,800
Annual Recreation Benefit, Moderate	$ 9,000
Annual Recreation Benefit, Low	$ 7,200
Annual Decreased Auto Use Benefit	$ 31.20
Total Annual Benefit, High	$ 57,627
Total Annual Benefit, Moderate	$ 46,059
Total Annual Benefit, Low	$ 44,131

Mobility Benefit	
Existing Visitor Bicyclists	11
Total New Visitor Bicyclists	4
Hourly Value of Time (V)	$ 13.65
Weeks per Year	26
Day per Week	5
Trips	2
Off-Street Trail	20.38
Bicycle Lane without Parking	18.02
Bicycle Lane with Parking	15.83
Off-Street Trail per Trip Benefit	$ 4.64
Bicycle Lane without Parking per Trip Benefit	$ 4.10
Bicycle Lane with Parking per Trip Benefit	$ 3.60
Annual Mobility Benefit, Off-Street Trail	$ 19,040
Annual Mobility Benefit, Bicycle Lane without Parking	$ 16,835
Annual Mobility Benefit, Bicycle Lane with Parking	$ 14,789

Health Benefit	
Total New Cyclists, High	15
Total New Cyclists, Moderate	9
Total New Cyclists, Low	8
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$1,920
Annual Health Benefit, Moderate	$1,152
Annual Health Benefit, Low	$1,024

Recreation Benefit	
Total New Cyclists, High	15
Total New Cyclists, Moderate	9
Total New Cyclists, Low	8
Total New Visitor Bicyclists, 2400m	4
Total New Recreation Cyclists, High	11
Total New Recreation Cyclists, Moderate	5
Total New Recreation Cyclists, Low	4
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 19,800
Annual Recreation Benefit, Moderate	$ 9,000
Annual Recreation Benefit, Low	$ 7,200

Decreased Auto Use Benefit	
Total New Visitors Bicylists	4
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	26
Days a Week	5
Annual Decreased Auto Use Benefit	$ 31.20

2.2.3 Segment Two

Bicycle Facility Benefits	
Annual Mobility Benefit	
Annual Mobility Benefit, Off-Street Trail	$ 185,654
Annual Mobility Benefit, Bicycle Lane without Parking	$ 164,155
Annual Mobility Benefit, Bicycle Lane with Parking	$ 144,205
Annual Health Benefit	
Annual Health Benefit, High	$ 23,424
Annual Health Benefit, Moderate	$ 13,824
Annual Health Benefit, Low	$ 12,544
Annual Recreation Benefit	
Annual Recreation Benefit, High	$ 235,800
Annual Recreation Benefit, Moderate	$ 100,800
Annual Recreation Benefit, Low	$ 82,800
Annual Decreased Auto Use Benefit	$ 405.27
Total Annual Benefit, High	$ 445,283
Total Annual Benefit, Moderate	$ 300,683
Total Annual Benefit, Low	$ 281,403

Mobility Benefit	
Existing Visitor Bicyclists	102
Total New Visitor Bicyclists	52
Hourly Value of Time (V)	$ 13.65
Weeks per Year	26
Day per Week	5
Trips	2
Off-Street Trail	20.38
Bicycle Lane without Parking	18.02
Bicycle Lane with Parking	15.83
Off-Street Trail per Trip Benefit	$ 4.64
Bicycle Lane without Parking per Trip Benefit	$ 4.10
Bicycle Lane with Parking per Trip Benefit	$ 3.60
Annual Mobility Benefit, Off-Street Trail	$ 185,654
Annual Mobility Benefit, Bicycle Lane without Parking	$ 164,155
Annual Mobility Benefit, Bicycle Lane with Parking	$ 144,205

Health Benefit	
Total New Cyclists, High	183
Total New Cyclists, Moderate	108
Total New Cyclists, Low	98
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$23,424
Annual Health Benefit, Moderate	$13,824
Annual Health Benefit, Low	$12,544

Recreation Benefit	
Total New Cyclists, High	183
Total New Cyclists, Moderate	108
Total New Cyclists, Low	98
Total New Visitor Bicyclists, 2400m	52
Total New Recreation Cyclists, High	131
Total New Recreation Cyclists, Moderate	56
Total New Recreation Cyclists, Low	46
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 235,800
Annual Recreation Benefit, Moderate	$ 100,800
Annual Recreation Benefit, Low	$ 82,800

Decreased Auto Use Benefit	
Total New Visitors Bicylists	52
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	26
Days a Week	5
Annual Decreased Auto Use Benefit	$ 405.27

2.2.4 Segment Three

Bicycle Facility Benefits	
Annual Mobility Benefit	
Annual Mobility Benefit, Off-Street Trail	$ 181,808
Annual Mobility Benefit, Bicycle Lane without Parking	$ 160,754
Annual Mobility Benefit, Bicycle Lane with Parking	$ 141,218
Annual Health Benefit	
Annual Health Benefit, High	$ 22,528
Annual Health Benefit, Moderate	$ 13,312
Annual Health Benefit, Low	$ 12,160
Annual Recreation Benefit	
Annual Recreation Benefit, High	$ 297,000
Annual Recreation Benefit, Moderate	$ 167,400
Annual Recreation Benefit, Low	$ 151,200
Annual Decreased Auto Use Benefit	$ 390.24
Total Annual Benefit, High	$ 501,726
Total Annual Benefit, Moderate	$ 362,910
Total Annual Benefit, Low	$ 345,558

Mobility Benefit	
Existing Visitor Bicyclists	101
Total New Visitor Bicyclists	50
Hourly Value of Time (V)	$ 13.65
Weeks per Year	26
Day per Week	5
Trips	2
Off-Street Trail	20.38
Bicycle Lane without Parking	18.02
Bicycle Lane with Parking	15.83
Off-Street Trail per Trip Benefit	$ 4.64
Bicycle Lane without Parking per Trip Benefit	$ 4.10
Bicycle Lane with Parking per Trip Benefit	$ 3.60
Annual Mobility Benefit, Off-Street Trail	$ 181,808
Annual Mobility Benefit, Bicycle Lane without Parking	$ 160,754
Annual Mobility Benefit, Bicycle Lane with Parking	$ 141,218

Health Benefit	
Total New Cyclists, High	176
Total New Cyclists, Moderate	104
Total New Cyclists, Low	95
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$22,528
Annual Health Benefit, Moderate	$13,312
Annual Health Benefit, Low	$12,160

Recreation Benefit	
Total New Cyclists, High	176
Total New Cyclists, Moderate	104
Total New Cyclists, Low	95
Total New Visitor Bicyclists, 2400m	11
Total New Recreation Cyclists, High	165
Total New Recreation Cyclists, Moderate	93
Total New Recreation Cyclists, Low	84
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 297,000
Annual Recreation Benefit, Moderate	$ 167,400
Annual Recreation Benefit, Low	$ 151,200

Decreased Auto Use Benefit	
Total New Visitors Bicylists	50
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	26
Days a Week	5
Annual Decreased Auto Use Benefit	$ 390.24

2.2.5 Segment Four

Bicycle Facility Benefits		
Annual Mobility Benefit		
Annual Mobility Benefit, Off-Street Trail	$	23,627
Annual Mobility Benefit, Bicycle Lane without Parking	$	20,891
Annual Mobility Benefit, Bicycle Lane with Parking	$	18,352
Annual Health Benefit		
Annual Health Benefit, High	$	1,975
Annual Health Benefit, Moderate	$	1,170
Annual Health Benefit, Low	$	1,063
Annual Recreation Benefit		
Annual Recreation Benefit, High	$	19,876
Annual Recreation Benefit, Moderate	$	8,552
Annual Recreation Benefit, Low	$	7,059
Annual Decreased Auto Use Benefit	$	34.21
Total Annual Benefit, High	$	45,512
Total Annual Benefit, Moderate	$	33,383
Total Annual Benefit, Low	$	31,784

Mobility Benefit		
Existing Visitor Bicyclists		15
Total New Visitor Bicyclists		4
Hourly Value of Time (V)	$	13.65
Weeks per Year		26
Day per Week		5
Trips		2
Off-Street Trail		20.38
Bicycle Lane without Parking		18.02
Bicycle Lane with Parking		15.83
Off-Street Trail per Trip Benefit	$	4.64
Bicycle Lane without Parking per Trip Benefit	$	4.10
Bicycle Lane with Parking per Trip Benefit	$	3.60
Annual Mobility Benefit, Off-Street Trail	$	23,627
Annual Mobility Benefit, Bicycle Lane without Parking	$	20,891
Annual Mobility Benefit, Bicycle Lane with Parking	$	18,352

Health Benefit	
Total New Cyclists, High	15
Total New Cyclists, Moderate	9
Total New Cyclists, Low	8
Annual Per Capita Cost Savings from Physical Activity	$128
Annual Health Benefit, High	$1,975
Annual Health Benefit, Moderate	$1,170
Annual Health Benefit, Low	$1,063

Recreation Benefit	
Total New Cyclists, High	15
Total New Cyclists, Moderate	9
Total New Cyclists, Low	8
Total New Visitor Bicyclists, 2400m	4
Total New Recreation Cyclists, High	11
Total New Recreation Cyclists, Moderate	5
Total New Recreation Cyclists, Low	4
Value of an Hour of Recreation	$10
Annual Recreation Benefit, High	$ 19,876
Annual Recreation Benefit, Moderate	$ 8,552
Annual Recreation Benefit, Low	$ 7,059

Decreased Auto Use Benefit	
Total New Visitors Bicylists	4
Net Benefit Per Mile, Urban	$ 0.13
Net Benefit Per Mile, Suburban	$ 0.08
Net Benefit Per Mile, Small Town/Rural	$ 0.01
Average Round Trip Length	3.00
Weeks per Year	26
Days a Week	5
Annual Decreased Auto Use Benefit	$ 34.21

3. Benefit-Cost Summary

3.1 Local Population

3.1.1 Comprehensive Study Area

Annual Benefit		
Total Annual Benefit, High	$	134,182
Total Annual Benefit, Moderate	$	111,514
Total Annual Benefit, Low	$	100,180

Improvements (with pedestrian bridge)	Cost (includes 50% contingencies)	
Class I Path (Paved)	$	1,838,940
Class II Bike Lane	$	10,500
Class I Path with Pedestrian Bridge	$	7,500,000
Decomposed Granite Path	$	108,000
Total Cost	$	9,457,440

Benefit-Cost Ratio	
High	0.01
Moderate	0.01
Low	0.01

3.1.2 Segment One

Annual Benefit		
Total Annual Benefit, High	$	43,340
Total Annual Benefit, Moderate	$	32,006
Total Annual Benefit, Low	$	28,740

Improvements	Cost (includes 50% contingencies)	
Class II Bike Lane	$	10,500
Class I Path (without pedestrian bridge)	$	375,000
Total Cost	$	385,500

Improvements	Cost (includes 50% contingencies)	
Class II Bike Lane	$	10,500
Class I Path (with pedestrian bridge)	$	7,500,000
Total Cost	$	7,510,500

Benefit-Cost Ratio (without pedestrian bridge)	
High	0.11
Moderate	0.08
Low	0.07

Benefit-Cost Ratio (with pedestrian bridge)	
High	0.0058
Moderate	0.0043
Low	0.0038

3.1.3 Segment Two

Annual Benefit		
Total Annual Benefit, High	$	45,832
Total Annual Benefit, Moderate	$	30,720
Total Annual Benefit, Low	$	23,932

Bicycle Improvements	Cost (includes 50% contingencies)	
Class I shared-use Path	$	848,340
Total Cost	$	848,340

Benefit-Cost Ratio	
High	0.05
Moderate	0.04
Low	0.03

3.1.4 Segment Three

Annual Benefit		
Total Annual Benefit, High	$	27,783
Total Annual Benefit, Moderate	$	20,227
Total Annual Benefit, Low	$	16,833

Bicycle Improvements	Cost (includes 50% contingencies)	
Decomposed Granite Path	$	108,000
Total Cost	$	108,000

Benefit-Cost Ratio	
High	0.26
Moderate	0.19
Low	0.16

3.1.5 Segment Four

Annual Benefit		
Total Annual Benefit, High	$	35,920
Total Annual Benefit, Moderate	$	24,586
Total Annual Benefit, Low	$	21,320

Bicycle Improvements	Cost (includes 50% contingencies)	
Class I Path	$	615,600
Total Cost	$	615,600

Benefit-Cost Ratio	
High	0.06
Moderate	0.04
Low	0.03

3.2 Visitor Population

3.2.1 Comprehensive Study Area

Annual Benefit		
Total Annual Benefit, High	$	1,030,068
Total Annual Benefit, Moderate	$	881,612
Total Annual Benefit, Low	$	860,404

Improvements (with pedestrian bridge)	Cost (includes 50% contingencies)	
Class I Path (Paved)	$	1,838,940
Class II Bike Lane	$	10,500
Decomposed Granite Path	$	108,000
Class I Path with Pedestrian Bridge	$	7,500,000
Total Cost	$	9,457,440

Benefit-Cost Ratio	
High	0.11
Moderate	0.09
Low	0.09

3.2.2 Segment One

Annual Benefit		
Total Annual Benefit, High	$	57,627
Total Annual Benefit, Moderate	$	46,059
Total Annual Benefit, Low	$	44,131

Improvements (with pedestrian bridge)	Cost (includes 50% contingencies)	
Class II Bike Lane	$	10,500
Class I path	$	7,500,000
Total Cost	$	7,510,500

Benefit-Cost Ratio	
High	0.01
Moderate	0.01
Low	0.01

3.2.3 Segment Two

Annual Benefit		
Total Annual Benefit, High	$	445,283
Total Annual Benefit, Moderate	$	300,683
Total Annual Benefit, Low	$	281,403

Bicycle Improvements	Cost (includes 50% contingencies)	
Class I shared-use Path	$	848,340
Total Cost	$	848,340

Benefit-Cost Ratio	
High	0.52
Moderate	0.35
Low	0.33

3.2.4 Segment Three

Annual Benefit		
Total Annual Benefit, High	$	501,726
Total Annual Benefit, Moderate	$	362,910
Total Annual Benefit, Low	$	345,558

Improvements	Cost (includes 50% contingencies)	
Decomposed Granite Path	$	108,000
Total Cost	$	108,000

Benefit-Cost Ratio	
High	4.65
Moderate	3.36
Low	3.20

3.2.5 Segment Four

Annual Benefit		
Total Annual Benefit, High	$	45,512
Total Annual Benefit, Moderate	$	33,383
Total Annual Benefit, Low	$	31,784

Bicycle Improvements	Cost (includes 50% contigencies)	
Class I Path	$	615,600
Total Cost	$	615,600

Benefit-Cost Ratio	
High	0.07
Moderate	0.05
Low	0.05

Appendix G: Level of Traffic Stress Criteria

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1. Bicycle Level of Traffic Stress Criteria

Table A-1 present the scoring criteria for segments in mixed traffic, while Tables A-2 and A-3 present the scoring criteria for segments with bike lanes. Table A-4 presents the scoring criteria for approaches, and Tables A-5 and A-6 present the criteria for unsignalized intersections. All Tables are directly sources from the "Low Stress Bicycling and Network Connectivity," Mineta Transportation Institute, Report 11-19, May 2012. The criteria presented in Tables A-1 through A-6 were used within the portions of the study area with posted speeds of less than 45 mph. Table A-7 reflects the criteria for scoring segments with speeds of 45 mph of greater. The criteria in Table A-7 is sourced from Oregon's Department of Transportation's (ODOT) Bicycle and Pedestrian Design Guide, which incorporates and builds upon the Mineta Institute's methodology.

Table A-1: Urban/Suburban Segment Criteria – Mixed Traffic

	Street Width		
Prevailing Speed or Speed Limit (mph)	**2-3 Lanes**	**4-5 Lanes**	**6+ Lanes**
≤ 25	LTS 1[a] or 2[a]	LTS 3	LTS 4
30	LTS 2[a] or 3[a]	LTS 4	LTS 4
≥ 35	LTS 4	LTS 4	LTS 4

[a] Use lower value for streets without marked centerlines and with ADT < 3000; use higher value otherwise.

Table A-2 Level of Traffic Stress Criteria for Bike Lanes Alongside a Parking Lane

	LTS≥1	LTS≥2	LTS≥3	LTS≥4
Street Width (through lanes per direction)	1	(no effect)	2 or more	(no effect)
Sun of Bike Lane and parking lane width (includes marked buffer and paved gutter)	15 ft or more	14 or 14.5 ft[1]	13.5 or less	(no effect)
Speed limit or prevailing speed	25 mph or less	30 mph	35 mph	40 mph or more
Bike Lane blockage (typically applies in commercial areas)	rare	(no effect)	frequent	(no effect)

Notes:

(no effect) = factor does not trigger an increase to this level of traffic stress

[1]If speed limit < 25 mph or Class + residential, then any width is acceptable for LTS 2.

Table A-3 Level of Traffic Stress Criteria for Bike Lanes Not Alongside Parking

	LTS≥1	LTS≥2	LTS≥3	LTS≥4
Street Width (through lanes per direction)	1	2, if directions are separated by a raised median	more than 2, or 2 without a separating median	(no effect)
Bike Lane width (includes marked buffer and paved gutter)	6 ft or more	5.5 ft[1]	(no effect)	(no effect)
Speed limit or prevailing speed	30 mph or less	(no effect)	35 mph	40 mph or more
Bike Lane blockage (may applies in commercial areas)	rare	(no effect)	frequent	(no effect)

Notes:
(no effect) = factor does not trigger an increase to this level of traffic stress

Table A-4 Level of Traffic Stress Criteria for Pocket Bike Lanes

Configuration	Level of Traffic Stress
single right-turn lane up to 150 ft. long starting abruptly while the bike lane continues straight, and having an intersection angle and curb radius such that turning speed is ≤15 mph.	LTS ≥ 2
single right-turn lane longer than 150 ft. starting abruptly while the bike lane continues straight, and having an intersection angle and curb radius such that turning speed is ≤20 mph.	LTS ≥ 3
Single right-turn lane in which the bike lane shifts to the left but the intersection angle and curb radius are such that turning speed is ≤15 mph.	LTS ≥ 3
Single right-turn lane with any other configuration; dual right-turn lanes; or right-turn lane along with an option (through-right) lane.	LTS ≥ 4

Table 5.5 Level of Traffic Stress Criteria for Crossings with a Median Refuge of at least 6 feet

Speed Limit of Street Being Crossed	Width of Street Being Crossed		
	Up to 3 lanes	4-5 lanes	6+ lanes
Up to 25 mph	LTS 1	LTS 1	LTS 2
30 mph	LTS 1	LTS 2	LST 3
35 mph	LTS 2	LST 3	LTS 4
40+	LST 3	LTS 4	LTS 4

[1] Roundabouts result in LTS 1 due to low speeds and visibility of cyclist.

Table A-6 Level of Traffic Stress Criteria for Crossings without a Median

Speed Limit of Street Being Crossed	Width of Street Being Crossed		
	Up to 3 lanes	4-5 lanes	6+ lanes
Up to 25 mph	LTS 1	LTS 2	LTS 4
30 mph	LTS 1	LTS 2	LTS 4
35 mph	LTS 2	LST 3	LTS 4
40+	LST 3	LTS 4	LTS 4

Table A-8: Rural Segment Criteria – Posted Speeds 45 mph or Greater

Daily Volume (vpd)	Paved Shoulder Width			
	0 - < 2 ft	2 - < 4 ft	4 - < 6 ft	> 6ft
< 400	LTS 2	LTS 2	LTS 2	LTS 2
400 – 1500	LTS 3	LTS 2	LTS 2	LTS 2
1500 – 7000 [4]	LTS 4	LTS 3	LTS 2	LTS 2
7000 +	LTS 4	LTS 4	LTS 3	LTS 3

[1] Based on p1-3 & Table 1-2 from the Oregon Bicycle and Pedestrian Design Guide, 2011.
[2] Adequate stopping sight distances on curves and grades assumed. A high frequency of sharper curves and short vertical transitions can increase the stress level especially on roadways with less than 6' shoulders. Engineering judgement will be needed to determine what impact this will have on LTS level on a particular segment.
[3] Segments with flashing warning beacons announcing presence of bicyclists (typically done on narrow long bridges or tunnels) may, depending on judgement, reduce the LTS by one, but no less than LTS 2.
[4] Over 1500 AADT, the Oregon Bicycle and Pedestrian Design Guide indicates the need for shoulders.

Traffic Counts, LOS Worksheets and Signal Warrant Worksheets

Appendix H: Traffic Counts, LOS Worksheets, Signal Warrant Worksheets

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Table Index

1. Camera Locations

Intersection turn movement counts were performed using mounted video cameras at eight locations throughout the project area on Tuesday, September 25, 2018. Peak hour intersection turning movement by vehicles, trucks, buses, bicycle and pedestrian movements (crossings and intersection corner movement counts) were collected at the following eight locations:

(1) Lotus Road at Bassi Road

(2) SR 49 at Marshall Road

(3) SR 49 at Lotus Road

(4) SR 49 at Mt. Murphy Road

(5) SR 49 at Brewery Street

(6) SR 49 at Church Street/SR 153

(7) Two (2) pedestrian mid-block crossings at Mill

The following sections contain images and description of locations identified for camera mounts to conduct traffic counts.

1.2 Lotus Road/ SR 49

1. Multiple utility poles available above retaining wall at Lotus/ SR 49 intersection.

1.3 Marshall Road/ SR 49

1. Light standard on NE corner of Marshall/ SR49 intersection.

1.4 Mt Murphy Road/ SR 49

1. Oak tree locations pointing south on SR 49 in Marshall Gold Discovery Park can capture data @ Mt. Murphy Road, and possibly all the way to the Argonaut.

2. Traffic Counts

This section provides a summary of traffic counts observed at each study intersection within the project area. The following documents reflect the AM, Midday and PM peak hour traffic conditions for each study intersection.

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1. Camera Locations

Intersection turn movement counts were performed using mounted video cameras at eight locations throughout the project area on Tuesday, September 25, 2018. Peak hour intersection turning movement by vehicles, trucks, buses, bicycle and pedestrian movements (crossings and intersection corner movement counts) were collected at the following eight locations:

(1) Lotus Road at Bassi Road

(2) SR 49 at Marshall Road

(3) SR 49 at Lotus Road

(4) SR 49 at Mt. Murphy Road

(5) SR 49 at Brewery Street

(6) SR 49 at Church Street/SR 153

(7) Two (2) pedestrian mid-block crossings at Mill

The following sections contain images and description of locations identified for camera mounts to conduct traffic counts.

1.2 Lotus Road/ SR 49

1. Multiple utility poles available above retaining wall at Lotus/ SR 49 intersection.

1.3 Marshall Road/ SR 49

1. Light standard on NE corner of Marshall/ SR49 intersection.

1.1 Lotus Road/ Bassi Road

1. Oak tree on right is 20 feet from Bassi/Lotus intersection. Camera could be mounted on tree pointing back toward photographer's position and capture the intersection.

2. Available utility pole at Bassi/Lotus intersection.

1.4 Mt Murphy Road/ SR 49

1. Oak tree locations pointing south on SR 49 in Marshall Gold Discovery Park can capture data @ Mt. Murphy Road, and possibly all the way to the Argonaut.

2. Traffic Counts

This section provides a summary of traffic counts observed at each study intersection within the project area. The following documents reflect the AM, Midday and PM peak hour traffic conditions for each study intersection.

Location: Lotus Rd & Bassi Rd
City: Coloma
Control: 3-Way Stop(NB/SB/EB)

Project ID: 18-07330-001
Date: 9/25/2018

Total

NS/EW Streets:	Lotus Rd				Lotus Rd				Bassi Rd				Bassi Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	31	0	0	0	44	1	0	3	0	9	0	0	0	0	0	88
7:15 AM	1	28	0	0	0	57	1	0	5	0	6	0	0	0	0	0	98
7:30 AM	0	25	0	0	0	69	2	0	6	0	6	0	0	0	0	0	108
7:45 AM	2	35	0	0	0	65	1	0	2	0	7	0	0	0	0	0	112
8:00 AM	2	24	0	0	0	44	5	0	2	0	6	0	0	0	0	0	83
8:15 AM	0	31	0	0	0	42	6	0	2	0	4	0	0	0	0	0	85
8:30 AM	2	29	0	0	0	43	4	0	3	0	2	0	0	0	0	0	83
8:45 AM	3	30	0	0	0	30	1	0	5	0	4	0	0	0	0	0	73
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	10	233	0	0	0	394	21	0	28	0	44	0	0	0	0	0	730
APPROACH %'s :	4.12%	95.88%	0.00%	0.00%	0.00%	94.94%	5.06%	0.00%	38.89%	0.00%	61.11%	0.00%					
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	3	119	0	0	0	235	5	0	16	0	28	0	0	0	0	0	406
PEAK HR FACTOR :	0.375	0.850	0.000	0.000	0.000	0.851	0.625	0.000	0.667	0.000	0.778	0.000	0.000	0.000	0.000	0.000	0.906
		0.824				0.845				0.917							

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
NOON	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
11:00 AM	0	31	0	0	0	32	2	0	3	0	4	0	0	0	0	0	72
11:15 AM	3	29	0	0	0	29	4	0	0	0	2	0	0	0	0	0	67
11:30 AM	6	27	0	0	0	31	5	0	4	0	3	0	0	0	0	0	76
11:45 AM	4	38	0	0	0	32	1	0	1	0	3	0	0	0	0	0	79
12:00 PM	4	28	0	0	0	35	7	0	1	0	1	0	0	0	0	0	76
12:15 PM	5	28	0	0	0	35	6	0	1	0	2	0	0	0	0	0	77
12:30 PM	5	30	0	0	0	32	3	0	3	0	1	0	0	0	0	0	74
12:45 PM	4	46	0	0	0	29	1	0	1	0	3	0	0	0	0	0	84
1:00 PM	2	35	0	0	0	48	1	0	2	0	1	0	0	0	0	0	89
1:15 PM	0	35	0	0	0	40	0	0	0	0	2	0	0	0	0	0	77
1:30 PM	2	38	0	0	0	46	6	0	0	0	2	0	0	0	0	0	94
1:45 PM	3	37	0	0	0	46	3	0	3	0	6	0	0	0	0	0	98
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	38	402	0	0	0	435	39	0	19	0	30	0	0	0	0	0	963
APPROACH %'s :	8.64%	91.36%	0.00%	0.00%	0.00%	91.77%	8.23%	0.00%	38.78%	0.00%	61.22%	0.00%					
PEAK HR :	01:00 PM - 02:00 PM																TOTAL
PEAK HR VOL :	7	145	0	0	0	180	10	0	5	0	11	0	0	0	0	0	358
PEAK HR FACTOR :	0.583	0.954	0.000	0.000	0.000	0.938	0.417	0.000	0.417	0.000	0.458	0.000	0.000	0.000	0.000	0.000	0.913
		0.950				0.913				0.444							

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	5	63	0	0	0	45	3	0	2	0	3	0	0	0	0	0	121
4:15 PM	9	56	0	0	0	39	4	0	1	0	3	0	0	0	0	0	112
4:30 PM	3	55	0	0	0	44	3	0	1	0	1	0	0	0	0	0	107
4:45 PM	5	62	0	0	0	28	3	0	3	0	3	0	0	0	0	0	104
5:00 PM	8	67	0	0	0	46	2	0	2	0	4	0	0	0	0	0	129
5:15 PM	6	60	0	0	0	31	3	0	4	0	2	0	0	0	0	0	106
5:30 PM	9	74	0	0	0	30	6	0	4	0	5	0	0	0	0	0	128
5:45 PM	5	58	0	0	0	35	3	0	4	0	3	0	0	0	0	0	108
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	50	495	0	0	0	298	27	0	21	0	24	0	0	0	0	0	915
APPROACH %'s :	9.17%	90.83%	0.00%	0.00%	0.00%	91.69%	8.31%	0.00%	46.67%	0.00%	53.33%	0.00%					
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	28	259	0	0	0	142	14	0	14	0	14	0	0	0	0	0	471
PEAK HR FACTOR :	0.778	0.875	0.000	0.000	0.000	0.772	0.583	0.000	0.875	0.000	0.700	0.000	0.000	0.000	0.000	0.000	0.913
		0.864				0.813				0.778							

Location: Marshall Rd & SR 49
City: Coloma
Control: 3-Way Stop(SB/EB/WB)

Project ID: 18-07330-002
Date: 9/25/2018

Total

NS/EW Streets:	Marshall Rd				Marshall Rd				SR 49				SR 49				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	0	1	0	1	1	0	0	0	1	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	1	0	40	0	2	0	0	39	0	0	0	24	11	0	117
7:15 AM	0	0	0	0	41	0	5	0	5	34	0	0	0	35	15	0	135
7:30 AM	0	0	0	0	55	0	4	0	6	41	0	0	0	30	10	0	146
7:45 AM	0	0	0	0	56	0	6	0	0	43	0	0	0	25	11	0	141
8:00 AM	0	0	0	0	24	0	0	0	1	42	0	0	0	36	15	0	118
8:15 AM	0	0	0	0	33	0	5	0	1	30	0	0	0	23	7	0	99
8:30 AM	0	0	0	0	35	0	2	0	3	36	0	0	0	27	7	0	110
8:45 AM	0	0	1	0	22	0	4	0	3	29	1	0	0	29	10	0	99
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	2	0	306	0	28	0	19	294	1	0	0	229	86	0	965
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%	91.62%	0.00%	8.38%	0.00%	6.05%	93.63%	0.32%	0.00%	0.00%	72.70%	27.30%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	0	0	0	176	0	15	0	12	160	0	0	0	126	51	0	540
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.786	0.000	0.625	0.000	0.500	0.930	0.000	0.000	0.000	0.875	0.850	0.000	0.925
					0.770				0.915				0.868				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	0	1	0	1	1	0	0	0	1	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
11:00 AM	0	0	0	0	24	0	0	0	3	25	0	0	0	26	22	0	100
11:15 AM	0	0	0	0	18	0	1	0	1	24	0	0	0	23	16	0	83
11:30 AM	0	0	0	0	18	0	2	0	2	25	0	0	0	20	23	0	90
11:45 AM	1	0	0	0	26	0	2	0	2	26	0	0	1	26	17	0	101
12:00 PM	0	0	0	0	18	0	3	0	2	31	0	0	0	21	19	1	95
12:15 PM	0	0	0	0	19	0	3	0	1	37	0	0	0	24	17	0	101
12:30 PM	0	0	0	0	30	0	3	0	1	29	0	0	0	23	13	0	99
12:45 PM	0	0	0	0	22	0	3	0	3	31	0	0	0	18	20	0	97
1:00 PM	0	0	1	0	25	0	5	0	0	30	0	0	1	30	30	0	122
1:15 PM	0	0	0	0	21	0	1	0	3	24	0	0	0	26	20	0	95
1:30 PM	0	0	0	0	27	0	2	0	0	32	0	0	0	31	31	0	123
1:45 PM	0	0	0	0	26	0	3	0	1	29	0	0	0	38	31	0	128
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	0	1	0	274	0	28	0	19	343	0	0	2	306	259	1	1234
APPROACH %'s :	50.00%	0.00%	50.00%	0.00%	90.73%	0.00%	9.27%	0.00%	5.25%	94.75%	0.00%	0.00%	0.35%	53.87%	45.60%	0.18%	
PEAK HR :	01:00 PM - 02:00 PM																TOTAL
PEAK HR VOL :	0	0	1	0	99	0	11	0	4	115	0	0	1	125	112	0	468
PEAK HR FACTOR :	0.000	0.000	0.250	0.000	0.917	0.000	0.550	0.000	0.333	0.898	0.000	0.000	0.250	0.822	0.903	0.000	0.914
	0.250				0.917				0.930				0.862				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	0	1	0	1	1	0	0	0	1	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	18	0	2	0	1	41	0	0	0	38	48	0	148
4:15 PM	0	0	0	0	16	0	2	0	8	36	0	0	0	52	45	0	159
4:30 PM	0	0	0	0	15	0	6	0	2	42	0	0	0	52	40	0	157
4:45 PM	0	0	0	0	12	0	3	0	2	36	0	0	0	47	38	0	138
5:00 PM	0	0	0	0	22	0	6	0	4	29	0	0	0	34	42	0	137
5:15 PM	0	0	0	0	21	0	3	0	6	26	0	0	0	48	61	0	165
5:30 PM	0	0	0	0	21	0	5	0	7	38	0	0	0	41	45	0	157
5:45 PM	0	0	0	0	18	0	4	0	7	33	0	0	0	43	57	0	162
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	143	0	31	0	37	281	0	0	0	355	376	0	1223
APPROACH %'s :					82.18%	0.00%	17.82%	0.00%	11.64%	88.36%	0.00%	0.00%	0.00%	48.56%	51.44%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	82	0	18	0	24	126	0	0	0	166	205	0	621
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.932	0.000	0.750	0.000	0.857	0.829	0.000	0.000	0.000	0.865	0.840	0.000	0.941
					0.893				0.833				0.851				

Location: Lotus Rd & SR 49
City: Coloma
Control: 3-Way Stop(NB/EB/WB)

Project ID: 18-07330-003
Date: 9/25/2018

Total

NS/EW Streets:	Lotus Rd				Lotus Rd				SR 49				SR 49				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	33	0	6	0	0	0	0	0	0	40	42	0	4	12	0	0	137
7:15 AM	28	0	1	0	0	0	0	0	0	31	51	0	1	11	0	0	123
7:30 AM	25	0	13	0	0	0	0	0	0	39	64	0	8	21	0	0	170
7:45 AM	26	0	7	0	0	0	0	0	0	33	61	0	7	19	0	0	153
8:00 AM	28	0	4	0	0	0	0	0	0	22	44	0	5	26	0	0	129
8:15 AM	25	0	6	0	0	0	0	0	0	22	46	0	4	12	0	0	115
8:30 AM	22	0	7	0	0	0	0	0	0	30	41	0	7	12	0	0	119
8:45 AM	24	0	11	0	0	0	0	0	0	19	35	0	0	24	0	0	113
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	211	0	55	0	0	0	0	0	0	236	384	0	36	137	0	0	1059
APPROACH %'s :	79.32%	0.00%	20.68%	0.00%					0.00%	38.06%	61.94%	0.00%	20.81%	79.19%	0.00%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	112	0	27	0	0	0	0	0	0	143	218	0	20	63	0	0	583
PEAK HR FACTOR :	0.848	0.000	0.519	0.000	0.000	0.000	0.000	0.000	0.000	0.894	0.852	0.000	0.625	0.750	0.000	0.000	0.857
	0.891								0.876				0.716				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
11:00 AM	32	0	2	0	0	0	0	0	0	23	29	0	4	28	0	0	118
11:15 AM	23	0	6	0	0	0	0	0	0	20	30	0	4	20	0	0	103
11:30 AM	27	0	3	0	0	0	0	0	0	17	32	0	4	14	0	0	97
11:45 AM	30	0	7	0	0	0	0	0	0	30	28	0	2	27	0	0	124
12:00 PM	29	0	5	0	0	0	0	0	0	28	38	0	4	17	0	0	121
12:15 PM	29	0	3	0	0	0	0	0	0	25	38	0	5	24	0	0	124
12:30 PM	25	0	3	0	0	0	0	0	0	26	31	0	3	19	0	0	107
12:45 PM	39	0	4	0	0	0	0	0	0	26	31	0	2	18	0	0	120
1:00 PM	38	0	7	0	0	0	0	0	0	22	46	0	8	26	0	0	147
1:15 PM	28	0	1	0	0	0	0	0	0	17	34	0	4	23	0	0	107
1:30 PM	36	0	3	0	0	0	0	0	0	24	43	0	6	33	0	0	145
1:45 PM	34	0	3	0	0	0	0	0	0	27	39	0	8	35	0	0	146
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	370	0	47	0	0	0	0	0	0	285	419	0	54	284	0	0	1459
APPROACH %'s :	88.73%	0.00%	11.27%	0.00%					0.00%	40.48%	59.52%	0.00%	15.98%	84.02%	0.00%	0.00%	
PEAK HR :	01:00 PM - 02:00 PM																TOTAL
PEAK HR VOL :	136	0	14	0	0	0	0	0	0	90	162	0	26	117	0	0	545
PEAK HR FACTOR :	0.895	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.833	0.880	0.000	0.813	0.836	0.000	0.000	0.927
	0.833								0.926				0.831				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	54	0	6	0	0	0	0	0	0	26	39	0	13	31	0	0	169
4:15 PM	61	0	7	0	0	0	0	0	0	24	34	0	8	42	0	0	176
4:30 PM	46	0	8	0	0	0	0	0	0	30	34	0	7	49	0	0	174
4:45 PM	51	0	4	0	0	0	0	0	0	21	30	0	7	34	0	0	147
5:00 PM	57	0	4	0	0	0	0	0	0	18	38	0	7	34	0	0	158
5:15 PM	57	0	4	0	0	0	0	0	0	15	34	0	4	44	0	0	158
5:30 PM	59	0	4	0	0	0	0	0	0	27	32	0	10	37	0	0	169
5:45 PM	72	0	5	0	0	0	0	0	0	23	33	0	2	27	0	0	162
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	457	0	42	0	0	0	0	0	0	184	274	0	58	298	0	0	1313
APPROACH %'s :	91.58%	0.00%	8.42%	0.00%					0.00%	40.17%	59.83%	0.00%	16.29%	83.71%	0.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	212	0	25	0	0	0	0	0	0	101	137	0	35	156	0	0	666
PEAK HR FACTOR :	0.869	0.000	0.781	0.000	0.000	0.000	0.000	0.000	0.000	0.842	0.878	0.000	0.673	0.796	0.000	0.000	0.946
	0.871								0.915				0.853				

Location: SR 49 & Mt Murphy Rd/Bridge St
City: Coloma
Control: 1-Way Stop(WB)

Project ID: 18-07330-004
Date: 9/25/2018

Total

NS/EW Streets:	SR 49				SR 49				Mt Murphy Rd/Bridge St				Mt Murphy Rd/Bridge St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	0	0	0	0	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	16	2	0	1	35	0	0	0	0	0	0	0	0	1	0	55
7:15 AM	1	15	0	0	2	32	1	0	0	0	0	0	1	0	4	0	56
7:30 AM	0	22	1	0	0	55	1	0	0	0	0	0	3	0	2	0	84
7:45 AM	0	32	0	0	1	47	0	0	0	0	0	0	2	0	6	0	88
8:00 AM	1	25	0	0	6	25	4	0	0	0	0	0	2	0	3	0	66
8:15 AM	1	18	3	0	10	32	0	0	0	0	0	0	1	0	1	0	66
8:30 AM	0	20	0	0	1	25	1	0	0	0	0	0	3	0	3	0	53
8:45 AM	1	17	1	0	1	23	1	0	0	0	0	0	0	0	4	0	48
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	165	7	0	22	274	8	0	0	0	0	0	12	0	24	0	516
APPROACH %'s :	2.27%	93.75%	3.98%	0.00%	7.24%	90.13%	2.63%	0.00%					33.33%	0.00%	66.67%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	2	97	4	0	17	159	5	0	0	0	0	0	8	0	12	0	304
PEAK HR FACTOR :	0.500	0.758	0.333	0.000	0.425	0.723	0.313	0.000	0.000	0.000	0.000	0.000	0.667	0.000	0.500	0.000	0.864
	0.805				0.808								0.625				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	0	0	0	0	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
11:00 AM	0	22	4	0	2	32	3	0	0	0	0	0	3	0	1	0	67
11:15 AM	0	26	2	0	1	22	3	0	0	0	0	0	0	0	3	0	57
11:30 AM	1	20	2	0	2	21	4	0	0	0	0	0	1	0	2	0	53
11:45 AM	0	24	3	0	5	20	4	0	0	0	0	0	2	0	1	0	59
12:00 PM	0	19	7	0	1	29	2	0	0	0	0	0	1	1	7	0	67
12:15 PM	2	28	1	0	0	34	6	0	0	0	0	0	3	2	4	0	80
12:30 PM	2	25	1	0	1	25	1	0	0	0	0	0	2	0	2	0	59
12:45 PM	2	31	1	0	3	24	4	0	1	0	0	0	1	0	2	0	69
1:00 PM	1	33	1	0	2	17	1	0	0	0	0	0	1	0	4	0	60
1:15 PM	0	25	2	0	1	26	1	0	0	0	0	0	2	0	2	0	59
1:30 PM	0	26	4	0	0	20	3	0	0	0	0	0	3	0	1	0	57
1:45 PM	3	31	1	0	3	35	2	0	0	0	0	0	3	0	4	0	82
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	11	310	29	0	21	305	34	0	1	0	0	0	22	3	33	0	769
APPROACH %'s :	3.14%	88.57%	8.29%	0.00%	5.83%	84.72%	9.44%	0.00%	100.00%	0.00%	0.00%	0.00%	37.93%	5.17%	56.90%	0.00%	
PEAK HR :	12:00 PM - 01:00 PM																TOTAL
PEAK HR VOL :	6	103	10	0	5	112	13	0	1	0	0	0	7	3	15	0	275
PEAK HR FACTOR :	0.750	0.831	0.357	0.000	0.417	0.824	0.542	0.000	0.250	0.000	0.000	0.000	0.583	0.375	0.536	0.000	0.859
	0.875				0.813				0.250				0.694				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	0	0	0	0	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	44	1	0	1	24	0	0	0	0	0	0	1	0	6	0	77
4:15 PM	0	49	3	0	3	25	1	0	0	0	0	0	1	0	2	0	84
4:30 PM	0	40	7	0	1	33	0	0	0	0	0	0	3	0	7	0	91
4:45 PM	1	36	1	0	3	25	0	0	0	0	0	0	0	0	1	0	67
5:00 PM	0	43	5	0	2	25	0	0	0	0	0	0	0	0	5	0	80
5:15 PM	1	35	4	0	0	20	0	0	0	0	0	0	2	0	2	0	64
5:30 PM	1	40	2	0	1	28	0	0	0	0	0	0	1	0	5	0	78
5:45 PM	0	22	3	0	4	28	0	0	0	0	0	0	2	0	5	0	64
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	309	26	0	15	208	1	0	0	0	0	0	10	0	33	0	605
APPROACH %'s :	0.89%	91.42%	7.69%	0.00%	6.70%	92.86%	0.45%	0.00%					23.26%	0.00%	76.74%	0.00%	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	1	168	16	0	9	108	1	0	0	0	0	0	4	0	15	0	322
PEAK HR FACTOR :	0.250	0.857	0.571	0.000	0.750	0.818	0.250	0.000	0.000	0.000	0.000	0.000	0.333	0.000	0.536	0.000	0.885
	0.889				0.868								0.475				

Location: SR 49 & Brewery St
City: Coloma
Control: 1-Way Stop(EB)

Project ID: 18-07330-005
Date: 9/25/2018

Total

NS/EW Streets:	SR 49				SR 49				Brewery St				Brewery St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	16	0	0	0	40	1	0	0	0	0	0	0	0	0	0	57
7:15 AM	0	10	1	0	0	35	1	0	0	2	0	0	0	1	0	0	50
7:30 AM	0	27	0	0	0	53	0	0	1	1	0	0	0	1	0	0	83
7:45 AM	0	23	0	0	0	44	0	0	2	0	0	0	0	0	0	0	69
8:00 AM	0	34	0	0	0	26	0	0	0	0	1	0	0	0	0	0	61
8:15 AM	0	15	0	0	1	25	1	1	0	0	0	0	0	0	0	0	43
8:30 AM	0	17	0	0	0	36	0	0	0	1	0	0	0	0	0	0	54
8:45 AM	0	26	0	0	0	25	1	0	1	0	0	0	0	0	0	0	53
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	168	1	0	1	284	4	1	4	4	1	0	0	2	0	0	470
APPROACH %'s :	0.00%	99.41%	0.59%	0.00%	0.34%	97.93%	1.38%	0.34%	44.44%	44.44%	11.11%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	94	1	0	0	158	1	0	3	3	1	0	0	2	0	0	263
PEAK HR FACTOR :	0.000	0.691	0.250	0.000	0.000	0.745	0.250	0.000	0.375	0.375	0.250	0.000	0.000	0.500	0.000	0.000	0.792
	0.699				0.750				0.875				0.500				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
11:00 AM	0	30	0	0	1	24	1	1	0	0	0	0	0	1	0	0	58
11:15 AM	1	21	0	0	0	26	2	0	1	1	2	0	0	1	0	0	55
11:30 AM	0	17	0	0	0	19	0	0	2	0	1	0	0	0	0	0	39
11:45 AM	0	28	0	0	0	33	0	1	1	0	0	0	0	0	0	0	63
12:00 PM	0	15	0	0	0	26	0	1	1	0	1	0	0	0	0	0	44
12:15 PM	0	24	0	0	1	31	0	0	1	0	0	0	0	0	0	0	57
12:30 PM	1	19	0	0	0	26	0	0	3	0	1	0	0	0	1	0	51
12:45 PM	0	25	0	0	0	24	4	0	1	1	3	0	0	0	1	0	59
1:00 PM	1	31	0	0	0	26	0	1	2	0	1	0	0	0	0	0	62
1:15 PM	0	29	0	0	0	17	0	0	2	0	2	0	0	0	1	0	51
1:30 PM	1	38	0	0	0	23	0	1	3	1	1	0	0	0	0	0	68
1:45 PM	0	39	0	0	1	28	1	0	2	0	1	0	0	1	0	0	73
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	316	0	0	3	303	8	5	19	3	13	0	0	3	3	0	680
APPROACH %'s :	1.25%	98.75%	0.00%	0.00%	0.94%	94.98%	2.51%	1.57%	54.29%	8.57%	37.14%	0.00%	0.00%	50.00%	50.00%	0.00%	
PEAK HR :	01:00 PM - 02:00 PM																TOTAL
PEAK HR VOL :	2	137	0	0	1	94	1	2	9	1	5	0	0	1	1	0	254
PEAK HR FACTOR :	0.500	0.878	0.000	0.000	0.250	0.839	0.250	0.500	0.750	0.250	0.625	0.000	0.000	0.250	0.250	0.000	0.870
	0.891				0.817				0.750				0.500				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	35	0	0	0	31	2	0	2	0	1	0	0	0	0	0	71
4:15 PM	0	55	0	0	0	24	0	0	4	0	2	0	0	0	1	0	86
4:30 PM	0	49	0	0	0	37	1	0	2	0	5	0	0	0	1	0	95
4:45 PM	0	33	0	0	0	27	1	0	0	0	2	0	0	0	0	0	63
5:00 PM	0	39	0	0	0	20	0	0	4	0	1	0	0	0	0	0	64
5:15 PM	0	41	0	0	0	23	0	0	5	0	0	0	0	0	0	0	69
5:30 PM	0	41	0	0	1	26	0	0	3	0	1	0	0	0	1	0	73
5:45 PM	0	23	0	0	0	26	0	1	3	0	0	0	0	0	0	0	53
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	316	0	0	1	214	4	1	23	0	12	0	0	0	3	0	574
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.45%	97.27%	1.82%	0.45%	65.71%	0.00%	34.29%	0.00%	0.00%	0.00%	100.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	172	0	0	0	119	4	0	8	0	10	0	0	0	2	0	315
PEAK HR FACTOR :	0.000	0.782	0.000	0.000	0.000	0.804	0.500	0.000	0.500	0.000	0.500	0.000	0.000	0.000	0.500	0.000	0.829
	0.782				0.809				0.643				0.500				

Location: SR 49/SR 153 & Church St
City: Coloma
Control: 2-Way Stop(NB/EB)

Project ID: 18-07330-006
Date: 9/25/2018

Total

NS/EW Streets:	SR 49/SR 153				SR 49/SR 153				Church St				Church St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	1	11	0	0	6	34	0	0	0	0	0	0	0	0	6	0	58
7:15 AM	0	7	0	0	8	27	0	0	0	0	0	0	2	0	5	0	49
7:30 AM	0	19	0	0	4	44	0	0	0	0	0	0	0	0	7	0	74
7:45 AM	0	18	1	0	9	33	0	0	0	0	0	0	0	0	7	0	68
8:00 AM	0	22	0	0	12	12	0	0	1	0	0	0	1	0	4	0	52
8:15 AM	0	10	0	0	9	18	0	0	0	0	0	0	4	0	4	0	45
8:30 AM	0	13	0	0	12	18	0	0	0	0	0	0	0	0	8	0	51
8:45 AM	1	9	0	0	12	16	0	0	0	0	0	0	0	0	9	0	47
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	109	1	0	72	202	0	0	1	0	0	0	7	0	50	0	444
APPROACH %'s :	1.79%	97.32%	0.89%	0.00%	26.28%	73.72%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	12.28%	0.00%	87.72%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	1	55	1	0	27	138	0	0	0	0	0	0	2	0	25	0	249
PEAK HR FACTOR :	0.250	0.724	0.250	0.000	0.750	0.784	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.893	0.000	0.841
	0.750				0.859								0.964				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
11:00 AM	0	15	0	0	10	8	0	0	0	0	0	0	0	0	10	0	43
11:15 AM	0	12	0	0	9	14	0	0	0	0	1	0	2	0	10	0	48
11:30 AM	0	13	0	0	10	12	0	0	0	0	1	0	0	0	6	0	42
11:45 AM	0	15	1	0	14	20	0	0	0	0	0	0	0	0	9	0	59
12:00 PM	0	10	0	0	10	16	0	0	0	0	0	0	0	0	5	0	41
12:15 PM	0	19	0	0	12	20	0	0	0	0	1	0	1	1	6	0	60
12:30 PM	0	14	0	0	16	11	0	0	0	0	0	0	1	0	2	0	44
12:45 PM	0	15	0	0	8	14	0	0	1	0	0	0	1	0	5	0	44
1:00 PM	1	21	1	0	9	15	0	0	0	0	0	0	0	0	10	0	57
1:15 PM	1	18	0	0	8	13	0	0	0	0	1	0	0	0	12	0	53
1:30 PM	1	23	1	0	8	14	0	0	0	0	0	0	0	0	17	0	64
1:45 PM	0	15	1	0	11	15	0	0	0	0	2	0	0	0	20	0	64
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	190	4	0	125	172	0	0	1	0	6	0	5	1	112	0	619
APPROACH %'s :	1.52%	96.45%	2.03%	0.00%	42.09%	57.91%	0.00%	0.00%	14.29%	0.00%	85.71%	0.00%	4.24%	0.85%	94.92%	0.00%	
PEAK HR :	01:00 PM - 02:00 PM																TOTAL
PEAK HR VOL :	3	77	3	0	36	57	0	0	0	0	3	0	0	0	59	0	238
PEAK HR FACTOR :	0.750	0.837	0.750	0.000	0.818	0.950	0.000	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.738	0.000	0.930
	0.830				0.894				0.375				0.738				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	19	1	0	7	24	0	0	0	0	0	0	0	0	14	0	65
4:15 PM	0	31	1	0	9	19	0	0	0	0	1	0	3	0	23	0	87
4:30 PM	0	28	1	0	17	23	0	1	0	0	1	0	0	0	18	0	89
4:45 PM	0	26	1	0	15	15	0	0	0	0	0	0	0	0	8	0	65
5:00 PM	0	32	1	0	9	10	0	0	0	1	0	0	1	0	11	0	65
5:15 PM	0	33	1	0	5	16	0	0	0	0	0	0	0	0	9	0	64
5:30 PM	0	31	0	0	11	16	0	0	0	1	0	0	1	1	7	0	68
5:45 PM	0	20	0	0	6	19	0	0	0	0	0	0	0	0	5	0	50
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	220	6	0	79	142	0	1	0	2	2	0	5	1	95	0	553
APPROACH %'s :	0.00%	97.35%	2.65%	0.00%	35.59%	63.96%	0.00%	0.45%	0.00%	50.00%	50.00%	0.00%	4.95%	0.99%	94.06%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	104	4	0	48	81	0	1	0	0	2	0	3	0	63	0	306
PEAK HR FACTOR :	0.000	0.839	1.000	0.000	0.706	0.844	0.000	0.250	0.000	0.000	0.500	0.000	0.250	0.000	0.685	0.000	0.860
	0.844				0.793				0.500				0.635				

Location: Mill Parking Lot Crosswalks & SR 49
City: Coloma
Control: 0

Project ID: 18-07330-007
Date: 9/25/2018

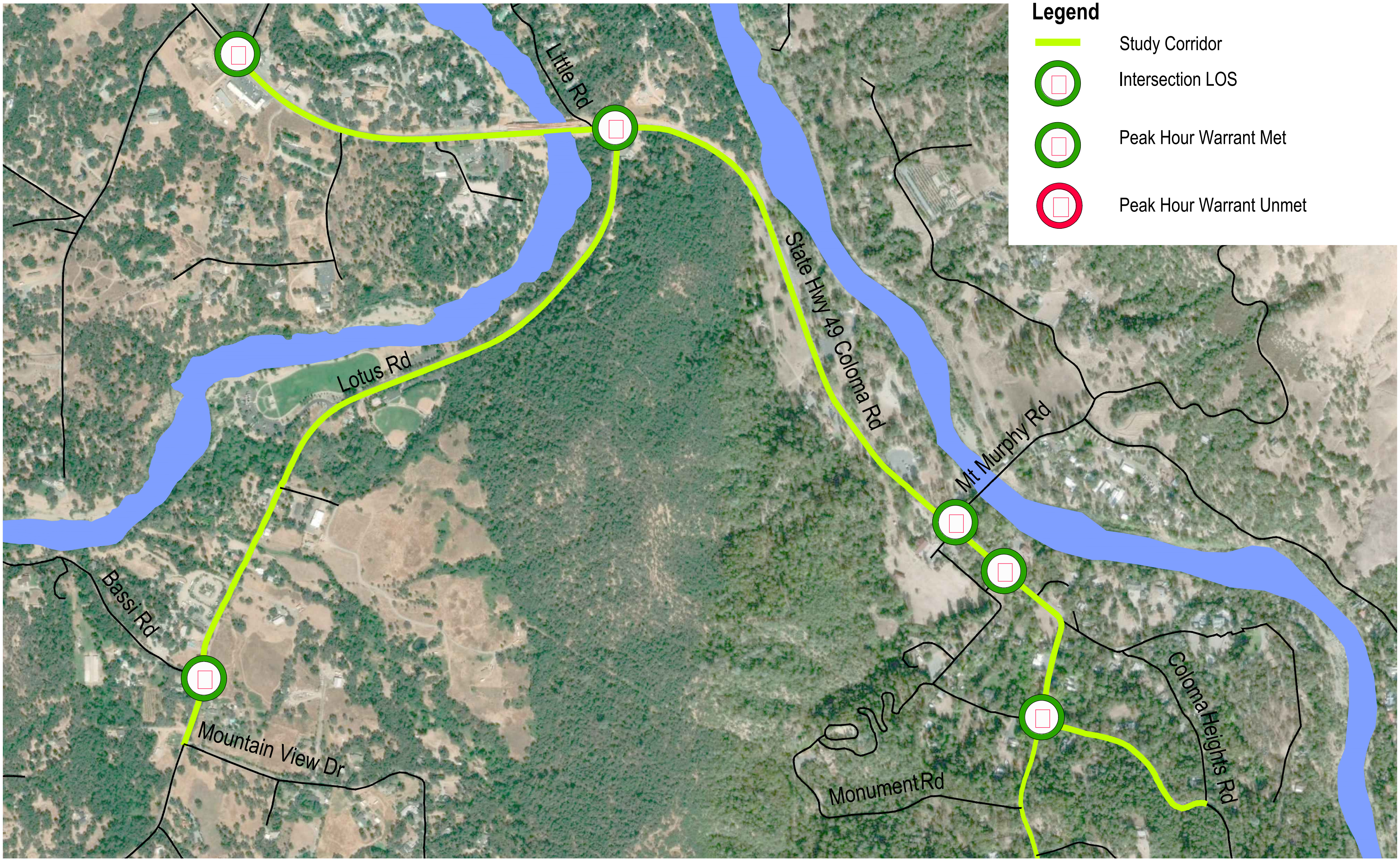
Bikes

NS/EW Streets:	Mill Parking Lot Crosswalks				Mill Parking Lot Crosswalks				SR 49				SR 49				
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	**07:00 AM - 08:00 AM**																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
NOON	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	**01:00 PM - 02:00 PM**																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
APPROACH %'s :					100.00%	0.00%	0.00%	0.00%									
PEAK HR :	**04:00 PM - 05:00 PM**																TOTAL
PEAK HR VOL :	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
PEAK HR FACTOR :	0.00	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250
					0.250												

3. Signal Warrant Worksheets



COLOMA LOTUS Mobility Plan

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GHD

El Dorado County Transportation Commission
COLOMA LOTUS MOBILITY PLAN

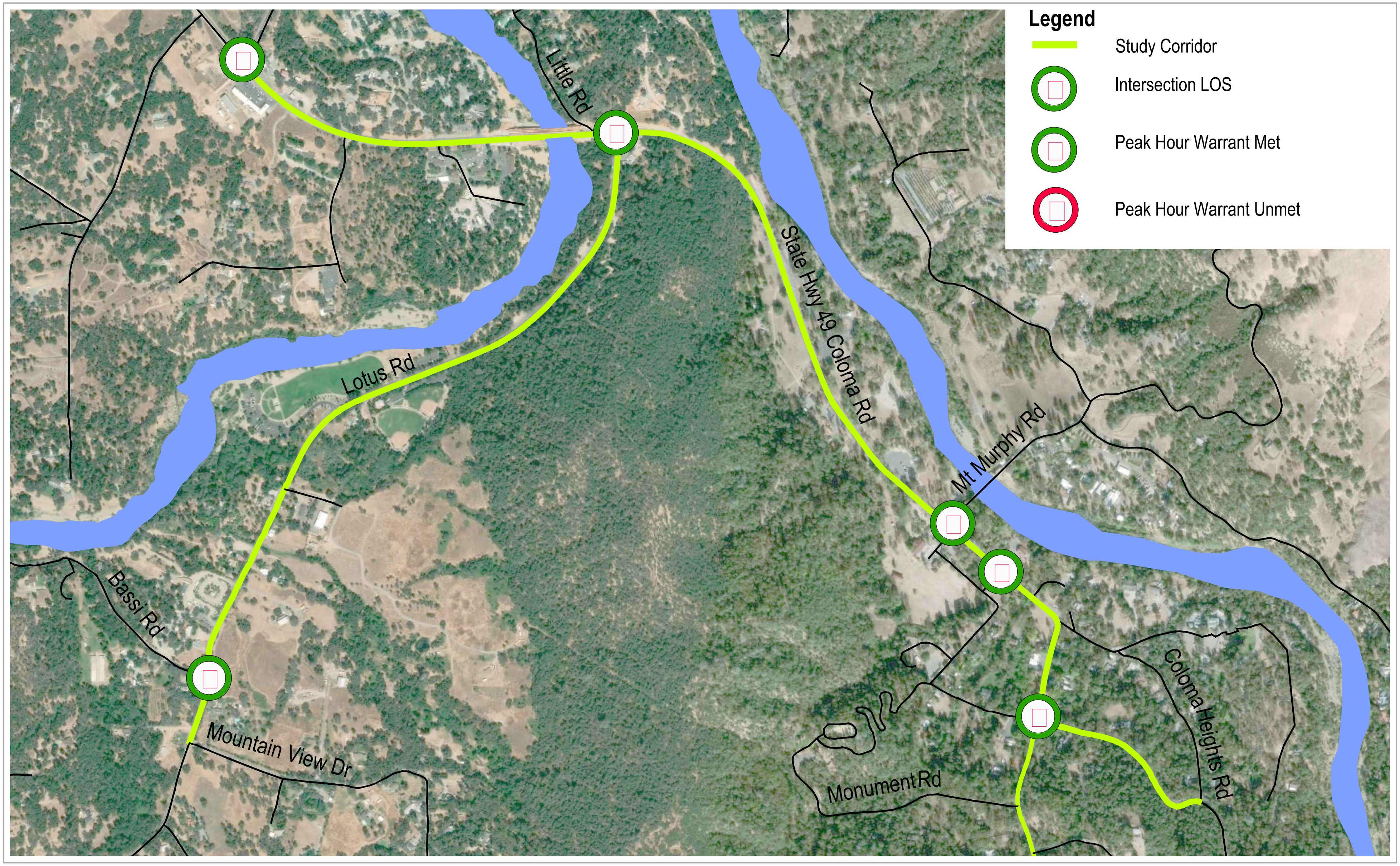
WARRANT ANALYSIS MAP
AM PEAK HOUR

Project No. 11180327
Report No. 000
Date 11/12/18

FIGURE X.X

Filename: \\10.3.250.25\data\Common\PRJ\2544\T2544\T2544TG001.dwg Plot Date: 12 November 2018 - 11:23 AM

Source:



COLOMA LOTUS Mobility Plan

El Dorado County Transportation Commission
COLOMA LOTUS MOBILITY PLAN

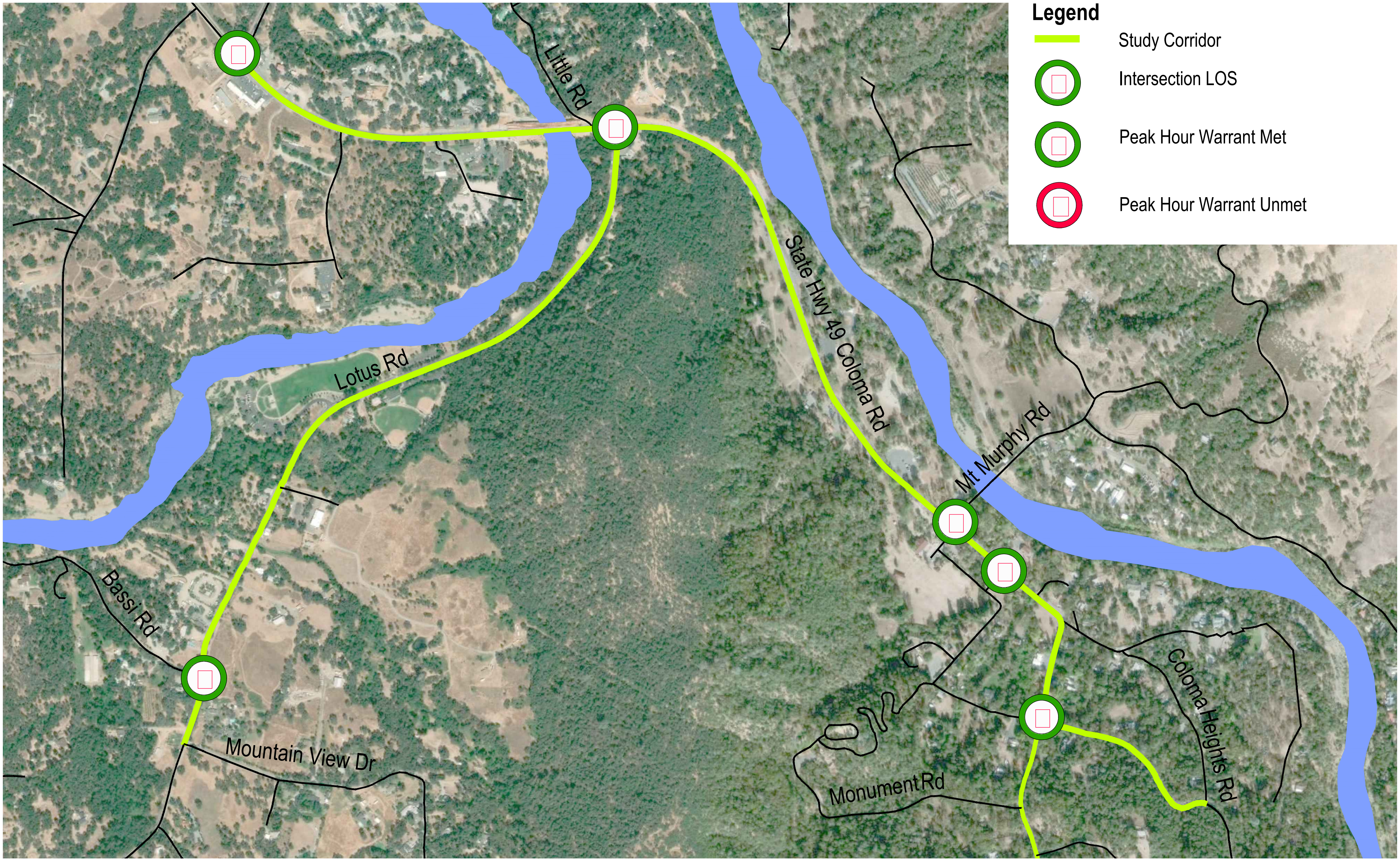
WARRANT ANALYSIS MAP
NOON PEAK HOUR

Project No. 11180327
Report No. 000
Date 11/12/18

FIGURE X.X

Filename: \\10.3.250.25\data\Common\PRJ\2544\T2544\T2544TG001.dwg Plot Date: 12 November 2018 - 11:24 AM

Source:



COLOMA LOTUS Mobility Plan

El Dorado County Transportation Commission
COLOMA LOTUS MOBILITY PLAN

WARRANT ANALYSIS MAP
PM PEAK HOUR

Project No. 11180327
Report No. 000
Date 11/12/18

FIGURE X.X

Filename: \\10.3.250.25\data\Common\PRJ\2544\T2544\T2544TG001.dwg Plot Date: 12 November 2018 - 11:24 AM

Source:

4. Intersection LOS Worksheets

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	28	3	119	235	5
Future Vol, veh/h	16	28	3	119	235	5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	9	5	2
Mvmt Flow	18	31	3	131	258	5
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.8	8.1	9.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	2%	36%	0%
Vol Thru, %	98%	0%	98%
Vol Right, %	0%	64%	2%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	122	44	240
LT Vol	3	16	0
Through Vol	119	0	235
RT Vol	0	28	5
Lane Flow Rate	134	48	264
Geometry Grp	1	1	1
Degree of Util (X)	0.157	0.06	0.305
Departure Headway (Hd)	4.223	4.493	4.159
Convergence, Y/N	Yes	Yes	Yes
Cap	835	802	857
Service Time	2.319	2.493	2.226
HCM Lane V/C Ratio	0.16	0.06	0.308
HCM Control Delay	8.1	7.8	9.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	0.2	1.3

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	11	7	145	180	10
Future Vol, veh/h	5	11	7	145	180	10
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	14	7	10	2
Mvmt Flow	5	12	8	159	198	11
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.5	8.5	8.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	5%	31%	0%
Vol Thru, %	95%	0%	95%
Vol Right, %	0%	69%	5%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	152	16	190
LT Vol	7	5	0
Through Vol	145	0	180
RT Vol	0	11	10
Lane Flow Rate	167	18	209
Geometry Grp	1	1	1
Degree of Util (X)	0.201	0.022	0.243
Departure Headway (Hd)	4.335	4.416	4.194
Convergence, Y/N	Yes	Yes	Yes
Cap	822	815	850
Service Time	2.396	2.416	2.251
HCM Lane V/C Ratio	0.203	0.022	0.246
HCM Control Delay	8.5	7.5	8.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.7	0.1	1

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	14	28	259	142	14
Future Vol, veh/h	14	14	28	259	142	14
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	4	2
Mvmt Flow	15	15	31	285	156	15
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8	9.6	8.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	10%	50%	0%
Vol Thru, %	90%	0%	91%
Vol Right, %	0%	50%	9%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	287	28	156
LT Vol	28	14	0
Through Vol	259	0	142
RT Vol	0	14	14
Lane Flow Rate	315	31	171
Geometry Grp	1	1	1
Degree of Util (X)	0.362	0.041	0.2
Departure Headway (Hd)	4.135	4.781	4.204
Convergence, Y/N	Yes	Yes	Yes
Cap	861	754	840
Service Time	2.204	2.781	2.303
HCM Lane V/C Ratio	0.366	0.041	0.204
HCM Control Delay	9.6	8	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.7	0.1	0.7

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	160	0	0	126	51	0	0	0	176	0	15
Future Vol, veh/h	12	160	0	0	126	51	0	0	0	176	0	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	17	6	2	2	5	8	2	2	2	2	2	7
Mvmt Flow	13	174	0	0	137	55	0	0	0	191	0	16
Number of Lanes	1	1	0	1	1	1	0	0	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	2
HCM Control Delay	10.6	9.6	0	11.6
HCM LOS	B	A	-	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	0%	100%	0%	0%	0%	0%	100%	0%
Vol Thru, %	100%	0%	100%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	12	160	0	126	51	176	15
LT Vol	0	12	0	0	0	0	176	0
Through Vol	0	0	160	0	126	0	0	0
RT Vol	0	0	0	0	0	51	0	15
Lane Flow Rate	0	13	174	0	137	55	191	16
Geometry Grp	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0.023	0.276	0	0.217	0.078	0.325	0.022
Departure Headway (Hd)	6.268	6.396	5.703	5.651	5.702	5.048	6.124	4.918
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	556	624	0	625	702	582	719
Service Time	3.968	4.182	3.488	3.435	3.486	2.831	3.914	2.707
HCM Lane V/C Ratio	0	0.023	0.279	0	0.219	0.078	0.328	0.022
HCM Control Delay	9	9.3	10.7	8.4	10.1	8.3	11.9	7.8
HCM Lane LOS	N	A	B	N	B	A	B	A
HCM 95th-tile Q	0	0.1	1.1	0	0.8	0.3	1.4	0.1

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	115	0	1	125	112	0	0	1	99	0	11
Future Vol, veh/h	4	115	0	1	125	112	0	0	1	99	0	11
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	2	10	2	2	7	5	2	2	2	5	2	2
Mvmt Flow	4	126	0	1	137	123	0	0	1	109	0	12
Number of Lanes	1	1	0	1	1	1	0	0	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	2
HCM Control Delay	9.7	8.8	7.9	10
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	0%	100%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	100%	0%	100%	0%	0%	0%
Vol Right, %	100%	0%	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1	4	115	1	125	112	99	11
LT Vol	0	4	0	1	0	0	99	0
Through Vol	0	0	115	0	125	0	0	0
RT Vol	1	0	0	0	0	112	0	11
Lane Flow Rate	1	4	126	1	137	123	109	12
Geometry Grp	8	8	8	8	8	8	8	8
Degree of Util (X)	0.002	0.007	0.196	0.002	0.203	0.157	0.185	0.016
Departure Headway (Hd)	5.156	5.94	5.574	5.734	5.318	4.58	6.112	4.859
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	688	600	641	623	673	780	585	732
Service Time	2.934	3.697	3.331	3.481	3.064	2.326	3.873	2.62
HCM Lane V/C Ratio	0.001	0.007	0.197	0.002	0.204	0.158	0.186	0.016
HCM Control Delay	7.9	8.7	9.7	8.5	9.4	8.2	10.3	7.7
HCM Lane LOS	A	A	A	A	A	A	B	A
HCM 95th-tile Q	0	0	0.7	0	0.8	0.6	0.7	0

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	126	0	0	166	205	0	0	0	82	0	18
Future Vol, veh/h	24	126	0	0	166	205	0	0	0	82	0	18
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	134	0	0	177	218	0	0	0	87	0	19
Number of Lanes	1	1	0	1	1	1	0	0	1	0	1	1

Approach	EB			WB					NB	SB		
Opposing Approach	WB			EB					SB	NB		
Opposing Lanes	3			2					2	1		
Conflicting Approach Left	SB			NB					EB	WB		
Conflicting Lanes Left	2			1					2	3		
Conflicting Approach Right	NB			SB					WB	EB		
Conflicting Lanes Right	1			2					3	2		
HCM Control Delay	9.8			9.4					0	10		
HCM LOS	A			A					-	A		

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	0%	100%	0%	0%	0%	0%	100%	0%
Vol Thru, %	100%	0%	100%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	24	126	0	166	205	82	18
LT Vol	0	24	0	0	0	0	82	0
Through Vol	0	0	126	0	166	0	0	0
RT Vol	0	0	0	0	0	205	0	18
Lane Flow Rate	0	26	134	0	177	218	87	19
Geometry Grp	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0.043	0.209	0	0.258	0.276	0.156	0.028
Departure Headway (Hd)	6.325	6.123	5.62	5.257	5.257	4.554	6.441	5.233
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	582	634	0	682	785	553	678
Service Time	4.025	3.895	3.391	3.007	3.007	2.303	4.223	3.014
HCM Lane V/C Ratio	0	0.045	0.211	0	0.26	0.278	0.157	0.028
HCM Control Delay	9	9.2	9.9	8	9.8	9	10.4	8.2
HCM Lane LOS	N	A	A	N	A	A	B	A
HCM 95th-tile Q	0	0.1	0.8	0	1	1.1	0.5	0.1

Intersection						
Int Delay, s/veh	3.5					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	143	218	20	63	112	27
Future Vol, veh/h	143	218	20	63	112	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	6	2	3	12	2
Mvmt Flow	166	253	23	73	130	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	419	0	412	293
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	119	-
Critical Hdwy	-	-	4.12	-	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	5.52	-
Critical Hdwy Stg 2	-	-	-	-	5.52	-
Follow-up Hdwy	-	-	2.218	-	3.608	3.318
Pot Cap-1 Maneuver	-	-	1140	-	578	746
Stage 1	-	-	-	-	735	-
Stage 2	-	-	-	-	882	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1140	-	566	746
Mov Cap-2 Maneuver	-	-	-	-	566	-
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	882	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	13.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	594	-	-	1140	-
HCM Lane V/C Ratio	0.272	-	-	0.02	-
HCM Control Delay (s)	13.3	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	3.9					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	90	162	26	117	136	14
Future Vol, veh/h	90	162	26	117	136	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	6	9	2	4	7	2
Mvmt Flow	97	174	28	126	146	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	271	0	366	184
Stage 1	-	-	-	-	184	-
Stage 2	-	-	-	-	182	-
Critical Hdwy	-	-	4.12	-	6.47	6.22
Critical Hdwy Stg 1	-	-	-	-	5.47	-
Critical Hdwy Stg 2	-	-	-	-	5.47	-
Follow-up Hdwy	-	-	2.218	-	3.563	3.318
Pot Cap-1 Maneuver	-	-	1292	-	624	858
Stage 1	-	-	-	-	836	-
Stage 2	-	-	-	-	837	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1292	-	610	858
Mov Cap-2 Maneuver	-	-	-	-	610	-
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	837	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	627	-	-	1292	-
HCM Lane V/C Ratio	0.257	-	-	0.022	-
HCM Control Delay (s)	12.7	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

Intersection						
Int Delay, s/veh	5.8					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	101	137	35	156	212	25
Future Vol, veh/h	101	137	35	156	212	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	3	2	2	2	2
Mvmt Flow	106	144	37	164	223	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	250	0	416	178
Stage 1	-	-	-	-	178	-
Stage 2	-	-	-	-	238	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1316	-	593	865
Stage 1	-	-	-	-	853	-
Stage 2	-	-	-	-	802	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1316	-	575	865
Mov Cap-2 Maneuver	-	-	-	-	575	-
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	802	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	15.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	596	-	-	1316	-
HCM Lane V/C Ratio	0.419	-	-	0.028	-
HCM Control Delay (s)	15.3	-	-	7.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	8	0	12	2	97	4	17	159	5
Future Vol, veh/h	0	0	0	8	0	12	2	97	4	17	159	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	12	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	9	0	14	2	113	5	20	185	6

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	348	351	116	191	0	0	118	0	0
Stage 1	120	120	-	-	-	-	-	-	-
Stage 2	228	231	-	-	-	-	-	-	-
Critical Hdwy	6.52	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	629	573	936	1383	-	-	1470	-	-
Stage 1	881	796	-	-	-	-	-	-	-
Stage 2	787	713	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	618	0	936	1383	-	-	1470	-	-
Mov Cap-2 Maneuver	618	0	-	-	-	-	-	-	-
Stage 1	866	0	-	-	-	-	-	-	-
Stage 2	787	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0.1	0.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1383	-	-	776	1470	-	-
HCM Lane V/C Ratio	0.002	-	-	0.03	0.013	-	-
HCM Control Delay (s)	7.6	0	-	9.8	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	7	3	15	6	103	10	5	112	13
Future Vol, veh/h	0	0	0	7	3	15	6	103	10	5	112	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	8	3	17	7	120	12	6	130	15

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	290	297	126	145	0	0	132	0	0
Stage 1	140	140	-	-	-	-	-	-	-
Stage 2	150	157	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	701	615	924	1437	-	-	1453	-	-
Stage 1	887	781	-	-	-	-	-	-	-
Stage 2	878	768	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	694	0	924	1437	-	-	1453	-	-
Mov Cap-2 Maneuver	694	0	-	-	-	-	-	-	-
Stage 1	878	0	-	-	-	-	-	-	-
Stage 2	878	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0.4	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1437	-	-	836	1453	-	-
HCM Lane V/C Ratio	0.005	-	-	0.035	0.004	-	-
HCM Control Delay (s)	7.5	0	-	9.5	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	4	0	15	1	168	16	9	108	1
Future Vol, veh/h	0	0	0	4	0	15	1	168	16	9	108	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	86	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	100
Mvmt Flow	0	0	0	5	0	17	1	191	18	10	123	1

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	346	346	200	124	0	0	209	0	0
Stage 1	202	202	-	-	-	-	-	-	-
Stage 2	144	144	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	5.42	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.42	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	651	577	841	1463	-	-	1362	-	-
Stage 1	832	734	-	-	-	-	-	-	-
Stage 2	883	778	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	645	0	841	1463	-	-	1362	-	-
Mov Cap-2 Maneuver	645	0	-	-	-	-	-	-	-
Stage 1	825	0	-	-	-	-	-	-	-
Stage 2	883	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1463	-	-	790	1362	-	-
HCM Lane V/C Ratio	0.001	-	-	0.027	0.008	-	-
HCM Control Delay (s)	7.5	0	-	9.7	7.7	0	-
HCM Lane LOS	A	A	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	3	1	0	2	0	0	94	1	0	158	1
Future Vol, veh/h	3	3	1	0	2	0	0	94	1	0	158	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	4	1	0	3	0	0	119	1	0	200	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	322	321	201	-	321	120	201	0	0	120	0	0
Stage 1	201	201	-	-	120	-	-	-	-	-	-	-
Stage 2	121	120	-	-	201	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	-	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	-	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	-	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	631	596	840	0	596	931	1371	-	-	1468	-	-
Stage 1	801	735	-	0	796	-	-	-	-	-	-	-
Stage 2	883	796	-	0	735	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	629	596	840	-	596	931	1371	-	-	1468	-	-
Mov Cap-2 Maneuver	629	596	-	-	596	-	-	-	-	-	-	-
Stage 1	801	735	-	-	796	-	-	-	-	-	-	-
Stage 2	880	796	-	-	735	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	11.1	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1371	-	-	637	596	1468	-	-
HCM Lane V/C Ratio	-	-	-	0.014	0.004	-	-	-
HCM Control Delay (s)	0	-	-	10.7	11.1	0	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	1	5	0	1	1	2	137	0	3	94	1
Future Vol, veh/h	9	1	5	0	1	1	2	137	0	3	94	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	100	2	5	2	2	4	2
Mvmt Flow	10	1	6	0	1	1	2	157	0	3	108	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	277	276	109	-	276	157	109	0	0	157	0	0
Stage 1	115	115	-	-	161	-	-	-	-	-	-	-
Stage 2	162	161	-	-	115	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	-	6.52	7.2	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	-	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	-	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	4.018	4.2	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	675	632	945	0	632	685	1481	-	-	1423	-	-
Stage 1	890	800	-	0	765	-	-	-	-	-	-	-
Stage 2	840	765	-	0	800	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	672	630	945	-	630	685	1481	-	-	1423	-	-
Mov Cap-2 Maneuver	672	630	-	-	630	-	-	-	-	-	-	-
Stage 1	889	798	-	-	764	-	-	-	-	-	-	-
Stage 2	836	764	-	-	798	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	10.5	0.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1481	-	-	740	656	1423	-	-
HCM Lane V/C Ratio	0.002	-	-	0.023	0.004	0.002	-	-
HCM Control Delay (s)	7.4	0	-	10	10.5	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	10	0	0	2	0	172	0	0	119	4
Future Vol, veh/h	8	0	10	0	0	2	0	172	0	0	119	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	12	0	0	2	0	207	0	0	143	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	354	353	146	-	355	207	148	0	0	207	0	0
Stage 1	146	146	-	-	207	-	-	-	-	-	-	-
Stage 2	208	207	-	-	148	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	-	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	-	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	-	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	-	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	601	572	901	0	571	833	1434	-	-	1364	-	-
Stage 1	857	776	-	0	731	-	-	-	-	-	-	-
Stage 2	794	731	-	0	775	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	599	572	901	-	571	833	1434	-	-	1364	-	-
Mov Cap-2 Maneuver	599	572	-	-	571	-	-	-	-	-	-	-
Stage 1	857	776	-	-	731	-	-	-	-	-	-	-
Stage 2	792	731	-	-	775	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	9.3	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1434	-	-	736	833	1364	-	-
HCM Lane V/C Ratio	-	-	-	0.029	0.003	-	-	-
HCM Control Delay (s)	0	-	-	10	9.3	0	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:55	6:55	6:55	6:55	6:55	6:55
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4
Vehs Entered	2009	2128	2058	2018	2068	2055
Vehs Exited	2003	2120	2055	2032	2067	2058
Starting Vehs	21	19	20	23	19	16
Ending Vehs	27	27	23	9	20	16
Travel Distance (mi)	462	490	476	466	475	474
Travel Time (hr)	19.3	20.4	19.9	19.5	20.0	19.8
Total Delay (hr)	3.4	3.6	3.7	3.6	3.8	3.6
Total Stops	1155	1200	1188	1117	1224	1177
Fuel Used (gal)	17.0	18.2	17.7	17.4	18.0	17.7

Interval #0 Information Seeding

Start Time	6:55
End Time	7:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	7:15
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	483	521	480	479	488	490
Vehs Exited	486	514	483	480	484	488
Starting Vehs	21	19	20	23	19	16
Ending Vehs	18	26	17	22	23	18
Travel Distance (mi)	112	119	111	109	112	113
Travel Time (hr)	4.7	5.0	4.7	4.6	4.7	4.7
Total Delay (hr)	0.8	0.9	0.9	0.9	0.9	0.9
Total Stops	285	280	286	278	287	283
Fuel Used (gal)	4.1	4.4	4.1	4.2	4.2	4.2

Interval #2 Information Recording

Start Time	7:15
End Time	7:30
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	495	466	497	444	502	479
Vehs Exited	498	482	488	447	507	483
Starting Vehs	18	26	17	22	23	18
Ending Vehs	15	10	26	19	18	15
Travel Distance (mi)	113	109	115	103	115	111
Travel Time (hr)	4.7	4.6	4.8	4.3	4.9	4.7
Total Delay (hr)	0.8	0.8	0.9	0.8	1.0	0.9
Total Stops	280	276	295	256	305	281
Fuel Used (gal)	4.1	4.1	4.3	3.8	4.4	4.1

Interval #3 Information Recording

Start Time	7:30
End Time	7:45
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	552	592	588	593	573	580
Vehs Exited	538	577	595	580	568	571
Starting Vehs	15	10	26	19	18	15
Ending Vehs	29	25	19	32	23	23
Travel Distance (mi)	126	133	136	135	131	132
Travel Time (hr)	5.3	5.5	5.8	5.6	5.5	5.5
Total Delay (hr)	0.9	1.0	1.1	1.0	1.1	1.0
Total Stops	305	311	326	300	327	313
Fuel Used (gal)	4.7	5.0	5.1	5.0	5.0	4.9

Interval #4 Information Recording

Start Time	7:45
End Time	8:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	479	549	493	502	505	507
Vehs Exited	481	547	489	525	508	510
Starting Vehs	29	25	19	32	23	23
Ending Vehs	27	27	23	9	20	16
Travel Distance (mi)	111	128	114	119	117	118
Travel Time (hr)	4.6	5.4	4.7	5.0	4.9	4.9
Total Delay (hr)	0.8	1.0	0.8	0.9	0.9	0.9
Total Stops	285	333	281	283	305	297
Fuel Used (gal)	4.1	4.8	4.2	4.4	4.4	4.4

6: SR 153 & Chruch St & SR 49 Performance by movement

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Total Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.4	0.1	3.1	5.0	1.8	0.1	0.1	1.3
Total Stops	0	0	1	56	1	0	0	58

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	12:55	12:55	12:55	12:55	12:55	12:55
End Time	2:00	2:00	2:00	2:00	2:00	2:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4
Vehs Entered	1874	2003	1964	1877	1878	1920
Vehs Exited	1875	1997	1955	1876	1881	1917
Starting Vehs	18	19	14	18	21	14
Ending Vehs	17	25	23	19	18	23
Travel Distance (mi)	429	457	450	429	428	439
Travel Time (hr)	17.9	19.0	18.7	17.7	17.8	18.2
Total Delay (hr)	3.1	3.4	3.3	3.0	3.1	3.2
Total Stops	1092	1145	1146	1046	1086	1104
Fuel Used (gal)	16.0	17.0	16.7	15.7	15.8	16.2

Interval #0 Information Seeding

Start Time	12:55
End Time	1:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	1:00
End Time	1:15
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	456	485	466	464	420	455
Vehs Exited	459	489	460	464	423	458
Starting Vehs	18	19	14	18	21	14
Ending Vehs	15	15	20	18	18	14
Travel Distance (mi)	106	112	105	106	96	105
Travel Time (hr)	4.4	4.6	4.3	4.4	4.0	4.3
Total Delay (hr)	0.8	0.8	0.8	0.7	0.7	0.8
Total Stops	277	290	283	249	256	268
Fuel Used (gal)	3.9	4.2	3.9	3.9	3.5	3.9

Interval #2 Information Recording

Start Time	1:15
End Time	1:30
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	475	490	484	440	472	473
Vehs Exited	467	489	486	441	474	472
Starting Vehs	15	15	20	18	18	14
Ending Vehs	23	16	18	17	16	16
Travel Distance (mi)	108	110	112	99	108	107
Travel Time (hr)	4.5	4.6	4.6	4.1	4.5	4.5
Total Delay (hr)	0.8	0.9	0.8	0.7	0.8	0.8
Total Stops	255	290	271	254	273	269
Fuel Used (gal)	3.9	4.2	4.1	3.7	4.0	4.0

Interval #3 Information Recording

Start Time	1:30
End Time	1:45
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	473	535	544	504	533	515
Vehs Exited	482	524	545	498	533	516
Starting Vehs	23	16	18	17	16	16
Ending Vehs	14	27	17	23	16	18
Travel Distance (mi)	110	123	126	115	121	119
Travel Time (hr)	4.6	5.1	5.3	4.7	5.0	4.9
Total Delay (hr)	0.8	0.8	1.0	0.8	0.9	0.9
Total Stops	287	296	316	275	301	292
Fuel Used (gal)	4.2	4.5	4.8	4.2	4.5	4.4

Interval #4 Information Recording

Start Time	1:45
End Time	2:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	470	493	470	469	453	470
Vehs Exited	467	495	464	473	451	470
Starting Vehs	14	27	17	23	16	18
Ending Vehs	17	25	23	19	18	23
Travel Distance (mi)	106	113	106	109	103	107
Travel Time (hr)	4.4	4.7	4.4	4.5	4.3	4.5
Total Delay (hr)	0.8	0.8	0.8	0.8	0.7	0.8
Total Stops	273	269	276	268	256	268
Fuel Used (gal)	4.0	4.1	4.0	3.9	3.8	4.0

6: SR 153 & Chruch St & SR 49 Performance by movement

Movement	EBR	WBR	NBL	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	2.6	0.2	3.8	5.5	3.1	0.1	0.1	1.9
Total Stops	3	0	3	74	4	0	0	84

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:55	3:55	3:55	3:55	3:55	3:55
End Time	5:00	5:00	5:00	5:00	5:00	5:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	5	5	5	5	5	5
# of Recorded Intervals	4	4	4	4	4	4
Vehs Entered	2425	2332	2415	2397	2380	2389
Vehs Exited	2412	2334	2418	2409	2382	2389
Starting Vehs	25	21	23	36	27	24
Ending Vehs	38	19	20	24	25	23
Travel Distance (mi)	562	541	555	560	551	554
Travel Time (hr)	23.9	22.8	23.5	23.6	23.4	23.4
Total Delay (hr)	4.6	4.3	4.4	4.5	4.5	4.5
Total Stops	1517	1432	1494	1486	1469	1479
Fuel Used (gal)	21.1	20.2	20.7	21.1	20.7	20.8

Interval #0 Information Seeding

Start Time	3:55
End Time	4:00
Total Time (min)	5

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	4:00
End Time	4:15
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	560	592	606	587	530	576
Vehs Exited	570	595	605	594	530	578
Starting Vehs	25	21	23	36	27	24
Ending Vehs	15	18	24	29	27	20
Travel Distance (mi)	130	136	142	140	123	134
Travel Time (hr)	5.5	5.8	6.0	5.9	5.2	5.7
Total Delay (hr)	1.0	1.1	1.2	1.1	1.0	1.1
Total Stops	349	375	370	363	339	360
Fuel Used (gal)	4.9	5.3	5.3	5.2	4.6	5.1

Interval #2 Information Recording

Start Time	4:15
End Time	4:30
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	591	584	573	546	613	582
Vehs Exited	586	580	578	540	615	578
Starting Vehs	15	18	24	29	27	20
Ending Vehs	20	22	19	35	25	21
Travel Distance (mi)	139	136	134	125	142	135
Travel Time (hr)	5.9	5.7	5.6	5.2	6.1	5.7
Total Delay (hr)	1.1	1.1	1.0	1.0	1.2	1.1
Total Stops	369	358	362	344	381	362
Fuel Used (gal)	5.2	5.0	4.9	4.6	5.3	5.0

Interval #3 Information RecordinRecordin

Start Time	4:30
End Time	4:45
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	667	598	652	620	659	640
Vehs Exited	661	596	656	637	656	644
Starting Vehs	20	22	19	35	25	21
Ending Vehs	26	24	15	18	28	21
Travel Distance (mi)	153	138	148	146	152	147
Travel Time (hr)	6.6	5.8	6.3	6.2	6.5	6.3
Total Delay (hr)	1.3	1.0	1.2	1.2	1.2	1.2
Total Stops	410	362	404	383	382	388
Fuel Used (gal)	5.8	5.0	5.6	5.6	5.7	5.5

Interval #4 Information Recording

Start Time	4:45
End Time	5:00
Total Time (min)	15

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	607	558	584	644	578	590
Vehs Exited	595	563	579	638	581	591
Starting Vehs	26	24	15	18	28	21
Ending Vehs	38	19	20	24	25	23
Travel Distance (mi)	140	131	132	149	134	137
Travel Time (hr)	6.0	5.5	5.6	6.3	5.7	5.8
Total Delay (hr)	1.2	1.0	1.0	1.2	1.1	1.1
Total Stops	389	337	358	396	367	368
Fuel Used (gal)	5.2	4.9	4.9	5.7	5.0	5.2

6: SR 153 & Chruch St & SR 49 Performance by movement

Movement	EBR	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2
Total Delay (hr)	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2
Total Del/Veh (s)	3.7	0.9	0.2	5.8	4.2	0.1	0.1	2.2
Total Stops	2	0	0	105	4	0	0	111