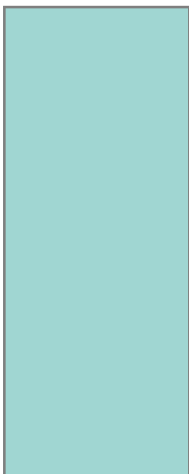


San Andreas SR 49 Commercial Gateway & Corridor Study

Final Report | October 2017



In Association with:
De Novo Planning Group
New Economics & Advisory



CALAVERAS COUNCIL
of GOVERNMENTS



San Andreas SR 49 Commercial Gateway and Corridor Study
Final Report

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Calaveras Council of Governments

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Executive Summary

Executive Summary

The San Andreas community is located on State Route (SR) 49 in Calaveras County. With approximately 240 acres of vacant land along SR 49 in southern San Andreas, and developer and community interest in residential and commercial projects, local planning agencies recognized the need for a comprehensive circulation plan for this potential growth area. Southern San Andreas (south of Mountain Ranch Road) currently lacks a significant roadway network and remains geographically and systematically detached from the greater San Andreas community. This study identifies opportunities to establish a new "Southern Gateway" into San Andreas to address community connectivity and circulation issues in the context of this development potential.

With the pursuit of a Southern Gateway, members of the community and participating agencies identified the need to balance existing community needs with development and revitalization in the potential growth area. Therefore, this study was expanded to address existing mobility and safety concerns along SR 49 through San Andreas, known locally as Saint Charles Street from approximately SR 12 to Mountain Ranch Road. Therefore, the *State Route 49 Commercial Gateway and Corridor Study* aims to understand the existing issues and challenges facing the San Andreas community, and to provide implementable recommendations for transportation improvements within the context of development potential in southern San Andreas. This Executive Summary summarizes the recommendations contained in the body of this report.

Project Goals

Project goals are listed as follows:

- **Goal: Southern Gateway Access and Circulation**

Identify opportunities for a new Southern Gateway into San Andreas and recommend improvements for enhanced access and circulation, and to set the stage for residential and commercial development, in southern San Andreas.

- **Goal: Corridor Multi-modal Planning**

Implement Main Street and Complete Street concepts into planning recommendations for the Saint Charles Street (SR 49) Corridor. Prioritize multi-modal travel to encourage and enhance pedestrian and bicycle travel.

- **Goal: Balance Competing Highway User Needs**

Maintain operational and capacity requirements of a State highway system while addressing existing community mobility concerns and future needs.

Short and Long-Term Recommendations

Short-Term and long-term recommended improvements are identified in the following section. Short-term recommendations include improvements that are needed under existing conditions and should be pursued within 20 years. Long-term recommendations include improvements that will be needed under future growth scenario conditions and are dependent on development (20 or more years). Recommendation concept maps, cost estimates, and implementation strategies are provided in the body of this report. The recommendations reflect the preliminary design preferences for transportation improvements, and will require further study prior to implementation.

Saint Charles Street (SR 49) Corridor

Saint Charles Street (SR 49) Corridor: Segment 1 (SR 12 to Gold Oak Road)

Recommended short-term improvements along Segment 1 include the following:

- Construct a single-lane Roundabout at SR 49/Pool Station Road to Surface Transportation Assistance Act (STAA) standards
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior to any intersection improvements on the State highway.*
- Complete sidewalk infrastructure, and construct Class II bike lanes
- Enhance Northern Gateway signage

Saint Charles Street (SR 49) Corridor: Segment 2 (Gold Oak Road to Court Street)

Recommended short-term improvements along Segment 2 include the following:

- Construct a Signal at SR 49/High School Street with a school pedestrian crossing
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior to any intersection improvements on the State highway.*
- Construct bulb-outs at the northbound approach of SR 49 at Russell Road
- Complete sidewalk infrastructure and construct Class II bike lanes
- Enhance Calaveras High School signage
- Reconfigure SR 49/Bellview Street intersection (**See Figure 14*)

Saint Charles Street (SR 49) Corridor: Segment 3 (Court Street to Treat Avenue)

Recommended short-term improvements along Segment 3 include the following:

- Signalize SR 49/Court Street/Adams Avenue
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior to any intersection improvements on the State highway.*
- Adams Avenue and Church Hill Road Circulation Improvements (**See Figure 15*).
- Construct pedestrian crossing with refuge and bulb-outs at the northbound approach of Main Street/Church Hill Road on SR 49
- Install minor gateway signage, in the form of flags, banners, and/or archways, to identify the Historic Main Street
- Construct bulb-outs at the southern approach of California Street on SR 49
- Complete sidewalk infrastructure and construct Class II bike lanes

Saint Charles Street (SR 49) Corridor: Segment 4 (Treat Avenue to Mountain Ranch Road)

Recommended improvements along Segment 4 include the following:

Short-Term Recommendations

- Construct a pedestrian crossing and bulb-outs on SR 49 at Treat Avenue
- Signalize SR 49/Mountain Ranch Road; reconfigure access to commercial business parking lot (**See Figure 16*)
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior any intersection improvements on the State highway.*

- Complete sidewalk infrastructure and construct Class II bike lanes

Long-Term Recommendations

- Signalize SR 49/Treat Avenue.
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior any intersection improvements on the State highway.*

Southern Gateway Plan Area

SR 49 (Mountain Ranch Road to Buckskin Way)

Recommended improvements in the Southern Gateway Plan Area include the following:

Short-Term Recommendations

- Construct a single-lane Roundabout at SR 49/Airport Road to STAA standards
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior any intersection improvements on the State highway.*
- Realign Angels Road to SR 49/Airport Road intersection (**See Figures 16A and 16B*)
- Install Southern Gateway, in the form of a monument or sign
- Complete sidewalk infrastructure and construct Class II bike lanes, south of Mountain Ranch Road to Airport Road
- Maintain existing passing lane in the southbound direction south of Airport Road

Long-Term Recommendations

- Extend existing Airport Road to Mountain Ranch Road
- Connect Airport Road west of SR 49 to George Reed Drive
- Southern Gateway Plan Area Long-Term Circulation Improvements (**See Figure 18*)

Mountain Ranch Road

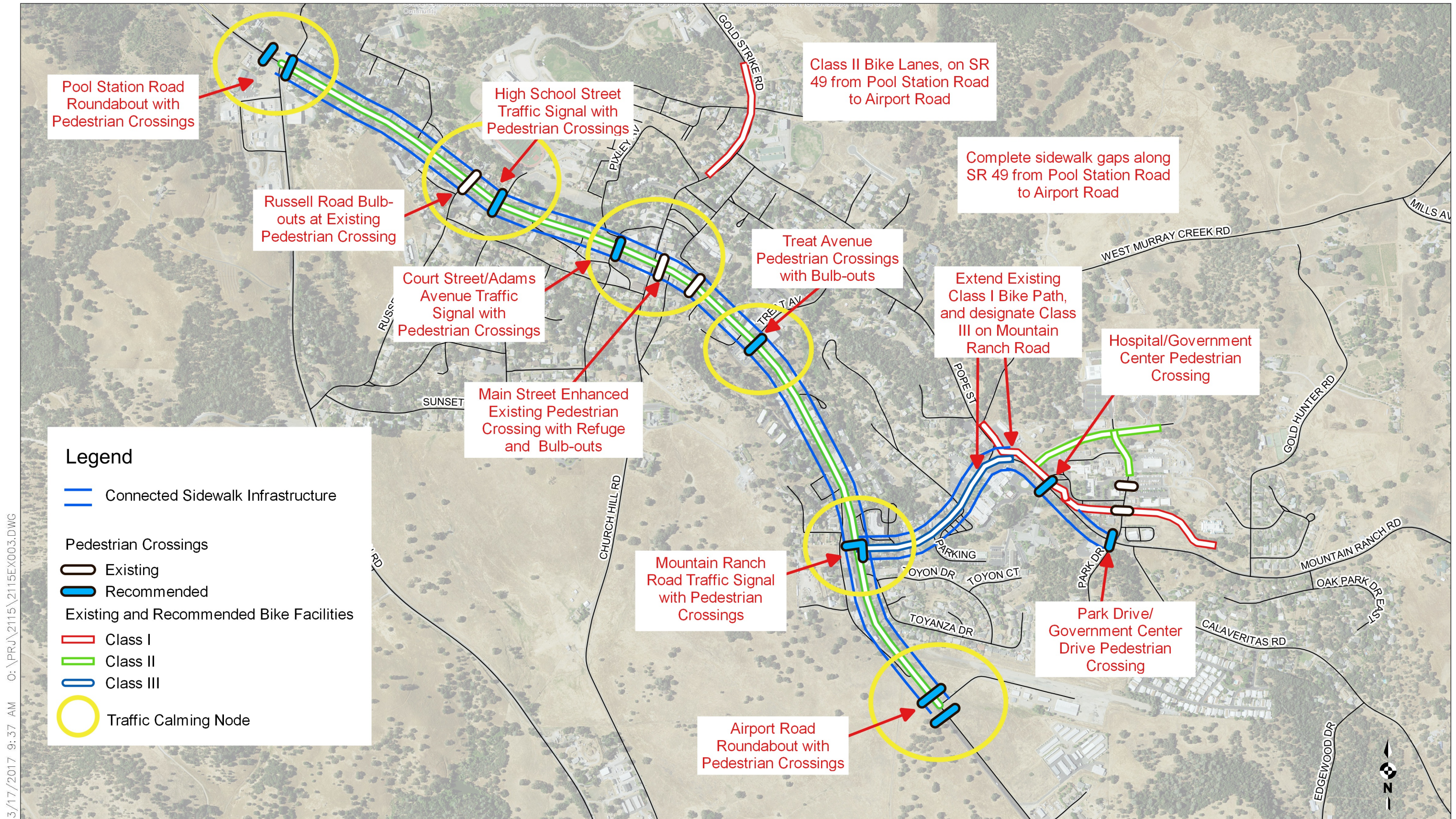
Mountain Ranch Road (SR 49 to Calaveritas Road)

Recommended short-term improvements along Mountain Ranch Road include the following:

- Complete sidewalk infrastructure according to existing County plans
- Designate Class III bike routes on Mountain Ranch Road according to existing County plans
- Construct pedestrian crossings from the hospital to the Government Center
- Extend existing Class I bike path west of Government Center Drive to Pope Street, beyond Pope Street to the DMV, and along Pope Street to Lewis Avenue.
- Enhance bicycle and pedestrian connectivity near the hospital and the Government Center transit stop (**See Figure 19B*)

The recommended short-term multimodal improvements as described above are presented in Figure ES-1 and the recommended short-term intersection improvements as described above are presented in Figure ES-2. The long-term recommended improvements as described above for the Southern Gateway Plan Area is presented in Figure ES-3.

Multimodal Improvements



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SHORT TERM IMPROVEMENTS

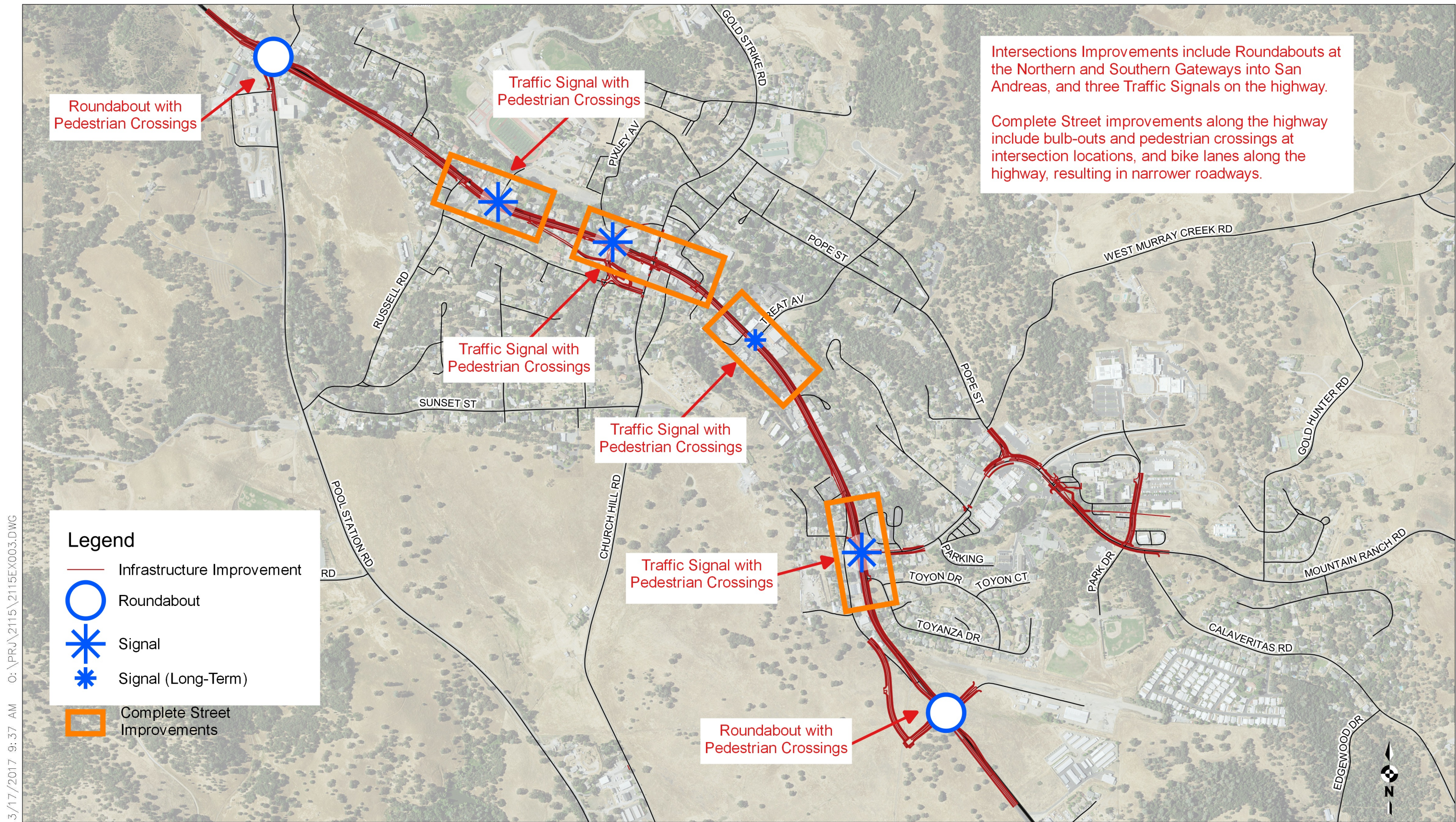
San Andreas SR 49 Commercial Gateway & Corridor Study

Figure ES-1



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Intersection Improvements



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SHORT TERM IMPROVEMENTS

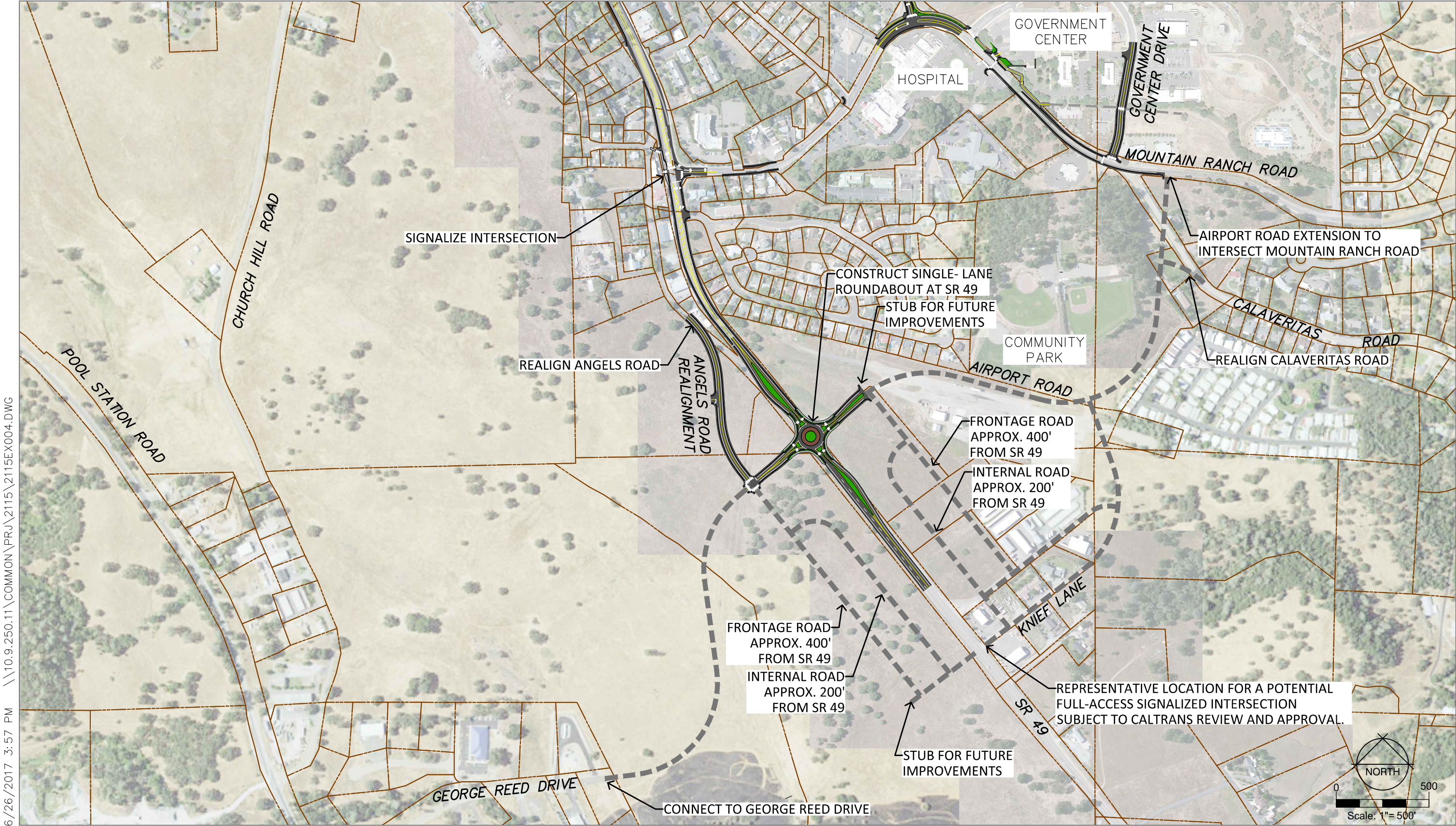
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Figure ES-2



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Southern Gateway Circulation Plan



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LONG-TERM IMPROVEMENTS

Figure ES-3



San Andreas SR 49 Commercial Gateway and Corridor Study - San Andreas, CA

1. Introduction

1. Introduction

The Calaveras Council of Governments (CCOG), in partnership with the County of Calaveras, has retained Omni-Means to complete the *San Andreas State Route 49 Commercial Gateway and Corridor Study*. This project is funded, in part, by a Caltrans administered FHWA Strategic Partnership Transportation Planning Grant - CDA No. 20.505.

1.1 Project Purpose

With approximately 240 acres of vacant land along State Route (SR) 49 in southern San Andreas, and developer and community interest in residential and commercial projects, local planning agencies recognized the need for a comprehensive circulation plan for this potential growth area. Southern San Andreas (south of Mountain Ranch Road) currently lacks a significant roadway network and remains geographically and systematically detached from the greater San Andreas community. This study identifies opportunities to establish a new "Southern Gateway" into San Andreas to address community connectivity and circulation issues in the context of this development potential.

With the pursuit of a Southern Gateway, members of the community and participating agencies identified the need to balance existing community needs with development and revitalization in the potential growth area. Therefore, this study was expanded to address existing mobility and safety concerns along SR 49 through San Andreas, known locally as Saint Charles Street, from approximately SR 12 to Mountain Ranch Road.

1.2 Project Background

In 2013, Caltrans published *Main Street, California - A Guide for Improving Community and Transportation Vitality*, to address planning and design challenges for State highway corridors that also serve as community "main streets". The goal of that effort was to ensure that State highway main streets adequately "accommodate the circulation of the local community as well as regional and statewide travel demands [in a way that] makes main streets an asset to the local community" through the incorporation of "complete street" and active transportation concepts into planning studies and transportation improvements.

Situated along the north-south alignment of SR 49 in Calaveras County, the community of San Andreas accommodates both local circulation and regional and statewide travel demands, yet it lacks the facilities necessary to provide safe and accessible travel for all users. While the Saint Charles Street (SR 49) corridor serves as the community's main street of San Andreas, excessive speeds, high vehicle and heavy truck volumes, and disconnected pedestrian infrastructure on the State highway pose challenges to the mobility and safety of the community. Additionally, while development and revitalization would provide numerous benefits, the corresponding growth over the next 20 years would exacerbate existing capacity and safety issues and add additional transportation impacts.

1.3 Project Approach

This study will identify and compare transportation and land use planning strategies that will need to balance the community's circulation needs with development and revitalization opportunities the Southern Gateway Plan Area. Additionally, transportation and land use planning within this growth area will also need to strategically align with mobility and livability goals along Saint Charles Street (SR 49) to ensure a cohesive and interconnected circulation

network throughout town.

This report provides an actionable circulation plan based on viable implementation strategies and supported by all partner agencies. Broad-based community and agency support for the projects identified in this study are the key distinguishing elements that ensure projects can become successfully funded and constructed.

1.4 Project Goals

Initial meetings highlighted project specific goals of this Study, identified as follows:

- **Goal: Southern Gateway Access & Circulation**

Identify opportunities for a new Southern Gateway into San Andreas and recommend improvements for enhanced access and circulation to set the stage for residential and commercial development, in southern San Andreas.

The community was supportive of the above listed goal; however, additional emphasis was placed on the importance of addressing the needs of the existing community, and maintaining the rural character of the community. To address community and agency priorities, the project goals were expanded to include the following:

- **Goal: Corridor Multi-modal Planning**

Implement Main Street and Complete Street concepts into planning recommendations for the Saint Charles Street (SR 49) Corridor. Prioritize multi-modal travel to encourage and enhance pedestrian and bicycle travel.

- **Goal: Balance Competing Highway User Needs**

Maintain operational and capacity requirements of a State highway system while addressing existing community mobility concerns and future needs.

Key Concepts

The following key concepts serve as defining features of the transportation improvement recommendations for the community of San Andreas:

- Community Gateways
- Intersection Control and Highway Access
- Multi-modal Infrastructure
- Speed Reduction Infrastructure

1.5 Organization

The Report provides a framework for addressing existing and future impacts within the context of a new Southern Gateway into San Andreas and is organized into the following sections:

1. Introduction

2. Background Conditions

This section presents the following:

1. Project Setting
2. Regulatory and Planning Framework
3. Demographics and Commute Trends
4. Local Roadway Network
5. Multi-modal Facilities
6. Collision Summary
7. Existing Traffic Operations

3. Existing Land Use and Future Growth

This section presents existing land uses, and future growth scenarios for vacant and underutilized land within the Southern Gateway Plan Area in southern San Andreas. Future (20 year) traffic forecasts correspond to varying levels of development within San Andreas.

4. Community Outreach

This section describes the community outreach and summarizes community input gathered over the course of this study to highlight community priorities for transportation improvements.

5. Corridor Issues and Concerns

This section highlights concerns and opportunities identified by the community and confirmed through traffic analysis conducted by Omni-Means, for the study segments.

6. Recommended Improvements

This section presents the recommended improvements for the study segments.

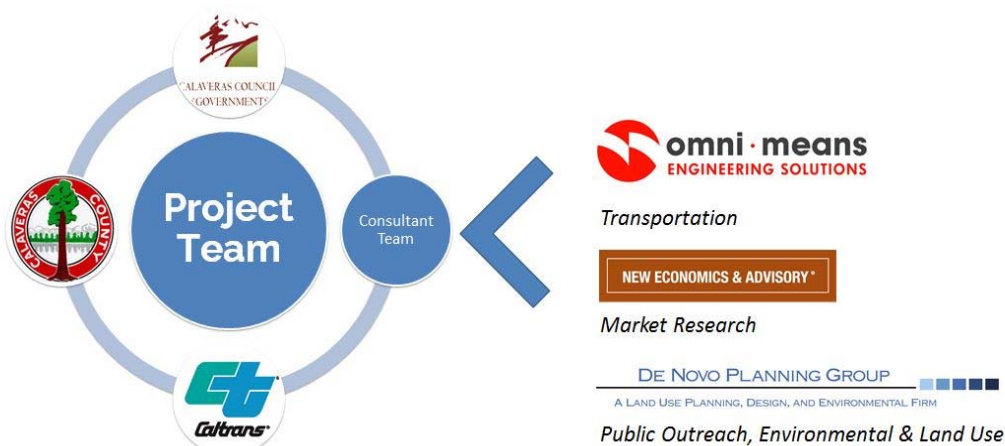
7. Implementation

This section presents project priorities, costs, and funding options for transportation improvement recommendations.

1.6 Project Process

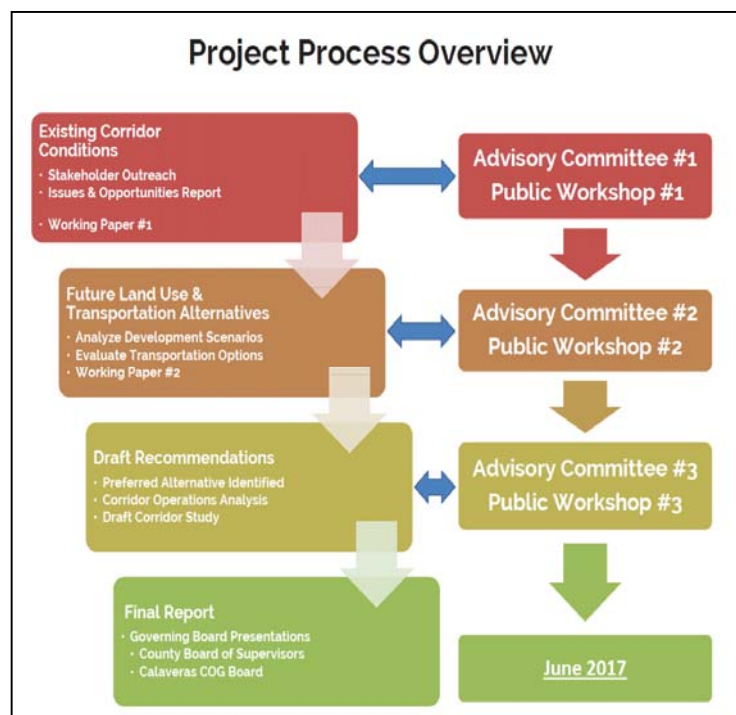
This Study represents a partnership opportunity between Calaveras County, CCOG, and Caltrans, who, along with a team of consultants lead by Omni-Means, comprise the Project Team. The consultants provided expertise on the areas of transportation, market conditions, and environmental and land use factors affecting the study areas. The Project Team leveraged community input in the form of an established Advisory Committee made up of local community officials and leaders, and invited public review and comment.

San Andreas SR 49 Commercial Gateway Corridor Study - Project Team



Project Schedule

The *Background Conditions* report was published in 2016, and summarized the existing corridor conditions. Findings in the *Background Conditions* report were presented at public workshops and advisory committee meetings. Upon project team consensus and incorporating public input, this Study consolidates the Background Conditions, provides a detailed review of alternative growth scenarios, and sets forth transportation improvement recommendations for the San Andreas community. After project team and public review of the recommendations contained in this study, the County Board of Supervisors will determine its adoption status. The project schedule remains as follows:



1.7 Study Area

This study is comprised of both a land use and circulation study area, as shown on Figure 1A.

Land Use Study Area

With approximately 240 acres of vacant land along SR 49 in southern San Andreas, and developer and community interest in residential and commercial projects, a land use study area was identified to analyze potential growth within southern San Andreas. Due to its geographical location and its potential for creating a southern gateway into San Andreas, the land use study area is referred to as the Southern Gateway Plan Area, and covers approximately 403 acres east/west of SR 49, south of Mountain Ranch Road to Buckskin Way.

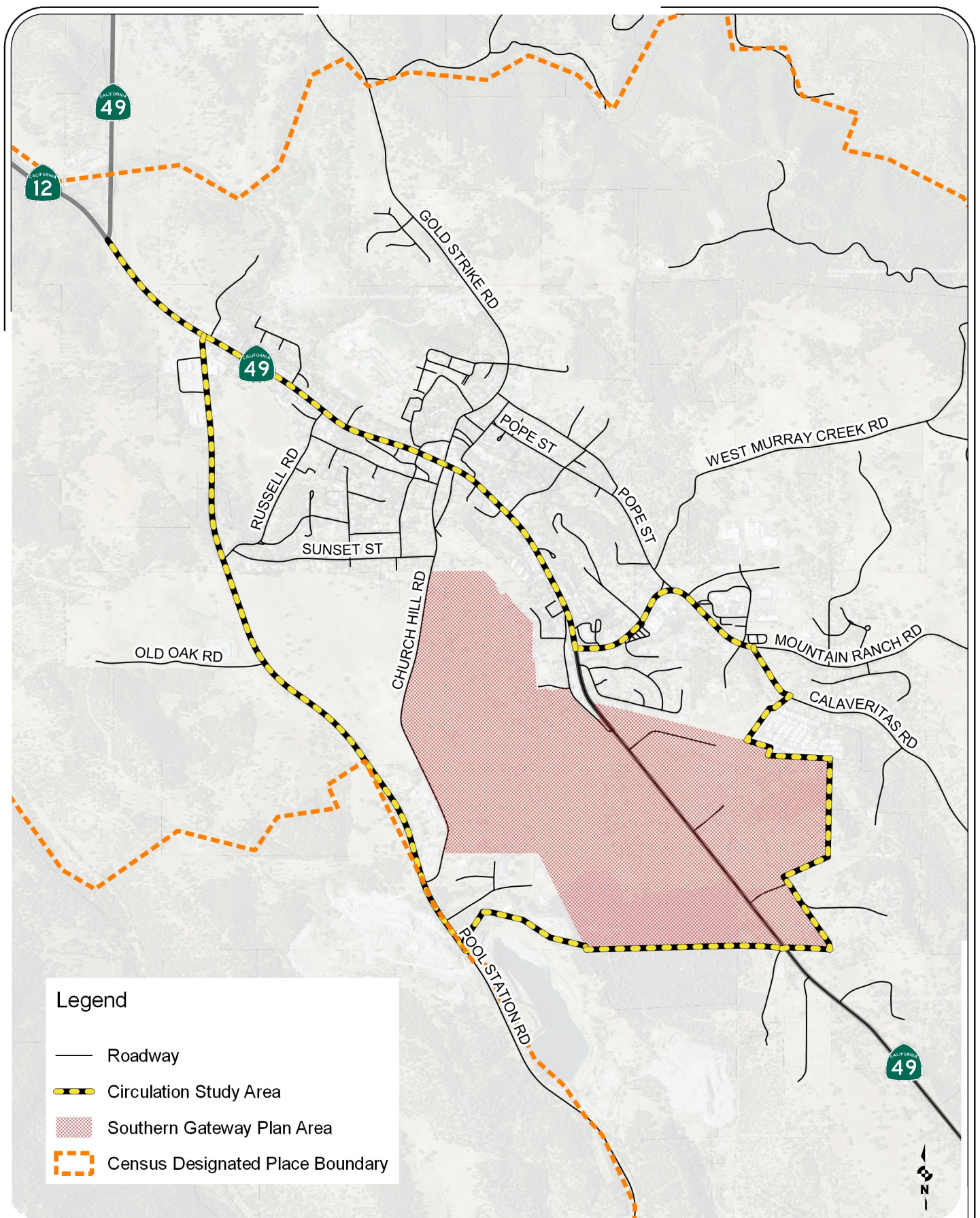
The Southern Gateway Plan Area extends from SR 49 to Pool Station Road in the west and to Calaveritas Road in the east. Currently, developed land includes commercial properties on Airport Road and Knief Lane, industrial sites on Pool Station Road and George Reed Drive, and several single-family residential units with private access driveways onto SR 49.

There are approximately 246 acres of vacant and 121 acres of underutilized residential, commercial, and/or industrial land in the Plan Area. The vacant land has no current form of development or improvement. Underutilized parcels have some form of development or improvement, but the improvements and existing development represent a small fraction of the development potential of the parcel, as allowed by the Calaveras County General Plan. Existing land development status within the Plan Area is summarized as follows:

Southern Gateway Plan Area - Land Development Status:

<u>Residential Land: 290 acres</u>	<u>Commercial Land: 83 acres</u>	<u>Industrial Land: 30 acres</u>
Vacant: 187 acres single-family (1 acre multi-family)	Vacant: 55 acres	Vacant: 3 acres
Underutilized: 98 acres single-family	Underutilized: 13 acres	Underutilized: 10 acres
Developed: 5 acres	Developed: 15 acres	Developed: 17 acres

Existing land uses are discussed further in the Existing Land Use and Future Growth section of this report.



San Andreas SR 49 Commercial Gateway & Corridor Study

San Andreas Study Area

Figure 1a

Circulation Study Area

The Circulation Study Area extends to the intersections of SR 49/SR 12 in the north, SR 49/Buckskin Way in the south, Pool Station Road/Church Hill Road in the west, and Mountain Ranch Road/Calaveritas Road in the east. Study intersections and segments are identified as follows and are presented on Figure 1B.

- The Saint Charles Street (SR 49) corridor was analyzed as four segments from SR 12 to Mountain Ranch Road.
- The Southern Gateway Plan Area extends from SR 49 to Pool Station Road in the west and to Calaveritas Road in the east. Within the Southern Gateway Plan Area, SR 49 was analyzed from Mountain Ranch Road to Buckskin Way.
- Mountain Ranch Road was analyzed from SR 49 to Calaveritas Road.

The following segment list, and corresponding intersections, provides the context for operational and safety analysis, and short and long-term recommendations, for the Circulation Study Area.

Saint Charles Street (SR 49) Corridor:

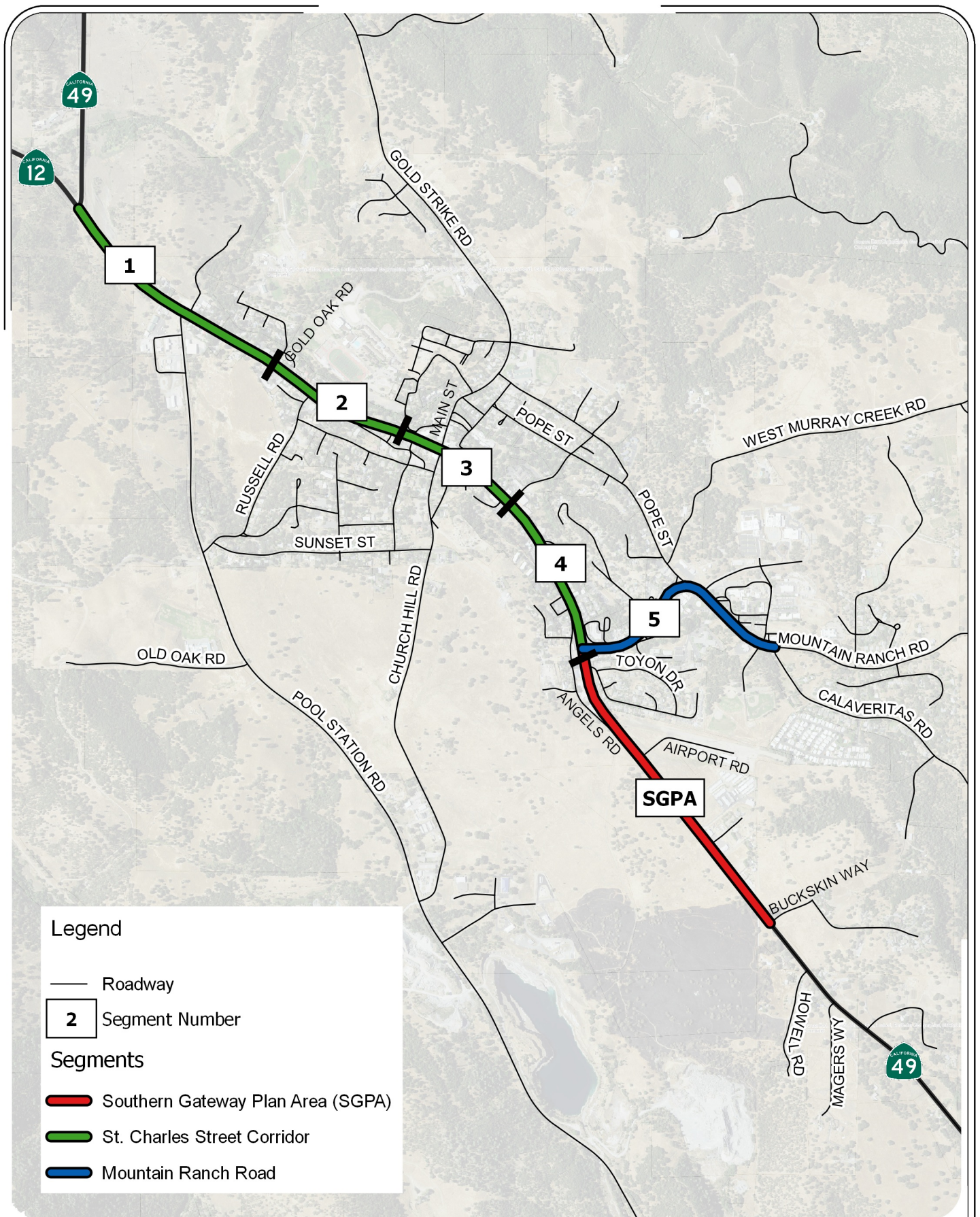
- Segment 1: SR 12 to Gold Oak Road
 - SR 49/SR 12
 - SR 49/Pool Station Road
- Segment 2: Gold Oak Road to Court Street
 - SR 49/Russell Road
 - SR 49/High School Street
- Segment 3: Court Street to Treat Avenue
 - SR 49/Court Street/Adams Avenue
 - SR 49/Main Street/Church Hill Road
- Segment 4: Treat Ave to Mountain Ranch Road
 - SR 49/Treat Avenue
 - SR 49/Mountain Ranch Road

Southern Gateway Plan Area:

- SR 49: Mountain Ranch Road to Buckskin Way

Mountain Ranch Road:

- SR 49 to Calaveritas Road
 - Mountain Ranch Road/Pope Street
 - Mountain Ranch Road/Jeff Tuttle Drive
 - Mountain Ranch Road/Park Drive/Government Center Drive
 - Mountain Ranch Road/Calaveritas Road



San Andreas SR 49 Commercial Gateway & Corridor Study

Circulation Study Segments

Figure 1b

2. Background Conditions

2. Background Conditions

This section identifies the study area, summarizes existing transportation infrastructure and traffic and safety conditions, and highlights community concerns.

2.1 Project Setting

San Andreas is an unincorporated Census-Designated Place (CDP) situated along SR 49 in Calaveras County Supervisorial District 1 and Caltrans District 10. SR 49 is a north-south arterial that runs through the Gold Country foothills in California, accommodating regional and interregional travel through Calaveras County and adjacent Tuolumne and Amador Counties. Located just south of the SR 49/SR 12 intersection, the community of San Andreas is approximately 12 miles northwest of the City of Angels Camp and 15 miles south of The City of Jackson. San Andreas is approximately 133 miles east of San Francisco and 85 miles southeast of Sacramento.



Northern Gateway entrance sign, as seen from SR 49/Pool Station Road

San Andreas has served as the county seat of Calaveras County since 1863, establishing it as one of the major government and employment hubs of the region. The town hosts a number of government facilities and employment centers, including the County court house, Government Center, hospital, high school, sheriff's department, and jail. As a result, SR 49 through San



Facing West on Pool Station Road, with rolling hills in the background

Andreas accommodates high volumes of commuter travel from neighboring communities and counties. Additionally, as a community of the Gold Country foothills, San Andreas holds historical value attributed to its position as a settlement area for immigrants who were attracted to the area's natural resources and mining opportunities. Tourists exploring the foothills often pass through San Andreas, taking notice of its historical buildings, rural landscapes, and rolling hills, that has been preserved amidst community growth.

During the 2015 Butte Fire, 70,868 acres of land in Amador and Calaveras County burned, along with 549 homes and 368 outbuildings. San Andreas hosts the California Department of Forestry and Fire Protection (Cal Fire) Tuolumne-Calaveras Unit and the San Andreas Fire Department, as well as the American Red Cross and Federal Emergency Management Agency (FEMA), and the Town served as the emergency and evacuation services center for Calaveras County during the fire. The community is still experiencing the effects of the fire, as heavy trucks travel on Mountain Ranch Road and SR 49 to remove debris from communities east of San Andreas. The potential for future fires within Calaveras County requires a review of the existing circulation system within the context of emergency preparedness.



Approaching SR 49/State Route 12 Intersection

Transportation Setting

The backbone of the community's circulation system is integrally connected to the regional transportation system, and plays an important role in commuter travel, goods movement, as well as tourist activity.

SR 49, known locally as Saint Charles Street, serves as the 'backbone' of the community's transportation system, providing access to local commercial and residential areas, as well as links to the transportation system. However, the roadway presents challenges to safety and efficiency of local circulation, as San Andreas residents are forced to compete against large volumes of regional travel and drivers exceeding the speed limit. In addition, the high concentration of access points and driveways along Saint Charles Street in San Andreas creates conflict between regional travel needs and local access needs.

Demographic Setting

The population of San Andreas is estimated at 2,812 residents, approximately 6 percent of the total Calaveras County population, and the Census-Designated Place (CDP) boundary has a total area of approximately 8.4 square miles (5,376 acres). In 2010, San Andreas held approximately 1,146 households, with an average household size of 2.6 persons/household. The median age in San Andreas is 45.7, which is higher than the state average of 35.2.

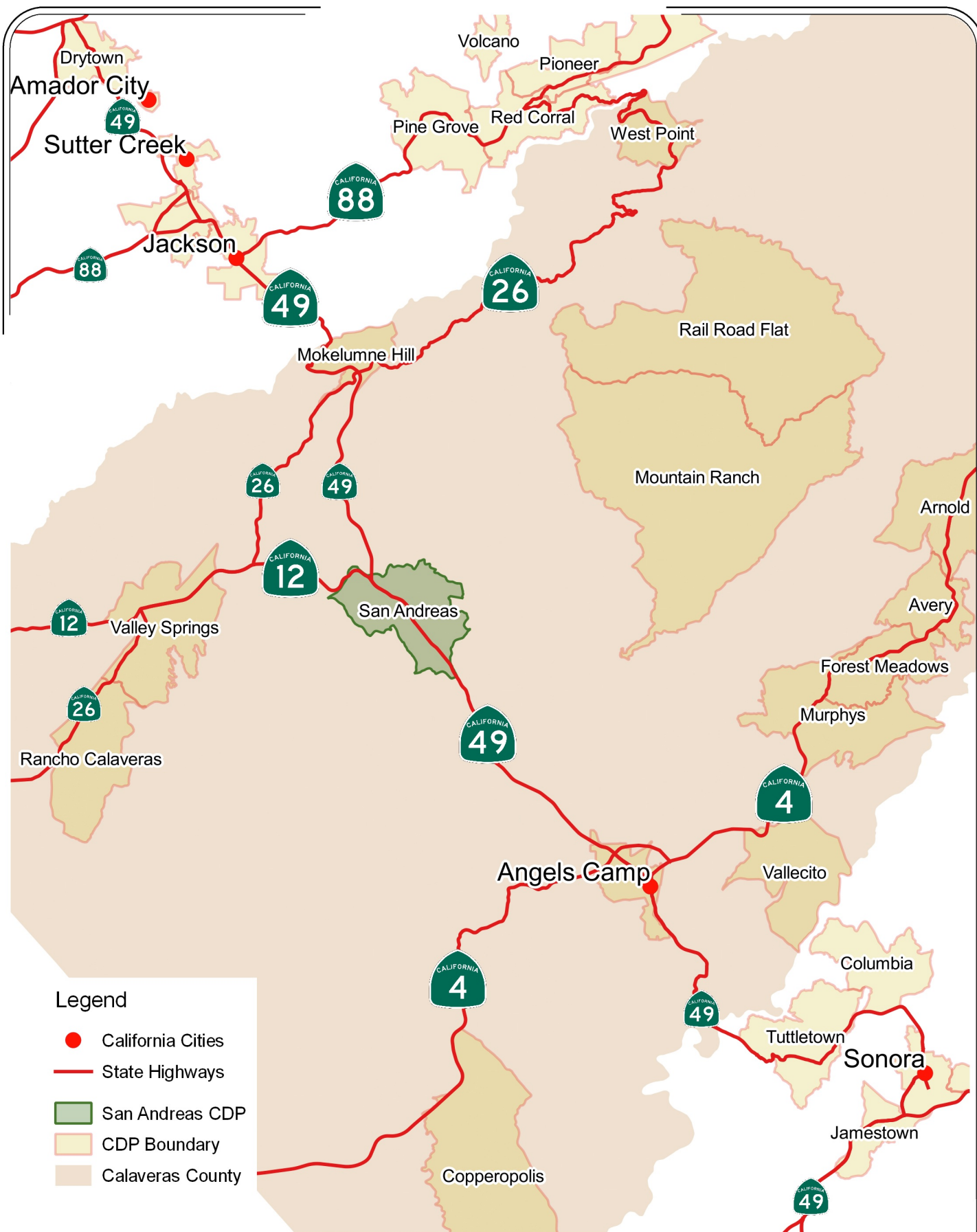
The community of San Andreas hosts businesses and government centers that employ the largest share (6.5 percent) of the 19,264 employed residents within Calaveras County. The most prominent industries for employment within San Andreas are Public Administration and Health Care and Social Assistance. However, only 7 percent of the jobs within San Andreas are held by residents of San Andreas, resulting in a large number of employees commuting in from neighboring communities and counties, giving San Andreas its description of a 'commuter-town'.

Economic Setting

Although San Andreas is considered an employment hub of the region, it lacks "quality of life" factors (such as building stock, shopping opportunities, and recreation/cultural amenities); discouraging employees from residing near their place of work. Non-resident employees commute into San Andreas, establishing a 'commuter-town' with minimal increases in residential growth. While Calaveras County had the sale of approximately 500 new homes from 2006 to 2015, San Andreas only experienced a sale of seven new homes. In 2015, the average sale price of a home in San Andreas was \$189,000, compared to \$235,000, which is the average throughout the County.

The median household income in San Andreas is \$40,600. Approximately 55 percent of San Andreas households own their own home, while 45 percent are renters. Approximately 12.6 percent of housing units were vacant in 2010, which is higher than the state average of 8.1 percent.

A vicinity map is presented on Figure 2.



San Andreas SR 49 Commercial Gateway & Corridor Study

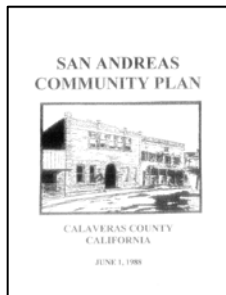
San Andreas Community Boundary and Vicinity Map

Figure 2

2.2 Regulatory and Planning Framework

This section summarizes previous regulatory and planning documents that guide transportation planning decisions in San Andreas and Calaveras County. The *State Route 49 Commercial Gateway Corridor Study* aims to align its recommendations with these available documents. To the extent feasible, the following documents were referenced for this study:

San Andreas Community Plan, 1988



The *San Andreas Community Plan* was adopted in 1981 and revised in June 1988. The Plan contains land use designations, implementation programs, a Community Plan land use map, and multiple introductory and background sections. The Community Plan provides community-specific land use and circulation plans in congruence with the County General Plan. The San Andreas Community Plan has not been updated since 1988; however, land use maps have been updated in the years 2008 and 2012. The Community Plan area covers nine square miles, including this Study's boundaries.

Calaveras County General Plan, 1996 and 2014 (Draft)

The *Calaveras County General Plan* was adopted in 1996. A *Draft 2014 General Plan Update* has been made available to the public. The *General Plan* aims to meet state planning requirements and guides countywide development in the following categories: land use, circulation, housing, conservation, open space, noise, and safety.

The *General Plan Land Use Element* is updated under the *Draft 2014 General Plan* and provides the general framework for development in the County, and identifies future land use designations in the unincorporated areas of Calaveras County to establish where and what type of development can occur. Specific to Calaveras County, the Land Use Element aims to maintain rural, open space by focusing development in and around existing communities.

The *General Plan Circulation Element* is updated under the *Draft 2014 General Plan* and provides the framework for countywide transportation systems. In line with planned land use patterns, the Circulation Element identifies the location and extent of existing transportation routes and improvements needed to account for future travel demand.

San Andreas Community Plan Report, 2008 (Not currently adopted)

The *San Andreas Community Plan Report* provides resident-input on land use, conservation, circulation, safety, and community participation, in lieu of the 2008 Calaveras County General Plan Update. The Report was prepared by Citizens for San Andreas, and is the product of several Town Hall meetings and public meetings over a two-year period.

Included in the list of "Proposed San Andreas Community Policies" are the following:

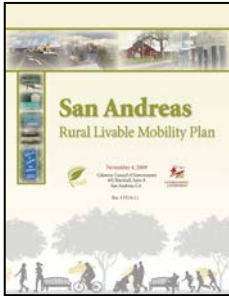
- Protect and maintain the rural and historical character of San Andreas
- Accommodate the development related influx to San Andreas through facility and road improvements in and around the Government Center, and
- Provide the community with increased retail and commercial opportunities while

maintaining the rural and local atmosphere.

The Report also identifies circulations issues, citing congestion and speed issues related to the large volume of drive-through traffic along SR 49; mobility and access barriers between east and west of town; and the lack of adequate bicycle and pedestrian facilities.

San Andreas Rural Livable Mobility Plan, 2009 (Adopted by CCOG)

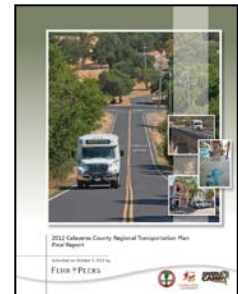
The *Rural Livable Mobility Plan* (RLMP) addresses mobility and safety issues and opportunities along the Saint Charles Street (SR 49) Corridor. As the main street corridor and most significant roadway in San Andreas, SR 49 serves a variety of land and mobility uses that often interfere with one another, creating a complex and unsafe space for local activity. The RLMP provides detailed approaches to multi-modal enhancements, traffic calming, intersection improvements, and streetscape design.



The RLMP was a planning effort lead by the community under the direction of the CCOG, but it was not adopted by Calaveras County. However, many of the improvements listed in the plan will be incorporated into this current planning effort.

Calaveras County Regional Transportation Plan, 2012

A *Regional Transportation Plan* (RTP) for Calaveras County was prepared in 2007 by LSC Transportation Consultants, Inc. and in 2012 by Fehr + Peers. As required by California law, the CCOG must adopt and submit an approved RTP to the California Transportation Commission (CTC) every five years. The RTP generally aims to guide transportation investments in the region over a 20-25 year period.



State Route 49: Transportation Concept Report, 2013

The *State Route 49: Transportation Concept Report* (TCR) was prepared by Caltrans District 10, and provides long-term planning for SR 49 within District 10 jurisdiction and specifically through San Andreas. SR 49 is broken down into segments, and provides descriptions and analysis for current roadway conditions.

Main Street, California: A Guide for Improving Community and Transportation Vitality, 2013



In 2013, Caltrans published *Main Street, California - A Guide for Improving Community and Transportation Vitality*. The Report provides planning, design, maintenance, and operational concepts for main street projects and serves as a guide to complete streets and active transportation planning along State highways.

Complete Streets Implementation Action Plan 2.0 (CSIAP 2.0), June 2014 - June 2017

The CSIAP 2.0 was prepared by Caltrans to describe the complete streets policy framework currently held by Caltrans for planning and implementation of complete streets on the State highway system. The CSIAP 2.0 is required by the *Deputy Directive 64-Revision 2: Complete Streets - Integrating the Transportation System (DD-64-R2)*, which is an update of the State's complete streets policy signed in October 2014.

DD-64-R2 provides the following Caltrans policy on complete streets:

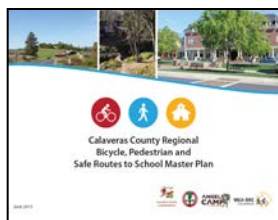
"The California Department of Transportation (Caltrans) provides for the needs of travelers of all ages and abilities in all planning, programming, design, construction, operations, and maintenance activities and products on the State highway system [and] recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system."



Calaveras Transit Intercity Service Feasibility Study, 2014

The *Transit Intercity Service Feasibility Study* (Transit Study) was prepared for CCOG in 2014 to address intercity transit needs for Calaveras County residents. The study focused on a new route(s) that would connect to Greyhound and Amtrak, provide service to out-of-county medical needs, and serve commuters and students.

Calaveras County Regional Bicycle, Pedestrian and Safe Routes to School Master Plan, 2015



This *Bicycle, Pedestrian, and Safe Routes to School Plan* (Bike, Ped, and SRTS Plan) identifies existing and proposed bicycle and pedestrian infrastructure and support facilities, and encourages improvements that enhance safety for active transportation modes. The plan serves as a guide for active transportation improvements that require federal, state, and local funding. As San Andreas is home to six schools, safe and reliable walking and biking routes for children is an important component of this plan.

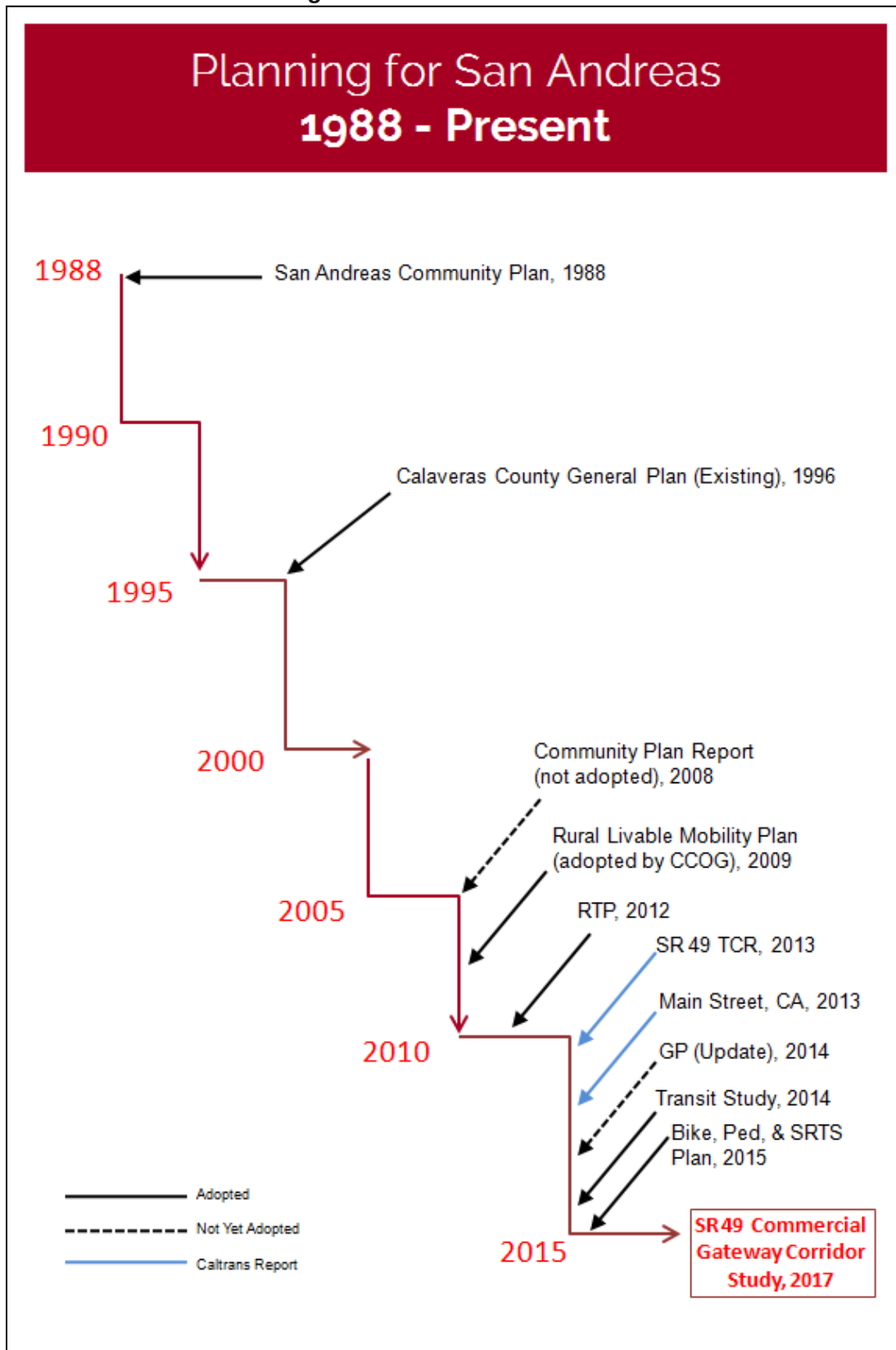
Calaveras County Short Range Transit Plan Update, 2016

The *Short Range Transit Plan Update* (SRTP) was recommended for approval in February 2016. The SRTP will provide the blueprint for the development of Calaveras County over the next five years. Key issues addressed in this plan include maintaining and improving transit connections to regional transit services in Calaveras County.

Table 1 highlights these regulatory and planning documents in terms of their adoption status and relationship to each other.

**TABLE 1
LOCAL AND REGIONAL PLANNING DOCUMENTS**

LOCAL AND REGIONAL PLANNING AND REGULATORY DOCUMENTS					
	Plan	Agency/Group	Year Completed	Approved / Adopted?	Current?
LAND USE	San Andreas Community Plan	County of Calaveras	1988	Yes (1981, revised 1988; maps revised '08, '12)	Yes, pending new General Plan
	Calaveras County General Plan including Land Use Element (Existing)	County of Calaveras	1996	Yes	Yes
	San Andreas Community Plan Report	Citizens for San Andreas	2008	No	Yes; no official status
	Calaveras County General Plan Background Report	County of Calaveras	In Progress	No	Adoption anticipated
	Calaveras County General Plan, including Land Use Element (Update)	County of Calaveras	In Progress	No	Adoption anticipated
TRANSPORTATION	Calaveras County General Plan including Circulation Element (Existing)	County of Calaveras	1996	Yes	General Plan update in progress
	San Andreas Rural Livable Mobility Plan	Calaveras Council of Governments	2009	Yes, by CCOG	Yes; no official status
	Regional Transportation Plan	Calaveras Council of Governments	2012	Yes	Yes
	State Route 49 Concept Report	California Department of Transportation	2013	Yes	Yes
	Main Street, California: A Guide for Improving Community and Transportation Vitality	California Department of Transportation	2013	Yes	Yes
	Calaveras Transit Intercity Service Feasibility Study	Calaveras Council of Governments	2014	Yes	Yes
	Calaveras County General Plan, including Circulation Element (Update)	County of Calaveras	In Progress	No	Adoption anticipated
	Calaveras County Regional Bicycle, Pedestrian and Safe Routes to School Master Plan	Calaveras Council of Governments	2015	Yes	Yes
	Calaveras County Short Range Transit Plan Update	Calaveras Council of Governments	2016	Yes	Yes



2.3 Demographics and Commute Trends

The following section examines recent trends in population, commuter travel, and mode-choice within San Andreas, Calaveras County, and California. Data from the United State Census Bureau's 2010-2014 American Community Survey and the State of California Employment Development Department (EDD) Labor Market Division forms the basis of the following demographic analysis. Data from the United State Census Bureau's 2014 LED/LEHD, "On the Map" application, forms the basis of the following commute analysis.

Population

The population in San Andreas increased from approximately 2,600 in 2000 to 2,783 in 2010, with current Census estimates of 2,812. In 2010, San Andreas was home to approximately 1,146 households, with an average household size of 2.6. The median age in San Andreas was 45.7 (significantly r than the state average of 35.2), and the median household income was \$40,600, compared to the state average of \$61,500. Approximately 55 percent of San Andreas households owned their own home, while 45 percents were renters. Approximately 12.6 percent of housing units were vacant in 2010, significantly higher than the state average of 8.1 percent. Table 2 presents the various demographic attributes of San Andreas in 2000 and 2010.

**TABLE 2
DEMOGRAPHIC ATTRIBUTES**

	San Andreas CDP			California
	2000	2010	% Change	(2010)
Population	2,615	2,783	6.4%	37,253,956
Households	1,097	1,146	4.5%	12,617,280
Average Household Size	2.24	2.26	0.9%	2.9
Housing Units	1,167	1,311	12.3%	13,680,081
Median Age	43	46	7.3%	35
Median Household Income	\$32,500	\$40,613	25.0%	\$61,489
Tenure				
Rent	43.8%	44.9%		45.2%
Own	56.2%	55.1%		54.8%
Vacant Housing Units	6.0%	12.6%	110.0%	8.1%

Source: U.S. Census 2000 and 2010 (as presented by New Economics, 2016)

Employment

According to the State of California Employment Development Department (EDD) Labor Market Division, approximately 1,170 San Andreas residents were employed in 2015, with an unemployment rate of 6.1 percent. Unemployment in San Andreas is consistent with the unemployment rate in Calaveras County (6.4 percent). Table 3 presents the labor force characteristics within San Andreas, and compares it to communities within Calaveras County. Subsequent analysis is based on 2014 data from United State Census Bureau's 2014 LED/LEHD, "On the Map" application, which differs slightly from, but does not conflict with, EDD (2016) data.

TABLE 3
SAN ANDREAS AND CALAVERAS COUNTY LABOR FORCE CHARACTERISTICS

Area Name	Labor Force	Employment	Unemployment	
			Number	Rate
Calaveras County	20,300	19,010	1,290	6.4%
San Andreas CDP	1,250	1,170	80	6.1%

Source: EDD, Labor Market Information Division, March 2016.
*March 2015 benchmark

San Andreas hosts 11 of the 25 identified 'major employers' within the County, including County Government offices, Mark Twain Medical Center, Forestry and Fire Protection, and several elementary and high schools. Given the commuter character of Calaveras County, and the concentration of employment centers within the community, San Andreas circulation patterns are heavily influenced by commuter travel. Table 4 provides information on the number employed and employment category of 'major employers' in San Andreas.

**TABLE 4
MAJORS EMPLOYERS IN SAN ANDREAS**

Employer	Number Employed	Category
Calaveras County Human Services	50-99	Government
Calaveras County Sheriff	50-99	Government
Calaveras Water District	50-99	Utility
Calaveras High School	50-99	School
Calaveras Public Works Department	50-99	Libraries-Public
Forestry & Fire Protection	250-499	Government
Independent Learning Center	50-99	School
Mark Twain Medical Center	250-499	Hospital
Rail Road Flat Elementary School	50-99	School
Rite-Passage-Sierra Ridge Academy	100-249	Residential Care Homes; School
West Point Elementary School	50-99	School

Source: State of California Employment Development Department, 2016.

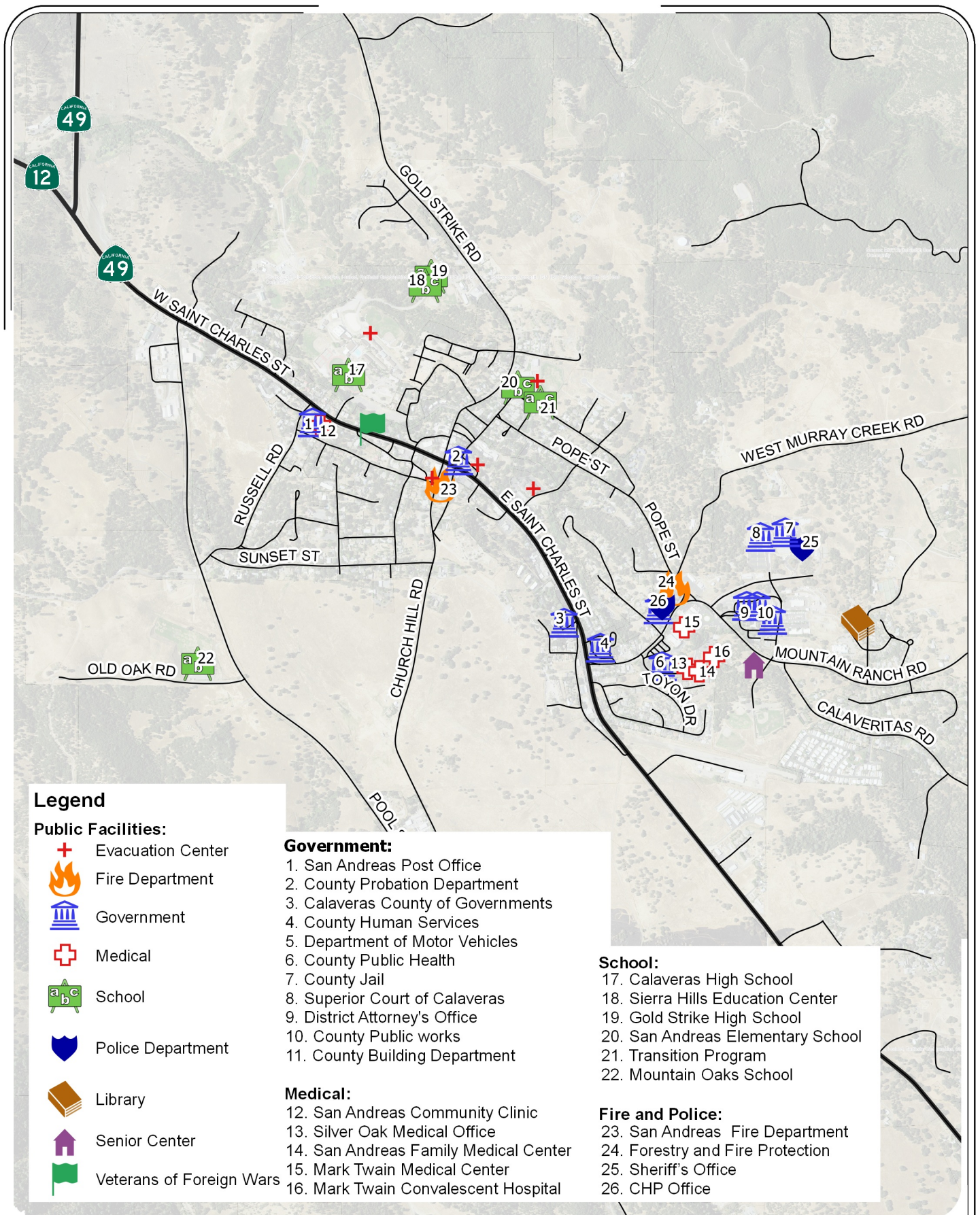


Calaveras High School



Hospital sign on Mountain Ranch Road for the Mark Twain Medical Center

The government sector accounts for approximately 14 percent of employment within Calaveras County, and the majority of these government employers are located along Mountain Ranch Road, east of SR 49. San Andreas is also host to three major schools and several learning centers, including a regional high school and local elementary school serving more than 1,200 students combined. These schools also significantly contribute to employment within the community, providing at least 250 jobs. The majority of these schools are located east of SR 49 and north of Main Street. Figure 3 illustrates the location of employment centers, schools, and other major facilities within San Andreas.



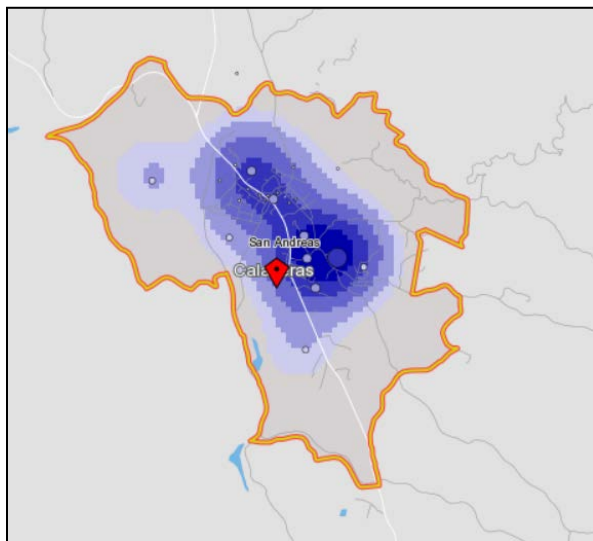
San Andreas SR 49 Commercial Gateway & Corridor Study

San Andreas Major Facilities and Employment Centers

Figure 3

Commute Trends

Calaveras County is characterized by a large degree of in-bound and out-bound commuter travel. Of the 19,264 employed residents within Calaveras County, approximately 23.5 percent work within the county; 13.5 percent commute to San Joaquin County in the west; and 7.7 percent commute to Sacramento County in the north. Overall, 20.8 percent of Calaveras employed residents travel more than 25 miles to work, and 46.5 percent travel more than 50 miles to work.



Source: U.S. Census Bureau, OnTheMap Application and LEHD (2002-2014).

Employment in San Andreas

Of the 19,264 employed residents within Calaveras County, 6.5 percent (1,252) work in San Andreas. As shown in Figure 3, a majority of the major government and employment centers in San Andreas are located along Mountain Ranch Road. SR 49 provides primary access to Mountain Ranch Road; however, Pope Street provides access via residential neighborhoods. Government Center Drive and Jeff Tuttle Drive provide access to government and employment centers via Mountain Ranch Road, and include bicycle and pedestrian facilities. The map (shown left) shows the concentration of jobs within San Andreas, with higher concentrations of jobs illustrated by a deeper shade of blue.

Intersection at Mountain Ranch Road and Pope Street



Jeff Tuttle Drive, seen from Mountain Ranch Road



Government Center Drive, seen from Mountain Ranch Road



Superior Court of Calaveras, Government Center Drive

In-Bound Commute Trends

Due to San Andreas' position as an employment hub, there is a great deal of in-bound commuter traffic entering via SR 49. Of the more than 1,900 jobs stationed within San Andreas, only 135 of those jobs (7 percent) are held by San Andreas residents. Approximately 93 percent of employees who work in San Andreas commute into the community from neighboring communities, cities, and counties.

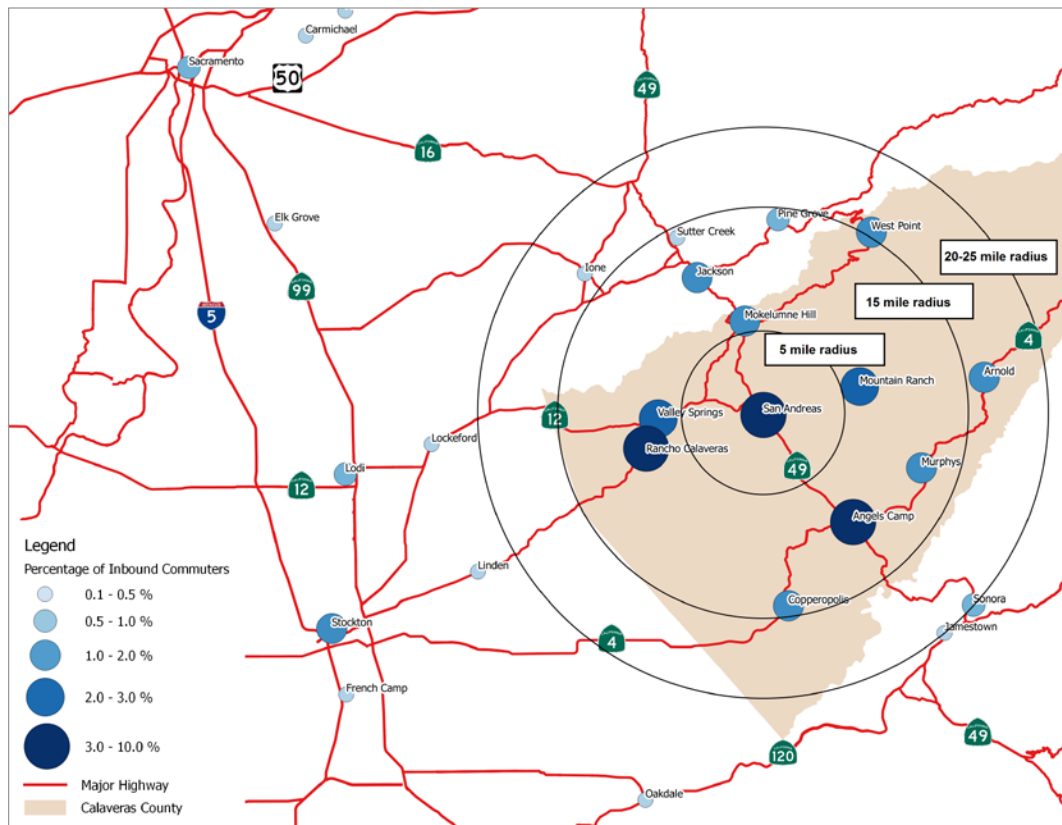
A majority of in-bound commuters employed in San Andreas come from the Rancho Calaveras and Valley Springs communities in the west, and from the City of Angels Camp in the south. In-bound commute trends, in terms of where employees who work in San Andreas live, are illustrated in Figure 4 and Table 5.

TABLE 5
WHERE SAN ANDREAS EMPLOYEES LIVE

	1,927	100%
Community	Count	Share
Rancho Calaveras CDP, CA	209	10.8%
San Andreas CDP, CA	135	7.0%
City of Angels Camp, CA	109	5.7%
Valley Springs CDP, CA	95	4.9%
Mountain Ranch CDP, CA	81	4.2%
Copperopolis CDP, CA	53	2.8%
Arnold CDP, CA	40	2.1%
Murphys CDP, CA	40	2.1%
City of Stockton, CA	38	2.0%
Other (< 2.0%)	1,127	58.5%

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2002-2014).

Figure 4 - In-Bound Commute Trends by City



Out-Bound Commute Trends

In the out-bound direction, 13.3 percent of the 1,013 employed San Andreas residents work within the community, while 86.7 percent commute outside of the community. The second most popular city of employment for San Andreas residents is the City of Stockton, capturing 4.5 percent of employed San Andreas residents.

Directionally, employed San Andreas residents generally travel west (northwest, west, and southwest) and southeast to work. Out-bound commute patterns in terms of where San Andreas residents work, are illustrated in Figure 5 and Table 6.

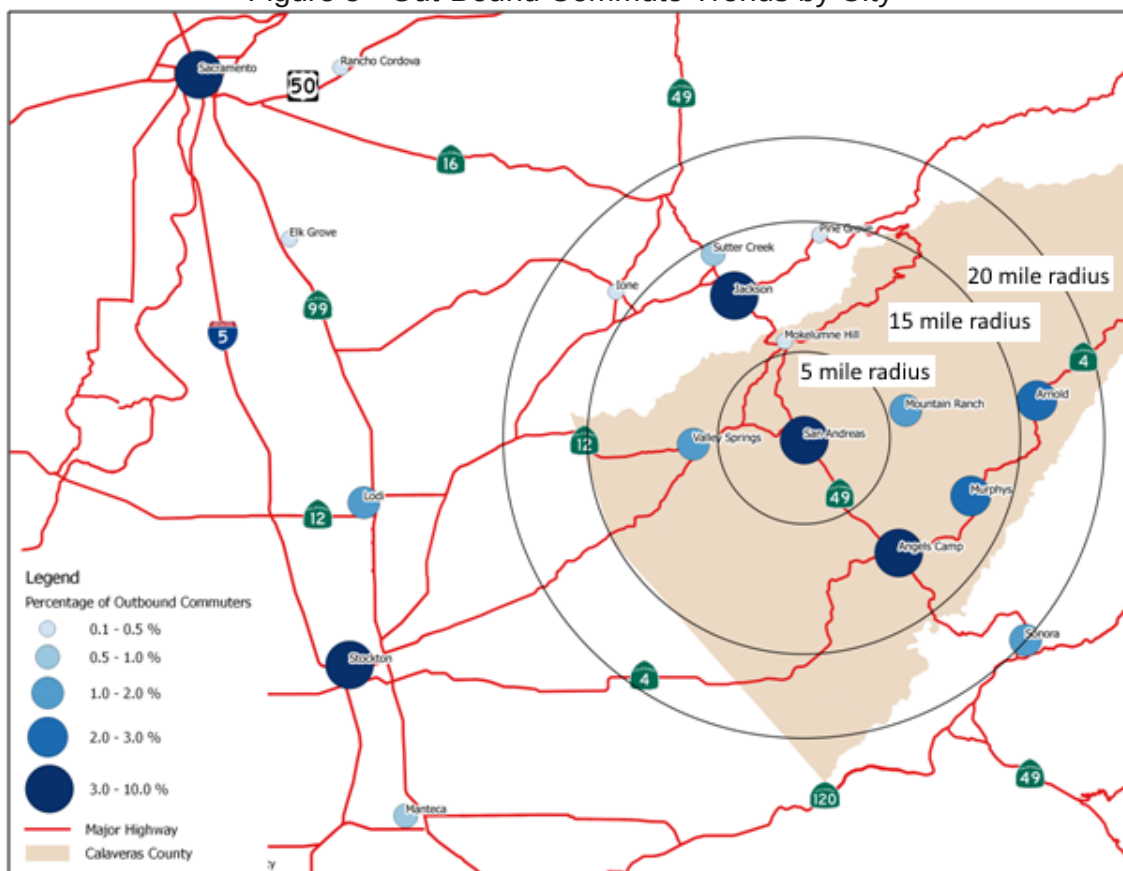
Out-bound commute patterns for San Andreas residents is discussed in further detail on the following page.

TABLE 6
WHERE SAN ANDREAS RESIDENTS WORK

	1,013	100%
Community	Count	Share
San Andreas CDP, CA	135	13.3%
City of Stockton, CA	46	4.5%
City of Angels Camp, CA	40	3.9%
City of Jackson, CA	27	2.7%
City of Sacramento, CA	27	2.7%
City of Los Angeles, CA	25	2.5%
Murphys CDP, CA	25	2.5%
City of San Jose, CA	22	2.2%
City of Sonora, CA	20	2.0%
<i>Other (< 2.0%)</i>	646	63.8%

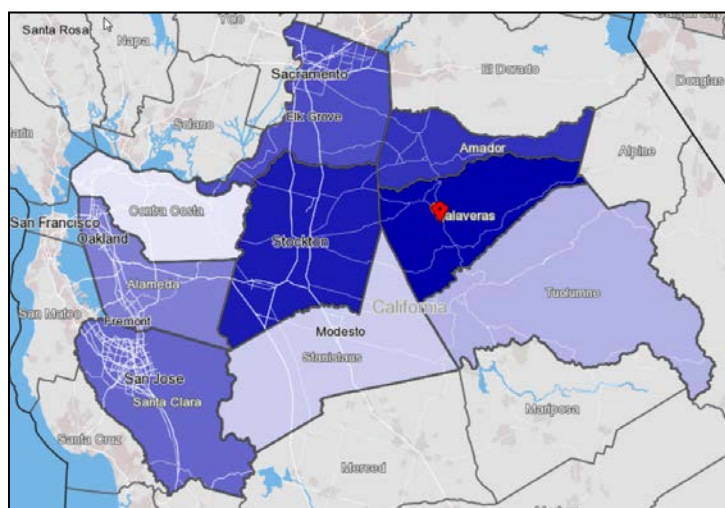
Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2002-2014).

Figure 5 - Out-Bound Commute Trends by City



Overall, the majority 30.9 percent (313 persons) of San Andreas residents work within Calaveras County. Approximately 10 percent (101 persons) commute to San Joaquin County; 5.8 percent (59 persons) commute to Amador County; and 5.7 percent (58 persons) commute to Sacramento County. In terms of travel distance to work, 19.8 percent (201 persons) commute less than 10 miles to work; 19.9 percent (202 persons) commute 10 to 24 miles to work; 18.2 percent (184 persons) commute 25 to 50 miles to work; and 42.1 percent (426 persons) commute more than 50 miles to work.

The following map shows employment destinations by San Andreas residents, with higher percentages of employment destinations expressed in darker blue. Table 7 presents travel time to work, and corresponds to data regarding distance and direction travelled.



Source: U.S. Census Bureau, OnTheMap Application and LEHD (2002-2014).

**TABLE 7
TRAVEL TIME TO WORK**

Travel Time to Work	Estimate
Less than 10 minutes	38.4%
10 to 14 minutes	11.2%
15 to 19 minutes	9.1%
20 to 24 minutes	14.2%
25 to 29 minutes	1.9%
30 to 34 minutes	6.3%
35 to 44 minutes	6.0%
45 to 59 minutes	6.1%
60 or more minutes	6.8%
Mean travel time to work (minutes)	19.2

Source: U.S. Census Bureau, 2010-2014 American Community Survey 5-Year

Table 8 shows the means mode of transportation to work for employed residents in San Andreas compared to Calaveras County and California. The term "mode" represents the type of travel utilized to travel to, and return from, a place of employment.

**TABLE 8
SAN ANDREAS RESIDENTS: MODE OF TRAVEL**

	Drive alone	Carpool	Transit	Walk	Bicycle	Other
San Andreas residents	69.8%	11.9%	0.0%	13.8%	1.0%	3.5%
Calaveras County	77.3%	11.7%	0.3%	2.9%	0.2%	7.7%
California	73.2%	11.1%	5.2%	2.7%	1.1%	6.6%

Source: U.S. Census, American Community Survey 5-year estimated (2010-2014).

Due to the high percentages of long-distance out-bound commuting through San Andreas, a majority of employed residents in San Andreas travel by car to their place of employment. Approximately, 13.8 percent of employed residents in San Andreas walk to their place of employment. This percentage is significantly higher than other communities in Calaveras County, which averages 2.9 percent. Pedestrian facilities, including marked crosswalks and connected sidewalks, are lacking in San Andreas. However, the close proximity of residential areas to places of employment could explain the relatively high percentage of commuters who walk to work.

2.4 Local Roadway Network

Roadway Classification

The 1996 *General Plan Circulation Element* includes the following roadway classifications for Calaveras County:

Major Arterials: Major arterials are multi-lane freeways, which handle high volumes of traffic. State Route (SR) 49 is classified as a major arterial in Calaveras County.

Minor Arterials: Minor arterials are roads, which have a primary function of serving through traffic movements and connect communities and traffic destination centers, such as recreational facilities and resources.

Major Collectors: Major collections are roads, which move traffic from one community to the next. Major collectors serve through traffic movements to and from minor arterials into and out of communities.

Minor Collectors: Minor collectors move traffic from traffic generators (such as residential areas) to major collectors or arterials. Minor collectors are generally located within residential areas where they connect a number of local roads to a major collector.

Local Roads: The primary function of local roads is to provide access to individual properties, delivering this traffic in a relative short distance compared to collectors or arterial roadways. Local roadways include commercial roads, cul-de-sacs, minimum service roads, and emergency access road(s).

Local Roadways

The following roadways provide primary connections within the community of San Andreas.

- SR 49 north and south of town
- Saint Charles Street (SR 49): SR 12 to Mountain Ranch Road
- Mountain Ranch Road
- Pool Station Road
- Church Hill Road
- Pope Street

Other significant roadways within the community circulation network include:

- Russell Road
- Main Street
- Court Street
- Treat Avenue
- Calaveritas Road

The 2014 *Calaveras County General Plan Update Draft* (GP Draft) provides roadway classifications for the study roadways. These classifications are consistent with the functional classifications provided within the 2012 *Calaveras County Regional Transportation Plan* (RTP); however, the GP Draft provides specifications for number of lanes. SR 49, previously a minor arterial, was classified as a principal arterial by the National Highway System (NHS) in 2014. (Note: The 2012 RTP classifies SR 49 through San Andreas as a Three-Lane Arterial, while the 2014 GP Draft classifies it as a Two-Lane Minor Arterial with Two-Way Left-turn Lanes)

(TWLTLs). The 2014 GP Draft classifications have been utilized in this report). The 2009 *Rural Livable Mobility Plan* (RLMP) provides classifications for roadways not classified in either the 2014 GP Draft or the 2012 RTP, and is therefore included for consideration purposes. Table 9 presents the classifications for study roadways as presented in the 2012 RTP, the 2014 GP Draft, and the 2009 RLMP.

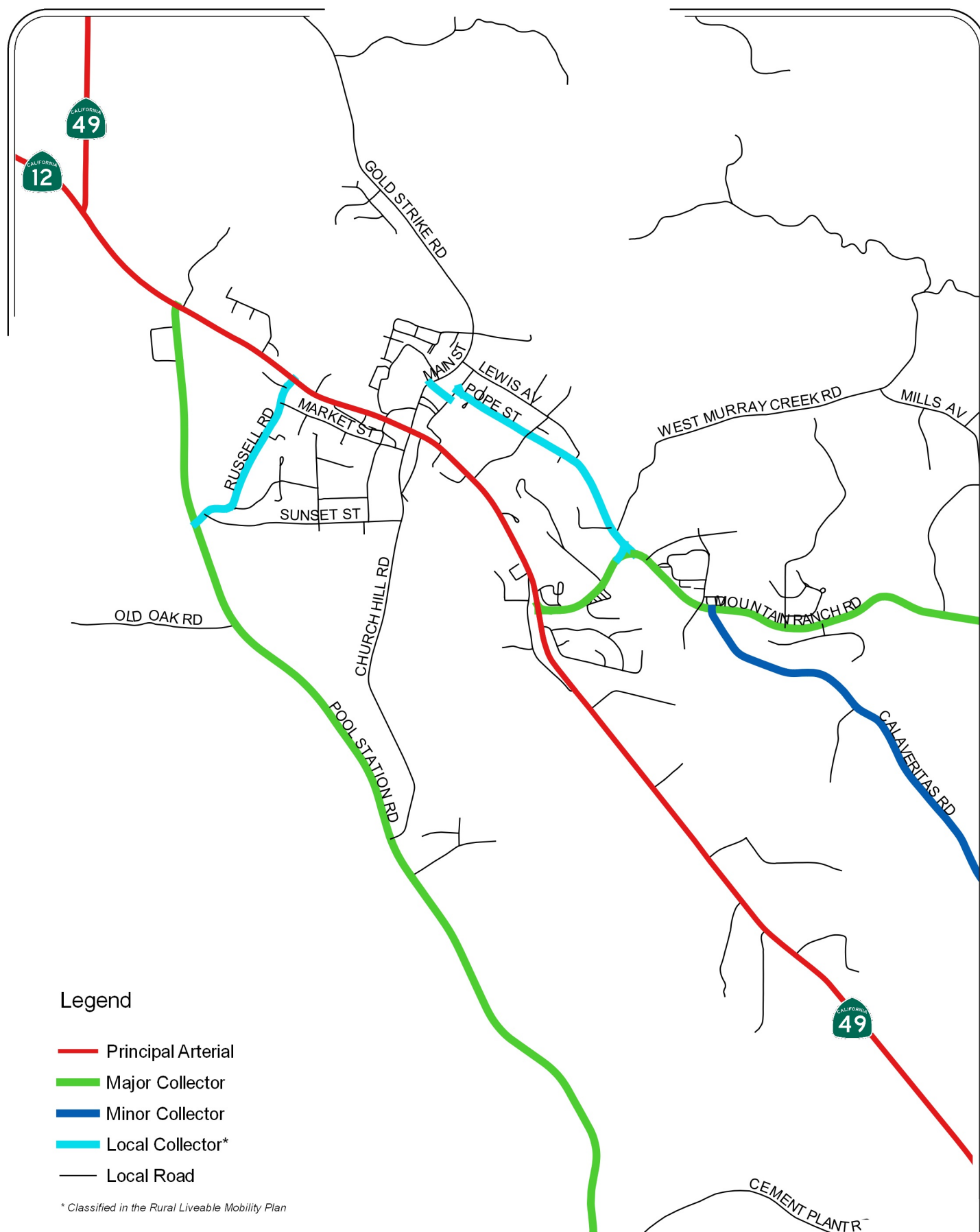
TABLE 9
LOCAL ROADWAY CLASSIFICATION IN VARIOUS DOCUMENTS

Roadway	Segment	2014 General Plan Update Draft	2012 County Regional Transportation Plan	2009 Rural Livable Mobility Plan (Adopted by CCOG)
State Route 49	SR 12 to Mountain Ranch Rd	Principle Arterial (National Highway System (NHS), 2014)	Three-Lane Minor Arterial	n/a
State Route 49	Mountain Ranch Rd to 4th Crossing Rd	Principle Arterial (National Highway System (NHS), 2014)	Major Two-Lane Highway/Minor Arterial	n/a
Mountain Ranch Road	SR 49 to Gold Hunter	Two-Lane Major Collector	Major Two-Lane Highway/Major Collector	Two-Lane Arterial
Pool Station Road	SR 4 to SR 49	Two-Lane Major Collector	Major Two-Lane Highway/Major Collector	Two-Lane Arterial
Calaveritas Road	<i>Within San Andreas</i>	Two-Lane Minor Collector	n/a	n/a
Pope Street	<i>Within San Andreas</i>	n/a	n/a	Local Collector
Russell Road	<i>Within San Andreas</i>	n/a	n/a	Local Collector
Main Street	<i>Within San Andreas</i>	Two-Lane Minor Arterial	n/a	n/a

Table 10 presents the roadway classifications assumed within this study. Figure 6 presents the existing roadway network in the Study area.

TABLE 10
LOCAL ROADWAY CLASSIFICATION

Roadway	Segment	Classification	Source
State Route 49	SR 12 to Mountain Ranch Rd	Principle Arterial	2014 NHS
State Route 49	Mountain Ranch Rd to 4th Crossing Rd	Principle Arterial	2014 NHS
Mountain Ranch Road	SR 49 to Gold Hunter	Two-Lane Major Collector	2014 GP Draft
Pool Station Road	SR 4 to SR 49	Two-Lane Major Collector	2014 GP Draft
Calaveritas Road	<i>Within San Andreas</i>	Two-Lane Minor Collector	2014 GP Draft
Pope Street	<i>Within San Andreas</i>	Local Collector	2009 RLMP
Russell Road	<i>Within San Andreas</i>	Local Collector	2009 RLMP
Main Street	<i>Within San Andreas</i>	Two-Lane Minor Arterial	2014 GP Draft



Legend

- Principal Arterial
- Major Collector
- Minor Collector
- Local Collector*
- Local Road

* Classified in the Rural Liveable Mobility Plan

San Andreas SR 49 Commercial Gateway & Corridor Study

San Andreas Existing Roadway Network

Figure 6

2.4.1 Roadway Characteristics

The following section presents existing roadway conditions and characteristics for segments of Saint Charles Street (SR 49) from SR 12 to Mountain Ranch Road, for SR 49 within the Southern Gateway Plan Area, and for the roadways of Mountain Ranch Road, Calaveritas Road, and Pool Station Road.

Corridor Characteristics

SR 49 is a Main Street Highway and National Highway System (NHS) designated route that runs on a skewed north-south alignment through San Andreas. SR 49 is known regionally as the Golden Chain Highway, as it provides the primary north-south connection to mining towns of the Gold Country foothills along the western slope of the Sierra Nevada. The State highway lies within Caltrans District 10 jurisdiction, extending north from Mariposa County to Amador County, continuing northeast to the California/Nevada county line. The number of travel lanes and the character of the roadway changes as it passes through District 10 counties, transitioning from two to four-lanes, and from a rural to urban segment. Within Calaveras County, SR 49 is a two-lane conventional highway, connecting to the communities of Mokelumne Hill, San Andreas, and the City of Angels Camp.



State Route 49



Through San Andreas, SR 49 is known as Saint Charles Street from SR 12 to Mountain Ranch Road, and is considered a Main Street Corridor. Saint Charles Street (SR 49) is a two lane conventional highway, and is classified by Caltrans as 'other principle arterial', per National Highway System 2014 designation as a principle arterial. The community of San Andreas borders Saint Charles Street (SR 49) to the east and west. As such, the major highway serves not only regional traffic through San Andreas, but also travel within the community. Local collector roads connect residential areas directly to Saint Charles Street (SR 49) and commercial businesses, government buildings, and some residences have direct access to Saint Charles Street (SR 49) via driveways. Currently, there is little in place to manage local access, and all intersections through the study area are two-way stop-controlled.

Approaching town from the south, the speed limit on SR 49 drops from 55 mph to 40 mph and again to 30 mph at Mountain Ranch Road. The speed limit returns to 55 mph after the SR 49/SR 12 intersection, approximately 1/3 mile north of Pool Station Road. This transition from a rural highway to a "main street corridor" with local circulation activity creates challenges to the safety and comfort of residents.

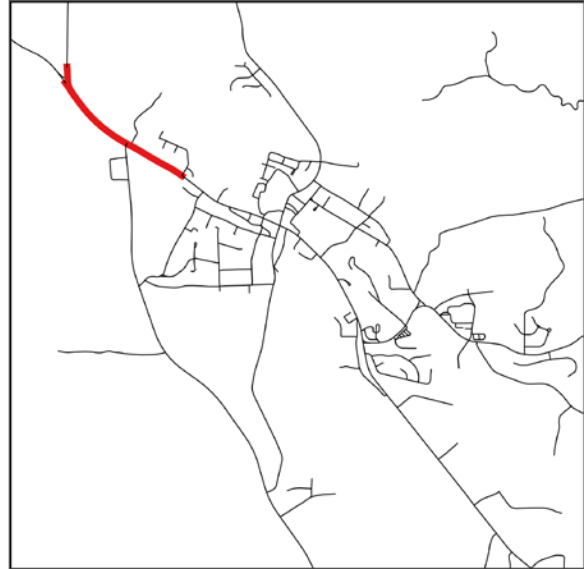
The following sections present existing roadway conditions and characteristics for segments of Saint Charles Street (SR 49) from SR 12 to Mountain Ranch Road and for SR 49 within the Southern Gateway Plan Area.

SR 12 to Gold Oak Road

As SR 49 runs through Calaveras County, it intersects with several major State highways, including SR 26, SR 4, and SR 12 just north of San Andreas. SR 12 is an east-west highway extending from its terminus at SR 49 in San Andreas westerly to the City of Lodi and beyond. At its eastern terminus, SR 12 runs into the north-south alignment of SR 49, creating a "Y" intersection at the north end of San Andreas CDP.

Entering San Andreas from the North, the southbound direction has two 12-foot lanes (pictured) to accommodate merging traffic from SR 12. The speed limit drops from 50 to 40 mph at Pool Station Road, and drops to 30 mph at Gold Oak Road, where SR 49 returns to one-lane in both the north and southbound direction.

At the intersection of SR 49/Pool Station Road, vehicles entering San Andreas are greeted by a sign stating "Welcome to Historic San Andreas - Calaveras County Seat" (pictured). The sign is located at the SR 49/Pool Station Road intersection. Signage like this aids in drawing attention to the transition from a rural highway into a community Main Street Corridor.



SR 49 - SR 12 to Gold Oak Road



Entering San Andreas from the North



SR 49/SR 12 Intersection, north of San Andreas



Gateway signage - Entering San Andreas from the North

Gold Oak Road to Court Street

While the San Andreas Community Plan area covers nine square miles, the San Andreas urban/commercial area is concentrated along a 1.3 mile segment of Saint Charles Street (SR 49), extending approximately from the SR 49/Gold Oak Road intersection to the SR 49/Mountain Ranch Road intersection.

Saint Charles Street (SR 49) from Gold Oak Road to Court Street is a two-lane highway segment approximately 0.4 miles in length and accommodating center TWLTLs and on-street parking throughout its extents.

This segment intersects with Russell Road and High School Street. Russell Road and Bellview Street collect residential traffic from western San Andreas and provide direct access to Saint Charles Street (SR 49) via one-way stop-controlled intersections. Motels and restaurants, as well as the post office and Calaveras High School, are located along this segment of Saint Charles Street (SR 49).

At its intersection with High School Street, which provides primary access to and from Calaveras High School, there are high volumes of student and school employee traffic turning left and right onto Saint Charles Street (SR 49).

Traveling southbound on Saint Charles Street (SR 49), there is one marked pedestrian crossing 300 feet north of High School Street (pictured), and incomplete sidewalk infrastructure. Heavy trucks driving through San Andreas on regional trucking routes pass by the entrance to the high school (pictured). Passing High School Street, Saint Charles Street (SR 49) slopes upwards to meet Court Street, just north of the historic Main Street.



SR 49 - Gold Oak Road to Court Street



School pedestrian crossing near the intersection of SR 49/Russell Road



Looking south on SR 49 - Heavy truck traffic by the High School

Court Street to Treat Avenue

Saint Charles Street (SR 49) from Court Street to Treat Avenue is a two-lane highway segment approximately 0.3 miles in length and accommodating center TWLTLs and on-street parking throughout its extents. There are patchy sidewalk facilities on either side of Saint Charles Street (SR 49) throughout this segment. There are two marked pedestrian crossings along this segment: one at Main Street, and one at California Street.

The SR 49/Main Street intersection signifies the town's geographic center and the historic core of San Andreas, and is distinguished by historic monuments and signage. Main Street begins at Saint Charles Street (SR 49) and travels one-way eastbound to Court Street, and two-way to Nielsen Road, where Main Street transitions into Gold Strike Road. In addition to these intersections, there are approximately 21 access points along this segment of SR 49 in the form of driveways and parking lots, connecting to local restaurants, shops, and residences.

Residential areas extend east and west into the hillsides on either side of the Main Street Corridor, connected to Saint Charles Street (SR 49) by Church Hill Road to the west, and California Street and Treat Avenue to the east.



SR 49 - Court Street to Treat Avenue



SR 49 /Main Street intersection



Pedestrian Crossing at California Street



SR 49 - Looking North from Main Street

Treat Avenue to Mountain Ranch Road

Saint Charles Street (SR 49) from Treat Avenue to Mountain Ranch Road is a two-lane highway segment approximately 0.4 miles in length and accommodating center TWLTLs and on-street parking throughout its extents. There are patchy sidewalk facilities on either side of Saint Charles Street (SR 49) throughout this segment. There are no marked pedestrian crossings along this segment.

While the only local road that connects to Saint Charles Street (SR 49) between Treat Avenue and Mountain Ranch Road is Angels Road, there are approximately 21 additional access points, connecting to local restaurants, shops, residences, gas stations, and a grocery store.



SR 49 - Treat Avenue to Mountain Ranch Road



SR 49/Treat Avenue intersection



Lack of sidewalk in the southbound direction on SR 49



Sidewalk in the northbound direction on SR 49



Heavy truck on street parking on SR 49

SR 49 through the Southern Gateway Plan Area

The southern segment of SR 49 in San Andreas runs for approximately one-mile south of the SR 49/Mountain Ranch Road intersection within the Southern Gateway Plan Area in southern San Andreas. There is a protected passing-lane for southbound traffic leaving San Andreas, and the roadway is a two-lane highway with passing lanes throughout this segment. Several local roads connect to SR 49 along this segment, including Angels Road, Airport Road (pictured), Knief Lane, and Buckskin Way. All of these roads are two-way stop-controlled at the minor approach.

The Southern Gateway Plan Area expands for 406 acres on the western and eastern sides of SR 49. Currently, the area consists of rural, open space, with sparsely located residential, industrial, and commercial sites connected by local roads. The area has no significant roadway network to support traffic flowing in from the south on SR 49, and remains geographically and systematically detached from the greater San Andreas community.

Due to the abrupt transition from an undeveloped rural highway area to a downtown "main street corridor", the southern segment of SR 49 generally hosts speeds that exceed the speed limits and safety standards for the rural community. Additionally, this transitional segments of SR 49 has eight access points, including the four roads identified above, as well as four uncontrolled driveways. Efforts to establish a southern gateway corridor on SR 49 aim to address these safety concerns by transforming the character area of southern San Andreas to highlight entrance into the community.



SR 49 - Mountain Ranch Road to Howell Road



SR 49/Mountain Ranch Road intersection



Entering San Andreas from the South

Mountain Ranch Road

Mountain Ranch Road is a two-lane major collector that runs from its intersection with SR 49 to the community of Mountain Ranch nine miles to the east. There are no pedestrian facilities crossing Mountain Ranch road through this segment. The posted speed limit is 25 mph.

Mountain Ranch Road provides access to the major government and employment centers in San Andreas. Marshall Avenue, Pope Street, Jeff Tuttle Drive, and Government Center Drive connect to Mountain Ranch Road. The presence of government facilities and employment centers along Mountain Ranch Road contributes to San Andreas' position as an activity hub and classifies Mountain Ranch Road as an important roadway for local and regional traffic.



Mountain Ranch Road - East of SR 49



Hospital sign on Westbound Mountain Ranch Road



Eastbound direction on Mountain Ranch Road, leaving San Andreas



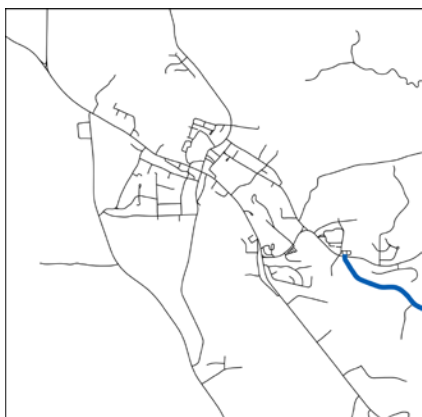
Government Center Building on Mountain Ranch Road



Approaching Mountain Ranch Road/Pope Street intersection from the East

Calaveritas Road

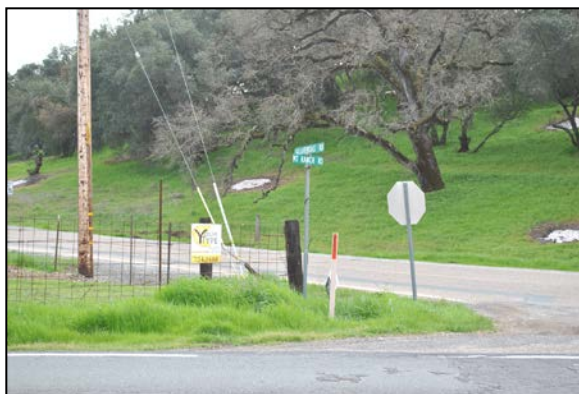
Calaveritas Road is a two-lane minor collector that runs southeast from Mountain Ranch Road to the community of Calaveritas. Through the San Andreas community, Calaveritas Road runs parallel to SR 49 and on the eastern border of the study area development site. Calaveritas Road provides access to residential communities just south of Mountain Ranch Road and sparsely located residential units throughout its extent.



Calaveritas Road



Calaveritas Road/Mountain Ranch Road intersection



Calaveritas Road/Mountain Ranch Road intersection

Pool Station Road

Pool Station Road is a two-lane major collector that runs from SR 49 on the north side of town to SR 4 approximately 10 miles southwest of San Andreas. Through the San Andreas community, Pool Station Road runs parallel to SR 49. Pool Station Road provides access to industrial sites, as well as Mountain Oaks School, Calaveras County Water District, and the Food Bank.



Pool Station Road



Northbound direction on Pool Station Road, towards San Andreas



Southbound direction on Pool Station Road

2.5 Multi-modal Facilities

A comprehensive network of bikeways and pedestrian paths that are safe, convenient, and accessible for multiple modes of travel is an essential part of community transportation infrastructure. However, as of current, Calaveras County has a limited network of bicycle and pedestrian facilities. According to the 2014 *General Plan Circulation Element Draft*, both bicycle and pedestrian facilities are discontinuous throughout the County, resulting in incomplete travel paths that significantly affect the mobility of children, seniors, and persons with disabilities who often rely on alternative travel modes.



Government Center Drive sidewalk - South Direction

In an effort to address these deficiencies, the *Calaveras County Bicycle Master Plan* and *Pedestrian Master Plan* were adopted in 2007 to establish guidance for bicycle and pedestrian planning throughout the County. The *Calaveras County Regional Bicycle, Pedestrian and Safe Routes to School Master Plan* was adopted in 2015 as an update to the bicycle and pedestrian master plans, and provides recommendations for facility improvements. The *San Andreas Rural Livable Mobility Plan* (2009) identifies transportation plans for the SR 49 Corridor through San Andreas and provides community input on active transportation needs.

In 2013, Caltrans published *Main Street, California - A Guide for Improving Community and Transportation Vitality*. The report provides planning, design, maintenance, and operational concepts for main street projects, and serves as a guide to complete streets and active transportation planning along State highways.

This section provides a summary of existing and proposed active transportation facilities within San Andreas. This section also reviews existing recommendations presented in the documents listed above, and introduces Complete Streets as a concept for the SR 49 Corridor.

Facility Classification

The 2014 *General Plan Circulation Element Draft* encourages the use of bicycling and walking, and recognizes the following functional classes of bicycle and pedestrian facilities:

Class I – Bicycle Path. Class I facilities are multi-use facilities that provide a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.

Class II – Bicycle Lane. Class II facilities provide a striped and signed lane for one-way bicycle travel within the paved area of a roadway that shares the roadway with motor vehicles. The minimum width for bike lanes ranges between four and six feet depending upon the edge of roadway conditions (curbs). Bike lanes are demarcated by a six-inch white stripe, signage, and pavement legends.



Class III – Bicycle Route. Class III facilities provide signs for shared use with motor vehicles within the same travel lane on a street or highway. Bike routes may be enhanced with warning or guide signs and shared lane pavement markings. While Class III routes do not provide a measure of separation, they have an important function in providing continuity to the bikeway network.



Class IV – Separated Bikeway. An exclusive bikeway for bicyclists that is separated from the roadway. Separations may include grade separation, flexible posts, physical barriers, or on-street parking.

Pedestrian Path. A path that is physically separated by distance or barrier from a roadway. Pedestrian paths are different from sidewalks and are typically constructed in conjunction with Class I Bicycle Paths.

Sidewalk. A pedestrian-dedicated paved walkway located adjacent to roadways.

Complete Street. A transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit vehicles, truckers, and motorists, appropriate to the function of the facility. Complete streets must be designed for the needs of travelers of all ages and abilities.



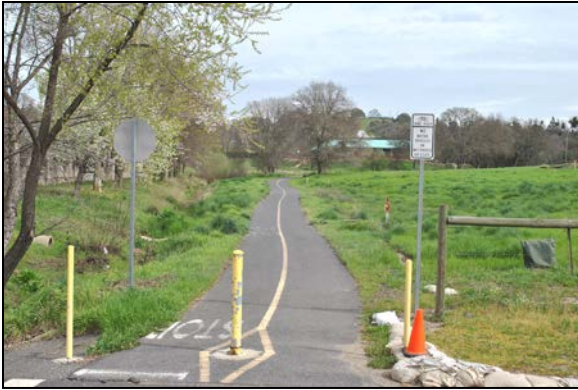
Existing Bicycle and Pedestrian Facilities

Calaveras County currently has approximately 2.5 miles of separated (Class I) bikeway, 0.4 miles of striped Class II bicycle lanes, and just less than 3 miles of signed (Class III) bicycle routes. Additionally, there is approximately 17.6 miles of recreation trail. Sidewalks are generally located within commercial centers. San Andreas currently has 0.86 miles of bicycle infrastructure. According to U.S. Census Data (2014), approximately 1.0 percent of San Andreas residents commute to work by bike. Table 11 lists the existing bicycle facilities in San Andreas. The following images show existing bicycle facilities in San Andreas.

**TABLE 11
EXISTING BICYCLE FACILITIES**

Existing Bikeway	Start	End	Class	Length (miles)
Government Center Class I Shared-Use Path	County Government Offices	Library	I	0.44
Gold Strike Rd	Gold Strike High School	Pixley Ave	I	0.32
Government Center Dr/Jeff Tuttle Dr	Government Center Rd	End of Jeff Tuttle Dr	II	0.1

Sources: Calaveras County Regional Bicycle, Pedestrian and Safe Routes to School Plan, 2015.



Government Center Class I - East Direction Government Center Dr - South Direction



Jeff Tuttle Drive - East Direction Government Center Class I terminus - East Direction

Pedestrian facilities include sidewalks, crosswalks, and pedestrian paths. Aspects of pedestrian safety include condition and continuity of sidewalks, crosswalk visibility, warning signs, street lighting, and curb extensions, among others. According to US Census data (2014), approximately 13.8 percent of San Andreas residents walk to work.

San Andreas' pedestrian facility network is comprised of nearly complete but discontinuous sidewalks on either side of SR 49 and Mountain Ranch Road. Aside from the easterly side of SR 49 from Main Street to Mountain Ranch Road, there is no continuous path accommodating safe pedestrian travel from various destinations throughout the community.



There are three crosswalks on SR 49 at the following intersections on the State highway: Russell Road, Main Street, and California Street. These crosswalks feature some level of visibility, but are not sufficient for their location along a State route of regional significance. The following images show existing pedestrian facilities in San Andreas.



Pedestrian crossing by the elementary school, Lewis Avenue Pedestrian crossing on SR 49 just south of Russell Road



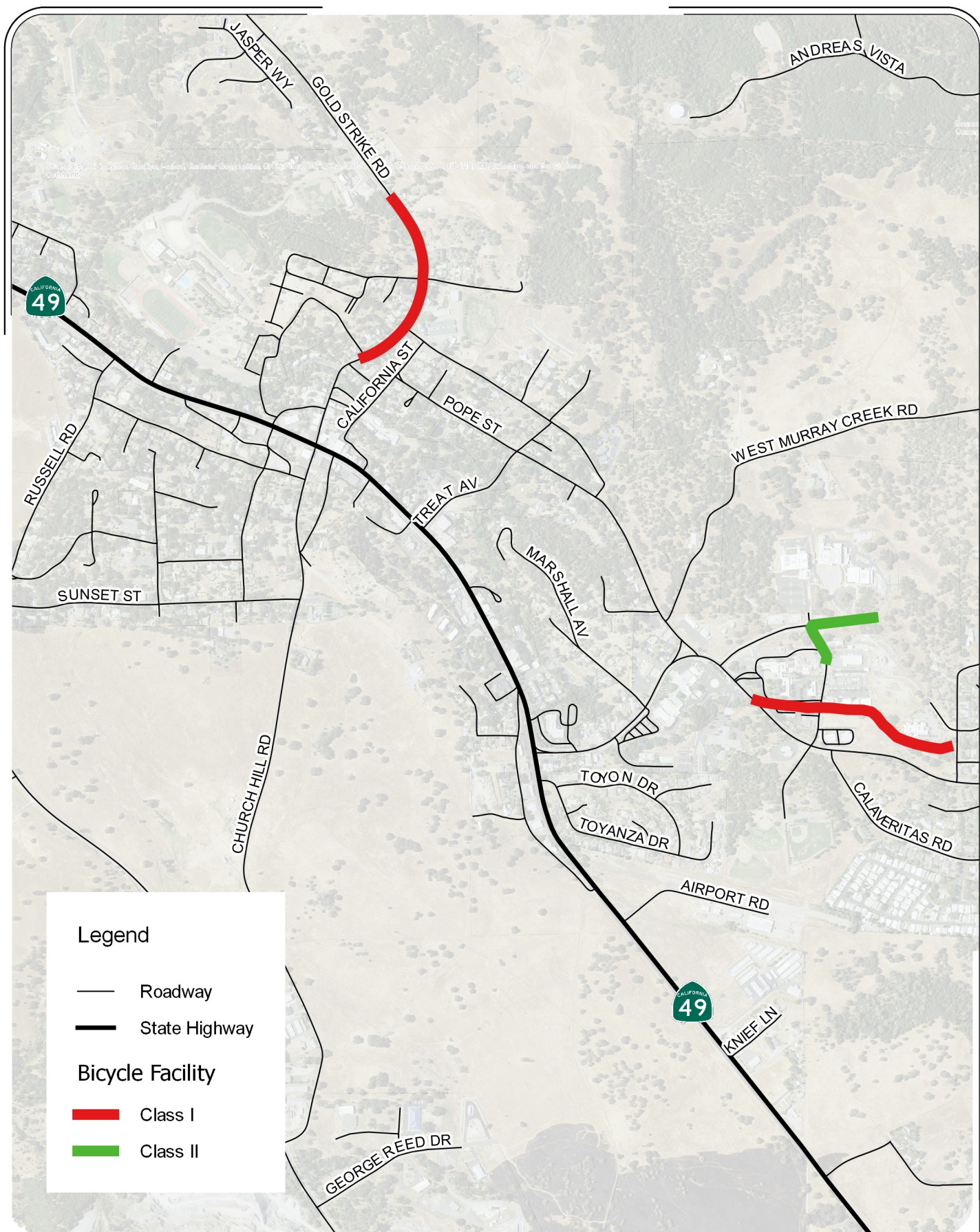
Faded pedestrian crossings on Government Center Drive

Pedestrians using the sidewalk on Jeff Tuttle Drive



Government Center Class I Multi-Use Path Pedestrian bridge crossing at the Public Library

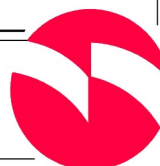
Figure 7 and Figure 8 present the locations of existing bicycle and pedestrian facilities as identified in the *Rural Livable Mobility Plan* (RLMP, 2009); and the *Calaveras County Regional Bicycle, Pedestrian, and Safe Routes to School Plan* (Bike, Ped, and SRTS Plan, 2015). Additional sidewalks and crosswalks were identified during field visits conducted in 2016.

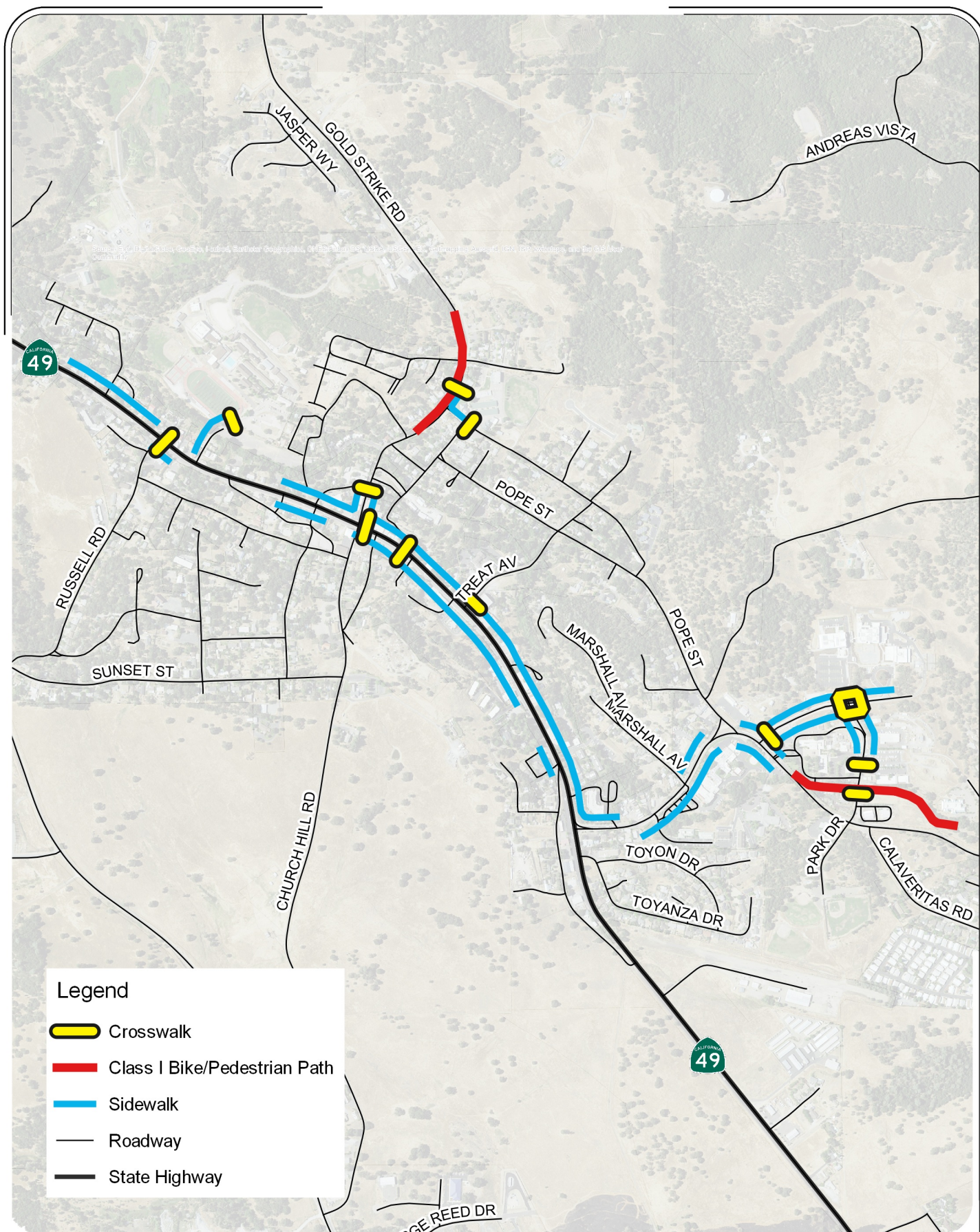


San Andreas SR 49 Commercial Gateway & Corridor Study

Existing Bicycle Facilities

Figure 7





San Andreas SR 49 Commercial Gateway & Corridor Study

Existing Pedestrian Facilities

Figure 8

Proposed Bicycle and Pedestrian Facilities

Table 12 and Table 13 show proposed bikeways and pedestrian facilities as recommended in the Bike, Ped, and SRTS Plan (2015).

**TABLE 12
PROPOSED BICYCLE FACILITIES**

Recommended Bikeway	Start	End	Class	Length (miles)	Source
Calaveritas Rd	Government Center	South Community Boundary	III	5.64	Calaveras County Regional Bicycle, Pedestrian and Safe Routes to School Plan
California St	Lewis Ave	Nielsen Park	III	0.15	
Government Center Dr	Mountain Ranch Rd	Government Center Rd	II	0.14	
Hwy 12	West Community Boundary	Pool Station Rd	STR	4.16	
Hwy 49	Pool Station Rd	Angels Rd	II	1.59	
Hwy 49	Hwy 26	Hwy 12	III	7.09	
Hwy 49	Angels Rd	South Community Boundary	STR	6.01	
Lewis Ave/Pope St/Mountain Ranch Rd	California St	Mountain Ranch Rd	I	0.7	
Main St	Hwy 12	Nielsen Park	III	0.09	
Mountain Ranch Rd	Pope St	Hwy 49	III	0.41	
Nielsen Park	Main St	California St	III	0.07	
Pool Station Rd	Hwy 49	South Community Boundary	III	5.43	
Pope St	California St	Lewis Ave	III	0.38	
San Andreas Elementary Path	Gold Hunter Rd	East end of Existing Path	I	0.03	

**TABLE 13
PROPOSED PEDESTRIAN FACILITIES**

Recommended Sidewalks	Start	End	Length (ft)
East side - St Charles St/Hwy 49	Pool Station Rd	Angeles Rd	8410
West wide - St Charles St/Hwy 49	High School St	Court St	1070
West wside - St Chrale St/Hwy 49	SE Gold Oak Rd	Russell Rd	160
Mountain Ranch Rd	Hwy 49	Government Center Dr	2973
Government Center Dr	Government Center Rd	Mountain Ranch Rd	326

Source: Calaveras County Regional Bicycle, Pedestrian and Safe Routes to School Plan

Complete Streets

The Complete Streets Act of 2008 (Assembly Bill 1358) requires cities and counties to adopt complete streets concepts in their general plans. A complete street provides mobility for all users, including bicyclists, pedestrians, transit riders, and motorists. The 2014 *Calaveras County General Plan Draft Circulation Element* holds the following policy on "Complete Streets":

CIR 1.1 *Incorporate the concept of complete streets in all planning, programming, design, operations, and maintenance activities, which requires more complete consideration of all users of the street, including pedestrians, bicyclists, automobiles, trucks, and transit, as appropriate for surrounding land uses.*

State Highway Main Streets

Caltrans' Deputy Directive 64-R2 (2008, 2014) directs Caltrans to implement complete streets. Recognizing the challenges as well as opportunities that accompany communities whose Main Street is also a State highway, Caltrans introduced their *Main Street, California* guide in 2013. The guide provides planning and design solutions for complete streets on State highways, and moves away from planning for high-speed Interstate highways. Caltrans states the following:

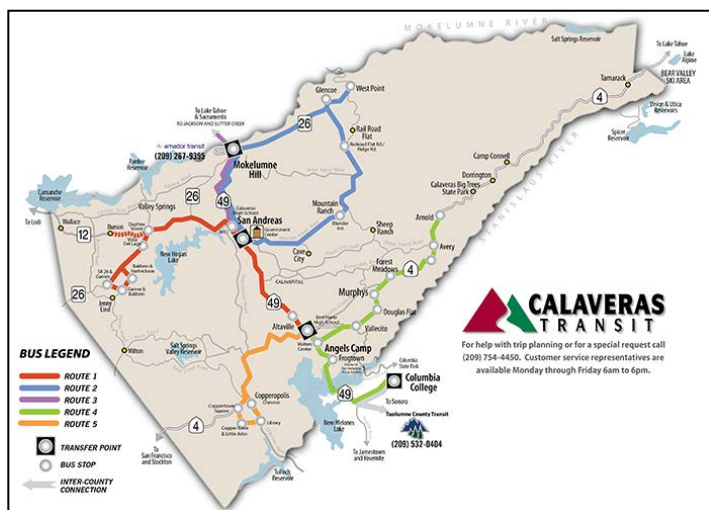
"State highway main streets must accommodate the circulation of the local community as well as regional and statewide travel demands [and] ensure that mobility and access are addressed in a manner that makes main street an asset to the local community."

Integral to a successful State highway Main Street is a sense of community livability, identify, and economic viability. Features such as street landscapes, safe public spaces, and options for active transportation promote a "sense of place" that enhances community life, improves circulation, and attracts opportunities for economic advancement.

Transit Facilities

Access to transit facilities is an important component of "Complete Streets". Transit service within Calaveras County is provided by Calaveras Transit of Calaveras County Department of Public Works. Calaveras Transit operates between 5:30 AM and 8:00 PM Monday through Friday, with no service on weekends or holidays. Calaveras Transit currently has five routes through Calaveras County. The Delta Gold Line provides bus service from the San Andreas Government Center to the City of Stockton, twice per day.

Routes 1 (A and B), 2, and 3 pass through San Andreas, connecting the community to Rancho Calaveras, Angels Camp, Valley Springs, Burson, West Point, Railroad Flat, Mountain Ranch, Jackson, and Mokelumne Hill, as shown in the Calaveras Transit map. As reported by the U.S. Census (2014), no San Andreas residents travel to work via transit.



2.6 Collision Summary

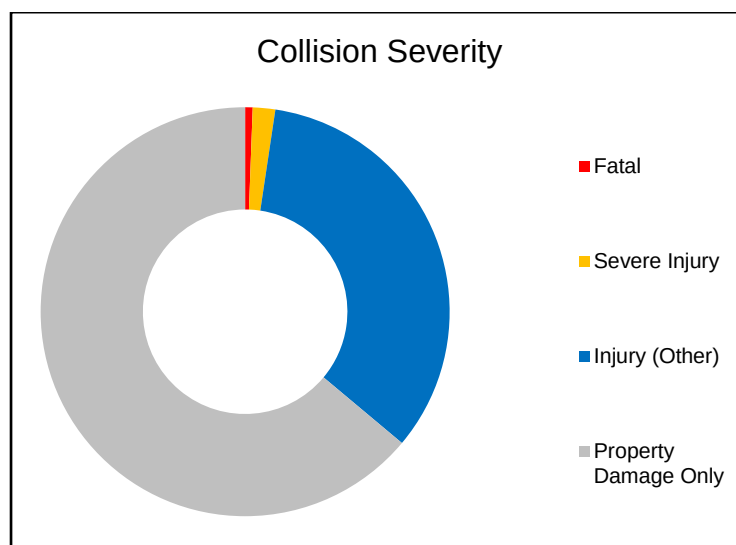
Collision data for the San Andreas circulation study area was derived from Statewide Integrated Traffic Records System (SWITRS), maintain by the California Highway Patrol (CHP), for a five-year period between January 1, 2011 and December 31, 2015.

Collision Type and Severity

During this five-year period, 179 collisions occurred within the circulation study area and on connecting roadways, resulting in 1 (0.6 percent) fatality, 3 (1.7 percent) severe injuries, 62 (33.5 percent) mild to moderate injuries, and 113 (63.1 percent) damages to property. The following tables provide a summary of the collisions within the study area from January 1, 2011 to December 31, 2015 by collision type and severity type, respectively. Tables 14 and 15 presents collision severity and collision type by study roadway. The following graphic presents the frequency of these severity types.

TABLE 14
COLLISIONS SEVERITY BY STUDY ROADWAY

	Fatal	Injury (Other)	Property Damage Only	Severe Injury	Grand Total
Calaveritas Rd			2		2
California St			1		1
Church Hill Rd			2		2
Court St			1		1
Mountain Ranch Rd		3	12	2	17
Pool Station Rd			2		2
Pope St		1	2		3
SR 49	1	40	67		108
SR 12		8	13		21

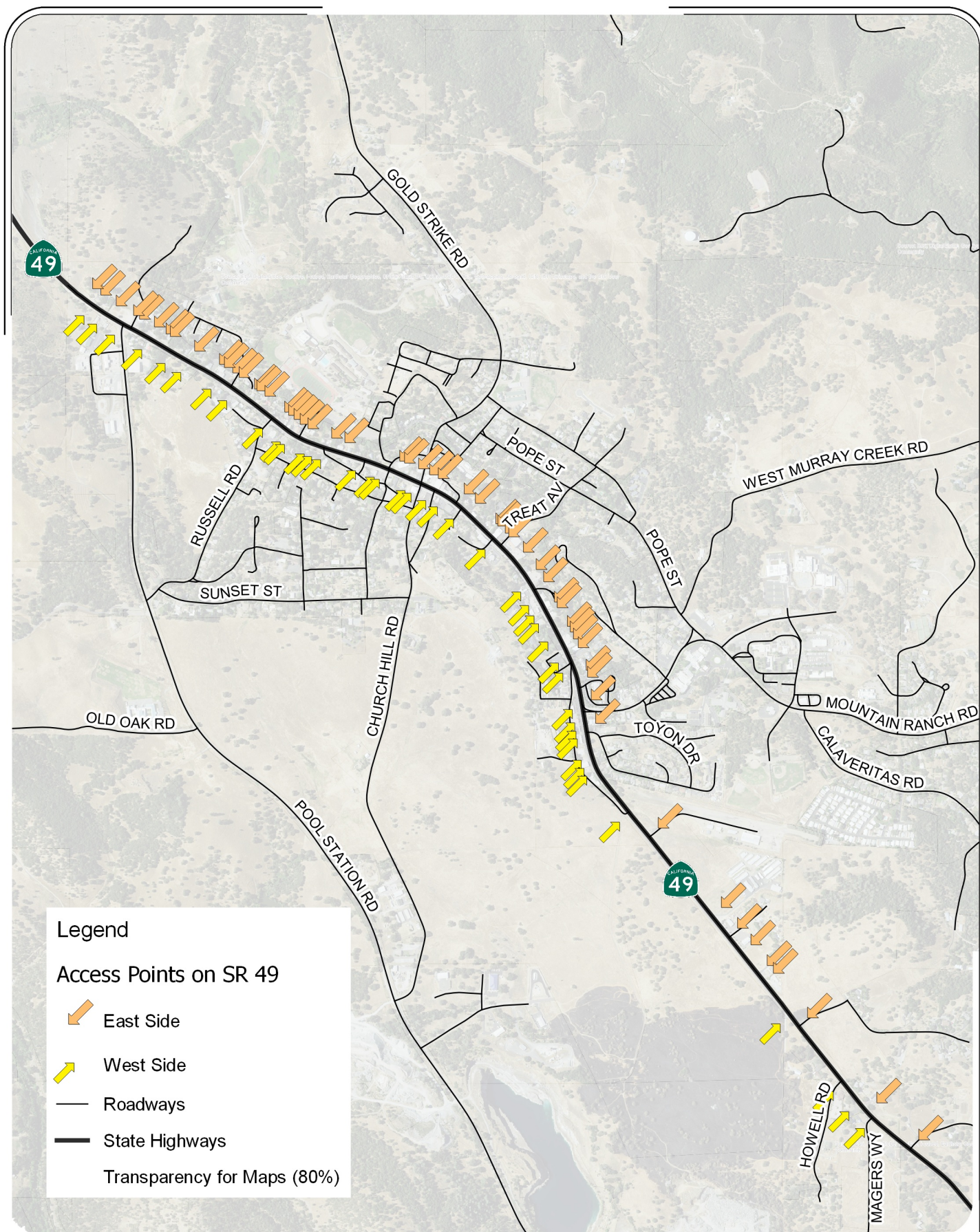


**TABLE 15
COLLISIONS BY TYPE**

<u>Collision Type</u>	Calaveritas Rd	California St	Church Hill Rd	Court St	Mountain Ranch Rd	Pool Station Rd	Pope St	SR 49	SR 12	Grand Total
Broadside							1	39	3	43
Head-On					3			3	1	7
Hit Object	1	1	1	1	5	2	1	13	11	36
Other	1							4		5
Overtaken					3			3	3	9
Rear End					4		1	33	2	40
Sideswipe			1		1			11	1	14
Vehicle/Pedestrian					1			2		3
Grand Total	2	1	2	1	17	2	3	108	21	157

Highway Access Points

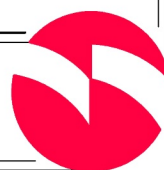
Segment collision rates through San Andreas are associated with the high number of access points along SR 49, where vehicles entering/existing the highway conflict with each other. Access points include intersecting roadways, and private and commercial driveways. Figure 9 presents the location of access points along SR 49.



San Andreas SR 49 Commercial Gateway & Corridor Study

Access Points on State Route 49

Figure 9



Collision Location & Severity

The majority (108 collisions/61 percent) of all collisions occurred on SR 49, including one fatality at the intersection of SR 49/Angels Road in 2012. Of the collisions with reported direction of travel, the majority occurred in the northbound direction. Nineteen collisions (18 percent) of collisions on SR 49 occurred just north or south of Treat Avenue. Figure 10 presents the approximate locations and frequency of these collisions. Figure 11 presents the location and severity of collisions resulting in injuries or fatalities.

Figure 10 - Collision Locations

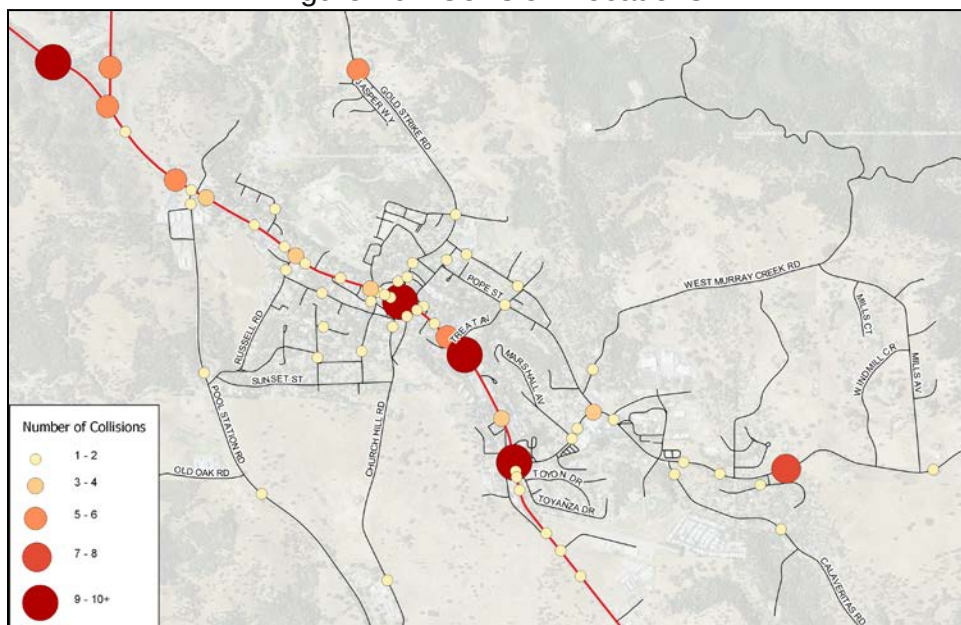
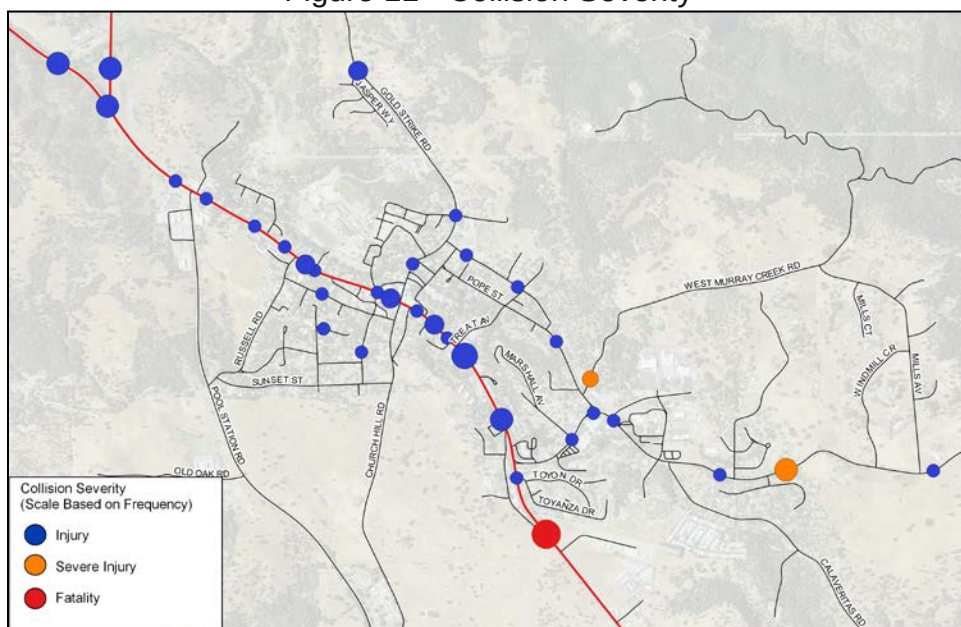


Figure 11 - Collision Severity



Between 2011 and 2015, there were three vehicle/pedestrian collisions, three vehicle/bicycle

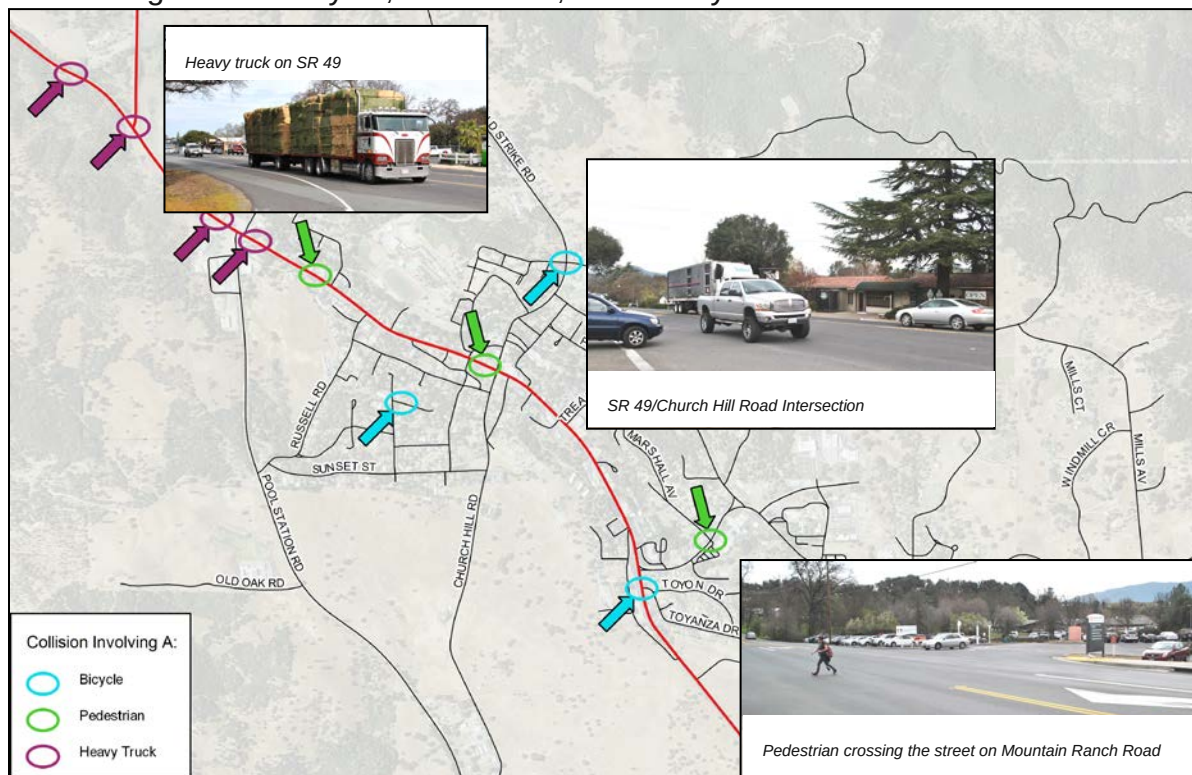
collisions, and five collisions involving a heavy truck. There were no severe injuries or fatalities. Table 16 shows the location and severity of these collisions along with Figure 12.

TABLE 16
COLLISIONS INVOLVING A BICYCLE, PEDESTRIAN, OR HEAVY TRUCK

Year	Primary Roadway	Location	Approximate Time	Injury Type	Severity	Collision Type	Existing Facilities/ Roadway Design
2011	SR 49	South of Court Street	7:54 PM	Pedestrian	Injury (Other)	Vehicle/Pedestrian	Sidewalk on east side; No crosswalk
2011	SR 49	North of Gold Oak Road	10:00 PM	Pedestrian	Injury (Complaint of	Vehicle/Pedestrian	No sidewalk; No crosswalk
2012	Gold Strike Road	Avenue	2:15 PM	Bicycle	Property	Other	Class I Bike Path
2012	SR 49	South of Pool Station Road	3:05 PM	Truck	Damage Only	Broadside	Two-way highway; No TWLTL
2012	SR 49	Intersection with Toyanza Street	3:40 PM	Bicycle	Injury (Complaint of	Other	No bike lane
2013	SR 12	West of SR 49	2:00 PM	Truck	Property	Hit Object	Two-way highway; No TWLTL
2013	SR 49	Intersection with SR 12	5:25 PM	Truck	Damage Only	Broadside	One-way stop controlled intersection
2014	Mountain Ranch Road	Marshall Avenue	10:30 AM	Pedestrian	Injury (Pain)	Vehicle/Pedestrian	Sidewalk; No crosswalk
2015	SR 49	North of Pool Station Road	8:03 AM	Truck	Injury (Other)	Hit Object	Two-way highway; No TWLTL
2015	Pine Street	South of Mariposa St	9:30 AM	Bicycle	Injury (Other)	Broadside	No bike lane
2015	SR 49	Intersection with SR 12	9:35 PM	Truck	Property Damage Only	Broadside	One-way stop controlled intersection

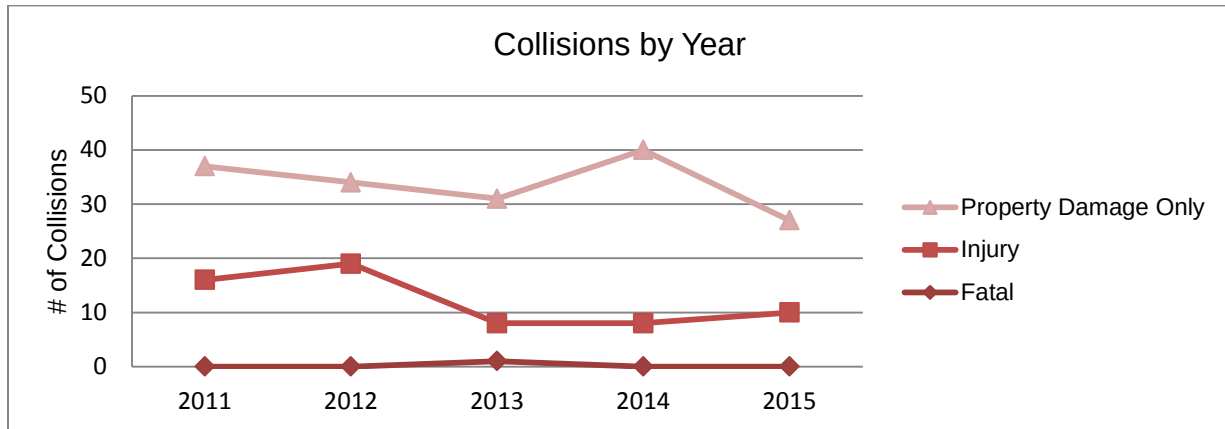
Source: SWITRS, 2011 - 2015

Figure 12 - Bicycle, Pedestrian, and Heavy Truck Collision Locations

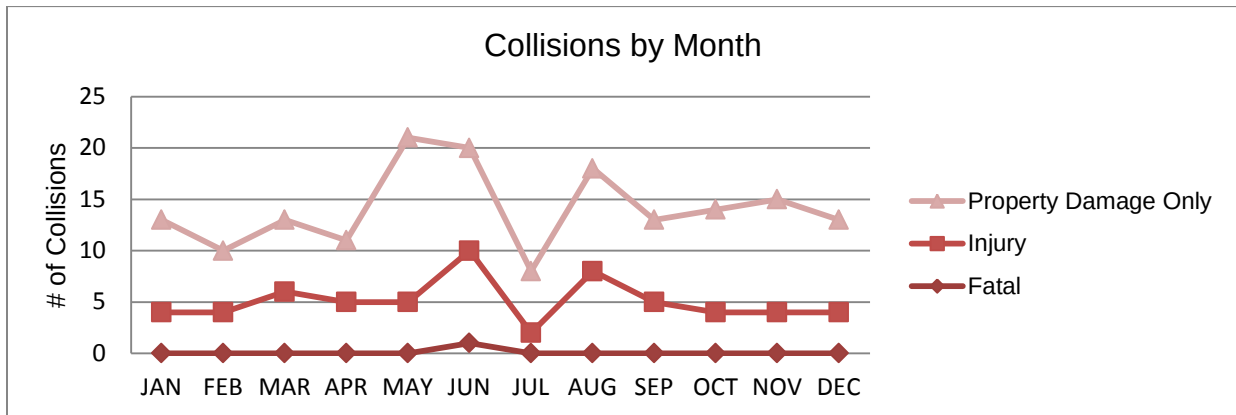


Collision Frequency

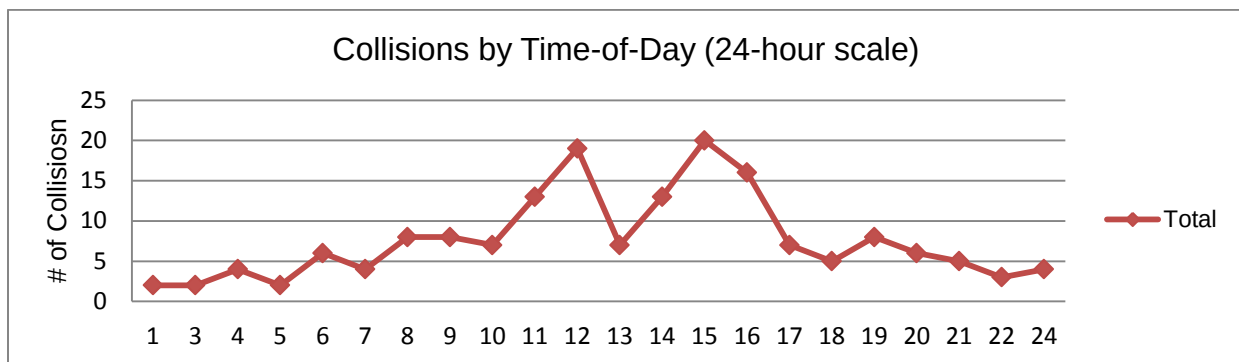
According to data gathered from SWITRS between January 1, 2011 to December 31, 2015, approximately 169 collisions have occurred within the circulation study area and connecting roadways. Collisions are most frequent during the months of May, June, and August; and between the hours of 11 AM to 12 AM, and 2 PM to 4 PM. Over the five year data period, there have been on average 34 collisions per year, with a slight spike in 2014 and fall in 2015, as shown in the following graphic.



The following graphic shows the number of collisions by month during the five-year period.



The following graphic shows the number of collisions by time-of-day during the five-year period.



Safety Performance

Collision rates were calculated for segments along SR 49 and Mountain Ranch Road, in terms of "accidents per million vehicle miles traveled". The collision rates are based on the number of collisions, the Average Daily Traffic (ADT) volumes (April 2016), the length of the segment, and the following equation:

$$\text{Collision Rate} = \frac{(\text{Number of Collisions}) \times (1,000,000)}{\text{Vehicle Miles Traveled}}$$

The calculated collision rates were compared with statewide average rates compiled by the Caltrans as published in their most recent document *2012 Collision Data on California State Highways*¹. The document provides basic average accident rates for various types of roadways and intersections categorized by number of lanes, travel speed, etc., and are derived from SWITRS. Table 17 presents the collision rates for the study segments of SR 49 and Mountain Ranch Road, as well as portions of the segments within the circulation study area.

TABLE 17
SAFETY PERFORMANCE: SR 49 AND MOUNTAIN RANCH ROAD

Segments	Length (mi)	2016 ADT	Total Collisions	Fatality (F) + Injury (I)	Segment F + I %	Statewide F + I %	Segment Collision Rate	Statewide Basic Average Rate
SR 49 (SR 12 to Howell Rd)	2.7	11365	100	38	38.0%	45.4%	1.79	1.15
SR 12 to Belview	0.88	11573	30	12	40.0%	45.4%	1.61	1.15
Belview to Treat Ave	0.44	12399	34	11	32.4%	45.4%	3.41	1.15
Treat Ave to Mtn Ranch Rd	0.4	12399	23	9	39.1%	45.4%	2.54	1.15
Mnt Ranch to Howell Rd	0.98	9089	13	6	46.2%	45.4%	0.80	1.15
Mountain Ranch Rd (SR 49 to east of Calaveritas)	1.12	5703	17	5	29.4%	42.5%	1.46	1.20
SR 49 to Calaveritas	0.59	7401	8	2	25.0%	42.5%	1.00	1.19
e/o Calaveritas	0.53	4005	9	3	33.3%	42.5%	2.32	1.23

As shown in red in Table 17, there are six segments where the collision rate is higher than the statewide average rate and one segment where the fatality and injury percentage of collisions is higher than the statewide average percentage. Overall, both SR 49 and Mountain Ranch Road, through the extents of the circulation study area, have higher collision rates than statewide average rates.

¹ California Department of Transportation *2012 Collision Data on California State Highways* (road miles, travel, collisions, collision rates), Division of Traffic Operations, Sacramento, CA.

2.7 Existing Traffic Operations

Traffic operations and impact are typically 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 as determined by vehicle delay and congestion. Table 18 presents intersection control types and corresponding LOS standards.

Recent state legislation (Senate Bill 743) mandates that traffic impact analysis utilize a different element to determine traffic operating conditions: Vehicle Miles Traveled (VMT). While this mandate will not take effect during the lifetime of this Study, the Calaveras County 2014 *General Plan Draft Circulation Element* recognizes that the new traffic impact analysis guidelines should be considered within the scope of future transportation planning, and has incorporated the following policies:

CIR 1.1 *Incorporate the concept of complete streets in all planning, programming, design, operations, and maintenance activities, which requires more complete consideration of all users of the street, including pedestrians, bicyclists, automobiles, trucks, and transit, as appropriate for surrounding land uses.*

CIR 1.3 *Prioritize funding and construction of projects that reduce vehicle miles traveled.*

CIR 1.6 *Encourage development that reduces or limits vehicle miles traveled, consistent with the policies of the Land Use Element.*

Level of Service Policy

The Calaveras County 2014 *General Plan Update Circulation Element* contains the following policy pertaining to the LOS standards within County jurisdiction:

CIR 2.3: Road impacts created by new development shall not reduce the minimum level of service of (LOS) D or better for roadways and intersections in Community Areas [...] and LOS C or better on County-maintained roadway outside of Community Areas, except as specified [...].

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.

**TABLE 18
LOS STANDARDS**

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

Traffic operation analysis was conducted for the 14 study intersections within the Circulation Study Area. These intersections were chosen based on their strategic location along and proximity to the SR 49 corridor and Mountain Ranch Road. Turning movement counts were collected on Tuesday, April 19, 2016 for the AM and PM peak hours.

Table 19 presents the existing peak hour intersection LOS for the 14 intersections (Note: Due to existing lane geometrics, the Mountain Ranch Road/Pope Street intersection is analyzed as two intersections, 10a and 10b). Bold text indicates unacceptable LOS D or worse. Table 20 presents the ADT calculated as the average of the daily traffic counts collected between April 19-21, 2016.

**TABLE 19
EXISTING INTERSECTION LOS**

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
1	SR 49 & SR 12	TWSC	C	59.4	F	29.4	D
2	SR 49 & Pool Station Road	TWSC	C	28.7	D	36.2	E
3	Pool Station Road & Russell Road	TWSC	C	9.5	A	9.0	A
4	SR 49 & Russell Road	TWSC	C	20.0	C	13.8	B
5	SR 49 & High School Street	TWSC	C	45.3	E	21.7	C
6	SR 49 & Court Street/Adams Avenue	TWSC	C	30.0	D	32.7	D
7	SR 49 & Main Street/Church Hill Road	TWSC	C	18.4	C	14.2	B
8	SR 49 & Treat Avenue	TWSC	C	20.2	C	17.6	C
9	SR 49 & Mountain Ranch Road³	TWSC	C	59.9	F	69.3	F
10a	Mountain Ranch Road & Pope Street (west)	TWSC	C	9.9	A	11.2	B
10b	Mountain Ranch Road & Pope Street (east)	TWSC	C	16.1	C	15.7	C
11	Mountain Ranch Road & Jeff Tuttle Drive	TWSC	C	10.2	B	11.6	B
12	Jeff Tuttle Drive & Gov't Center Drive	AWSC	C	7.3	A	7.1	A
13	Mountain Ranch Road & Park Drive/Gov't Center Drive	TWSC	C	12.2	B	13.9	B
14	Mountain Ranch Road & Calaveritas Road	TWSC	C	11.6	B	12.0	B

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDBT = Roundabout

2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDBT

3. Intersection delay based on NB approach due to minimal traffic on EB approach

**TABLE 20
EXISTING AVERAGE DAILY TRAFFIC**

Location	Existing ADT Count
SR 12 n/o SR 49	6,830
SR 49 n/o SR 12	5,260
SR 49 s/o SR 12	11,573
Pool Station s/o SR 49	1,836
SR 49 s/o Bellview Street	12,399
Court Street e/o SR 49	1,380
Church Hill Road w/o SR 49	850
Main Street e/o SR 49	700
SR 49 n/o Treat Avenue	12,559
SR 49 n/o Mountain Ranch Road	11,300
SR 49 s/o Mountain Ranch Road	9,089
Mountain Ranch Rd e/o SR 49	7,401
Pope Street n/o Mountain Ranch	1,533
Mountain Ranch Rd e/o Jeff Tuttle Drive	5,940
Calaveritas Rd s/o Mountain Ranch Road	967
Mountain Ranch Road e/o Calaveritas Road	4,005

3. Existing Land Use and Future Growth

3. Existing Land Use and Future Growth

The Southern Gateway Plan Area (land use study area) encompasses approximately 400 acres, including 240 acres of undeveloped land in southern San Andreas. This section provides summaries of land use and market analyses, and future land use growth scenarios.

3.1 Land Use and Market Analysis Summaries

This section highlights existing land uses and environmental conditions for the land use study area and San Andreas in general, that were conducted by De Novo Planning Group and New Economics & Advisory, respectively. Full reports presenting the entirety of these analyses are provided in the Appendix.

Land Use Analysis

The land use study area is designated Single-Family Residential (SFR), Multi-Family Residential (MFR), Commercial Planned Development (C-PD), and Industrial Planned Development (I-PD) by the San Andreas Community Plan. The area south of the study area is designated Agricultural Preserve, Mineral Resource Area 2B, and Timberlands/Mineral Resource 2A/Dam Inundation by the 1996 *Calaveras County General Plan*. Table 21 shows the land use designation categories by acreage, as provided by De Novo Planning Group.



Landscape of Oak trees in the Land Use Study Area

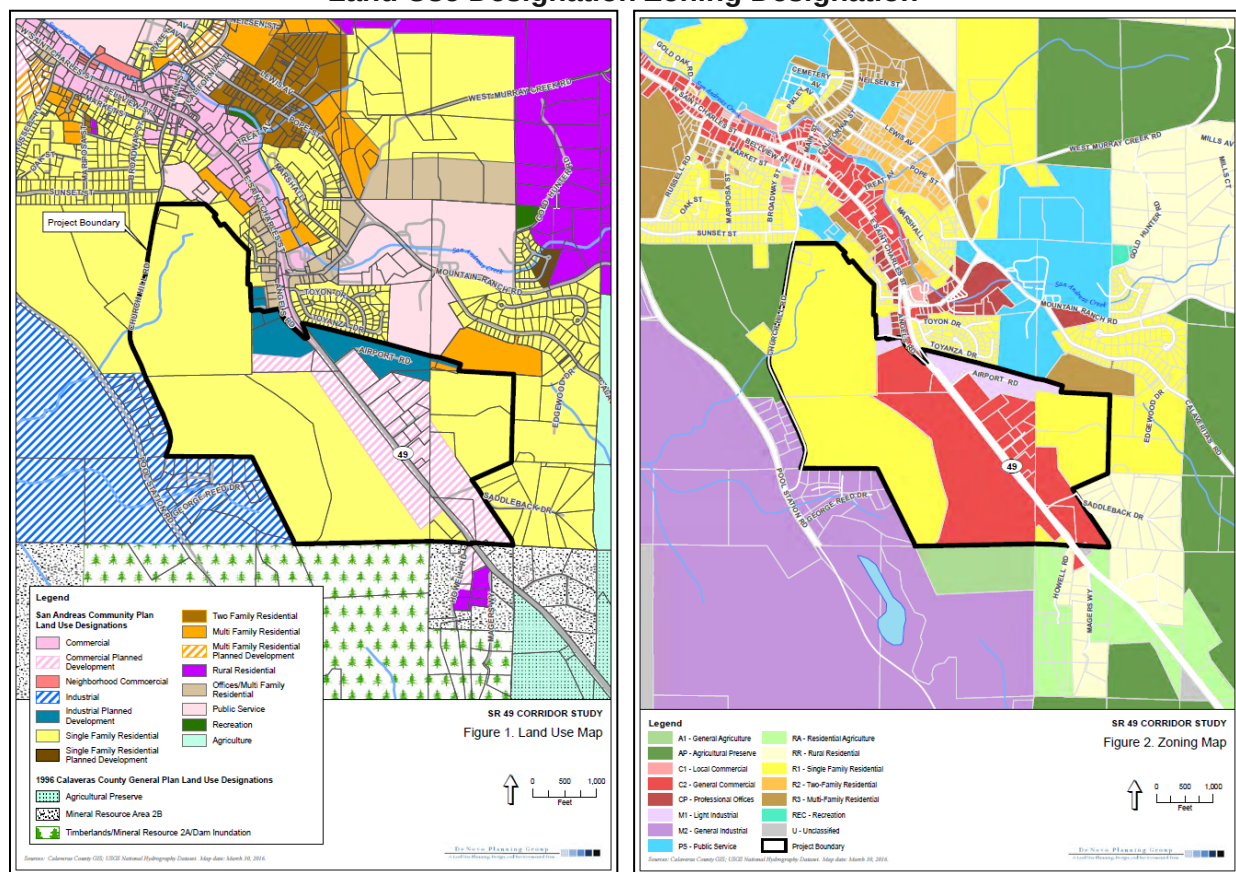
TABLE 21
STUDY AREA LAND USE DESIGNATIONS

Land Use Designation	Total Acres	% of Total
Commercial Planned Development (C-PD)	82.89	20.6%
Industrial Planned Development (I-pD)	29.84	7.4%
Multi-Family Residential (MFR)	0.99	0.2%
Single Family Residential (SFR)	289.23	71.8%
Total	402.95	100.0%

As prepared by De Novo Planning Group, 2016.

The following images present the land use designations and the zoning designations map as provided by De Novo Planning Group. The land use study area is zoned Single-Family Residential (R1), General Commercial (C2), and Light Industrial (M1). The portion of the study area adjacent to SR 49 is zoned C2 and M1; the eastern and westernmost portions of the study area are zoned R1.

Land Use Designation Zoning Designation



Environmental Conditions

The general landscape of the land use study area is classified as grasslands and oak woodland habitat. There are clusters of oak woodlands throughout and a stream located in the northwestern portion of study area. The majority of the slopes in the study area are less than 15 percent. Areas that contain slopes greater than 15 percent include areas near the on-site stream/river in the northern portion, the southeastern corner, and a small area in the central portion of the study area.

Development Status

The land use study area is comprised of underutilized, vacant, and developed parcels, each with an adopted land use designation. Underutilized parcels have some form of development or improvement, but the improvements and existing development represent a small fraction of the development potential of the parcel, as allowed by the San Andreas Community Plan.



Industrial/commercial site on Airport Road

There are approximately 120.88 acres of underutilized parcels and 246.46 acres of vacant parcels in the land use study area. There are approximately 35.61 acres of developed parcels in the land use study area, which are concentrated east of SR 49, north and south of Airport Road. Table 22 shows the breakdown by land use category of the underutilized and vacant parcels in the land use study area.

TABLE 22
LAND USE STUDY AREA: DEVELOPMENT STATUS

Land Use Designation	Underutilized Acres	Vacant Acres	% of Total
Commercial Planned Development (C-PD)	12.96	55.09	18.5%
Industrial Planned Development (I-pD)	9.74	3.34	3.6%
Multi-Family Residential (MFR)	0	0.88	0.2%
Single Family Residential (SFR)	98.18	187.5	77.8%
Total	120.88	246.46	100.0%

As prepared by De Novo Planning Group, 2016.

Water Supply & Sewer Services Summary

According to an analysis on environmental conditions and constraints prepared by the De Novo Planning Group (See Appendix A), Calaveras Public Utility District (CPUD), which provides treated water services to the study area, has adequate capacity to provide service to existing water connections, and adequate water rights to supply projected growth in demand well past 2030. CPUD has adequate treatment capacity to accommodate near-term growth in the next 10-15 years.

The Wastewater Treatment Plant (WWTP) is currently at capacity. The District estimates that the WWTP can accept a maximum of 22 new connections, and that it will need a new plant to serve projected growth. Additionally, there is no reserve capacity for in-fill development.

Market Analysis

According to the Market Analysis prepared by New Economics & Advisory in 2016 (See Appendix B), San Andreas remains a challenged market for new development. While there is a relatively large amount of jobs within the community, employees favor living outside of San Andreas because of the lack of "quality of life" factors such as building quality stock, shopping opportunities, and recreational/cultural amenities. While the County grew by approximately 500 new homes from 2006 to 2015 (the majority of which occurred in the communities of Valley Springs and Copperopolis), San Andreas grew by only 7 new homes.

The following findings and projections from the Market Analysis are intended to provide a realistic and reasonable expectation for future development opportunities in the land use study area. These estimates are based on future expectation of growth in the County, and San Andreas' current anticipated share of countywide growth. However, with potential opportunities to enhance circulation and access to the study, the potential exists for San Andreas to capture a larger share of countywide growth and develop more of its study area than the study projects.

Additionally, should the County experience more growth than currently anticipated, San Andreas could potentially achieve higher levels of growth within the study area.

Overall Findings:

- San Andreas median household income and average home sales price are significantly lower than communities throughout the County and new home development is limited.
- Residential growth in San Andreas has been limited, and its proportion of growth in the region has been declining over the past 40 years.
- San Andreas holds the opportunity to attract future development to serve workers who are employed in San Andreas and wish to live close to their place of work.
- The Primary Trade Area (PTA) of San Andreas is a six-mile radius around the center of town; however, it does not capture residents of areas near Jackson and Angels Camp, who have a larger selection of shopping opportunities available to them closer their homes.
- No significant retail development has occurred in several decades, and existing retail buildings in San Andreas are uniformly aged and of poor quality by today's standards.

Projections:

- Assuming "business as usual" conditions, San Andreas can expect to experience approximately 180 (a growth increase of 0.69 percent per year) to 220 units of new residential growth over the next 20 years.
- San Andreas may support up to approximately 20,000 square feet (approximately 2.0 acres) of new retail development over the next 20 years.
- Given anticipated growth in employment and population, San Andreas could expect approximately 2 to 4 acres of office development in the next 20 years.
- San Andreas could expect approximately 1.5 to 3.5 acres of industrial space by 2035.

Table 23 summarizes the growth projections for residential, retail, office, and industrial land uses, with a moderate estimate and high estimate for 20-year projections.

TABLE 23
SAN ANDREAS 20-YEAR DEVELOPMENT PROJECTIONS: 2016 THROUGH 2035

Item	20-Year Total: 2016 - 2035	
	Moderate Estimate	High Estimate
Residential Growth		
New Residential Units	180	220
Commercial Growth		
Retail Acres	1.8	1.9
Office Acres	1.8	4.1
Industrial Acres	1.5	3.4
Subtotal Commercial Growth (Acres)	5.2	9.5

As prepared by New Economics & Advisory, 2016.

3.2 Future Land Use Growth Assumptions

Omni-Means developed two future growth scenarios to reflect residential, commercial, and/or industrial development opportunities within the Southern Gateway Plan Area:

- Market-Based Growth Scenario
- Theoretical Buildout Growth Scenario

The Market-Based Growth Scenario represents 20 Year development projections based on market analysis presented in the Market Analysis report (See Appendix B). The Theoretical Buildout Growth Scenario assumes a maximum growth scenario within the Southern Gateway Plan Area based on existing General Plan land use designations. However, it is unlikely that this level of growth will occur over the next 20 years. Therefore, the Theoretical Buildout Growth Scenario is analyzed as a "theoretical scenario" for future (>20 year) conditions and when/if the market conditions improves or changes.

For analysis purposes, "land use growth" is considered in terms of new residential dwelling units (for residential development) and/or employees (for commercial and/or industrial development).

Market-Based Growth Scenario

The Market-Based (20 year) Growth Scenario was established using market-based residential and commercial/industrial forecasts presented in the *San Andreas SR 49 Commercial Gateway and Corridor Study Market Analysis* (2016). Therefore, the Market-Based Growth Scenario reflects market-based development potential on vacant and underutilized parcels and represents a realistic level of development that could occur in the San Andreas over the next 20 years. The Market-Based Growth Scenario assumes the following level of growth within the San Andreas CDP approximate boundary:

Residential Growth: 237 total new Dwelling Units (DUs) within the CDP boundary

- 220 new DUs within the Southern Gateway Plan Area

Employee Growth: 422 total new employees within the CDP boundary

- 406 new employees within the Southern Gateway Plan Area

Theoretical Buildout Growth Scenario

The Theoretical Buildout (>20 year) Growth Scenario was established assuming maximum commercial and residential growth on both vacant and underutilized parcels within the Southern Gateway Plan Area. The Theoretical Buildout Growth Scenario reflects the "theoretical development potential" within the Southern Gateway Plan Area; however, it is unlikely that this development will occur within the next 20 years. The Theoretical Buildout Growth Scenario assumes the following level of growth within the San Andreas CDP approximate boundary:

Residential Growth: 747 total new Dwelling Units (DUs) within the CDP boundary

- 730 new DUs within the Southern Gateway Plan Area
(510 Additional new DUs beyond 20 years)

Employee Growth: 1,667 total new employees within the CDP boundary

- 1,651 new employees within the Southern Gateway Plan Area
(1,245 Additional new employees beyond 20 years)

Future Traffic Forecasts

Identifying potential future land use growth levels allows for the forecast of future traffic conditions, as increases in the number of housing units and employees generate increases in the number of vehicles on the community's roadways. Future traffic conditions within San Andreas, presented in subsequent sections of this report, correspond to the levels of residential and commercial growth presented above.

Omni-Means developed future (20 Year and >20 Year) traffic forecasts utilizing the *Calaveras Council of Governments Transportation Demand Model* (CCOG model) and reasonable traffic growth rates based on project team knowledge of historical traffic trends and local context. Vehicle volume growth rates were calculated for the two growth scenarios listed above, as follows:

Market-Based Growth Scenario: one percent annual compounded growth rate (20 year) *Volumes on Saint Charles Street (SR 49) and local side streets will grow at approximately 1 percent per year for approximately 20 years.*

Theoretical Buildout Growth Scenario: 2.8 percent annual compounded growth rate (>20 year) *Volumes on Saint Charles Street (SR 49) and local side streets will grow at approximately 2.8 percent per year for approximately 20 years, and represent future, greater than 20 year, development conditions.*

These growth rates were applied unilaterally to existing intersection volumes and roadway ADT volumes to establish future traffic volumes. Future traffic volumes were utilized to determine future intersection and roadway conditions for both the Market-Based Growth Scenario and the Theoretical Buildout Growth Scenario, discussed in the following section.

Future intersection LOS is presented in Table 24. Bold text indicates unacceptable LOS D or worse. Existing and future roadway ADT is presented in Table 25.

**TABLE 24
FUTURE INTERSECTION LEVEL OF SERVICE**

#	Intersection	Control Type ^{1,2}	Target LOS*	MARKET-BASED GROWTH SCENARIO				THEORETICAL BUILDOUT GROWTH SCENARIO			
				AM		PM		AM		PM	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	SR 49 & SR 12	TWSC	C	246.4	F	66.2	F	OVR	F	OVR	F
2	SR 49 & Pool Station Road	TWSC	C	97.0	F	105.5	F	OVR	F	OVR	F
3	Pool Station Road & Russell Road	TWSC	C	9.5	A	9.1	A	10.1	B	9.4	A
4	SR 49 & Russell Road	TWSC	C	27.2	D	16.4	C	95.4	F	29.6	D
5	SR 49 & High School Street	TWSC	C	208.0	F	34.4	D	OVR	F	OVR	F
6	SR 49 & Court Street/Adams Avenue	TWSC	C	86.7	F	84.3	F	OVR	F	OVR	F
7	SR 49 & Main Street/Church Hill Road	TWSC	C	17.3	C	17.6	C	155.1	F	46.4	E
8	SR 49 & Treat Avenue	TWSC	C	23.1	C	23.6	C	89.5	F	110.8	F
9	SR 49 & Mountain Ranch Road	TWSC	C	155.0	F	122.6	F	OVR	F	OVR	F
10a	Mountain Ranch Road & Pope Street (EB)	TWSC	C	10.4	B	11.9	B	11.7	B	14.7	B
10b	Mountain Ranch Road & Pope Street (WB)	TWSC	C	19.6	C	18.6	C	43.8	E	36.1	E
11	Mountain Ranch Road & Jeff Tuttle Drive	TWSC	C	10.6	B	12.8	B	12.1	B	17.8	C
12	Jeff Tuttle Drive & Gov't Center Drive	AWSC	C	7.3	A	7.1	A	7.5	A	7.2	A
13	Mountain Ranch Road & Park Drive/Gov't Center Drive	TWSC	C	13.8	B	15.2	C	18.9	C	23.8	C
14	Mountain Ranch Road & Calaveritas Road	TWSC	C	12.7	B	13.4	B	16.6	C	18.2	C

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control

2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDBT

*Target LOS is subject to change in the forthcoming Calaveras County General Plan update from LOS 'C' to LOS 'D'.

**TABLE 25
EXISTING AND FUTURE ROADWAY ADT**

Location	Existing ADT Count	Market-Based Growth Scenario	Theoretical Buildout Growth
SR 12 n/o SR 49	6,830	8,334	11,865
SR 49 n/o SR 12	5,260	6,418	9,138
SR 49 s/o SR 12	11,573	14,121	20,105
Pool Station s/o SR 49	1,836	2,240	3,190
SR 49 s/o Bellview Street	12,399	15,129	21,540
Court Street e/o SR 49	1,380	1,684	2,397
Church Hill Road w/o SR 49	850	1,037	1,477
Main Street e/o SR 49	700	854	1,216
SR 49 n/o Treat Avenue	12,559	15,325	21,819
SR 49 n/o Mountain Ranch Road	11,300	13,788	19,631
SR 49 s/o Mountain Ranch Road	9,089	11,090	15,790
Mountain Ranch Rd e/o SR 49	7,401	9,031	12,858
Pope Street n/o Mountain Ranch	1,533	1,871	2,663
Mountain Ranch Rd e/o Jeff Tuttle Drive	5,940	7,248	10,319
Calaveritas Rd s/o Mountain Ranch Road	967	1,180	1,680
Mountain Ranch Road e/o Calaveritas Road	4,005	4,887	6,958

4. Community Outreach

4. Community Outreach

Over the course of this Study (2016-2017), various public meetings were held. This includes three Public Workshops, four Advisory Committee Meetings, and two Property Owner Meetings. Members of the Advisory Committee were selected through an application process administered by CCOG. Their role and purpose as the Advisory Committee was to provide an initial “sounding board” for the technical Team, so that community concerns and issues could clearly be understood and initial feedback provided on analysis findings and potential recommended solutions. Property owners include those individuals owning property within the Southern Gateway Plan Area.

Public meetings were held on the following dates:

- May 11, 2016
- August 24, 2016
- May 24, 2017

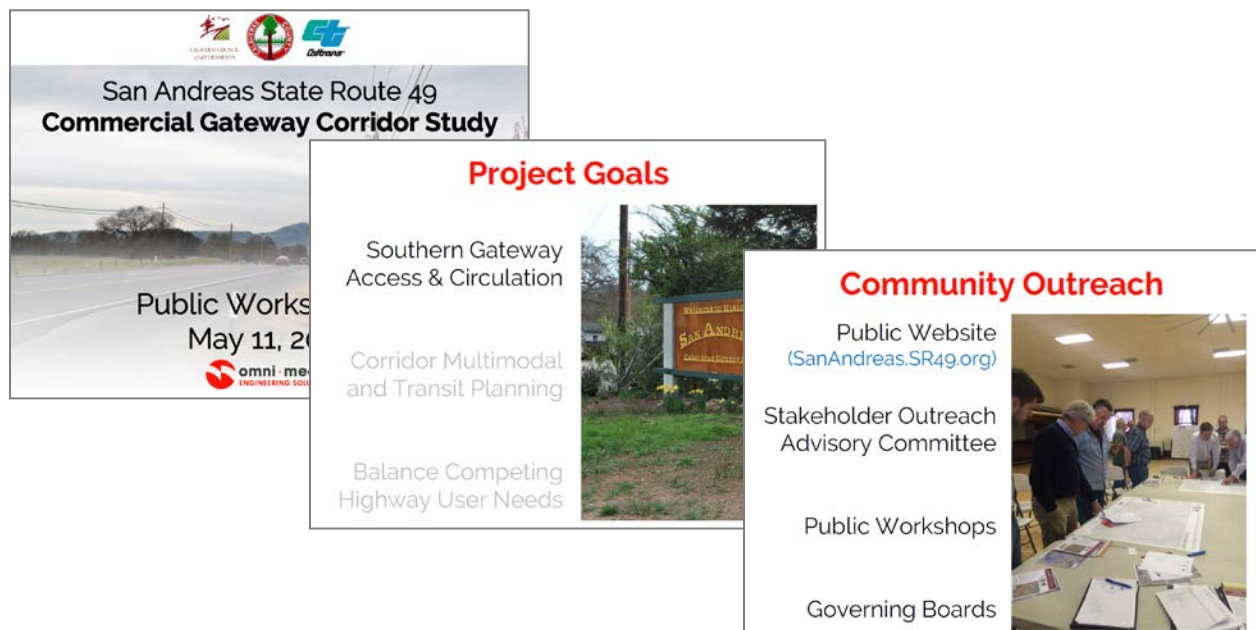
Advisory Committee meetings were held on the following dates:

- April 18, 2016
- June 29, 2016
- August 17, 2016
- May 24, 2017

Property Owner meetings were held on the following dates:

- March 31, 2016
- May 24, 2017

During these meetings, the project team presented findings in the form of PowerPoint presentations, visual aids, and maps. Example slides from a PowerPoint presentation are shown below:



4.1 Community Input

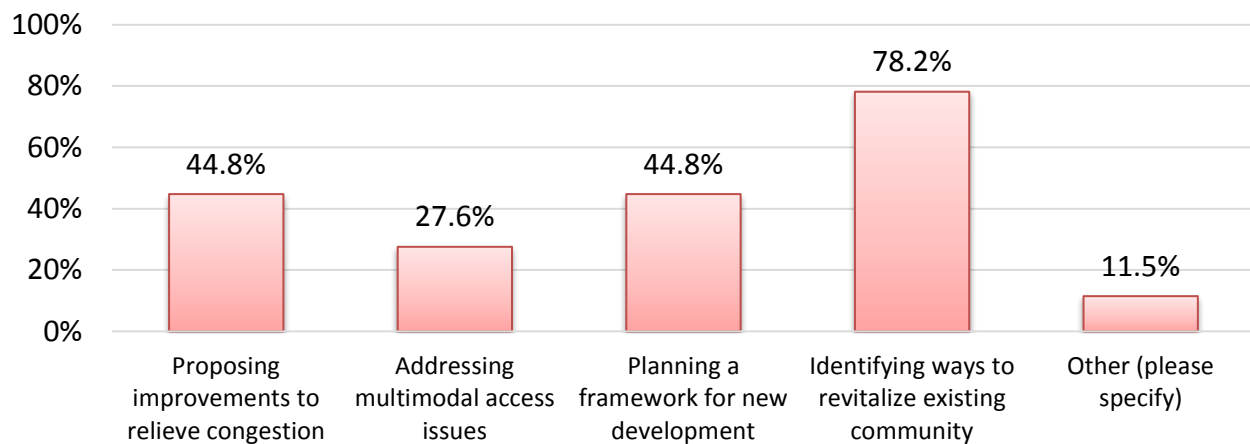
Within the context of these goals, issues and challenges were identified in collaboration with the project team (CCOG, Calaveras County, and Caltrans), the advisory committee, property owners, and members of the public. Public input was gathered at public workshops, via email, and through an online survey generated by Omni-Means (see Appendix C).

The following discussion highlights prominent community concerns.

Public Survey Responses

The following graphs highlight the major concerns and opinions identified by the community as identified by 89 participants. Responses were gathered at a public meeting in August 2016 and through an online survey.

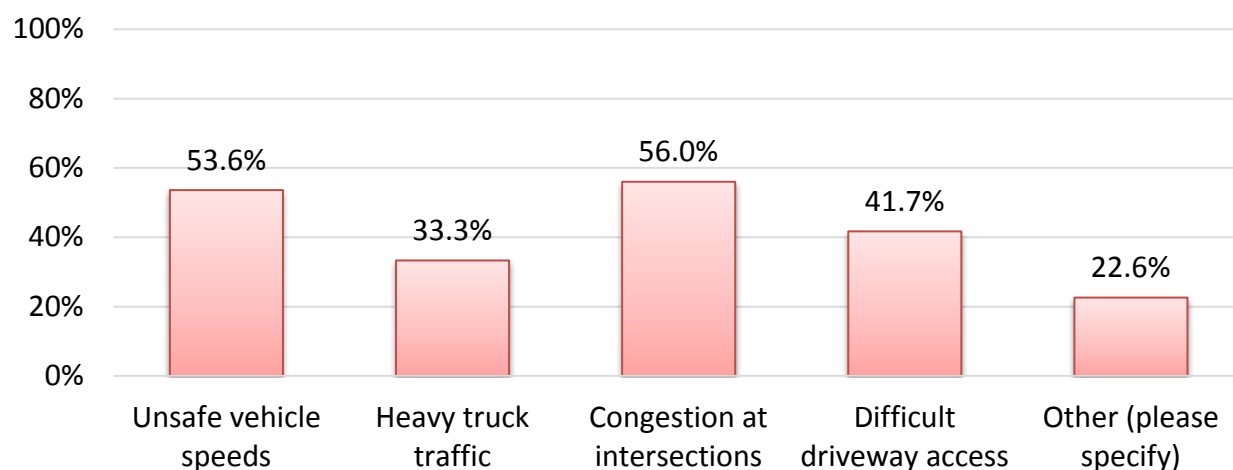
❖ **This study would best serve San Andreas by...**



Responses provided for the "Other" category include the following:

- Calming traffic
- Create safer walking and biking paths
- Address High School Street congestion and safety concerns

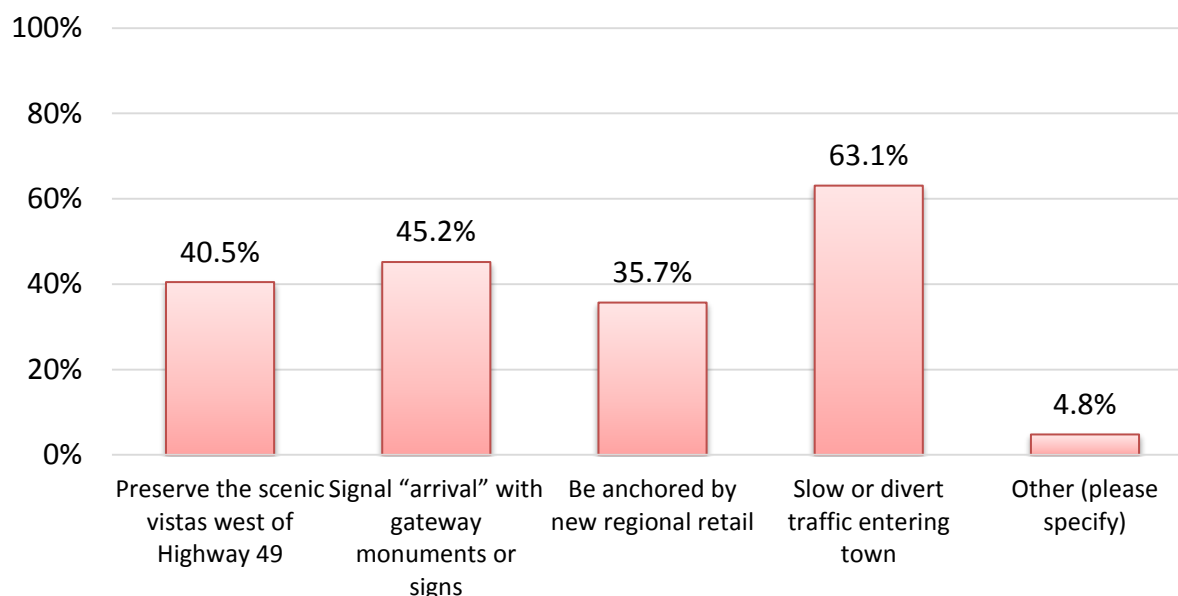
❖ **What is the biggest issue facing drivers on SR 49?**



Responses provided for the "Other" category include the following:

- Lack of signal controlled pedestrian crossings
- Lack of traffic signals at key intersections; desire a traffic signal at the SR 49/Mountain Ranch Road intersection
- It is difficult to access the highway from local side streets
- Pedestrians cross the highway in unmarked areas; existing crossings are not very visible

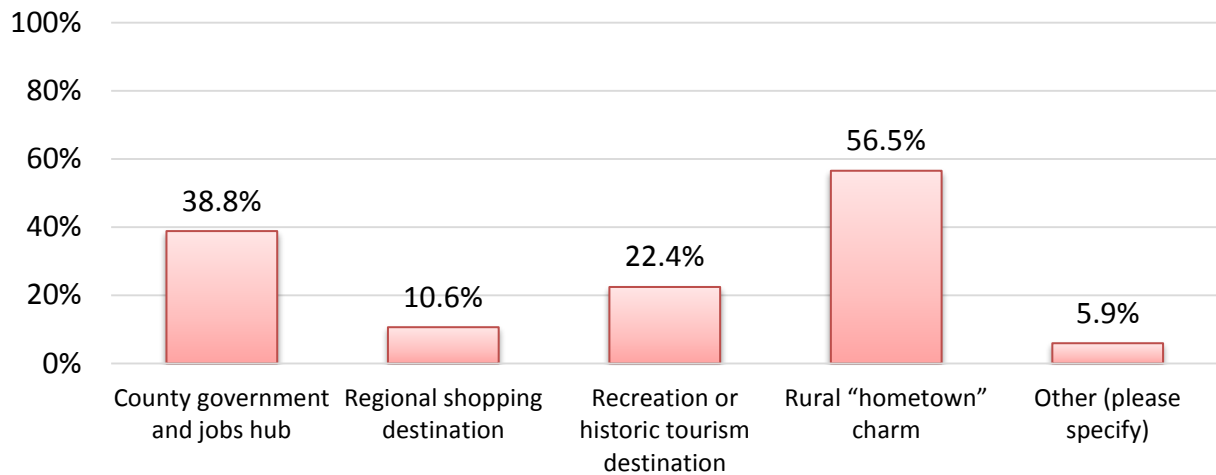
❖ **It is critical that the southern gateway to San Andreas...**



Responses provided for the "Other" category include the following:

- Address existing community issues and connect to the existing community
- Provide access to new retail and housing

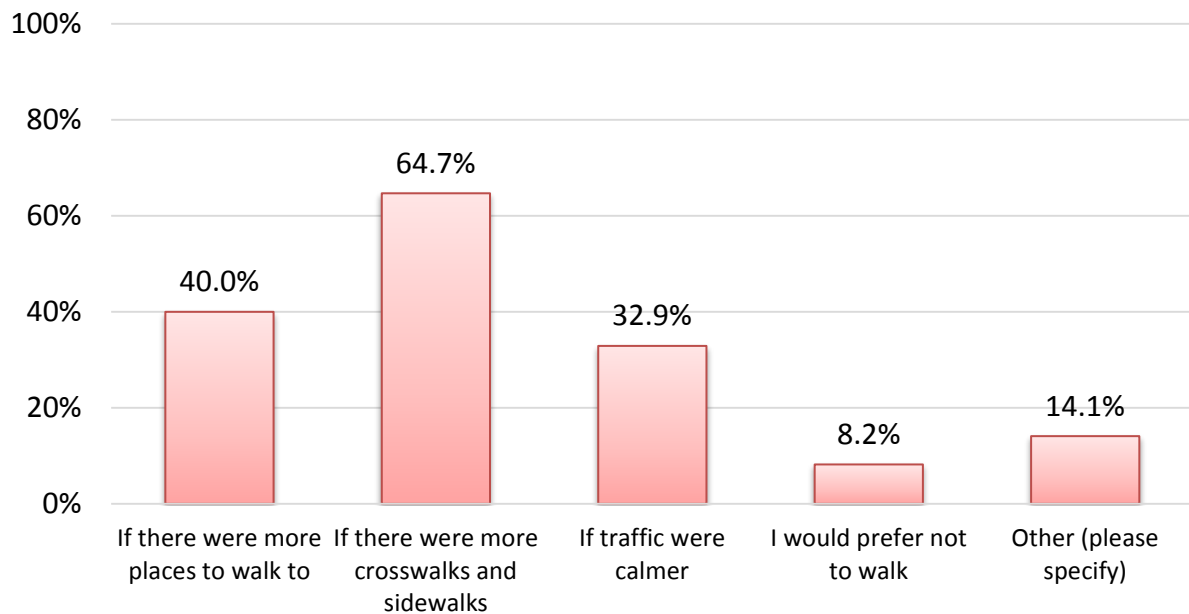
❖ **If you could choose a single identify for San Andreas, it would be...**



Responses provided for the "Other" category include the following:

- A town with unrealized potential
- Only Main Street has any charm

❖ **I may choose to walk more in San Andreas if...**



Responses provided for the "Other" category include the following:

- If there were controlled lighting
- If there were more lighted crosswalks and sidewalks
- If there were more safer places to walk

4.2 Community Issues and Concerns Summary

Community input was instrumental in determining recommended improvements for the Saint Charles Street (SR 49) corridor, the Southern Gateway Plan Area, and Mountain Ranch Road.

The following maps were developed in response to community input, and were presented at public workshops and advisory committee meetings, as well as on the project website. The following maps presented the following information for existing conditions:

- Sidewalk and Bicycle Infrastructure Gaps
- Safety Deficiencies at Intersections
Collision rates for segments along Saint Charles Street (SR 49) were presented in the Background Conditions section of this report.
- Operational Deficiencies at Intersections
Intersection level of service was presented in the Background Conditions section of this report.
- Number of Access Points onto the Highway (Saint Charles Street)
- Community Concerns gathered at public workshops and advisory committee meetings

Note: For presentation, the study area is shown as northern (A) and southern (B) San Andreas.

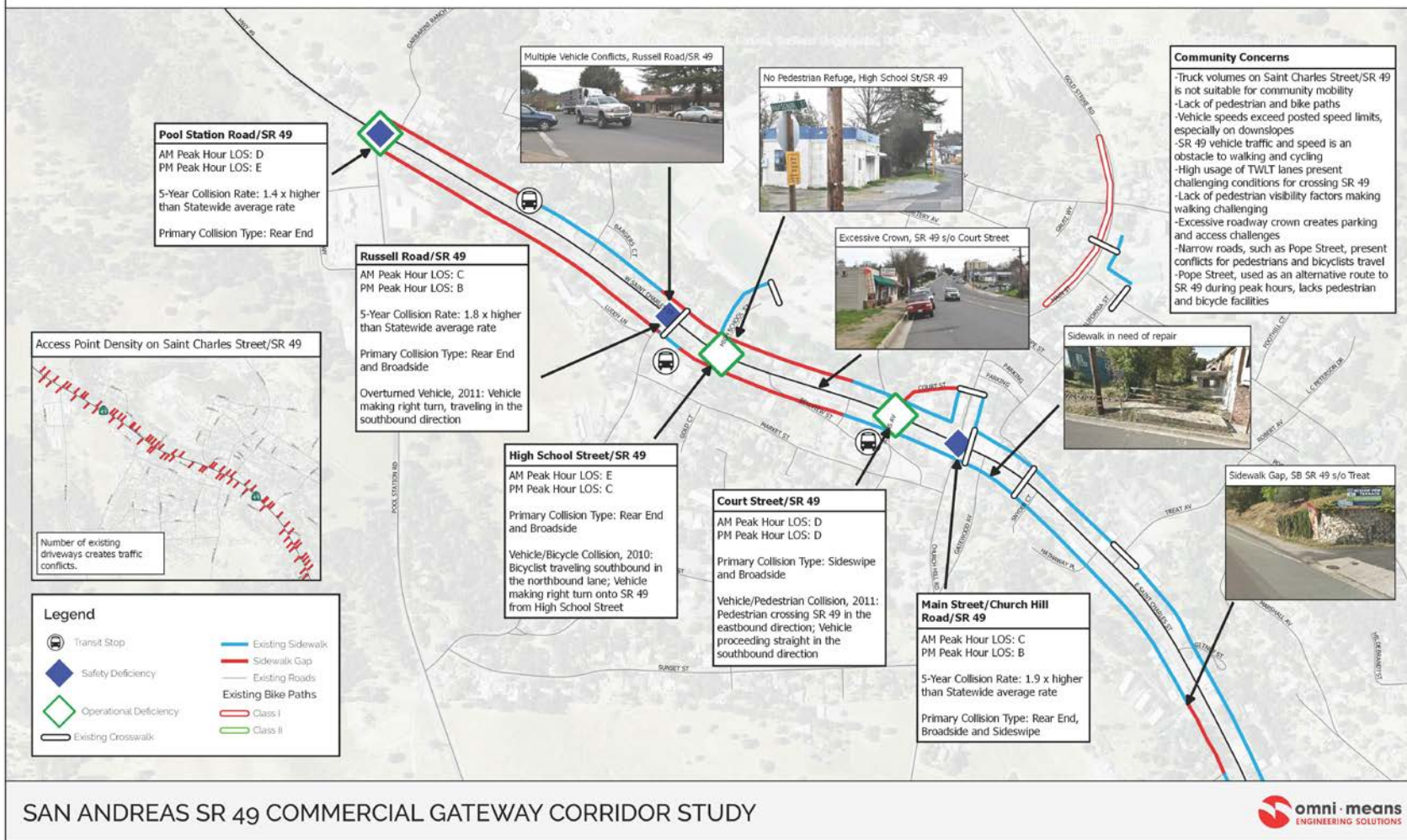
Corridor Issues & Concerns (A) Northern San Andreas.

As shown, the intersections of SR 49 at Pool Station Road, High School Street, and Court Street have operational deficiencies under existing conditions. The intersections of SR 49 at Pool Station Road, Russell Road, and Main Street have safety deficiencies under existing conditions. Existing bike facilities are limited; sidewalk gaps restrict pedestrian access and mobility.

Corridor Issues & Concerns (B) Southern San Andreas.

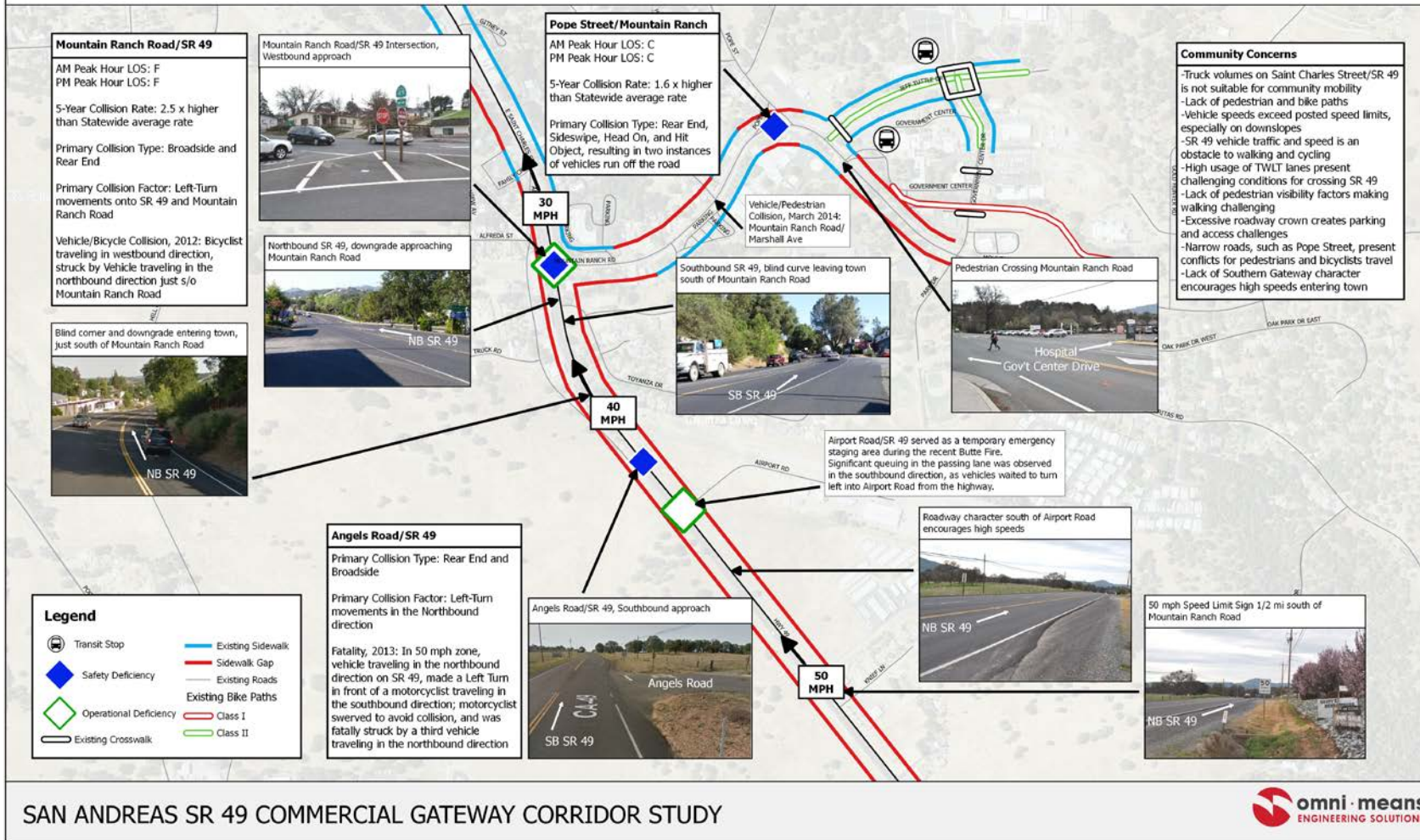
As shown, the intersections of SR 49 at Mountain Ranch Road and Airport Road have operational deficiencies under existing conditions. The intersections of SR 49 at Mountain Ranch Road and Angels Road, and the intersection of Mountain Ranch Road/Pope Street, have safety deficiencies under existing conditions. Existing bike facilities are limited; sidewalk gaps restrict pedestrian access and mobility.

CORRIDOR ISSUES & CONCERNS (A)



SAN ANDREAS SR 49 COMMERCIAL GATEWAY CORRIDOR STUDY

CORRIDOR ISSUES & CONCERNS (B)



Community Input Summary

The following provides a summary of community input identified over the course of this Study:

- **Excessive speeds on the Saint Charles Street (SR 49) corridor**
 - Existing roadway design encourages speeding, due to wide road width, hilly terrain, and minimal pedestrian crossings
 - Existing speed limit reduction signage north and south of town does not adequately warn drivers of impending community activity
 - Lack of community identify (in the form of signage, commercial development, pedestrian/bicycle activity, etc.) that would serve to slow drivers
 - Difficult for pedestrians to cross the highway even at designated crosswalks
 - High volumes and excessive speeds make it difficult for vehicles to merge onto the highway from side streets or driveways
 - **Lack of, or disconnected, pedestrian and bicycle facilities**
 - Discourages multi-modal travel through town
 - Makes multi-modal travel especially dangerous for young children and the elderly
 - Local side streets often serve as alternative routes to Saint Charles Street (SR 49), but also lack pedestrian and bicycle facilities
 - Existing crosswalks lack high visibility features such as flashing beacons, pedestrian refuges, painted crossings, etc.
 - Difficult for pedestrians to cross the highway even at designated crosswalks
 - Lack of lighted crosswalk and sidewalks
 - **High heavy truck volumes**
 - Heavy truck volume percentages of total vehicular volume are as high as 16.4 percent on Saint Charles Street (SR 49) and Mountain Ranch Road through town
 - Industrial trucks travel through residential and community areas, along Saint Charles Street (SR 49) and/or Church Hill Road, to reach industrial sites on Pool Station Road
 - Heavy trucks traveling to/from communities east of San Andreas must travel on Mountain Ranch Road, which affects traffic congestion at the SR 49/Mountain Ranch Road intersection
 - **Poor roadway conditions**
 - Steep highway crown creates parking and access challenges
 - Narrow roads such as Pope Street provide parallel routes to Saint Charles Street (SR 49), but were not designed to accommodate regional traffic levels
 - **Lack of identifiable 'town character'**
 - Encourages excessive speeds entering town as SR 49 shifts from a rural highway to a main street corridor, with no identifiable change of character
 - Missed economic opportunities from tourist travel
 - **Emergency response challenges**
 - Congestion, especially at SR 49/Mountain Ranch Road, poses a threat to safety and efficiency of emergency response
 - In light of the 2015 Butte Fire, it is important to consider evacuation sites and routes in future plans
- *Truck presence is due, in part, to the 2015 Butte Fire cleanup efforts*

Summary: *Incorporating public input with the operational and safety analysis conducted by Omni-Means, shows excessive speed is considered the most significant challenge facing the community, resulting in both traffic flow and safety concerns.*

In addition, challenges within the existing circulation network and a lack of plans for mobility, connectivity, and coordinated highway access within the development area present challenges to the overall success of potential development projects, hindering economic opportunity.

5. Corridor Issues and Concerns

5. Corridor Issues and Concerns

This section outlines segment specific operational and safety challenges and highlights community concerns for the Saint Charles Street (SR 49) corridor, the Southern Gateway Plan Area, and Mountain Ranch Road in San Andreas. The Saint Charles Street (SR 49) corridor was analyzed as four segments from SR 12 to Mountain Ranch Road. The Southern Gateway Plan Area circulation area extends from SR 49 to Pool Station Road in the west and to Calaveritas Road in the east. Within the Southern Gateway Plan Area, SR 49 was analyzed from south of Mountain Ranch Road to Buckskin Way. Mountain Ranch Road was analyzed from SR 49 to Calaveritas Road.

As presented in the preceding section, San Andreas faces a number of existing challenges to community mobility and safety. In addition to identifying existing issues, operational LOS has been projected for future traffic conditions at key intersections. Future (Market-Based Growth and Theoretical Buildout Growth) scenarios assume existing lane geometrics, as shown in the Appendix C. Short and long-term improvement recommendations are identified in a subsequent section of this report.

The following segment list, and corresponding intersections, provides the context for operational and safety analysis, and short and long-term recommendations, for the study area:

Saint Charles Street (SR 49) Corridor:

- Segment 1: SR 12 to Gold Oak Road
 - SR 49/SR 12
 - SR 49/Pool Station Road
- Segment 2: Gold Oak Road to Court Street
 - SR 49/Russell Road
 - SR 49/High School Street
- Segment 3: Court Street to Treat Avenue
 - SR 49/Court Street/Adams Avenue
 - SR 49/Main Street/Church Hill Road
- Segment 4: Treat Avenue to Mountain Ranch Road
 - SR 49/Treat Avenue
 - SR 49/Mountain Ranch Road

Southern Gateway Plan Area:

- SR 49: Mountain Ranch Road to Buckskin Way

The Southern Gateway Plan Area extends from SR 49 to Pool Station Road in the west and to Calaveritas Road in the east. Within the Southern Gateway Plan Area, SR 49 is analyzed from Mountain Ranch Road to Buckskin Way. Long-term recommendations address the need for new roadway connections within the Southern Gateway Plan Area.

Mountain Ranch Road:

- Mountain Ranch Road: SR 49 to Calaveritas Road
 - Mountain Ranch Road/Pope Street
 - Mountain Ranch Road/Jeff Tuttle Drive
 - Mountain Ranch Road/Park Drive/Government Center Drive
 - Mountain Ranch Road/Calaveritas Road

5.1 Saint Charles Street (SR 49) Corridor: SR 12 to Mountain Ranch Road

Saint Charles Street (SR 49) Corridor: Segment 1 (SR 12 to Gold Oak Road)

Segment 1 on Saint Charles Street (SR 49) corridor extends from SR 12 to Gold Oak Road. As the northern entry point into the town, Segment 1 is considered the "Northern Gateway" into San Andreas. Regional traffic traveling east along SR 12 and south on SR 49 merges southbound onto SR 49 north of "town", just one-third mile north of Pool Station Road.

Entering San Andreas in the southbound direction, SR 49 has two 12-foot lanes to accommodate merging traffic from SR 12. The speed limit drops from 50 mph to 40 mph at Pool Station Road, and drops again to 30 mph at Gold Oak Road, where SR 49 returns to one-lane in both the north and southbound direction.

Pool Station Road is considered the northern extent of existing community activity, with community places, such as restaurants, the post office, and the high school located just south of Pool Station Road. As SR 49 transitions from a rural highway to a Main Street corridor (Saint Charles Street (SR 49) corridor), Segment 1 is subject to excessive speeds as travelers enter town from the north. To signify changing roadway character to southbound travelers, gateway signage was recently installed in the southwest corner of the SR 49 and Pool Station Road intersection, reading "Welcome to Historic San Andreas - Calaveras County Seat" (see picture).



However, San Andreas continues to face challenges in slowing traffic along this Northern Gateway segment. Additionally, the lack of pedestrian and bicycle facilities, coupled with high heavy truck volumes, are impediments to community mobility.

The following image shows the existing SR 49/Pool Station Road intersection.





Operational and Safety Analysis

The intersections of SR 49/SR 12 and SR 49/Pool Station Road are within Segment 1 limits.

Existing Conditions

Under Existing Conditions, the intersections of SR 49/SR 12 and SR 49/Pool Station Road operate at LOS F and D in the AM peak hour, and LOS D and E in the PM peak hour, respectively.

Existing ADT on SR 49 Segment 1 south of SR 12 is 11,573 vehicles.

The SR 49/Pool Station Road intersection has a collision factor 1.4 times the statewide average rate, with six collisions and one injury occurring between 2011 and 2014. The majority of these collisions were rear end accidents caused by vehicles travelling in the northbound and southbound directions.

Market-Based Growth Scenario (20 Year)

Under the Marker-Based Growth Scenario, the intersections of SR 49/SR 12 and SR 49/Pool Station Road are projected to operate at LOS F in the AM and PM peak hours.

ADT on SR 49 Segment 1 south of SR 12 is projected to reach 14,121 vehicles.

Theoretical Buildout Growth Scenario (>20 Years)

Under the Theoretical Buildout Growth Scenario, the intersections of SR 49/SR 12 and SR 49/Pool Station Road are projected to operate at LOS F in the AM and PM peak hours.

ADT on SR 49 Segment 1 south of SR 12 is projected to reach 20,105 vehicles.

Saint Charles Street (SR 49) Corridor: Segment 2 (Gold Oak Road to Court Street)

Segment 2 extends from Gold Oak Road to north of Court Street. Court Streets is considered within Segment 3 limits due to its correlation with the SR 49/Main Street/Church Hill Road intersection. Saint Charles Street (SR 49) from Gold Oak Road to Court Street is a two-lane highway approximately 0.4 miles in length and accommodating a center two-way left-turn lane and on-street parking throughout its extents.



Community businesses, as well as the post office and Calaveras High School, are located along Segment 2. This segment intersects with two roadways of local significance: Russell Road and High School Street. Russell Road accommodates community residential and commercial traffic; High School Street is the primary access to the high school.

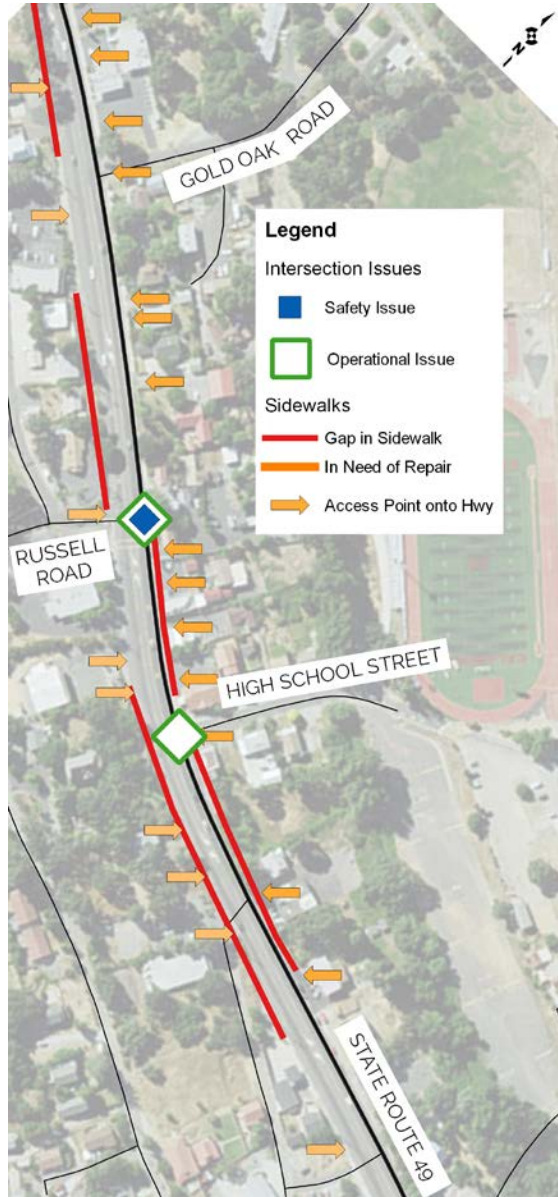
There is one marked pedestrian crossing along Segment 2, 300 feet north of High School Street at Russell Road (pictured), and incomplete

sidewalk infrastructure on the western and eastern sides of the highway, and currently no bicycle infrastructure.

The steep downgrade for northbound travelers passing Court Street encourages excessive speeds as vehicles approach High School Street. Additionally, vehicles and heavy trucks traveling north are not clearly visible to drivers exiting High School Street due to sight distance challenges.

The following image shows the existing SR 49/Russell Road intersection. As shown, vehicles on Russell Road compete with northbound and southbound traffic, and heavy trucks in the center turn lane (two-way left-turn lane), on Saint Charles Street (SR 49).





Operational and Safety Analysis

The intersections of SR 49/Russell Road and SR 49/High School Street are within Segment 2 limits.

Existing Conditions

Under Existing Conditions, the intersections of SR 49 at Russell Road and High School Street operate at LOS and E in the AM peak hour, and LOS B and C in the PM peak hour, respectively.

Existing ADT on SR 49 Segment 2 south of Bellview Street is 12,399 vehicles.

The SR 49/Russell Road intersection has a collision factor 1.8 times the statewide average rate, with eight collisions and five injuries occurring between 2011 and 2014. Primary collision types on Segment 2 were rear end (vehicles proceeding straight on SR 49) and broadside (vehicles turning off of or onto SR 49 from side streets).

Market-Based Growth Scenario (20 Year)

Under the Marker-Based Growth Scenario, the intersections of SR 49 at Russell Road and High School Street operate at LOS D and F in the AM peak hour, and LOS C and D in the PM peak hour, respectively. ADT on SR 49 Segment 2 south of Bellview Street is projected to reach 15,129 vehicles.

Theoretical Buildout Growth Scenario (>20 Years)

Under the Theoretical Buildout Growth Scenario, the intersections of SR 49 at Russell Road and High School Street are projected to operate at LOS F in the AM peak hour, and LOS D and F in the PM peak hour, respectively.

ADT on SR 49 Segment 2 south of Bellview Street is projected to reach 21,540 vehicles.

Saint Charles Street (SR 49) Corridor: Segment 3 (Court Street to Treat Avenue)

Segment 3 extends from Court Street to north of Treat Avenue. Saint Charles Street (SR 49) along this segment is a two-lane highway approximately 0.3 miles in length with a center two-way left-turn lanes and on-street parking throughout its extents.



The intersections of SR 49/Court Street/Adams Avenue and SR 49/Main Street/Church Hill Road signify the town's geographic center and the historic core of San Andreas, and is distinguished by historic buildings (see picture) and monuments, and local shops and business on Main Street. Residential areas extend east and west into the hillsides on either side of Segment 3.

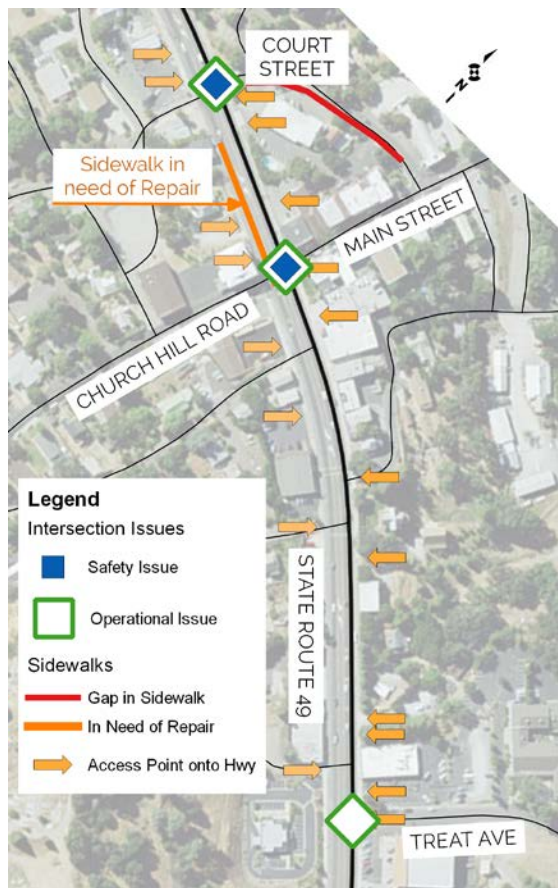
There is disconnected sidewalk infrastructure on either side of Segment 3. There are two marked pedestrian crossings along this segment, one at Main Street, and one at California Street. Pedestrian crossings lack high visibility features and are not sufficient to ensure safe travel across the highway. Additionally, sight distance is inhibited due to steep grade approaching Main Street in the southbound direction.

Circulation along this segment is inhibited by narrow roadways. Church Hill Road is approximately 20 feet wide; Adams Avenue is approximately 18 feet wide; Main Street has a 13-foot one-way travel lane (between parked cars on either side of the road). In addition, there are approximately 21 access points along this segment of SR 49 in the form of driveways and parking lots, connecting local restaurants, shops, and residences to the highway.



As shown in the following image, the intersection of SR 49/Main Street/Church Hill Road faces challenges of sight distance, narrow road widths, and inadequate pedestrian amenities.





Operational and Safety Analysis

The intersections of SR 49/Court Street/Adams Avenue and SR 49/Main Street/Church Hill Road are within Segment 3 limits.

Existing Conditions

Under Existing Conditions, the intersections on SR 49 at Court Street and Main Street/Church Hill Road are projected to operate at LOS D and C in the AM peak hour, and LOS D and B in the PM peak hour, respectively.

Existing ADT on SR 49 Segment 3 north of Treat Avenue is 12,559 vehicles.

The SR 49/Main Street/Church Hill Road intersection has a collision factor 1.9 times the statewide average rate, with 13 collisions and 4 injuries occurring between 2011 and 2014, and consisting of rear ends (vehicles proceeding straight on SR 49), and broadsides and sideswipes (vehicles turning off of or onto SR 49 from side streets). One injury resulted from an overturned vehicle after a driver made a southbound right-turn onto Church Hill Road.

Market-Based Growth Scenario (20 Year)

Under the Market-Based Growth Scenario, the intersections are projected to operate at LOS F and D in the AM peak hour, and LOS F and C in the PM peak hour, respectively.

ADT on SR 49 Segment 3 south of Bellview Street is projected to reach 15,325 vehicles.

Theoretical Buildout Growth Scenario (>20 Years)

Under the Theoretical Buildout Growth Scenario, the intersections are projected to operate at LOS F in the AM peak hour and LOS F in the PM peak hour.

ADT on SR 49 Segment 3 south of Bellview Street is projected to reach 21,819 vehicles.

Saint Charles Street (SR 49) Corridor: Segment 4 (Treat Avenue to Mountain Ranch Road)

Segment 4 extends from Treat Avenue to Mountain Ranch Road. Saint Charles Street (SR 49) is a two-lane highway approximately 0.4 miles in length and accommodating a center two-way left-turn lanes and on-street parking throughout its extents.



There is nonexistent or disconnected sidewalk infrastructure on the westerly side of the highway (picture). There are no marked pedestrian crossings along this segment. The closest crossing is located at California Avenue, approximately 0.5 miles north of Mountain Ranch Road. There are approximately 21 access points along Segment 4, connecting to local restaurants, shops, residences, gas stations, office buildings, and a grocery store.

Mountain Ranch Road provides access to employment and government centers. As a result, the SR 49/Mountain Ranch Road intersection experiences long queues in the AM and PM peak hours, when employees arrive and depart their place of employment.

Additionally, Mountain Ranch Road serves as the sole connection to San Andreas from communities to the east. After the Butte Fire (2015), heavy trucks travel on Mountain Ranch Road to transport materials from burned areas, increasing the number of heavy trucks through the community (pictured), and further affecting congestion and safety concerns on Saint Charles Street.



As shown in the following images, the SR 49/Mountain Ranch Road intersection accommodates conflicting approaches, and vehicles turning left onto SR 49 have to compete with through highway traffic. Additionally, northbound travelers on SR 49 approach the Mountain Ranch Road intersection on a steep down slope, which encourages high speeds.





Operational and Safety Analysis

The intersections of SR 49/Treat Avenue and SR 49/Mountain Ranch Road are within Segment 4 limits.

Existing Conditions

Under Existing Conditions, the intersections on SR 49 at Treat Avenue and Mountain Ranch Road operate at LOS C and F and in the AM and PM peak hours, respectively. Under Existing Conditions, the SR 49/Mountain Ranch Road intersection meets signal warrant thresholds in the AM and PM peak hours.

Existing ADT on SR 49 Segment 4 north of Mountain Ranch Road is 11,300 vehicles.

The SR 49/Mountain Ranch Road intersection has a collision factor 2.5 times the statewide average rate, with 12 collisions and 7 injuries occurring between 2010 and 2014. The majority of these collisions resulted from vehicles turning left off of or onto SR 49.

Market-Based Growth Scenario (20 Year)

Under the Market-Based Growth Scenario, the intersections on SR 49 at Treat Avenue and Mountain Ranch Road are projected to operate at LOS D and F in the AM and C and F in the PM peak hour, respectively.

ADT on SR 49 Segment 4 north of Mountain Ranch Road is projected to reach 13,788 vehicles.

Theoretical Buildout Growth Scenario (>20 Years)

Under the Theoretical Buildout Growth Scenario, the intersections on SR 49 at Treat Avenue and Mountain Ranch Road are projected to operate at LOS F in the AM and PM peak hours.

ADT on SR 49 Segment 4 north of Mountain Ranch Road is projected to reach 19,631 vehicles.

5.2 Southern Gateway Plan Area: SR 49 (Mountain Ranch Road to Buckskin Way)

Southern Gateway Plan Area: SR 49 (Mountain Ranch Road to Buckskin Way)

The southern segment of SR 49, south of the Saint Charles Street (SR 49) corridor, runs for approximately one-mile south of Mountain Ranch Road to Buckskin Way through the Southern Gateway Plan Area (Plan Area). The Plan Area, as described previously, encompasses vacant and underutilized land in southern San Andreas, and has been evaluated for development potential under the Market-Based Growth Scenario (20 Year) and the Theoretical Buildout Growth Scenario (>20 Year). The Southern Gateway Plan Area circulation area extends from Church Hill Road in the west to Mountain Ranch Road and Calaveritas Road in the east.

SR 49 along this segment is a two-lane highway with southbound passing lanes throughout. Several local roads connect to SR 49 from the east south of Mountain Ranch Road, including Angels Road, Airport Road, Knief Lane, and Buckskin Way.

Angels Road, Airport Road, Knief Lane, and Buckskin Way are two-way stop-controlled at the minor approaches. In addition to these roads, this segment of SR 49 provides access to four private driveways on the easterly side, and one on the westerly side of the highway.



Northbound Travel: Due to the abrupt, northbound transition from an undeveloped regional highway to a community Main Street corridor, the southern segment of SR 49 generally hosts speeds that exceed the safety standards of a rural community. There is currently no gateway signage identifying the San Andreas community boundary to northbound travelers as they approach a blind curve approximately 700 feet south of the SR 49/Mountain Ranch Road intersection. The speed limit is 50 mph south of Airport Road (pictured), and 40 mph south of Mountain Ranch Road. The speed limit drops to 30 mph after Mountain Ranch Road.

Southbound Travel: There is a protected passing-lane for southbound travelers leaving San Andreas. A passing-lane is necessary to allow drivers to pass heavy trucks after traveling through San Andreas. However, excessive southbound speeds create challenges for northbound travelers turning left onto Angels Road and has resulted in several collisions, including one fatality in 2014.



Operational and Safety Analysis

SR 49/Angels Road and SR 49/Airport Road were not analyzed for intersection LOS. The intersection of SR 49/Mountain Ranch Road is analyzed under Segment 4. SR 49/Angels Road has safety issues due to the recent fatality at the intersection.

Existing Conditions

Existing ADT on SR 49 south of Mountain Ranch Road is 9,089 vehicles.

Between 2011 and 2014, five collisions occurred at SR 49/Angels Road, the majority of which resulted from northbound left-turns onto Angels Road, including one fatality.

Market-Based Growth Scenario (20 Year)

ADT on SR 49 south of Mountain Ranch Road is projected to reach 11,090 vehicles.

As development occurs within the Southern Gateway Plan Area, safety, operations, and access need to be further evaluated.

Theoretical Buildout Growth Scenario (>20 Years)

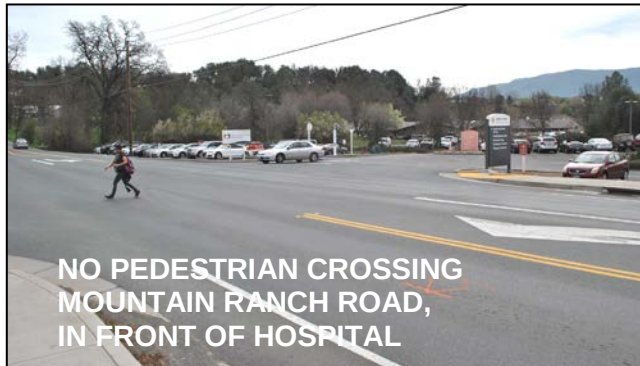
ADT on SR 49 south of Mountain Ranch Road is projected to reach 15,790 vehicles.

As development occurs within the Southern Gateway Plan Area, safety, operations, and access need to be further evaluated.

5.3 Mountain Ranch Road SR 49 to Calaveritas Road

Mountain Ranch Road (SR 49 to Calaveritas Road)

Mountain Ranch Road extends from SR 49 to the community of Mountain Ranch nine miles to the east. Mountain Ranch Road is a two-lane major collector through San Andreas. Existing sidewalk infrastructure is disconnected, and there are no pedestrian crossings or bike lanes on Mountain Ranch Road. There is a Class I bike path connecting the Government Center to the County Library on the northerly side of Mountain Ranch Road.

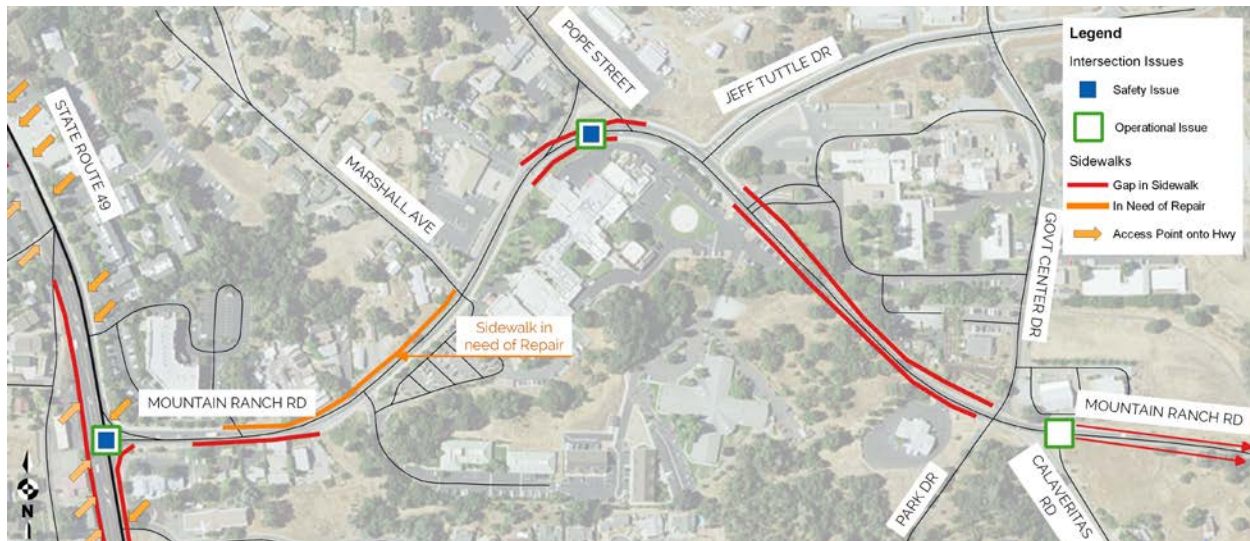


Mountain Ranch Road provides access to the major government and employment centers in San Andreas. Marshall Avenue, Pope Street, Jeff Tuttle Drive, and Government Center Drive connect to Mountain Ranch Road. The presence of government facilities and employment centers, including the Mark Twain Hospital along Mountain Ranch Road contributes to San Andreas' position as an activity hub and classifies Mountain Ranch Road as an important roadway for local and regional traffic.

Mountain Ranch Road intersects with the following roads: Pope Street, Jeff Tuttle Drive, Government Center Drive, Park Drive, and Calaveritas Road. These intersections are two-way stop-controlled. Due to its existing configuration, the Mountain Ranch Road/Pope Street intersection is analyzed as two intersections (one Eastbound (EB) and one Westbound, (WB), pictured).

The intersection of Jeff Tuttle Drive and Government Center Drive provides direct access to Mountain Ranch Road and is therefore analyzed in this section. Jeff Tuttle Drive/Government Center Drive is an all-way stop-controlled intersection.





Operational and Safety Analysis

Mountain Ranch Road intersects with the following roads: Pope Street, Jeff Tuttle Drive, Government Center Drive, Park Drive, and Calaveritas Road.

Existing Conditions

Under Existing Conditions, the intersections on Mountain Ranch Road at Pope Street (WB and EB legs), Jeff Tuttle Drive, Government Center Drive/Park Drive, and Calaveritas Road operate at acceptable LOS in the AM and PM peak hours.

Existing ADT on Mountain Ranch Road east of SR 49 is 7,401 vehicles, and east of Calaveritas is 4,005 vehicles.

The Mountain Ranch Road/Pope Street (WB and EB legs) intersection has a collision factor 1.6 times the statewide average rate. Primary collision types include rear end and sideswipe for vehicles travelling east and west on Mountain Ranch Road. Two vehicle/pedestrian accidents occurred at Mountain Ranch Road/Marshall Avenue in 2014.

Market-Based Growth Scenario (20 Year)

Under the Market-Based Growth Scenario, the intersections on Mountain Ranch Road at Pope Street (WB and EB legs), Jeff Tuttle Drive, Government Center Drive/Park Drive, and Calaveritas Road are projected to operate at acceptable LOS in the AM and PM peak hours.

ADT on Mountain Ranch Road east of SR 49 is projected to reach 9,031 vehicles, and east of Calaveritas is projected to 4,887 vehicles.

Theoretical Buildout Growth Scenario (>20 Years)

Under the Theoretical Buildout Growth Scenario, the intersections on Mountain Ranch Road at Pope Street (WB leg), Jeff Tuttle Drive, Government Center Drive/Park Drive, and Calaveritas Road are projected to operate at acceptable LOS in the AM and PM peak hours.

ADT on Mountain Ranch Road east of SR 49 is projected to reach 12,858 vehicles, and east of Calaveritas Road is projected to reach 6,958 vehicles.

6. Recommended Improvements

6. Recommended Improvements

This section identifies both Short-Term and long-term recommendations and costs for transportation improvements within the circulation study area's respective segments. Short-term recommendations include improvements that are needed under existing conditions and should be implemented within twenty years. Long-term recommendations include improvements that will be development driven under future growth scenario conditions (20 or more years), following significant development of the Southern Gateway Plan Area. Recommended improvement priorities, cost, and funding strategies are discussed in the subsequent section.

Improvement Concepts

The following key concepts serve as defining features of the transportation improvement recommendations for the community of San Andreas:

- I. Community Gateways
- II. Intersection Control and Highway Access
- III. Multi-Modal Infrastructure
- IV. Speed Reduction Infrastructure

The goal of these improvements is to establish 'nodes' (or points) throughout the community that, as defining features of the improvements themselves, help in achieving the following goals:

- Community Identify and Character
- Intersection Capacity and Safety
- Pedestrian and Bicycle Safety
- Traffic Calming and Speed Reduction

I. Community Gateways

This Study recommends gateways at the north and south end of town. Gateways will be valuable in establishing a sense of identity for the community and serving as landmarks to establish community boundaries. Major gateway design should be consistent with the town's rural character and appeal, and be of an appropriate scale to be noticeable to approaching traffic. Major gateways are recommended along at SR 49/Pool Station Road and SR 49/Airport Road to slow traffic entering town. Minor gateways may include historic landmark identification and signage along the Saint Charles Street (SR 49) corridor to highlight areas of business and social activity through town.

The existing Northern Gateway monument is shown on the left; the recommended Southern Gateway monument design is shown on the right:



II. Intersection Control and Highway Access

Intersection improvements, including traffic signals and roundabouts, are subject to Caltrans approval through an Intersection Control Evaluation (ICE) study. This ICE process was added by Caltrans in 2015, to standardize and guide evaluation requirements for intersection improvements on the State highway system. Of note within the ICE process, Caltrans requires the analysis of a roundabout concept as an alternative for all intersection improvements. The reason why a roundabout concept is not the most preferred is required to be provided.

To be clear, although specific intersection recommendations along Saint Charles Street (SR 49) have been provided, including both signals and roundabouts, the ultimate improvement on the state highway system will need to be supported by the findings of the ICE process.

Due to the numerous driveways and local roads providing direct access onto the highway through San Andreas, intersection control and highway access are necessary components to achieving acceptable capacity and safety at intersections along Saint Charles Street (SR 49). Through town, three traffic signals are recommended at the following locations in the Short-Term: High School Street, Court Street, and Mountain Ranch Road. Signalized intersection control will improve highway access for community travel on local side streets. Additionally, signalized intersections at these locations will allow for signalized pedestrian crossings on the highway. Signalization of these intersections is not expected to significantly increase travel time delay for through travelers on Saint Charles Street (SR 49).

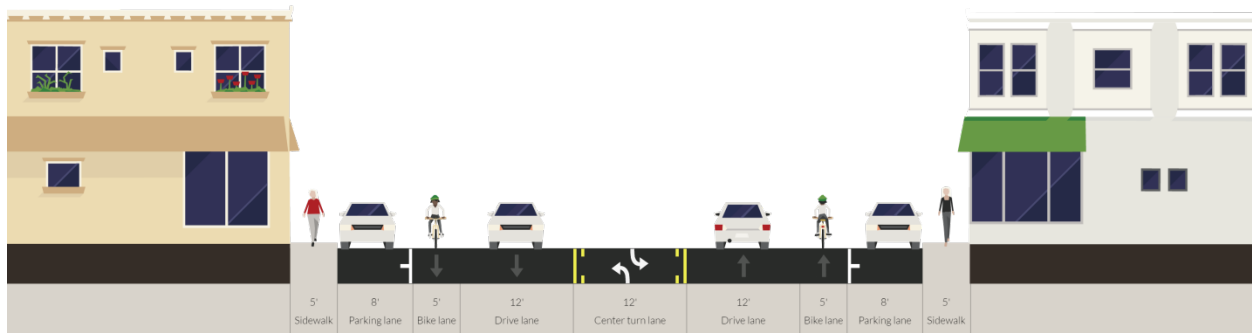


This study also recommends two roundabouts at the intersections of SR 49/Pool Station Road and SR 49/Airport Road. Roundabouts are recommended at the northern and southern entry points into town, due to their ability to slow traffic and reduce accident frequency and severity. The strategic placement of roundabouts at the northern and southern gateways will serve to slow traffic entering town while maintaining capacity and operational standards on SR 49. Due to sight distance and collision issues, it is recommended that the SR 49/Angels Road intersection be closed, and that Angels Road be realigned to intersect with the SR 49/Airport Road roundabout at its westbound approach.

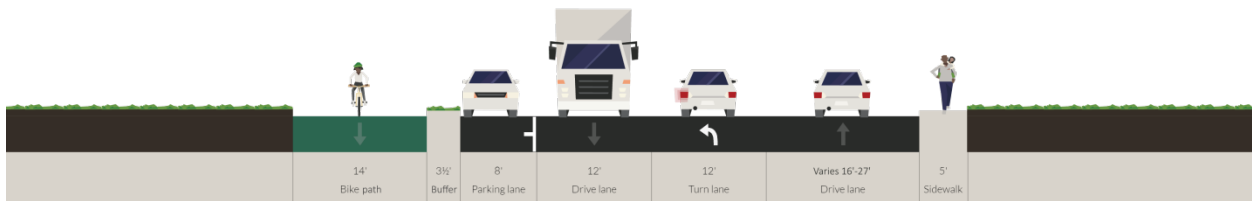
III. Multi-modal Infrastructure

This Study recommends the construction of pedestrian and bicycle infrastructure through the community. Specifically, pedestrian and bicycle infrastructure should be provided on Saint Charles Street (SR 49) through town to ensure safe and accessible travel on the State highway. Complete Streets and Main Streets concepts are employed to balance the needs of all users. A continuous Class II bike lane is recommended on Saint Charles Street (SR 49) north of Airport Road to Pool Station Road. A Class III bike route is recommended on Mountain Ranch Road due to the ROW constraints and lower speeds. The following roadway cross-sections for Saint Charles Street, Mountain Ranch Road and other local roadways are shown as follows.

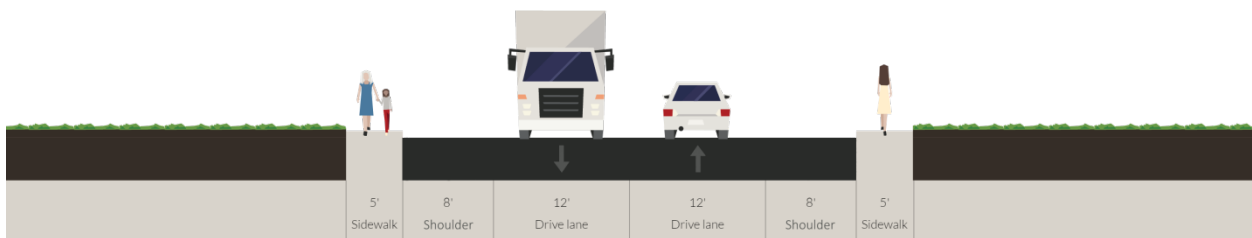
ST. CHARLES STREET (SR 49) TYPICAL 72' CROSS-SECTION



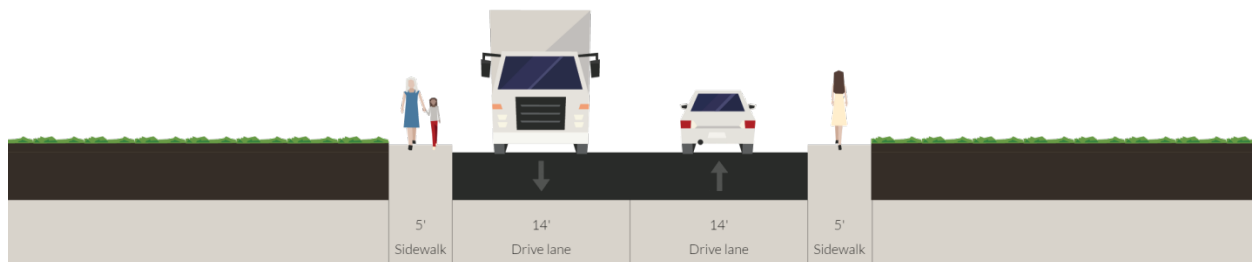
MOUNTAIN RANCH ROAD (NEAR POPE STREET) TYPICAL 70.5'-81' (VARIES) CROSS-SECTION



MOUNTAIN RANCH ROAD, GOVERNMENT CENTER DRIVE EXTENSION, & ANGELS ROAD EXTENSION TYPICAL 50' CROSS-SECTION



ADAMS STREET TYPICAL 38' CROSS-SECTION



A Class II bike lane is shown on the left; a Class III bike route is shown on the right:



The following image shows a high visibility pedestrian crossing with ADA (Americans with Disabilities Act) curb ramp. Additionally, continuous sidewalk infrastructure and proper lighting increase pedestrian safety along the highway.



IV. Speed Reduction Infrastructure

This Study recommends the implementation of speed reduction infrastructure at key locations along the SR 49 Corridor. Speed reduction infrastructure includes bulb outs, high-visibility pedestrian crossings, and aesthetic enhancements to draw attention to places of community activity. Additionally, bike lanes and complete sidewalk infrastructure will further slow vehicles down as they become aware of local activity along the Saint Charles Street (SR 49) corridor through town.

The following images show two bulb-out design options: one providing additional pedestrian space at a designated crosswalk, the other serving to narrow the roadway while providing space for bicycle parking.



Improvement Cost

This Improvement Cost discussion is intended to provide an overall magnitude of potential improvement costs to construct the identified recommended improvements contained in this study. The purpose of these opinions of cost is to identify potential funding requirements only. Further engineering design, environmental clearance, and other agency approvals including Caltrans, will be required before costs that are more accurate can be provided.

The following table, table 26, provides a breakdown of “ballpark” unit costs by improvement type (LF = Linear Foot; EA = Each; SQFT = Square Foot). To these base unit costs, percentages have been added to account for Contingency, Engineering, and Construction Support, to establish opinions of “total improvement unit cost” that will be applied to each of the improvement types below.

**TABLE 26
IMPROVEMENT COSTS**

<i>Item Description</i>	<i>Units</i>	<i>Opinion of Base Unit Cost</i>	<i>Contingency (50%)</i>	<i>Engineering (15%)</i>	<i>Construction (10%)</i>	<i>Opinion of Total Unit Cost</i>
Sidewalk	LF	\$ 150	\$ 75	\$ 34	\$ 23	\$ 281
Bike Lane	LF	\$ 3	\$ 2	\$ 1	\$ 0	\$ 6
Bulb-Out	EA	\$ 20,000	\$ 10,000	\$ 4,500	\$ 3,000	\$ 37,500
Crosswalk	EA	\$ 2,000	\$ 1,000	\$ 450	\$ 300	\$ 3,750
Traffic Signal (minor intersection modifications)	EA	\$ 400,000	\$ 200,000	\$ 90,000	\$ 60,000	\$ 750,000
Roundabout (Pool Station)	EA	\$ 2,500,000	<i>Included in Opinion Base Unit Cost</i>			\$ 2,500,000
Roundabout with Angels Road Realignment (Road Only)	EA	\$ 3,000,000	<i>Included in Opinion Base Unit Cost</i>			\$ 3,000,000

Unit costs are based on the following assumptions:

- Sidewalk: 6-foot sidewalks at \$10/SQFT (or \$60/LF) with Curb and Gutter at \$40/LF and \$50/LF for “average” grading and site preparation. The cost for grading and site preparation can vary substantially along the corridor. This cost does not include utility relocation or right of way, but may be required.
- Bike Lane: Unit cost includes striping, legends and signing.
- Bulb-Out: Average of \$20,000 per bulb-out based on approximate cost of \$10,000 per curb ramp.
- Crosswalk: Assumes \$5/SQFT and an average of 400 SQFT per crosswalk.
- Traffic Signal: Represents average cost of a signal in preliminary design estimates, including potential minor intersection improvements.
- Roundabout: Represents average cost of a roundabout in preliminary design estimates. At the Southern Gateway roundabout, the roadway only for the Angels Road realignment is included in this opinion of cost and does not include frontage improvements.

Total improvement costs for each segment, including contingency, engineering, and construction costs, are provided in the following sections.

6.1 Saint Charles Street (SR 49) Corridor SR 12 to Mountain Ranch Road

Saint Charles Street (SR 49) Corridor Segment 1: Recommended Improvements

As a key feature of Segment 1, a roundabout is recommended at the intersection of SR 49/Pool Station Road. A roundabout at this location will serve to slow vehicles entering town from the north, and to signalize to the driver the transition from a State highway to a Main Street Corridor. Additionally, a roundabout will enhance existing gateway signage located in the southwest quadrant of the SR 49/Pool Station Road intersection, reading, "Welcome to Historic San Andreas - Calaveras County Seat".

Short-Term Recommendations

Short-Term recommendations are presented on Figure 13. Recommended short-term improvements along Segment 1 include the following:

- Construct a single-lane Roundabout at SR 49/Pool Station Road to STAA standards
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior any intersection improvements on the State highway.*
- Complete sidewalk infrastructure
- Construct a Class II bike lane in the northbound and southbound direction
- Enhance Northern Gateway signage

These short-term improvements address long-term concerns.

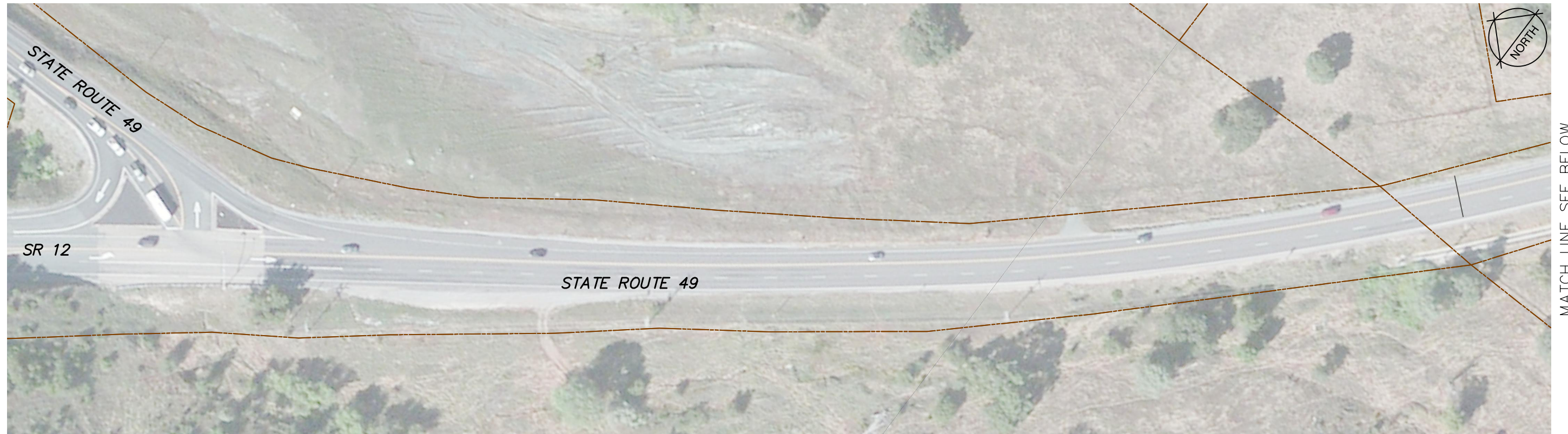
Recommended improvement costs include the following:

<i>Item Description</i>	<i>Units</i>	<i>Opinion of Total Unit Cost</i>
Sidewalk	LF	\$ 298,125
Bike Lane	LF	\$ 15,840
Roundabout	EA	\$ 2,500,000
		\$ 2,813,965

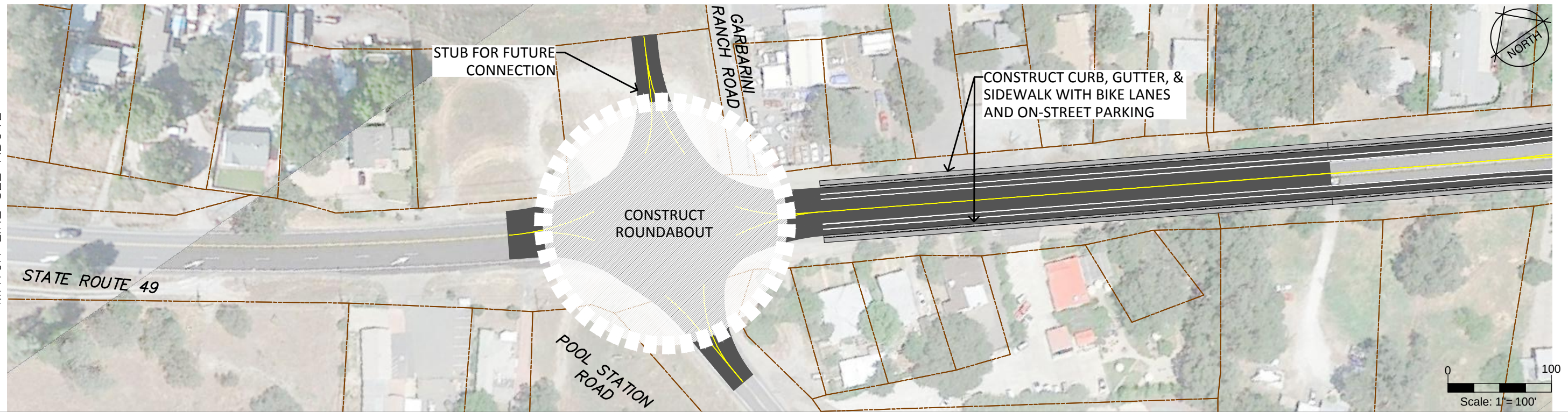
Segment 1 (Saint Charles Street Corridor: SR 12 to Gold Oak Road)

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MATCH LINE SEE ABOVE



MATCH LINE SEE BELOW



SHORT-TERM IMPROVEMENTS

Figure 13



San Andreas SR 49 Commercial Gateway and Corridor Study - San Andreas, CA

February 2017
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Saint Charles Street (SR 49) Corridor Segment 2: Recommended Improvements

Segment 2 provides access to the post office, high school, and various community services. As a segment of Saint Charles Street (SR 49) that accommodates a great deal of community activity, it is important to employ speed reduction infrastructure consistent with Complete Streets and Main Streets concepts (i.e., Bulb-outs, pedestrian crossings, and proper signage). To ensure safe vehicular and multi-modal access to the high school, a signal is recommended for the SR 49/High School Street intersection.

Short-Term Recommendations

Short-Term recommendations are presented on Figure 14. Recommended short-term improvements along Segment 2 include the following:

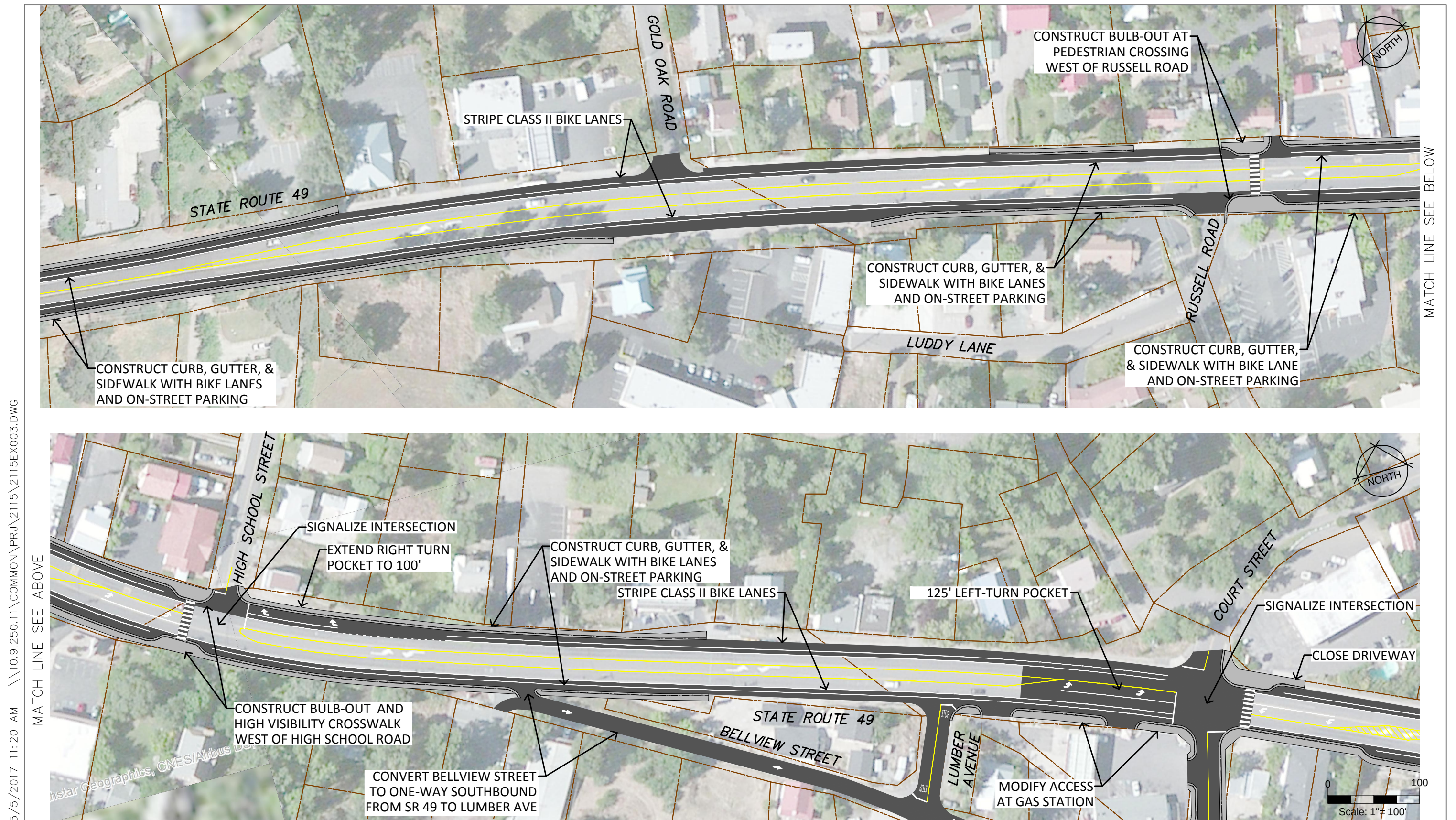
- Construct a Signal at SR 49/High School Street with bulb-outs and a pedestrian crossing at the southbound approach (west of High School Street)
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior to any intersection improvements on the State highway.*
- Construct bulb-outs at the northbound approach of SR 49 at Russell Road
- Complete and repair sidewalk infrastructure on the westerly side of the SR 49 from Gold Oak Road to Court Street
- Complete and repair existing sidewalk infrastructure on the easterly side of the SR 49 from Russell Road to Court Street
- Construct a Class II bike lane in the northbound and southbound direction
- Restrict Bellview Street to one-way southbound travel; reconfigure SR 49/Bellview Street intersection to restrict left-turns out onto the highway
- Restrict left-turns onto Lumber Avenue
**This improvement is to be completed in conjunction with the Court Street Signal improvement for Segment 3, to follow.*

These short-term improvements address long-term concerns.

Recommended improvement costs include the following:

<i>Item Description</i>	<i>Units</i>	<i>Opinion of Total Unit Cost</i>
Sidewalk	LF	\$ 627,188
Bike Lane	LF	\$ 23,029
Bulb Out	EA	\$ 75,000
Crosswalk	EA	\$ 3,750
Traffic Signal	EA	\$ 750,000
Total		\$ 1,478,967

Segment 2 (Saint Charles Street Corridor: Gold Oak Road to Court Street)



SHORT-TERM IMPROVEMENTS

Figure 14

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ENGINEERING SOLUTIONS

San Andreas SR 49 Commercial Gateway and Corridor Study - San Andreas, CA

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Saint Charles Street (SR 49) Corridor Segment 3: Recommended Improvements

Segment 3 provides access to the commercial and tourist attractions located along Historic Main Street, which are considered the downtown core of San Andreas. High vehicle volumes accessing Saint Charles Street (SR 49) from Church Hill Road and Gold Strike Road (through Court Street), are forced to navigate one-way travel lanes, blind curves, and narrow roadways. To enhance connectivity and safety along Segment 3, it is important to employ speed reduction infrastructure consistent with Complete Streets and Main Streets concepts (i.e., Bulb-outs, pedestrian crossings, and proper signage). To slow vehicles approaching Main Street from the north, and approaching High School Street from the south, a signal at the intersection of SR 49/Court Street/Adams Avenue is recommended.

Short-Term Recommendations

Short-Term recommendations are presented on Figure 15. Recommended short-term improvements along Segment 3 include the following:

- Signalize SR 49/Court Street/Adams Avenue (*See concept map)
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior to any intersection improvements on the State highway.*
- Adams Avenue & Church Hill Road Circulation Improvements: Reconfigure access at the SR 49/Court Street/Adams Avenue intersection; Restrict Church Hill Road to one-way eastbound north of Adams Avenue)
- Construct pedestrian crossing with refuge, and bulb-outs at the northbound approach of Main Street/Church Hill Road on SR 49 (east of Main Street)
- Construct bulb-outs at the southern approach of California Street on SR 49
- Complete sidewalk infrastructure on SR 49 from Court Street to Treat Avenue
- Construct a Class II bike lane in the northbound and southbound direction

These short-term improvements address long-term concerns.

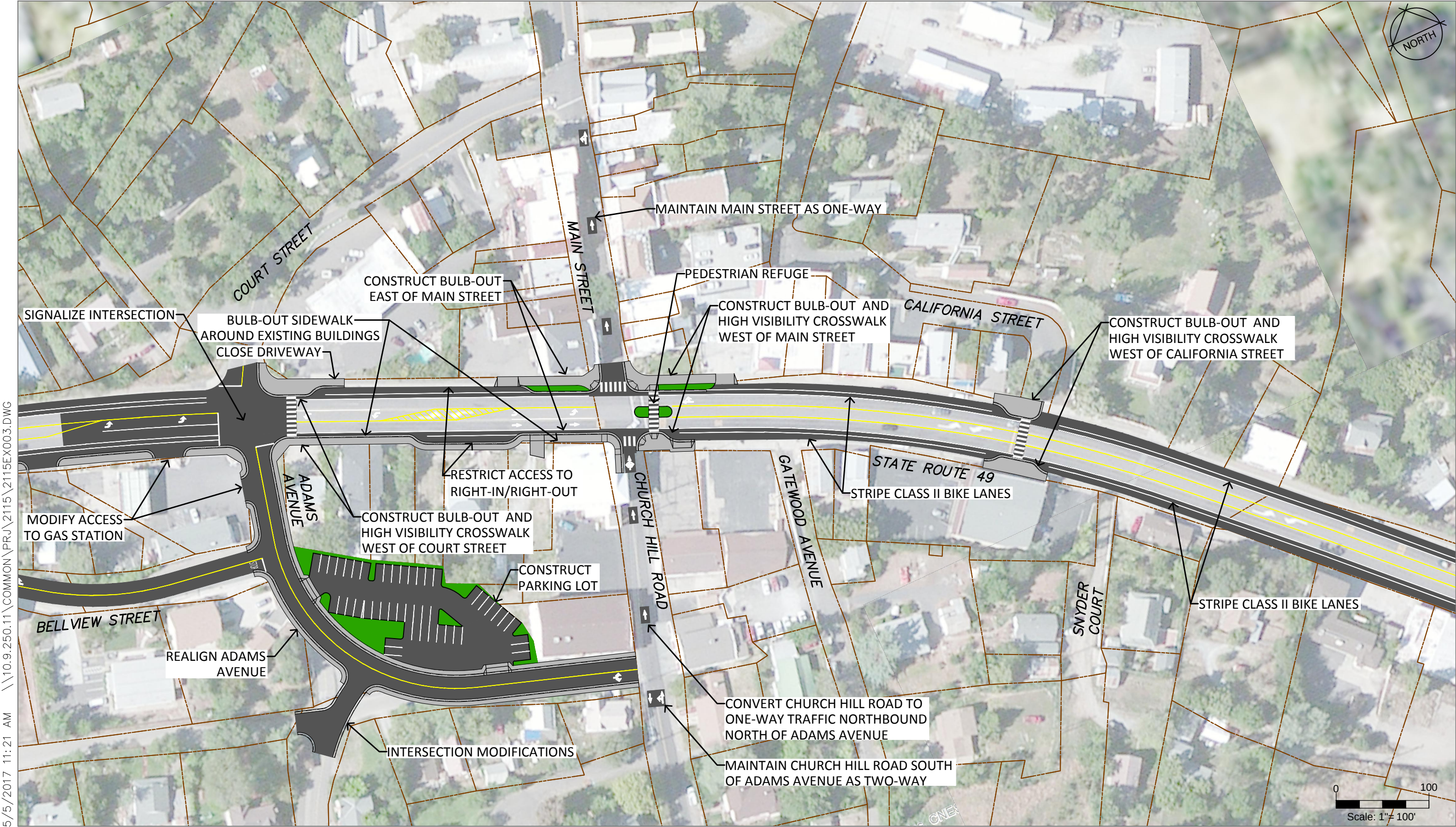
Recommended improvement costs include the following:

<i>Item Description</i>	<i>Units</i>	<i>Opinion of Total Unit Cost</i>
Sidewalk	LF	\$ 157,500
Bike Lane	LF	\$ 17,359
Bulb Out	EA	\$ 150,000
Crosswalk	EA	\$ 3,750
Traffic Signal	EA	\$ 750,000
Total		\$ 1,078,609

*Note: Adams Avenue/Church Hill Road
Circulation Improvements not included.*

The SR 49/Main Street/Church Hill Road intersection is the geographical center and the historic core of San Andreas. Due to its location and proximity to community activity, improvements should be accompanied by aesthetic enhancements, such as landscape design, lighting fixtures, and pedestrian amenities, illustrated in the following vignettes.

Segment 3 (Saint Charles Street Corridor: Court Street to Treat Avenue)



SHORT-TERM IMPROVEMENTS

Figure 15



The following images show the northbound approach to Main Street/Church Hill Road, with a pedestrian crossing and refuge and a bulb out. Church Hill Road is converted to one-way eastbound travel, restricting left-turns onto Church Hill Road from Saint Charles Street (SR 49).

SR 49/Main Street/Church Hill Road, Northbound Approach



Pedestrian Refuge at Main Street, Northbound Approach



The following image shows the southbound approach to Main Street/Church Hill Road with improved sidewalk infrastructure, Class II bike lanes, and aesthetic improvements.

SR 49/Main Street/Church Hill Road, Southbound Approach



The following image shows a bird's eye perspective of the SR 49/Main Street/Church Hill Road intersection. The above listed improvements will contribute to traffic calming, multi-modal, and safety goals, as well as drawing attention to the community character of Main Street.

SR 49/Main Street/Church Hill Road, Bird's Eye Perspective



Saint Charles Street (SR 49) Corridor Segment 4: Recommended Improvements

Segment 4 is generally characterized by its wide road width, high number of access points, and lack of pedestrian crossings. While the easterly side of SR 49 has a connected sidewalk throughout Segment 4 extents, the westerly side sidewalk is only approximately 50 percent complete. With no pedestrian crossings along Segment 4, individuals wishing to cross the State highway are forced either to walk excessive distances to a pedestrian crossing, or to cross unsafely. Segment 4 includes the intersection of SR 49/Mountain Ranch Road, which accommodates high volumes of traffic, especially during peak hours. To address these congestion and pedestrian safety concerns, a signal is recommended for the intersection of SR 49/Mountain Ranch Road, and a new pedestrian crossing is recommended on SR 49 at Treat Avenue.

Short-Term Recommendations

Short-Term recommendations are presented on Figure 16. Recommended short improvements along Segment 4 include the following:

- Construct a pedestrian crossing and bulb-outs at the northbound approach of Treat Avenue on SR 49 (east of Treat Avenue)
- Signalize SR 49/Mountain Ranch Road; with pedestrian crossing at the southbound, westbound, and eastbound approaches; reconfigure access to commercial business parking lot (*See Figure 8)
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior to any intersection improvements on the State highway.*
- Complete and repair sidewalk infrastructure on both sides of SR 49 from Treat Avenue to Mountain Ranch Road
- Construct a Class II bike lane in the northbound and southbound direction

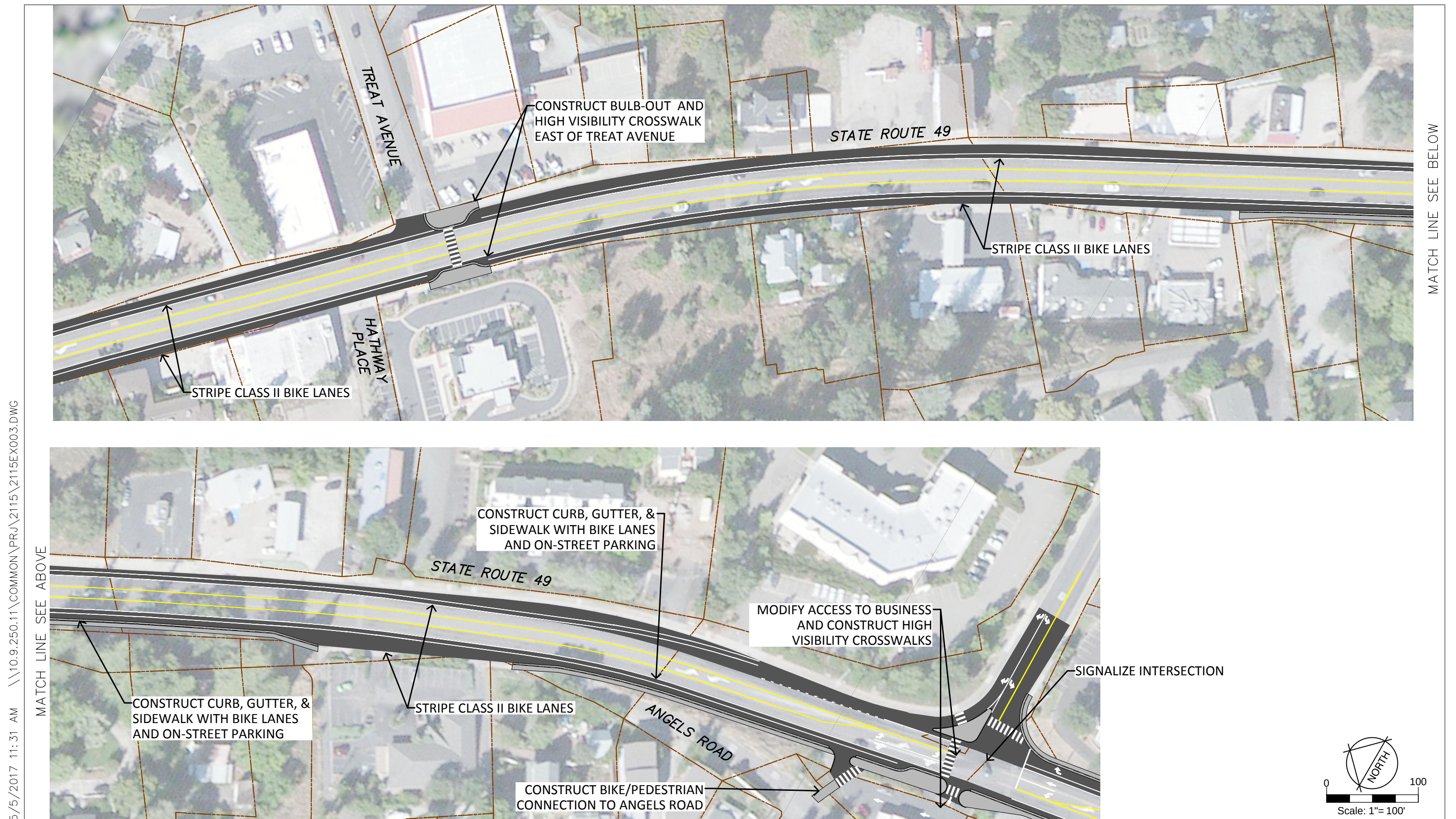
Long-Term Recommendations

- Signalize SR 49/Treat Avenue intersection (No long-term concept map is provided for Segment 4)
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior to any intersection improvements on the State highway.*

Recommended improvement costs include the following:

Item Description	Units	Opinion of Total Unit Cost
Sidewalk	LF	\$ 281,250
Bike Lane	LF	\$ 23,513
Bulb Out	EA	\$ 75,000
Crosswalk	EA	\$ 3,750
Traffic Signal	EA	\$ 750,000
Roundabout	EA	\$ -
Subtotal		\$ 1,133,513
(Long Term)		
Traffic Signal	EA	\$ 750,000
Total		\$ 1,883,513

Segment 4 (Saint Charles Street Corridor: Treat Avenue to Mountain Ranch Road)



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SHORT-TERM IMPROVEMENTS

Figure 16

6.2 Southern Gateway Plan Area: SR 49 (Mountain Ranch Road to Buckskin Way)

Southern Gateway Plan Area Recommended Improvements

The Southern Gateway Plan Area improvements will play a significant factor in the future of San Andreas in the short and Long-Term. With the recommendation of a roundabout at Airport Road and the closure of the Angels Road intersection will improve existing safety and circulation issues as vehicles enter and exit town, these improvements will also set the stage for future residential and commercial development in the Southern Gateway Plan Area. Furthermore, new roadway connections from Mountain Ranch Road and Pool Station Road to SR 49 will not only allow for future development connections within the Southern Gateway Plan Area, but they will lessen existing travel demand on Mountain Ranch Road and the Saint Charles Street (SR 49) corridor by providing an alternative route.

Short-Term Recommendations

Short-Term recommendations are presented in Figures 17A and 17B. The following improvements are recommended for the Southern Gateway Plan Area in the Short-Term (>20 years):

- Construct a single-lane Roundabout at SR 49/Airport Road to STAA standards
**Requires Caltrans approved Intersection Control Evaluation (ICE) study prior to any intersection improvements on the State highway.*
- Close the existing SR 49/Angels Road intersection; realign Angels Road to connect to Airport Road extension west of SR 49
- Install Southern Gateway, in the form of a monument or sign, to notify northbound travelers of changing roadway character and approaching community activity
- Complete sidewalk infrastructure, and construct Class II bike lane, south of Mountain Ranch Road to Airport Road
- Maintain existing passing lane in the southbound direction south of Airport Road

Long-Term Recommendations

Long-Term recommendations are presented on Figure 18. The following improvements are recommended for the Southern Gateway Plan Area in the Long-Term (20+ years):

- Extend existing Airport Road to Mountain Ranch Road
- Connect Airport Road west of SR 49 to George Reed Drive
- *Additional Long-Term circulation improvement recommendations (See Figure 9)*

The *Additional Long-Term Recommendations* includes a potential signal at the SR 49/Knief Lane intersection. With the proposed roundabout at SR 49/Airport Road, the need for this additional signalized intersection on SR 49 will be dependent on future development levels in the Southern Gateway Plan Area and the Caltrans *Intersection Control Evaluation (ICE)* approval process, including signal warrant analysis.

Recommended improvement costs include the following:

Short-Term Item Description	Units	Opinion of Total Unit Cost
Sidewalk	LF	\$ 540,000
Bike Lane	LF	\$ 18,428
Roundabout	EA	\$ 3,000,000
Subtotal (w/ Angels Road realignment included (Road Only))		\$ 3,558,428
(Long Term)		
Traffic Signal* (Knief	EA	\$ 750,000
*Subject to Caltrans approval		
**New roadway		\$ 4,308,428

The SR 49/Airport Road roundabout will serve as the defining Southern Gateway feature. As such, the above listed improvement recommendations should be accompanied by aesthetic enhancements, such as landscape design, rural character monuments or statues (see picture,), and promote an identifiable town character. In particular, a Southern Gateway monument, along with improved circulation connections, will aide in establishing a sense of identity for the community, and inspiring circulation and safety improvements along the Saint Charles Street (SR 49) corridor. The following image presents the Southern Gateway concept perspective of the SR 49/Airport Road roundabout and gateway monument, as seen by northbound travelers on SR 49.

SR 49/Airport Road Southern Gateway, Northbound Approach



The SR 49/Airport Road roundabout should be designed to accommodate existing and future traffic levels on the highway, as well as community travel along Airport Road and Angels Road east and west of the highway. The central island should reflect the rural community identity and fit with the natural landscape. Native plants, and non-native drought-tolerant plants, should be used for all landscaping purposes. The central island concept is shown in the following image.

SR 49/Airport Road Southern Gateway, Center Island Design

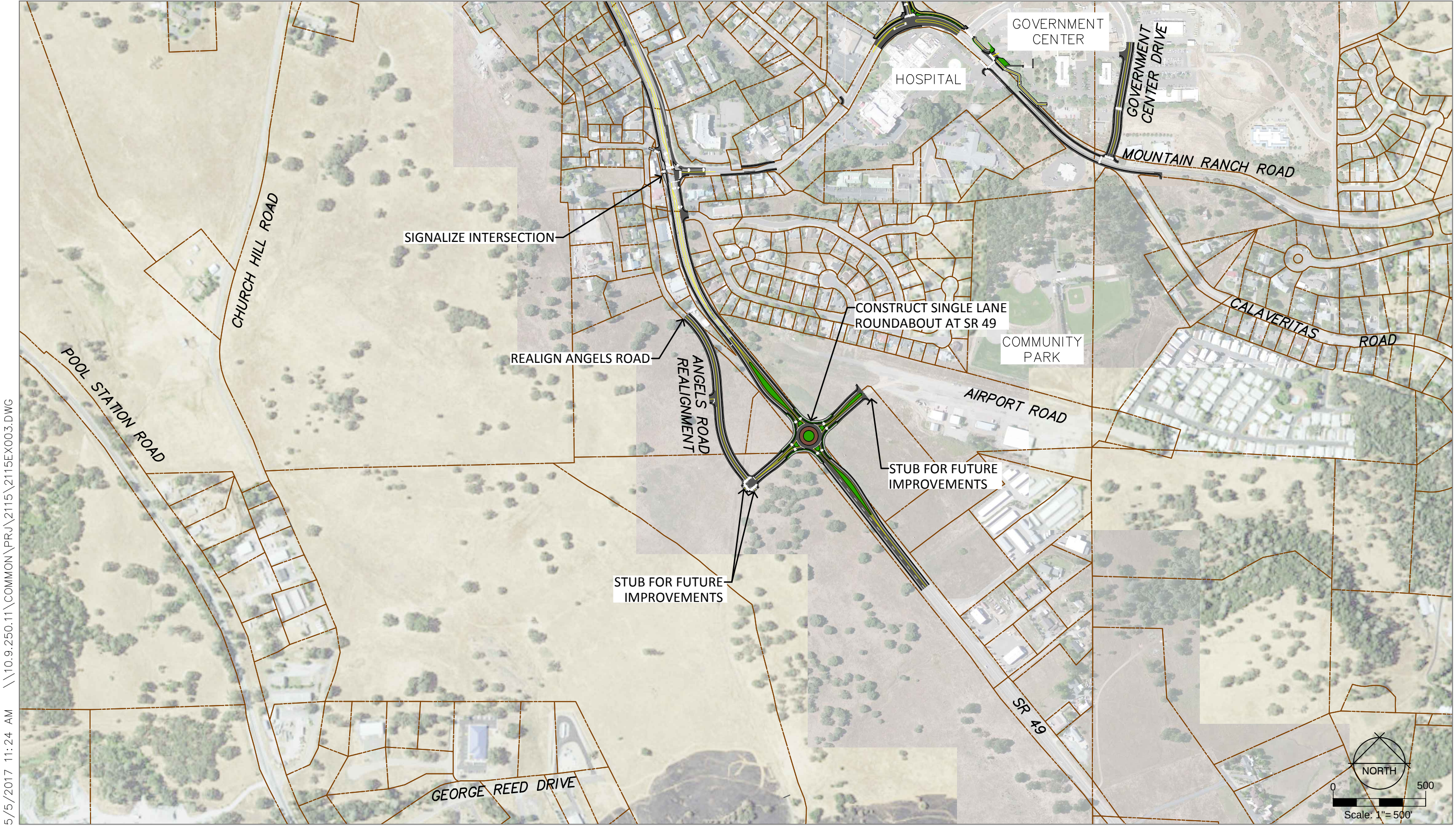


The SR 49/Airport Road roundabout will serve as the primary entry point into town from the south. In addition to signifying entrance to the community to vehicular traffic, the roundabout should provide sufficient bicycle and pedestrian connections. In parallel with any development within the Southern Gateway Plan Area, bicycle and pedestrian connections should be established and enhanced. The following image shows sidewalks and pedestrian crossings at the roundabout and bicycle travel through the roundabout.

SR 49/Airport Road Southern Gateway, Multi-modal Accommodation



Southern Gateway Circulation Plan



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SHORT-TERM IMPROVEMENTS

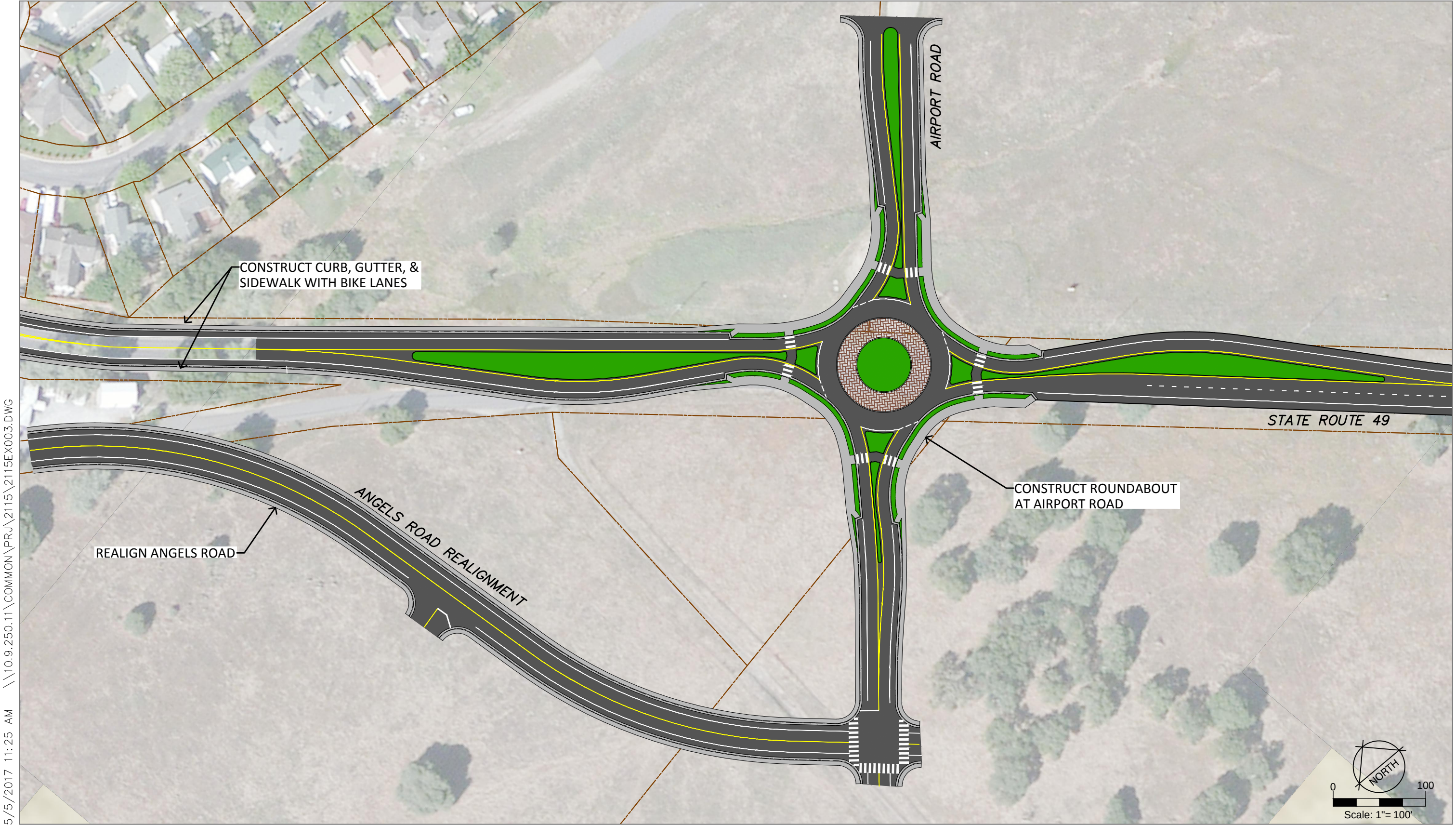
Figure 17A



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Southern Gateway Circulation Plan



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SHORT-TERM IMPROVEMENTS

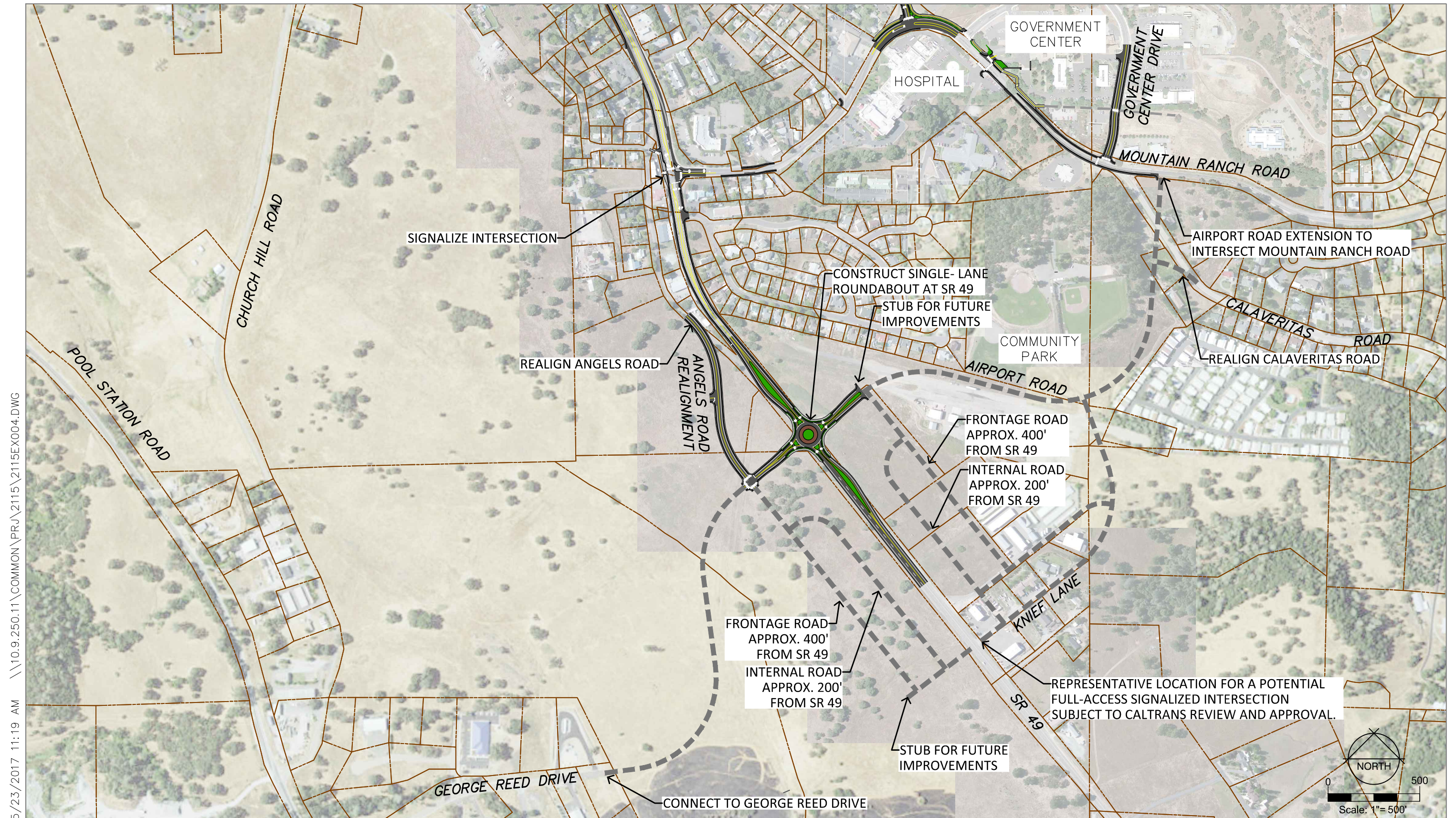
Figure 17B



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Southern Gateway Circulation Plan



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LONG-TERM IMPROVEMENTS

Figure 18



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6.3 Mountain Ranch Road

Mountain Ranch Road Segment Recommended Improvements

Mountain Ranch Road provides access and government and employment centers, including the Government Center, County Court House, Mark Twain Hospital, among others. Because of the high concentration of government and employment centers, Mountain Ranch Road hosts high volumes of commuter, regional, and local traffic.

Mountain Ranch Road also provides access to transit stops, the County Library, the park located on Park Drive, and other important community services. However, there are currently no pedestrian crossings along Mountain Ranch Road (there are currently no marked pedestrian crossings at SR 49/Mountain Ranch Road intersection, as well). Recommended improvements focus on completing pedestrian and bicycle infrastructure and adding high visibility pedestrian crossings at three key locations on Mountain Ranch Road.

Short-Term Recommendations

Short-Term recommendations are presented on Figures 19A and 19B. The following improvements are recommended for Mountain Ranch Road in the Short-Term:

- Complete sidewalk infrastructure (*County of Calaveras has approved sidewalk improvements to Mountain Ranch Road between SR 49 and west of Jeff Tuttle Drive; re: County of Calaveras, Mountain Ranch Road Improvements, 2008*)
- Designate a Class III bike route on Mountain Ranch Road (*County of Calaveras has approved a Class III bike route on Mountain Ranch Road between SR 49 and west of Jeff Tuttle Drive*)
- Realign Mountain Ranch Road/Pope Street intersection (*See Figure 19b; County of Calaveras has approved the realignment of Mountain Ranch Road/Pope Street intersection; re: County of Calaveras, Mountain Ranch Road Improvements, 2008*)
- Construct high visibility crosswalk at the westbound, northbound, and southbound approaches at Mountain Ranch Road/Government Center Drive/Hospital Driveway
- Extend existing Class I bike path west of Government Center Drive to Pope Street, beyond Pope Street to the DMV, and along Pope Street to Lewis Avenue
- Construct high visibility crosswalk at the eastbound and southbound approaches at Mountain Ranch Road/Government Center Drive/Park Drive
- Enhance pedestrian crossing and extend bike lanes on Government Center Drive

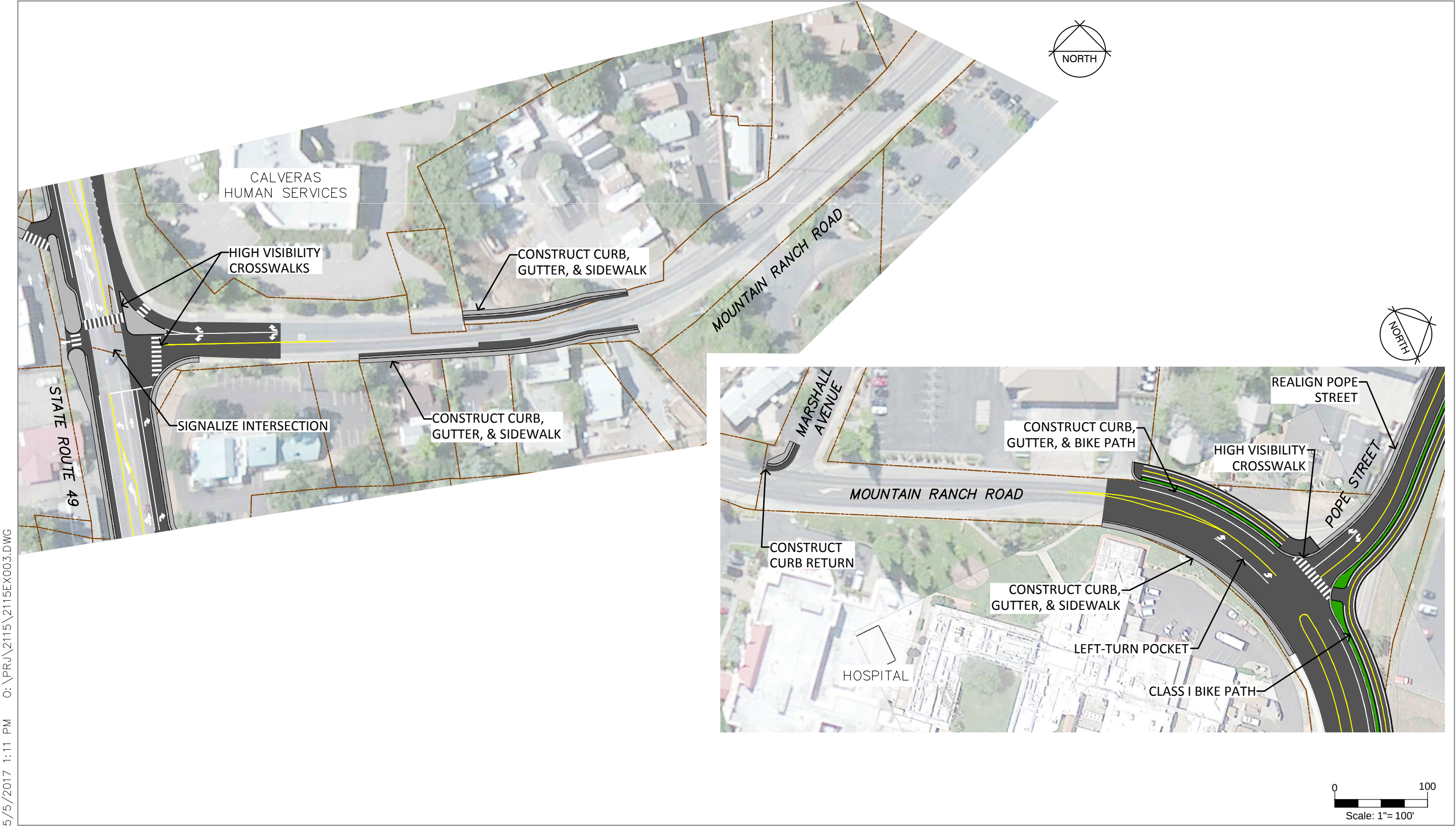
**Signalization of the SR 49/Mountain Ranch Road intersection is recommended under Segment 4 Short-Term recommendations.*

***Connection from Mountain Ranch Road to SR 49, and to Pool Station Road, is recommended under Southern Gateway Plan Area Long-Term recommendations.*

These short-term improvements address long-term concerns.

Recommended improvement costs have largely been included and funded within an existing Calaveras County improvement project of Mountain Ranch Road. The only improvement not included in the existing County project is the extension of the Class I Bike Path within the Government Center to Pope Street. The cost for this path extension is \$220,000.

Mountain Ranch Road: SR 49 to Calaveritas Avenue



SHORT-TERM IMPROVEMENTS

Figure 19A



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Mountain Ranch Road: SR 49 to Calaveritas Avenue

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SHORT-TERM IMPROVEMENTS

Figure 19B



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7. Implementation

7. Implementation

This section provides a summary of, and initial cost estimates for, the recommended improvements presented in the previous section, and provides a discussion of potential funding sources and implementation strategies to ensure successful project delivery.

Improvements will require additional planning and design, along with the programming of funding before they are ready for construction. The five basic steps required to implement any of the transportation improvements are as follows:

1. Adopt the *SR 49 Commercial Gateway and Corridor Study*
2. Identify and prioritize funding for preliminary and final designs
3. Prepare necessary planning, engineering, and environmental clearance documents
4. Identify and obtain construction funding
5. Secure right-of-way needed for each improvement project,
6. Obtain all necessary encroachment and environmental permits,
7. Coordinate with all utilities for necessary easements and required relocations,
8. Advertise and construct projects.

For implementation, although these eight steps are presented sequentially, the actual process involves many of the steps being interwoven and conducted over time to actually arrive with the necessary encroachment, environmental and utility permits, and easements to construct the projects. For example, early consultation for environmental permitting is essential to assure construction does not occur during seasons of particular environmental sensitivity. Also, early coordination with utility companies is particularly important so that needed routing and re-routings of services are planned to either avoid or minimize costs and any loss of service to utility customers. Once all of the permits are obtained so that the project is authorized for construction, a construction management team will then oversee the coordination of the construction of the project to minimize public disturbance, adhere to all permit requirements, and achieve the orderly construction of the project.

7.1 Recommendation Summary

Multi-modal Improvements

Multi-modal improvements improve access and safety for multiple modes of travel, and include sidewalks, bulb-outs, pedestrian crossings (crosswalks), and bike lanes (Class I, Class II, and Class III).

Sidewalks

Approximately 9,370 LF of new sidewalk infrastructure is proposed for the San Andreas community. (ST=Short-Term; LT=Long-Term) as summarized in Table 27 by roadway segment.

**TABLE 27
SIDEWALK IMPROVEMENTS**

Project	ST/LT	Start	End	Description
Southern Gateway Plan Area Sidewalk	ST	Mountain Ranch Rd	Airport Rd	Approx. 1920' (Not including Roundabout)
Segment 1 Sidewalk on SR 49	ST	Mountain Ranch Rd	Treat Avenue	Approx. 1000' (Not including Mountain Ranch Road signal)
Segment 2 Sidewalk on SR 49	ST	Treat Avenue	Court Str	Approx. 560' (Not including Court Street signal or Bulb-outs)
Segment 3 Sidewalk on SR 49	ST	Court St	Gold Oak Rd	Approx. 2230' (Not including Bulb-outs)
Segment 4 Sidewalk	ST	Gold Oak Rd	Pool Station Rd	Approx. 1060' (not including Roundabout)
Mountain Ranch Road Sidewalk	ST	SR 49	Park Drive/Gov't Center Drive	2600' *Currently programmed by the County

Bike Paths and Lanes

Approximately 17,452 linear feet of striped Class II bike lanes are proposed for the San Andreas community on SR 49 from Pool Station Road to Airport Road. Approximately 1,000 linear feet of Class I bike path is proposed for the San Andreas community, extending from the existing Class I bike path at the Government Center to Pope Street. (ST=Short-Term; LT=Long-Term). Table 28 summarizes the locations of the proposed bikeway improvements

**TABLE 28
BICYCLE IMPROVEMENTS**

Project	ST/LT	Start	End	Description
Class II Bike Lane	ST	Mountain Ranch Rd	Airport Rd	Approx. 3,276'
Segment 1 Class II Bike Lane on SR 49	ST	Mountain Ranch Rd	Treat Avenue	Approx. 4,180'
Segment 2 Class II Bike Lane on SR 49	ST	Treat Avenue	Court Street	Approx. 3,086'
Segment 3 Class II Bike Lane on SR 49	ST	Court St	Gold Oak Rd	Approx. 4,094'
Segment 4 Class II Bike Lane on SR 49	ST	Gold Oak Rd	Pool Station Rd	Approx. 2,816'
Mountain Ranch Rd Class III Bike Route	ST	SR 49	Calaveritas Rd	Designate a Class III bike route on Mountain Ranch Road
Existing Class I Bike Path Extension to Pope Street	ST	Existing Class I Bike Path	Pope Street	Extend existing Class I bike path
Gov't Center Dr Class II Extension	ST	Existing Class II	Mountain Ranch Rd	Extend existing Class II bike lane

Bulb-Outs and Pedestrian Crossings

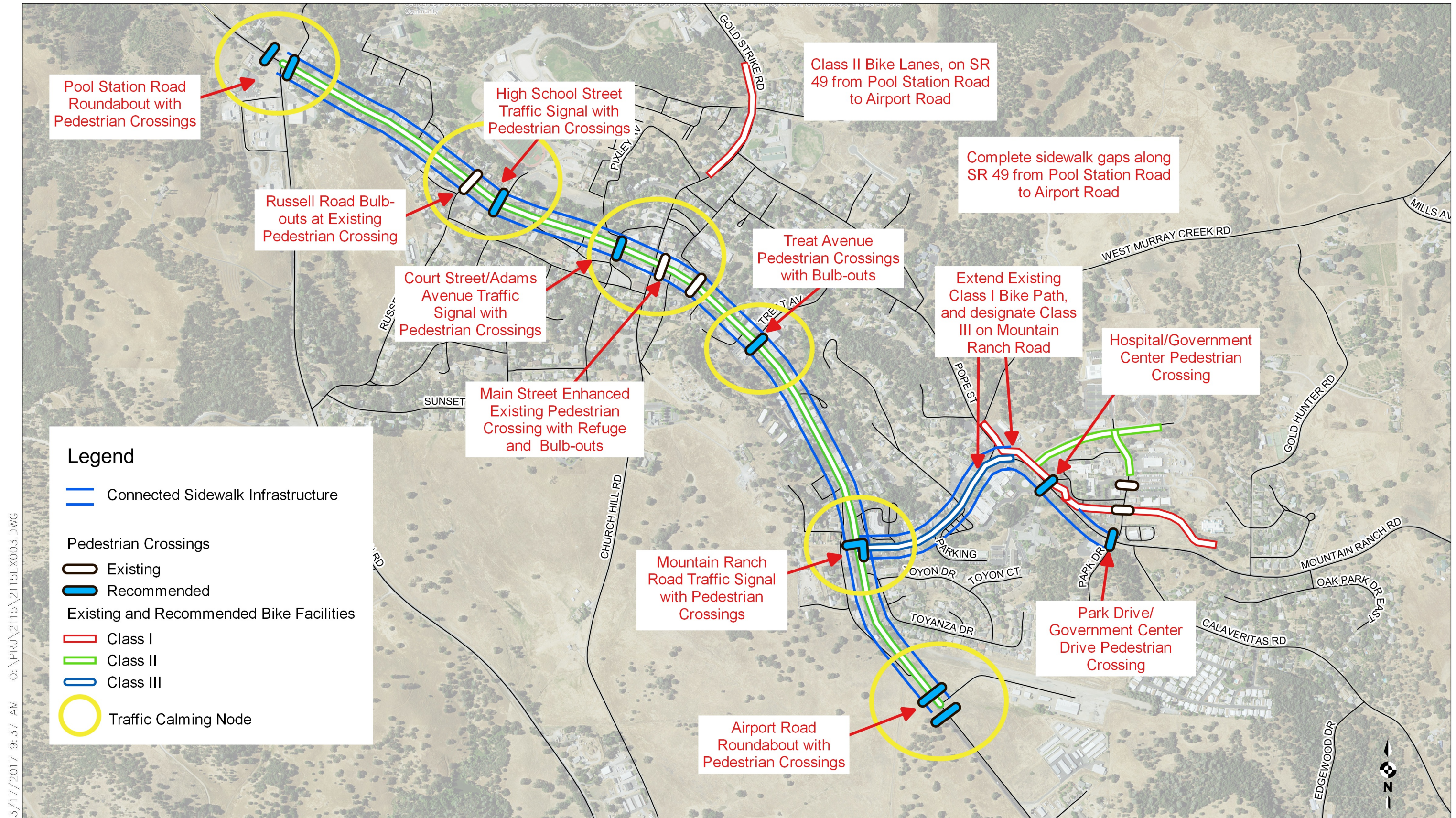
As shown in Table 29, bulb-outs are recommended at four locations on Saint Charles Street (SR 49) corridor; three (3) are recommended at existing pedestrian crossings (crosswalks) at Main Street, California Street, Russell Road, and one is recommended at Treat Avenue, to accompany a new pedestrian crossing. An additional pedestrian crossing near the Government Center to the hospital is also recommended along Mountain Ranch Road.

As shown in Table 29, bulb-outs at SR 49/Main Street (northbound approach) should correlate with additional pedestrian visibility improvements, including re-striping of the pedestrian crossing (crosswalk), flashing beacons and lighting, and a pedestrian refuge. Figure 20 presents the location of the above listed multi-modal improvements. (ST=Short-Term; LT=Long-Term)

**TABLE 29
BULB-OUTS AND PEDESTRIAN CROSSINGS**

Project	ST/LT	Start	End	Description
Treat Avenue Bulb-out	ST	SR 49/Treat Avenue		Bulb-out at southbound approach of SR 49/Treat Avenue
Main Street Bulb-out	ST	SR 49/Main Street		Bulb-out at northbound approach of SR 49/Main Street
California Street Bulb-out	ST	SR 49/California Street		Bulb-out at southbound approach of SR 49/California Street
Russell Rd Bulb-Out	ST	SR 49/Russell Rd		Bulb-out at northbound approach of SR 49/Russell Road
Treat Avenue Pedestrian Crossing	ST	SR 49/Treat Avenue		Pedestrian crossing at southbound approach of SR 49/Treat Avenue
Main Street Enhanced Ped Crossing and Refuge	ST	SR 49/Main Street		Enhance existing pedestrian crossing and add pedestrian refuge at northbound approach of SR 49/Main Street
Hospital & Government Center Pedestrian Crossing	ST	Mountain Ranch Rd/Mark Twain Medical Center/Government Center		Pedestrian path on Mountain Ranch Rd at the westbound approach, and across hospital and Govt Center driveways
Park Drive & Govt Center Drive Pedestrian Crossing	ST	Mountain Ranch Rd/Park Drive/Government Center Drive		Pedestrian crossing on Mountain Ranch Road at Park Drive, eastbound approach and southbound approach

Multimodal Improvements



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SHORT TERM IMPROVEMENTS

San Andreas SR 49 Commercial Gateway & Corridor Study

Figure 20

Intersection Improvements

Intersection improvements include traffic signals, roundabouts, and intersection closures. Traffic signals are recommended at key locations on the Saint Charles Street (SR 49) Corridor to address issues of vehicle speed, intersection congestion, and highway access. Traffic signals are recommended in the Short-Term at Mountain Ranch Road, Court Street/Adams Avenue, and High School Street. On the Saint Charles Street (SR 49) corridor, a traffic signal is recommended in the Long-Term at Treat Avenue. Roundabouts are recommended at the north and south of town to slow traffic entering San Andreas. In the Southern Gateway Plan Area, a traffic signal is recommended in the Long-Term, with the location to be decided. All intersection improvements are subject to Caltrans approval through an Intersection Control Evaluation (ICE) study. Figure 21 presents the location of the intersection improvements. (ST=Short-Term; LT=Long-Term)

**TABLE 30
INTERSECTION IMPROVEMENTS**

Project	ST/LT	Start	End	Description
Angels Road Realignment	ST	Angels Rd	Airport Rd extension	Close the SR 49/Angels Road intersection, and realign Angels Road to intersect with Airport Road extension, approximately 250' west of SR 49. Provide a stub for future connections.
SR 49/Airport Rd Roundabout	ST	SR 49/Airport Rd		Construct a single-lane roundabout to accommodate STAA trucks at SR 49/Airport Road, adding an eastbound leg to connect to Angels Road. Maintain southbound passing lane.
Pool Station Road Roundabout	ST	SR 49/Pool Station Rd		Construct a single-lane roundabout to accommodate STAA trucks at SR 49/Pool Station Road
Mountain Ranch Rd Signal	ST	SR 49/Mountain Ranch Rd		SR 49/Mountain Ranch Road signalization
Court St/Adams Avenue Signal	ST	SR 49/Court Street/Adams Avenue		SR 49/Court Street/Adams Avenue signalization (Accompanies access reconfiguration at the gas station)
High School Street Signal	ST	SR 49/High School Street		SR 49/High School Street signalization, with school crossing at the southbound approach
SR 49/Treat Avenue Signal	LT	SR 49/Treat Avenue		SR 49/Treat Avenue signalization
Southern Gateway Plan Area Signalized Intersection	LT	SR 49/Knief Lane		Provide a full-access signalized intersection south of the SR 49/Airport Road roundabout, near Knief Lane, where appropriate. Maintain the southbound passing lane.

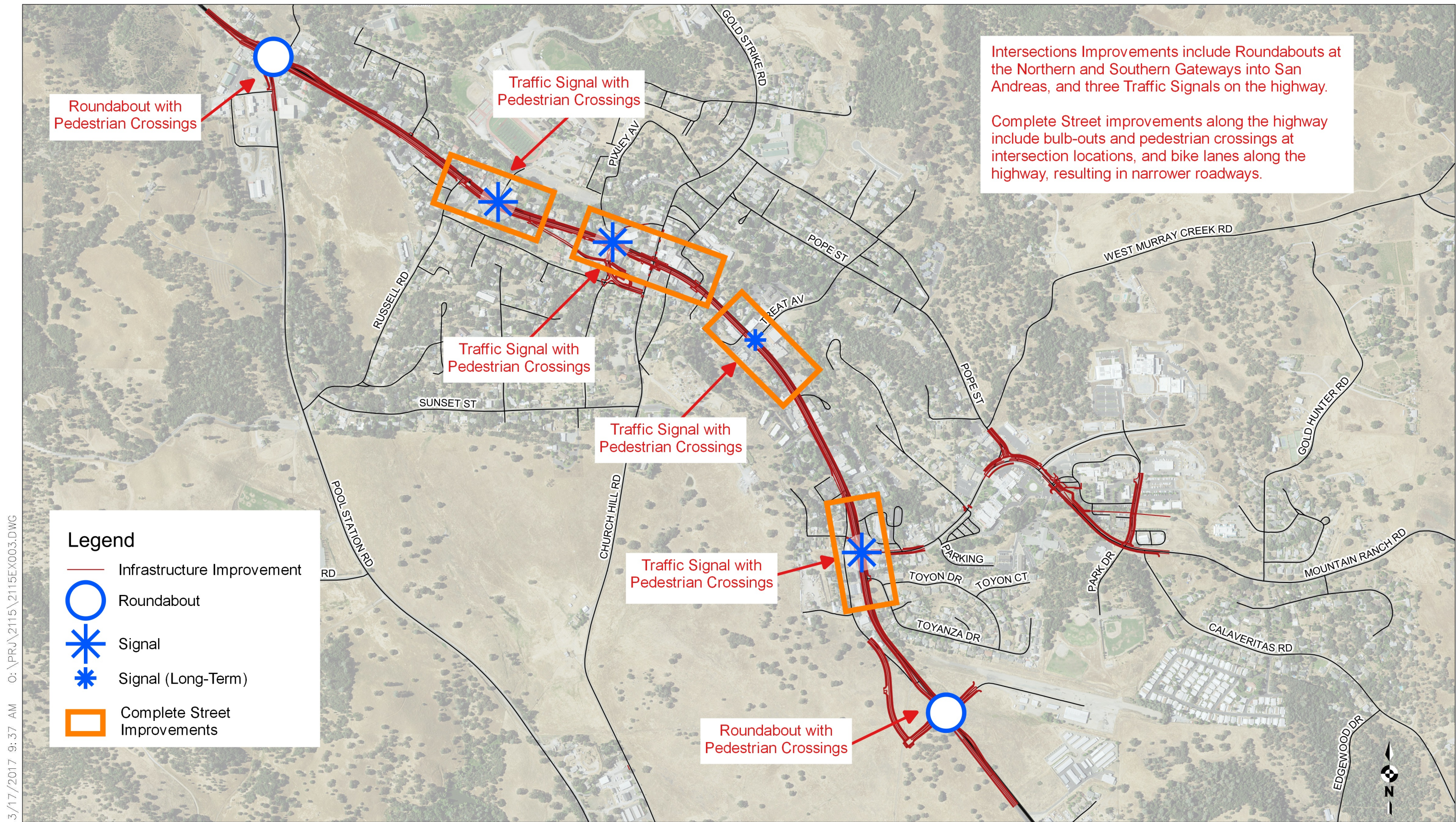
Circulation Improvements

Circulation improvements refer to recommended directional changes or additional roadway connections. Long-term circulation improvements in the Southern Gateway Plan Area include providing new roadway connections in southern San Andreas. (ST=Short-Term; LT=Long-Term)

**TABLE 31
CIRCULATION IMPROVEMENTS**

Project	ST/LT	Start	End	Description
Adams Avenue & Church Hill Road Circulation Improvements	ST	SR 49	Church Hill Rd	Church Hill Road changed to one-way eastbound, north of Adams Avenue (Accompanies signalization of Court Street/Adams Avenue)
Bellview Street One-Way	ST	SR 49	Lumber Avenue	Designate travel on Bellview Street to one-way southbound (Right-In, Left-In only) (Accompanies signalization of Court Street/Adams Avenue)
Southern Gateway Plan Area Circulation Improvements	LT	Pool Station Rd	Mountain Ranch Rd	Provide new roadway connection between SR 49 and Mountain Ranch Road, and SR 49 and Pool Station Road (via George Reed Drive). Provide frontage roads as development opportunities arise. Timing will be development driven.

Intersection Improvements



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SHORT TERM IMPROVEMENTS

San Andreas SR 49 Commercial Gateway & Corridor Study

Figure 21



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Improvement Cost Summary

The following table, table 32, presents a summary of the total short-term improvement costs by segment and by improvement type. Segment specific improvement costs were presented in the Corridor Issues and Concerns section of this report. Circulation improvements, future roadway connections, and gateway monuments were not included in the improvement cost summary.

TABLE 32
SHORT-TERM IMPROVEMENT COSTS

<i>Short Term Improvements</i>	<i>Sidewalk</i>	<i>Bike Lanes</i>	<i>Bulb-Outs</i>	<i>Crosswalk</i>	<i>Traffic Signal</i>	<i>Roundabout</i>	<i>Opinion of Total Unit Cost</i>
Segment 1	\$ 298,125	\$ 15,840	-	-	-	\$ 2,500,000	\$ 2,813,965
Segment 2	\$ 627,188	\$ 23,029	\$ 75,000	\$ 3,750	\$ 750,000	-	\$ 1,478,966
Segment 3	\$ 157,500	\$ 17,359	\$ 150,000	\$ 3,750	\$ 750,000	-	\$ 1,078,609
Segment 4	\$ 281,250	\$ 23,513	\$ 75,000	\$ 3,750	\$ 750,000	-	\$ 1,133,513
Southern Gateway Plan Area	\$ 540,000	\$ 18,428	-	-	-	\$ 3,000,000	\$ 3,558,428
Mountain Ranch Road *		\$ 220,000					\$ 220,000
Total	\$1,904,063	\$ 318,168	\$ 300,000	\$ 11,250	\$2,250,000	\$ 5,500,000	\$ 10,283,480

* Improvement cost for Class I Bike Path

The following table, table 33, presents the total short and long-term improvement costs by segment and by improvement type.

TABLE 33
SHORT AND LONG-TERM IMPROVEMENT COSTS

<i>Short & Long Term Improvements</i>	<i>Sidewalk</i>	<i>Bike Lanes</i>	<i>Bulb-Outs</i>	<i>Crosswalk</i>	<i>Traffic Signal</i>	<i>Roundabout</i>	<i>Opinion of Total Unit Cost</i>
Segment 1	\$ 298,125	\$ 15,840	-	-	-	\$ 2,500,000	\$ 2,813,965
Segment 2	\$ 627,188	\$ 23,029	\$ 75,000	\$ 3,750	\$ 750,000	-	\$ 1,478,966
Segment 3	\$ 157,500	\$ 17,359	\$ 150,000	\$ 3,750	\$ 750,000	-	\$ 1,078,609
Segment 4	\$ 281,250	\$ 23,513	\$ 75,000	\$ 3,750	\$ 1,500,000	-	\$ 1,883,513
Southern Gateway Plan Area	\$ 540,000	\$ 18,428	-	-	\$ 750,000	\$ 3,000,000	\$ 4,308,428
Mountain Ranch Road *		\$ 220,000					\$ 220,000
Total	\$ 1,904,063	\$ 318,168	\$ 300,000	\$ 11,250	\$ 3,750,000	\$ 5,500,000	\$ 11,783,480

* Improvement cost for Class I Bike Path

Recognizing that nearly \$12 million in improvements are being recommended and not likely to be constructed at the same time, potential funding options need to be explored as well as priorities need to be established for the recommended improvements. Therefore, following the identification of potential funding options in Section 7.2, Section 7.3 will suggest a priority list for the recommended improvements.

7.2 Funding

This chapter provides a listing of available funding sources, a brief description of each source, and the process for obtaining the funds. Some funding sources are designed for planning and preliminary engineering level studies while other sources are intended for design and construction of improvements.

Developer In-Kind Contributions

Infrastructure improvements in correlation with land development are typically the responsibility of the developer(s), unless other funding sources can be identified. This cost would be included within the project budget. Developer-responsibility for improvements within the Southern Gateway Plan Area would include frontage roads providing access to commercial and/or residential development east and west of the highway.

Plan Area Fees and Reimbursement Agreements

The Southern Gateway Plan Area includes approximately 246 acres of vacant and 121 acres of underutilized residential, commercial, and/or industrial land. Due to this large plan area, infrastructure costs must be spread equitably amongst those properties benefiting from the improvements.

Countywide Road Impact Mitigation (RIM) Fee Program

The RIM Fee Program funds transportation improvements that help to mitigate the impacts of new development on existing regional road systems. Currently, improvements on Mountain Ranch Road are programmed through the RIM Fee Program.

State Funding Programs

State Transportation Improvement Program (STIP) and Interregional Transportation Improvement Program (ITIP)

At the State level, these funds are divided into two programs: (1) the Regional Improvement Program (RIP) funded from a local share of the 75 percent of State Highway Account (SHA) funds set aside for regional transportation agency programming, and the Interregional Improvement Program (IIP), funded from the remaining 25 percent available for State programming. The CCOG has authority to decide how to program the Calaveras County regional share of RIP funds, subject to STIP eligibility guidelines. To be eligible, projects must be nominated by the regional agency in their Regional Transportation Improvement Program (RTIP). Caltrans has the authority to program the Interregional Transportation Improvement Funds. Similar to the RTIP, Caltrans must nominate projects within the ITIP.

STIP funds are primarily intended for capital projects. Eligible projects include constructing and widening state highways, local roads, public transit (including buses), pedestrian and bicycle facilities, grade separations, intermodal facilities, and safety projects. While these funds may also be used for local road rehabilitation, the California Transportation Commission (CTC), which has authority over the STIP, has not supported the programming of STIP funds for road rehabilitation projects in recent STIP cycles.

State Highway Operations and Protection Program (SHOPP)

The State Highway Operating and Protection Plan (SHOPP) is a four-year program of projects that have the purpose of collision reduction, major damage restoration, bridge preservation, roadway preservation, roadside preservation, mobility enhancement, and preservation of other transportation facilities related to the state highway system. Non-capital projects are programmed through the SHOPP. The SHOPP is adopted simultaneously with the STIP every two years. While the CCOG is allowed input to the SHOPP, the State has sole discretionary authority over the use of SHOPP funds.

The SHOPP program includes projects designed to maintain the safety and operational integrity of the state highway system. Most of the projects are for pavement rehabilitation, bridge rehabilitation, and traffic safety improvements. Other projects may include such things as operational improvements (e.g. traffic signalization) and roadside rest areas. It does not include projects to add through lanes to increase capacity.

Active Transportation Program (ATP)

On September 26, 2013, Governor Brown signed legislation creating the Active Transportation Program (ATP) in the Department of Transportation (Senate Bill 99, Chapter 359 and Assembly Bill 101, Chapter 354). The ATP consolidates existing federal and state transportation programs, including the aforementioned Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SR2S), into a single program with a focus to make California a national leader in active transportation. The ATP administered by the Division of Local Assistance, Office of Active Transportation and Special Programs.

The purpose of ATP is to encourage increased use of active modes of transportation by achieving the following goals:

- Increase the proportion of trips accomplished by biking and walking
- Increase safety and mobility for non-motorized users
- Advance the active transportation efforts of regional agencies to achieve greenhouse gas reduction goals
- Enhance public health
- Ensure that disadvantaged communities fully share in the benefits of the program
- Provide a broad spectrum of projects to benefit many types of active transportation users.

Regional Surface Transportation Program

Surface Transportation Block Grant Program funds are apportioned to States to provide flexible funding that may be used by States and localities for projects to preserve or improve conditions and performance on any Federal-Aid highway, bridge projects on any public road, facilities for active transportation, transit capital projects and public bus terminals and facilities. Fifty percent of a State's funds are to be distributed to areas based on population, known as Regional Surface Transportation Program (RSTP) funds. In addition, a portion of its RSTP funds is to be set aside for bridges not on Federal-Aid highways. Furthermore, a special rule is provided to allow a portion of funds reserved for rural areas to be spent on rural minor collectors.

Examples of projects eligible for RSTP include highway projects; bridges (including construction,

reconstruction, seismic retrofit, and painting); transit capital improvements; carpool, parking, bicycle, and pedestrian facilities; safety improvements and hazard elimination; research; traffic management systems; surface transportation planning; transportation enhancement activities and control measures; and wetland and other environmental mitigation.

Federal Funding Programs

Congestion Mitigation and Air Quality

The Congestion Mitigation and Air Quality (CMAQ) program was implemented to support surface transportation projects and other related efforts that contribute air quality improvements and provide congestion relief. Funds are directed to transportation projects and programs, which contribute to the attainment and maintenance of National Ambient Air Quality Standards in non-attainment or air quality maintenance areas for ozone, carbon monoxide, or particulate matter under provisions in the Federal Clean Air Act.

Eligible CMAQ projects include public transit improvements; high occupancy vehicle lanes; Intelligent Transportation System Infrastructure; traffic management and traveler information systems (i.e., electric toll collection systems); employer-based transportation management plans and incentives; traffic flow improvement programs (signal coordination); fringe parking facilities serving multiple occupancy vehicles; shared ride services; bicycle and pedestrian facilities; flexible work-hour programs; outreach activities establishing Transportation Management Associations; fare/fee subsidy programs; and under certain conditions, Particulate Matter improvement projects.

Surface Transportation Block Grant Program

The Fixing America's Surface Transportation (FAST) Act converts the long-standing Surface Transportation Program into the Surface Transportation Block Grant Program (STBG) acknowledging that this program has the most flexible eligibilities among all Federal-Aid highway programs and aligning the program's name with how the Federal Highway Administration (FHWA) has historically administered it. [FAST Act 1109(a)]. The STBG promotes flexibility in State and local transportation decisions and provides flexible funding to best address State and local transportation needs. (See *RSTP*)

Highway Safety Improvement Program (HSIP)

The intent of this program is to significantly reduce public roadway fatalities and serious injuries. The emphasis will be at locations that are data and strategically driven. The HSIP has several major program features; separate fact sheets are available on each of these:

- Strategic Highway Safety Plan (SHSP)
- High Risk Rural Roads (HRRR)
- Reporting Requirements (HSIP Reports)

The project must be on any public road or publicly owned bicycle, pedestrian pathway, or trail. Projects must identify a specific safety problem that can be corrected or improved substantially. City or County transportation planning agencies can apply for these funds. The maximum funding amount for a project is \$1 million, and the federal reimbursement rate is 90 percent. Caltrans district staff will solicit candidate projects from eligible public agencies. Interested agencies must submit an application by the due date to compete for funding. Caltrans staff will evaluate applications based on a Safety Index (calculated based on traffic safety data). A notice is made

once a year to local agencies to submit applications for candidate HSIP projects.

7.3 Prioritization Plan

Improvements to the existing transportation system as contained within the *SR 49 Commercial Gateway and Corridor Study* area will take many years to fund and construct. Prioritization of improvements is based on the following factors:

- Primary destinations
- Safety
- Cost
- Feasibility

In general, multi-modal improvements (sidewalks, bulb-outs, crosswalks, and bike lanes) are considered priority projects due to the immediate safety benefits for pedestrians and bicyclists and existing community needs. Additionally, as intersection improvements (roundabouts and traffic signals) and circulation improvements (new roadways or realignments of existing roadways) are more costly, multi-modal improvements are expected to be completed first.

Additionally, future Caltrans highway maintenance (designated under SHOPP funds) will aim to address the roadway crown issues on Saint Charles Street (SR 49). Multi-modal improvements should be addressed in conjunction with road maintenance measures, and should therefore be identified and programmed prior to or concurrent to this maintenance.

Prioritization of projects along the corridor is recommended as follows:

Multi-modal Improvements - Sidewalks, Bike Lanes, Crosswalks, and Bulb-outs

1. Segment 2 - Saint Charles Street (SR 49) from Gold Oak Road to Court Street
2. Segment 3 - Saint Charles Street (SR 49) from Court Street to Treat Avenue
3. Segment 4 - Saint Charles Street (SR 49) from Treat Avenue to Mountain Ranch Road
4. Segment 1 - Saint Charles Street (SR 49) from SR 12 to Gold Oak Road
5. Southern Gateway Plan Area **In parallel with potential future development*

Intersection Improvements - Traffic Signals in Order of Priority

*Requires Caltrans approved ICE study prior to determination of intersection control

1. SR 49/Mountain Ranch Road
2. SR 49/High School Street
3. SR 49/Court Street/Adams Avenue *(To accompany Adams Avenue and Church Hill Road Circulation Improvements)*
4. SR 49/Treat Avenue **Long-Term Improvement*

Intersection Improvements – Roundabouts in Order of Priority

*Requires Caltrans approved ICE study prior to determination of intersection control

1. Airport Road/SR 49 *(To be accompanied by Angels Road intersection closure and realignment)*
2. Pool Station Road/SR 49

Future roadway connections in the Southern Gateway Plan Area should be programmed in parallel with future development interest.

APPENDIX

**A. State Route 49 Corridor Study - De Novo
Planning Group**

**B. San Andreas State Route 49 Commercial
Gateway Corridor Study - Market Analysis -
New Economics & Advisory**

C. Community Needs Summary

D. Improvements Cost Opinions Summary

E. Synchro Intersection Worksheets

**F. Mountain Ranch Road Signal Warrant
Worksheets**

**A. State Route 49 Corridor Study - De Novo
Planning Group**

State Route 49 Corridor Study

This technical memo provides a summary and overview of land uses within the study area, regulatory documents that guide land uses within the study area, environmental conditions and constraints within the study area, and water and sewer services within the study area that may influence future growth and development.

REGULATORY DOCUMENTS

San Andreas Community Plan

The San Andreas Community Plan was adopted in 1981 and revised in June 1988. The Community Plan contains land use designations, implementation programs, a Community Plan Map, and multiple introductory and background sections. The Community Plan provides community-specific land use and circulation plans in congruence with the County General Plan. The San Andreas Community Plan has not been updated since 1988; however, land use maps have been updated in the years 2008 and 2012.

The San Andreas Community Plan Report provides resident-input on land use, conservation, circulation, safety, and community participation, in lieu of the 2008 Calaveras County General Plan Update. The Community Plan Report has not been adopted.

Calaveras County General Plan

The Calaveras County General Plan was adopted in 1996. A 2014 General Plan update has been drafted and made available to the public, and is awaiting adoption by the County Board of Supervisors. This document aims to meet state planning requirements and guides countywide development in the following categories: land use, circulation, housing, conservation, open space, noise, and safety.

The Calaveras County General Plan Land Use Element provides the general framework for development in the County, and identifies future land use designations in the unincorporated areas of Calaveras County to establish where and what type of development can occur. Specific to Calaveras County, the Land Use Element aims to maintain rural, open space by focusing development in and around existing communities. The 2014 Land Use Element has not been adopted.

The Calaveras County General Plan Background Report provides technical data to support the 2014 General Plan.

Calaveras County Zoning Ordinance

Title 17 of the Calaveras County Municipal Code is the County's Zoning Ordinance. The Zoning Ordinance carries out the policies of the General Plan by classifying and regulating the uses of land and structures within the county, consistent with the General Plan. The Zoning Ordinance is adopted to promote and protect the public health, safety, peace, comfort, convenience, and general welfare. More specifically, the purpose of the Zoning Ordinance is to achieve the following objectives:

- A. To provide a means of implementing the policies of the Calaveras County general plan;
- B. To provide a means to classify, and ensure adequate development of real property in the unincorporated portion of the county;
- C. To ensure that there are adequate services available to meet the needs of residences, business, commerce, recreation and industry;

- D. To establish fair, consistent development standards;
- E. To provide a means of prompt, fair, project consideration and review.

The Zoning Ordinance establishes the County's zoning districts and includes the County's Zoning Map and provides direction for the interpretation of the Zoning Map. The Zoning Ordinance defines allowable land uses within each zoning and combining district, provides development standards for each zoning district and, where applicable, provides performance standards and identifies design criteria.

LAND USE AND PLANNING

The following provides a summary of land uses, zoning, and development status within the study area.

Land Use Designations

The following discussion is based on a search of the San Andreas Community Plan and 1996 Calaveras County General Plan land use maps.

Figure 1, Land Use Map, shows the San Andreas Community Plan and 1996 Calaveras County General Plan land use designations for the study area and region. As shown in the figure, the study area is designated Single Family Residential (SFR), Multi Family Residential (MFR), Commercial Planned Development (C-PD), and Industrial Planned Development (I-PD) by the San Andreas Community Plan. The study area is not designated by the 1996 Calaveras County General Plan; however, the area to the south of the study area is designated Agricultural Preserve, Mineral Resource Area 2B, and Timberlands/Mineral Resource 2A/Dam Inundation by the 1996 Calaveras County General Plan. The surrounding land uses outside of the study area are shown in the following table:

Table 1: Surrounding Land Uses

DIRECTION	SAN ANDREAS COMMUNITY PLAN	1996 CALAVERAS COUNTY GENERAL PLAN
North	Single Family Residential, Two Family Residential, Multi Family Residential, Multi Family Residential Planned Development, Rural Residential, Public Service, Commercial, Neighborhood Commercial, Commercial Planned Development, Offices/Multi Family Residential	N/A
South	Rural Residential, Commercial Planned Development	Agricultural Preserve, Mineral Resource Area 2B, Timberlands/Mineral Resource 2A/Dam Inundation
East	Single Family Residential, Single Family Residential Planned Development, Multi Family Residential, Rural Residential, Public Service, Commercial, Offices/Multi Family Residential, Agriculture, Recreation	N/A
West	Single Family Residential, Industrial	N/A

Zoning

The following discussion is based on a search of the Calaveras County zoning map.

Figure 2, Zoning Map, shows the Calaveras County zoning designations for the study area and region. As shown in the figure, the study area is zoned Single Family Residential (R1), General Commercial (C2), and Light Industrial (M1). The portion of the study area adjacent to SR 49 is zoned C2 and M1, while the eastern and westernmost portions of the study area are zoned R1. The zoning designations surrounding the study area include: R1, Two-Family Residential (R2), Multi-Family Residential (R3), Local Commercial (C1) C2, M1, Professional Offices (CP), Public Service (PS), and Agricultural Preserve (AP) to the north; R1, Rural Residential (RR), R2, R3, C1, C2, CP, PS, AP, and Recreation (REC) to the east; General Industrial (M2), General Agriculture (A1), AP, Residential Agriculture (RA), and RR to the south; and R1, AP, and M2 to the west.

Development Status

All of the parcels within the study area are shown on Figure 3, and are listed below in Table 2. Table 2 identifies the map label, which corresponds to Figure 3, identifies the APN, parcel acreage, San Andreas Community Plan Land Use Designation, and the development status of each parcel within the study area.

Table 2: Parcels in the Study Area

MAP LABEL	APN	ACRES	SAN ANDREAS COMMUNITY PLAN LAND USE DESIGNATION	DEVELOPMENT STATUS
1	440-06-040	1.099	I-PD	Vacant
2	440-07-020	2.6977	C-PD	Developed
3	440-07-021	2.5256	C-PD	Underutilized
4	440-14-014	18.7742	C-PD: 17.7 acres; SFR: 1.1 acres	Vacant
5	440-07-006	0.9553	C-PD	Developed
6	440-07-022	0.9951	C-PD	Developed
7	440-07-005	1.0448	C-PD	Developed
8	440-07-016	1.4424	C-PD	Developed
9	440-01-008	1.5577	SFR	Developed
10	440-14-007	3.831	C-PD	Vacant
11	440-14-027	3.1052	C-PD: 1.0 acres; SFR: 2.1 acres	Underutilized
12	440-14-026	0.0285	C-PD	Vacant
13	440-07-014	0.6984	C-PD	Developed
14	440-07-012	3.9407	C-PD	Underutilized
15	440-06-032	1.4128	C-PD	Vacant
16	440-06-026	5.9399	C-PD	Vacant
17	440-14-004	0.095	C-PD	Developed
18	440-14-019	0.6688	SFR	Developed
19	440-14-018	1.675	SFR	Developed
20	440-07-001	3.1201	C-PD	Vacant
21	440-07-019	2.6633	C-PD	Developed

MAP LABEL	APN	ACRES	SAN ANDREAS COMMUNITY PLAN LAND USE DESIGNATION	DEVELOPMENT STATUS
22	440-12-033	0.0957	SFR	Vacant
23	440-06-030	1.3643	I-PD	Vacant
24	440-14-024	19.1701	SFR	Vacant
25	440-14-025	0.1079	MFR	Developed
26	440-12-032	1.3071	I-PD: 0.66 acres; MFR: 0.65 acres	Vacant
27	440-12-028	0.4564	I-PD: 0.22 acres; MFR: 0.23 acres	Vacant
28	440-07-018	0.7941	C-PD	Developed
29	440-07-004	1.157	C-PD	Developed
30	440-14-016	21.1014	C-PD: 0.28 acres; SFR: 20.83 acres	Vacant
31	440-07-017	1.0367	C-PD	Developed
32	440-06-028	15.5928	I-PD	Developed
33	440-07-010	0.8924	C-PD	Developed
34	440-07-009	0.371	C-PD	Developed
35	440-01-074	81.6938	C-PD: 22.77 acres; SFR: 58.93 acres	Vacant
36	440-06-031	15.2356	C-PD: 5.50 acres; I-PD: 9.74 acres	Underutilized
37	440-06-039	1.1637	I-PD	Developed
38	440-01-056	87.067	SFR	Vacant
39	440-01-071	96.0769	SFR	Underutilized

Table 3 identifies the total acreage of each land use designation within the study area.

Table 3: Total Acreage of Land Uses in the Study Area

SAN ANDREAS COMMUNITY PLAN LAND USE DESIGNATION	TOTAL ACRES
Commercial Planned Development (C-PD)	82.89
Industrial Planned Development (I-PD)	29.84
Multifamily Residential (MFR)	0.99
Single Family Residential (SFR)	289.23
Grand Total	402.95

Underutilized parcels are parcels that have some form of development or physical improvements, as recorded by the County Assessor's Office, but the improvements and existing development represent a small fraction of the development potential of the parcel, as allowed by the San Andreas Community Plan. Table 4 identifies the acreage of each land use designation for underutilized parcels within the study area.

Table 4: Underutilized Parcels in the Study Area

SAN ANDREAS COMMUNITY PLAN LAND USE DESIGNATION	TOTAL ACRES
Commercial Planned Development (C-PD)	12.96
Industrial Planned Development (I-PD)	9.74
Single Family Residential (SFR)	98.18
Grand Total	120.88

Vacant parcels are parcels that have no development or physical improvements, as recorded by the County Assessor's Office. Table 5 identifies the acreage of each land use designation for vacant parcels within the study area.

Table 5: Vacant Parcels in the Study Area

SAN ANDREAS COMMUNITY PLAN LAND USE DESIGNATION	TOTAL ACRES
Commercial Planned Development (C-PD)	55.09
Industrial Planned Development (I-PD)	3.34
Multifamily Residential (MFR)	0.88
Single Family Residential (SFR)	187.5
Grand Total	246.46

Developed parcels are parcels that have existing buildings and structures, and are assumed to have little to no additional development potential. Table 6 identifies the acreage of each land use designation for developed parcels within the study area.

Table 6: Developed Parcels in the Study Area

SAN ANDREAS COMMUNITY PLAN LAND USE DESIGNATION	TOTAL ACRES
Commercial Planned Development (C-PD)	14.84
Industrial Planned Development (I-PD)	16.76
Multifamily Residential (MFR)	0.11
Single Family Residential (SFR)	3.90
Grand Total	35.61

As shown in the tables above, over half of the study area is undeveloped, and the majority of the vacant land within the study area is designated Single Family Residential.

ENVIRONMENTAL CONSTRAINTS AND CONDITIONS

The following section provides a summary of the environmental constraints and conditions influencing the study area.

Biological Resources

Habitat types in the study area can be generally described and classified as grasslands and oak woodland habitat. To the west of SR 49, oak trees and clusters of oak woodlands are scattered throughout grasslands within the largely undeveloped areas of the study area. A dense stand of oak woodlands is located east of SR 49, southeast of the terminus of Airport Road. As shown on Figure 4, an ephemeral

stream is located in the northwestern portion of the study area. While a wetland delineation has not been performed for the study area, a review of historical aerial photography indicates the potential presence of wetlands in the areas adjacent to this stream channel.

In order to determine the presence of special-status species in the study area, a background search of special-status species that are documented in the California Natural Diversity Database (CNDDDB) was performed. The background search was regional in scope and focused on the documented occurrences within the vicinity of the study area. Figure 5, CNDDDB 5-mile Radius Search, presents the documented occurrences within a 1-mile and 5-mile radius of the study area.

As shown in the figure, there are no documented occurrences of special-status species within the study area. However, special-status species are known to occur within 5 miles of the study area. The nearest special-status species occurrence, Townsend's big-eared bat, is located approximately 1.25 miles northwest of the study area. Other special-status species occurrences within 5 miles of the study area include lone Chaparral (approximately 2.60 miles to the northeast), lone manzanita (approximately 2.60 miles to the northeast), Bisbee Peak rush-rose (approximately 2.90 miles to the north), and Parry's horkelia (approximately 5.00 miles to the northeast). Special-status species occurrences beyond the 5-mile radius include bald eagle (approximately 5.60 miles to the southwest), tricolored blackbird (approximately 6.23 miles to the southeast), Red hills soaproot (approximately 8.75 miles to the northeast), foothill yellow-legged frog (approximately 8.45 miles to the northeast), and dubious pea (approximately 8.88 miles to the northeast).

The oak woodlands located throughout the study area provide suitable nesting and foraging habitat for a variety of raptors protected under the Migratory Bird Treaty Act. Any future development within the study area should be required to conduct pre-construction surveys for nesting raptors. Additionally, future development potential within the study area would be limited within the dense stand of oak woodlands located in the eastern portion of the study area. Future development in the northwestern portion of the study area, within the vicinity of the stream and pond shown on Figure 4, may be required to complete a wetland delineation in order to assess and avoid potential impacts to wetland and jurisdictional waters of the U.S.

Cultural Resources

In order to determine the potential for cultural or historical resources to occur within the study area, a records search was completed through the Central California Information Center. According to the search results provided by the Information Center, there are no known prehistoric or Native American historical resources known to occur within the study area.

There are a limited number of historic-era resources known to occur within the eastern portion of the study area. These include mining remnants, concrete stock tanks, and concrete slab foundations. Given the nature of these documented resources, it is not likely that these resources would pose an impediment to future development within the study area, however, proper recordation and documentation of these resources would likely be required prior to any removal or disturbance.

Additionally, as with most projects in the region that involve ground-disturbing activities, there is the potential for discovery of a previously unknown cultural, paleontological, or archaeological resources. The California Public Resources Code and the California Environmental Quality Act include requirements and

procedures that must be implemented in the event that a previously-unknown cultural or historical resource is discovered during construction activities.

EARTHQUAKE FAULTS

The following discussion is based on a background search of regional earthquake faults that are documented by the U.S. Geological Survey (USGS).

Figure 6, Fault Map, shows quaternary faults in the region of the study area. The figure also shows the slip rates of the quaternary faults. Slip rates are considered well constrained if the direction, amount, and timing of displacement have been demonstrated. Moderately constrained slip rates generally have significant uncertainty for one of these components. Poorly constrained slip rates have either significant uncertainty with respect to both amount and timing of displacement or else the reported slip rate is a long-term (late Cenozoic) average rate. Many of the faults in California are poorly to moderately constrained because they have not been studied sufficiently or because no available site has been found that contains appropriate stratigraphic relationships and dateable material needed to infer details of the paleoseismic history.¹

The study area is not located within a currently designated Alquist-Priolo Earthquake Fault Zone, and known surface expression of active faults does not exist within the study area. However, the study area is located within a seismically active region. As shown in the figure, quaternary faults are known to occur within the vicinity of the study area. The nearest quaternary fault, the Poorman Gulch Fault, crosses a portion of the western study area boundary. This fault is considered “well-constrained.” Other quaternary faults near the study area include the Haupt Creek Fault (approximately 2.42 miles to the east), Youngs Creek Fault (approximately 2.94 miles to the east), Waters Peak Fault (approximately 6.95 miles to the east), Lone Fault (approximately 10.05 miles to the northwest), Bowie Flat Fault (approximately 14.65 miles to the south), Green Springs Run Fault (approximately 17.73 miles to the south), and Rawhide Flat East Fault (approximately 18.48 miles to the south).

All areas within California are subject to hazards associated with earthquakes and seismic ground shaking. Any future development that occurs within the study area would be required to be built in conformance with the most current edition of the California Building Code (CBC), which would reduce hazards to life and property associated with earthquakes and seismic ground shaking.

Slope Contours

The following discussion is based on an assessment of slope contours and the presence of USGS streams/rivers that are documented in the Calaveras County Geographical Information System (GIS) and USGS National Hydrography Dataset.

Figure 7, Slope Map, shows the contours, slope percentages, and presence of streams or rivers in the region of the study area. As shown in the figure, the majority of the slopes in the study area are less than 15 percent. A USGS stream/river is located in the northern portion of the study area, and streams/rivers are located to the north, south, east, and west of the study area. Areas within the study area that contain slopes greater than 15 percent include areas near the on-site stream/river in the northern portion of the study area, the southeastern corner of the study area, and a small area in the central portion of the study

¹ California Department of Conservation, California Geological Survey. 1996. Probabilistic Seismic Hazard Assessment for the State of California - Open File Report 96-08.

area. These areas with slopes greater than 15 percent would be constrained for future development potential.

Soil Types

The following discussion is based on a soils report completed for the study area using soil data provided by Calaveras County.

Figure 8, Soils Map, shows the soil types, locations, and properties in the study area. As shown in the figure, the study area contains four soil series: Stover (fine, mixed, thermic), Auburn (loamy, mixed, thermic), Exchequer (loamy, mixed, non-acidic, thermic), and Inks (loamy-skeletal, mixed thermic). Urban/industrial soils are also located along SR 49 and the northern study area boundary. The on-site soils are moderately permeable, well to excessively drained, and have moderately low to high runoff potential with a slight erosion hazard. The Auburn soil series, which has moderately high runoff potential, makes up the majority of the study area. The soils present within the study area do not pose a significant hazard or impediment to future development potential.

FLOOD HAZARDS

The following discussion is based on the Flood Insurance Rate Map (FIRM) delineated by the Federal Emergency Management Agency (FEMA).

Figure 9, FEMA Flood Hazard Map, shows the FEMA FIRM for the study area and region. As shown in the figure, the majority of the study area is located in Zone X, outside of the 100-year flood zone in an area of minimal flood hazard. Two small areas of the study area are located in Zone A, within the 100-year flood zone: an area in the northern portion of the study area near the USGS stream/river, and an area in the southern portion of the study area near George Reed Drive.

Hydrography

The following discussion is based on a search of the National Wetlands Inventory documented by the U.S. Fish and Wildlife Service (USFWS), as well as the USGS National Hydrography Dataset and Calaveras County GIS.

Figure 4, Hydrography Map, shows the watersheds and nearby freshwater emergent wetlands, freshwater ponds, lakes, and other water features for the study area and region. As shown in the figure, the study area is located within the South Fork Calaveras River watershed, Calaveritas Creek watershed, and Murray Creek watershed. The majority of the study area is located within the South Fork Calaveras River watershed, while the other two watersheds are mainly located east of SR 49 within the study area. As noted previously, a USGS stream/river is located in the northern portion of the study area. The stream/river terminates at a freshwater pond in the northernmost-portion of the study area. Other freshwater ponds, emergent wetlands, and a lake are located in the vicinity of the study area.

WATER AND SEWER SERVICES

Information in this section was derived primarily from the *Final Water and Wastewater Municipal Service Review*, Calaveras Local Agency Formation Commission, June 18, 2012.

Water Services

The Calaveras Public Utility District (CPUD) provides treated water services to the study area. The CPUD's service area includes Mokelumne Hill, San Andreas, Paloma, and portions of Glencoe and Railroad Flat.

The District bounds encompass a variety of land uses, as they include the communities of San Andreas and Mokelumne Hill, in addition to the Highway 49 corridor between the two. In the community of San Andreas, land uses include residential, commercial, public, and parks and recreation land uses; and in the community of Mokelumne Hill, land uses include residential, commercial, agricultural, and public land uses. Significant planned development is associated with both communities. Other land uses within CPUD include agricultural preserve, timberland and mineral resources.

Local businesses include commercial and institutional operations located in the communities of San Andreas and Mokelumne Hill. Major employers within the District include Calaveras County, Mark Twain St. Joseph's Hospital, Mark Twain Convalescent Hospital, and Calaveras Unified School District.

The District considers its customer base to be the water connections served and the residents within the District boundaries. As of 2009, the District provided water services to 1,985 water connections—1,461 single-family residential, 285 multi-family residential, 228 commercial, seven public, no industrial, and four irrigation connections. The estimated number of residents in 2009 was 3,915, based on analysis of connections served and 2010 DOF household size data. The District's population density was approximately 50 per square mile in 2009, compared with the countywide density of 45 per square mile.

The District's projected population growth rate from 2009 to 2030 is 49 percent (two percent annually), which is somewhat higher than the countywide projected growth of 32 percent over that period.

In terms of planned development, new multi-family units within the District are planned south of Highway 49, west of Russell Road, and north of Highway 49, along Main Street and along Gold Strike Way. Multi-family units are also planned in the vicinity of the Highway 12/49 junction. Commercial development is planned south of Highway 49, east of Pool Station Road, and in the southeastern portion of the District along Highway 49. Industrial areas are planned west of Angels Road and along Airport Road, in the south of the District. Minimal development is planned in Mokelumne Hill where single family residential infill is planned to be constructed on two parcels south of Center Street. The District is not a land use authority, and does not hold primary responsibility for implementing growth strategies.

CPUD provides surface water treatment and distribution, for domestic use, directly. CPUD provides limited raw water service to four accounts. The District generates hydroelectric power at four generating stations for sale to PG&E. Key infrastructure for water service includes the District's water supplies, its water treatment plant, three pump stations, two reservoirs, six storage tanks, three pressure-reducing stations, 18 miles of transmission mains, and 23 miles of distribution pipeline.

Water Supplies

CPUD obtains its water from the South Fork of the Mokelumne River where the District has a diversion dam; the dam is located just below the confluence of the South and Licking Forks of the Mokelumne River. The dam causes the river water to pool, so CPUD can extract the water from the river through a pump station (3,300 gpm capacity) and transport it via a three-mile pipeline (9.7 mgd capacity) to the Jeff Davis Reservoir. From there, it enters the treatment plant and then flows through transmission mains into the distribution system.

The District also has facilities for extracting water from the Middle Fork of the Mokelumne River. CPUD's Schaads Reservoir on the Middle Fork of the Mokelumne River is used to supply CCWD with up to 200 acre-feet annually (afa). The reservoir capacity is 1,800 afa. Historically, water was moved from Schaads Reservoir through a diversion canal to the Licking Fork of the Mokelumne River (which is upstream from the CPUD pump station). Due to the poor condition of the diversion canal, the Middle Fork water has not been diverted into the Licking Fork for some time. Schaads Reservoir is not connected hydraulically to the CPUD treated water system at this time. Schaads Reservoir needs improvements to remove siltation, install flashboards and reconstruct the pressure reducing facility there.

CPUD reported that it has rights to store 400 afa of Calaveras River water at its Redhawk Reservoir located to the east of the intersection of Ridge Road and Railroad Flat. The water was used in the past to supply downstream agricultural users. CPUD has not supplied those agricultural users since approximately 2002, and is not actively operating the Redhawk Reservoir.

Treatment Systems

The District owns, operates and maintains a treatment plant for surface water. The Jeff Davis Water Treatment Plant (WTP) consists of six dual media pressure filters, and has capacity to produce 6 million gallons per day (mgd) of treated water.

The WTP was designed to allow for expansion to 12 mgd capacity with the addition of six pressure filters. By comparison, average day demand is 1.3 mgd and peak day demand is 3.02 mgd. There is adequate WTP capacity. CPUD plans to start planning for WTP expansion within the next 10-15 years. The WTP is in good condition, having been upgraded recently. When it is expanded, the WTP will need to provide more treated water storage and to re-engineer to avoid in-plant pumping.

Water Storage

The Agency owns and maintains six treated water storage facilities. The storage tanks have a combined storage of 5.66 mg of water. Treated water storage would accommodate 1.9 days of peak demand or 4.4 days of average system demand. Four storage tanks were built in the 1970s, a minor storage tank in Golden Hills was built in the 1980s, and the Railroad Flat storage tank was built in 2002. Storage facilities in Golden Hills and Paloma lack capacity to meet District standards.

Distribution and Transmission

The transmission system consists of 18 miles of mains made primarily from cement, mortar lined and coated steel pipe of 16 to 27 inches in diameter. The transmission main runs from the WTP and generally follows SR 26 but crosses open country in some locations. The distribution system consists of 20 miles of pipeline made of steel, PVC and other materials; some distribution pipelines are 50 years or older in age.

The CPUD master plan calls for \$795,000 in annual pipeline replacement expenditures to replace aging pipelines; under this plan 25 percent of the CPUD pipeline will be replaced by 2030. The most recent State inspection report indicated that a majority of distribution lines are steel mains installed in the 1940s and 1950s.

Water Demand and Supply

Average annual water demand within the CPUD service area increased from 1,250 acre-feet per year (afy) to 1,625 afy from 2000 to 2015. Total demand is projected to increase to 2,186 afy by 2030. Surface water supplies from the Mokelumne River average 6,656 afy, with a maximum supply of 9,125 afy, and a safe/firm supply of 4,370. The safe/firm supply is approximately twice the project demand for the year 2030.

Summary

CPUD has adequate capacity to provide service to existing water connections. The District has adequate water rights to supply projected growth in demand well past 2030. CPUD has adequate treatment capacity to accommodate near-term growth, and plans to initiate WTP expansion planning in the next 10-15 years to accommodate long-term growth needs. As such, water supplies and water availability do not pose an impediment to future development within the study area.

Sewer Services

The San Andreas Sanitary District (SASD) provides wastewater collection, treatment and disposal services for the unincorporated community of San Andreas and neighboring areas. The boundaries of SASD extend along SR 49 from Magers Way to beyond Pool Station Road, north along Gold Strike Road in the east and up to West Murray Creek Road in the West. The District has a boundary area of approximately 1,387 acres or 2.2 square miles.

The SASD provides sewer services to the eastern portion of the study area, east of SR 49. However, the majority of the study area located to the west of SR 49 is not within the service area of the SASD, and sewer services are not provided by any other provider or service district in this portion of the study area.

The District bounds encompass residential, commercial, public, and parks and recreation land uses. Single family residential land uses are located in the central portion of the District, north and south of Highway 49. Two-family and multi-family residential land uses are located in the central portion of the District, north of Highway 49, and in the southern portion of the District, south of Calaveras Road. Rural residential land uses are located in the northwestern and northeastern portions of the District boundary. Commercial land uses dominate the Highway 49 corridor that runs through the District. Public land uses include the Calaveras County Government Center, San Andreas Elementary School, Calaveras High School, the Peoples Cemetery, and the San Andreas Sanitary District facilities. Park and recreation facilities within the District include Nielsen Park and the baseball fields at Park Drive, south of Mountain Ranch Road, and tennis courts adjacent to Gold Hunter Road.

Local business activities include the County's offices, a hospital, a California Highway Patrol office, a Department of Forestry station, and two hotels. As San Andreas is the county seat of Calaveras County and has a high school, there is a substantial influx in population during the day, resulting in increased demand for wastewater services.

The District considers its customer base to be the wastewater connections served and the residents within the District boundaries. As of 2010, the District provided wastewater services to 897 wastewater connections—657 single family residential, 78 multi-family residential, 162 commercial and public, and no industrial connections. The estimated number of residents in 2010 was 1,658, based on analysis of the number of residential connections served. The District’s population density was approximately 386 per square mile in 2010, compared with the countywide density of 45 per square mile.

The District reported that it anticipates approximately two to three new connections annually, although this may fluctuate depending on the timing of the completion of proposed developments. Two to three new connections annually would result in a growth in population of eight percent between 2010 and 2030, which is lower than the countywide projected growth of 40 percent over that period. However, these projections may be low given the number of developments that showed interest prior to the economic recession.

In terms of planned development, new multi-family units within the District are planned south of Highway 49, west of Russell Road, and north of Highway 49, along Main Street and along Gold Strike Way. Multi-family units are also planned west of the existing SASD boundaries, in the vicinity of the Highway 12/49 junction. Commercial development is planned south of Highway 49, east of Pool Station Road, and in the southeastern portion of the District along Highway 49. Industrial areas are planned west of Angels Road and along Airport Road, in the south of the District, and to the west of the existing SASD boundaries along Highway 49. The future growth area of the District is to the west of the existing boundaries, encompassing the planned multi-family and industrial development areas. The District is not a land use authority, and does not hold primary responsibility for implementing growth strategies.

Infrastructure

Key SASD wastewater infrastructure includes one wastewater treatment plant (WWTP), leach fields, 23.5 miles of sewer pipes and 5 lift stations.

Wastewater is treated to tertiary levels, is discharged into an effluent storage reservoir and then pumped to two miles of on-site evaporation, transpiration and percolation ditches. The WWTP was upgraded in 2011. Under the District’s former waste discharge requirements permit (R5-2003-0151), treated effluent was discharged exclusively to the percolation ditches during the dry months from May 1 to October 31. During wet weather, from November 1 to April 30, treated effluent was discharged to the land disposal area to the extent possible; however, treated effluent that could not be discharged to the land was discharged into the San Andreas Creek. The former permit required that discharges to the San Andreas Creek, as well as the North Fork Calaveras River, be diluted to a daily average of 20:1 (receiving water flow: treated effluent flow) or receive tertiary treatment after April 1, 2006. SASD has since constructed an outfall pipeline to the North Fork Calaveras River, to discharge excess secondary treated effluent from November 1 to April 30, and has discontinued discharging to San Andreas Creek. Dried sludge is disposed of at the Forward Landfill.

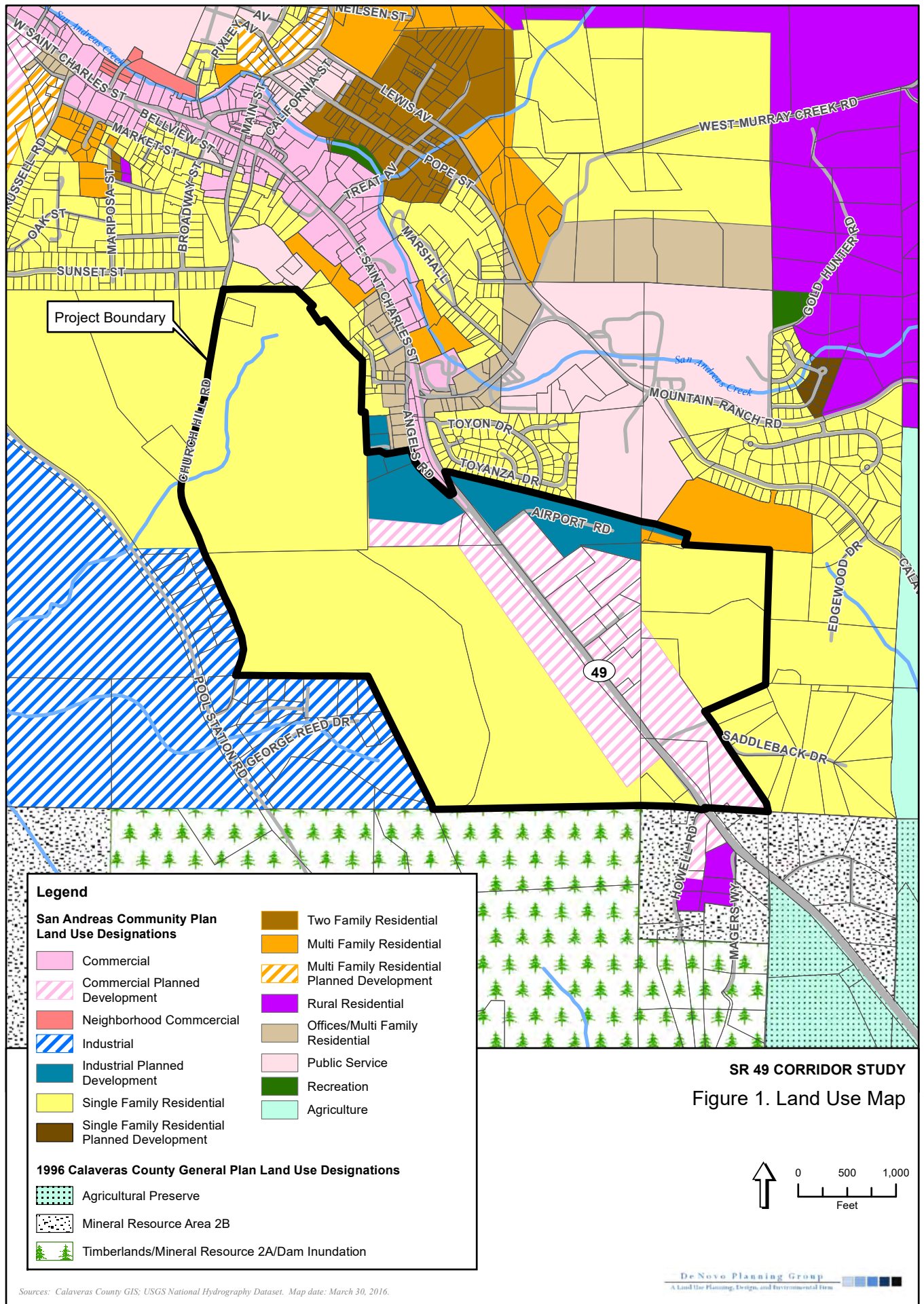
The WWTP was originally built between 1948 and 1954 and was upgraded in 1975, 1995 and 2011. The District identified the plant as being in good condition.

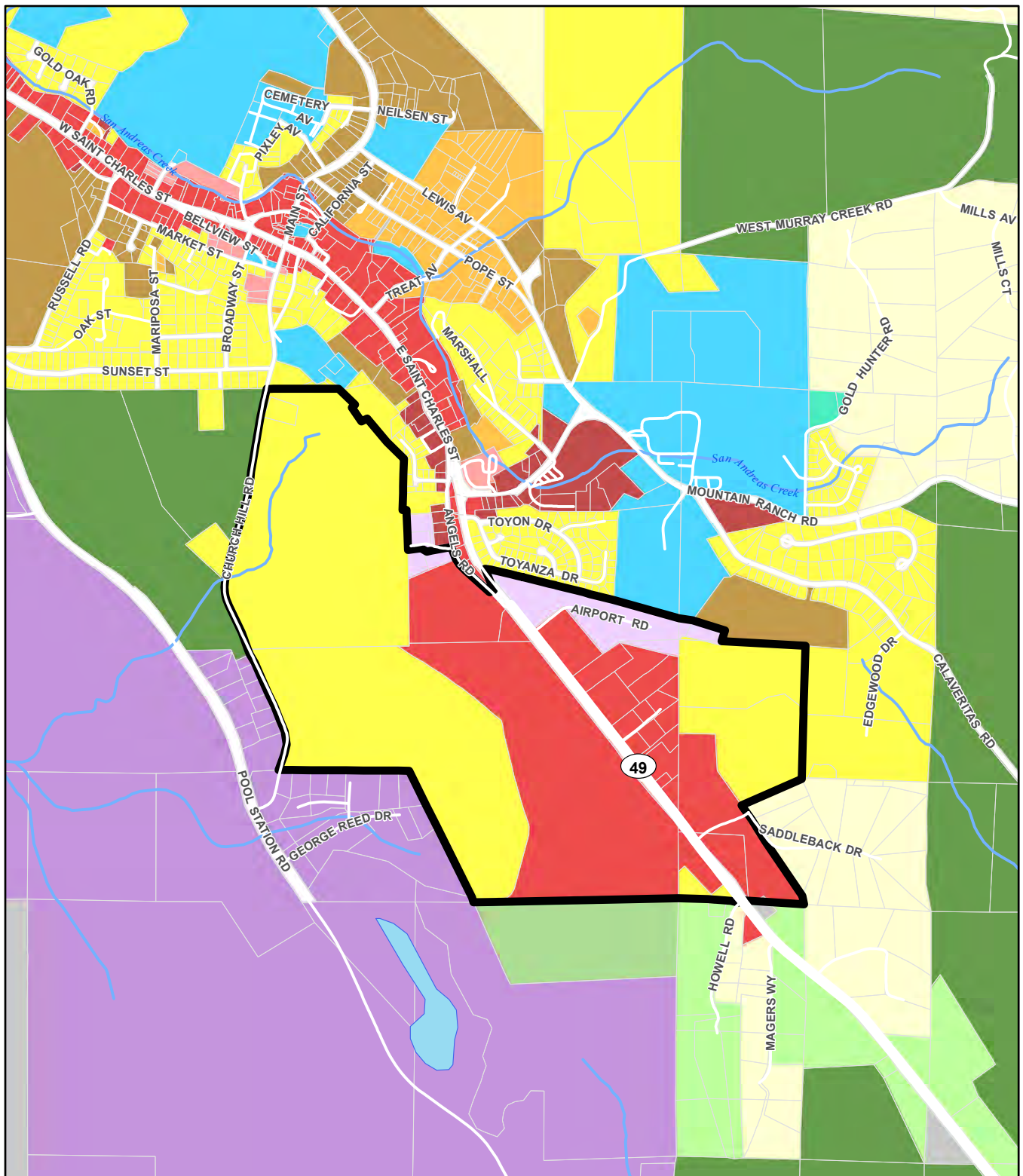
Summary

The WWTP has a design capacity of 0.4 mgd average dry weather flow. While the District's average dry weather flow is .29 mgd or 73 percent of the WWTP's capacity, the District reported that due to high flows during work periods, the WWTP is essentially at capacity. Based on the design capacity of 0.4 mgd, the District can treat approximately 277 gpm; however, during work hours on weekdays the plant treats up to 350 gpm. During evening hours, the District's flow can be as low as 90 gpm. The District estimates that it can accept a maximum of 22 new connections.

Due to limitations on capacity expansion at the existing WWTP, the District reported that it will need a new plant to serve projected growth. The District reported that there is presently no reserve capacity for in-fill development.

The existing capacity limitations at the WWTP present a significant obstacle to future growth and development within the study area.

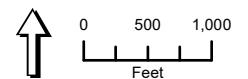




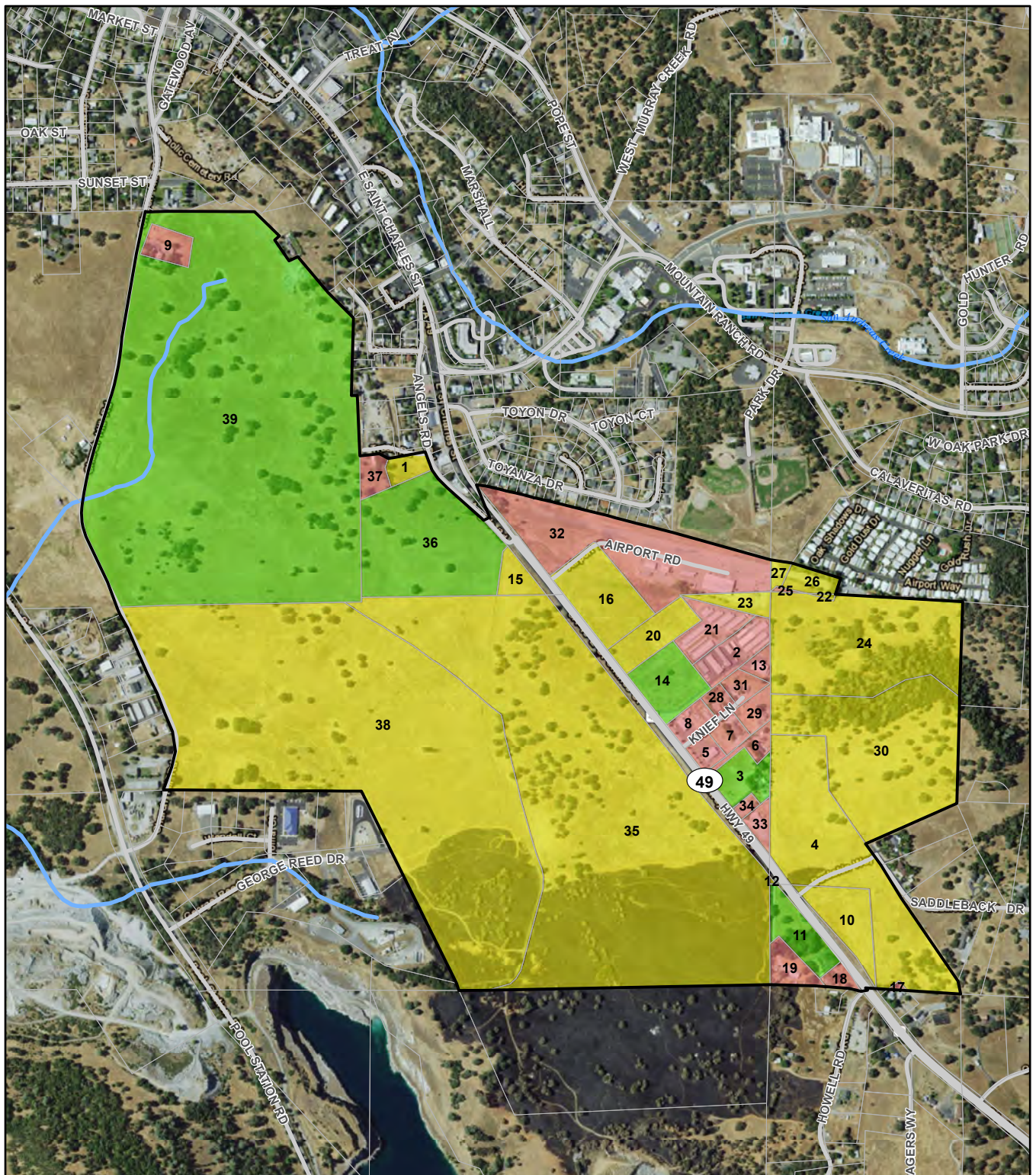
Legend

 A1 - General Agriculture	 RA - Residential Agriculture
 AP - Agricultural Preserve	 RR - Rural Residential
 C1 - Local Commercial	 R1 - Single Family Residential
 C2 - General Commercial	 R2 - Two-Family Residential
 CP - Professional Offices	 R3 - Multi-Family Residential
 M1 - Light Industrial	 REC - Recreation
 M2 - General Industrial	 U - Unclassified
 PS - Public Service	 Project Boundary

SR 49 CORRIDOR STUDY
Figure 2. Zoning Map



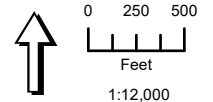
Sources: Calaveras County GIS; USGS National Hydrography Dataset. Map date: March 30, 2016.

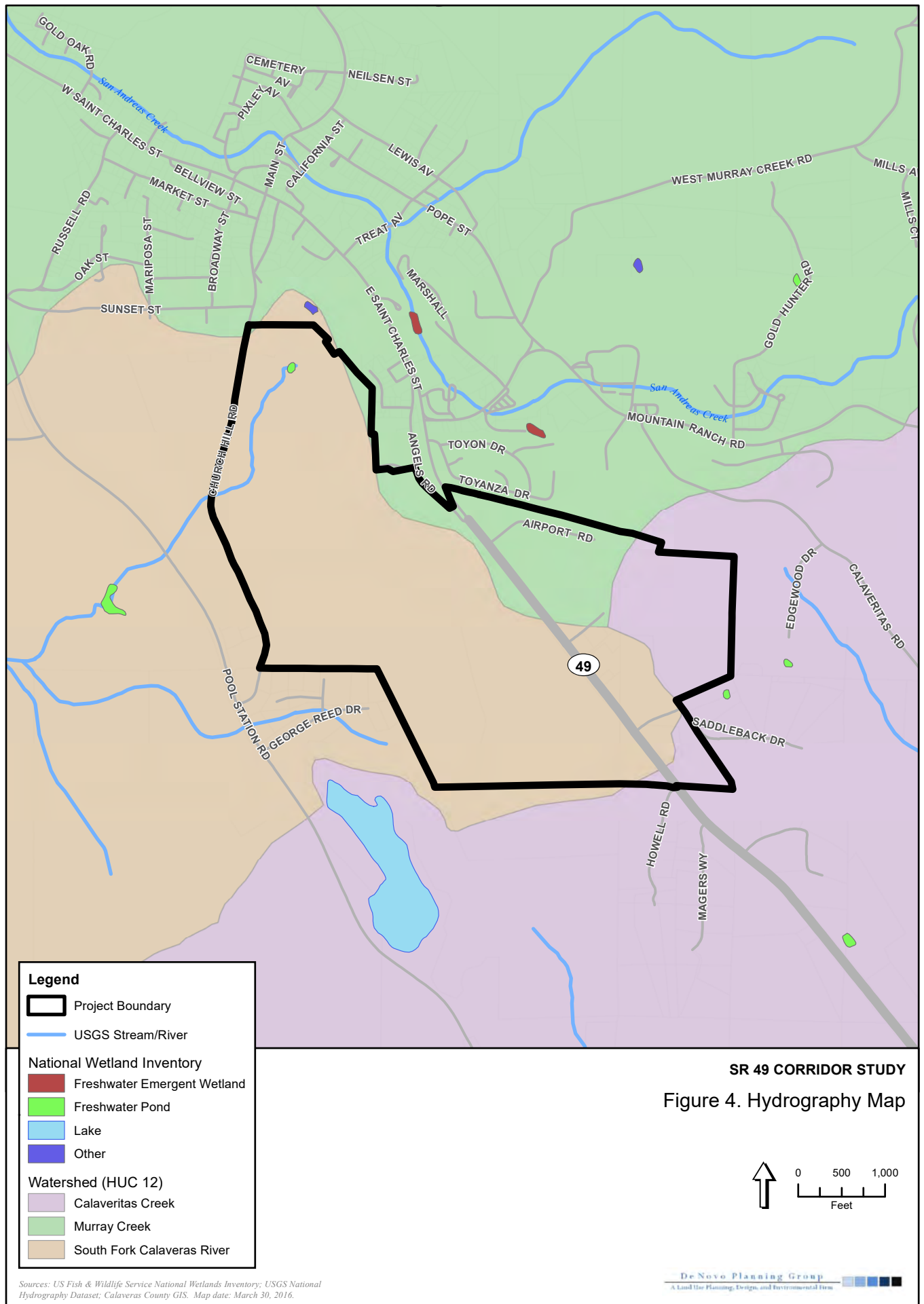


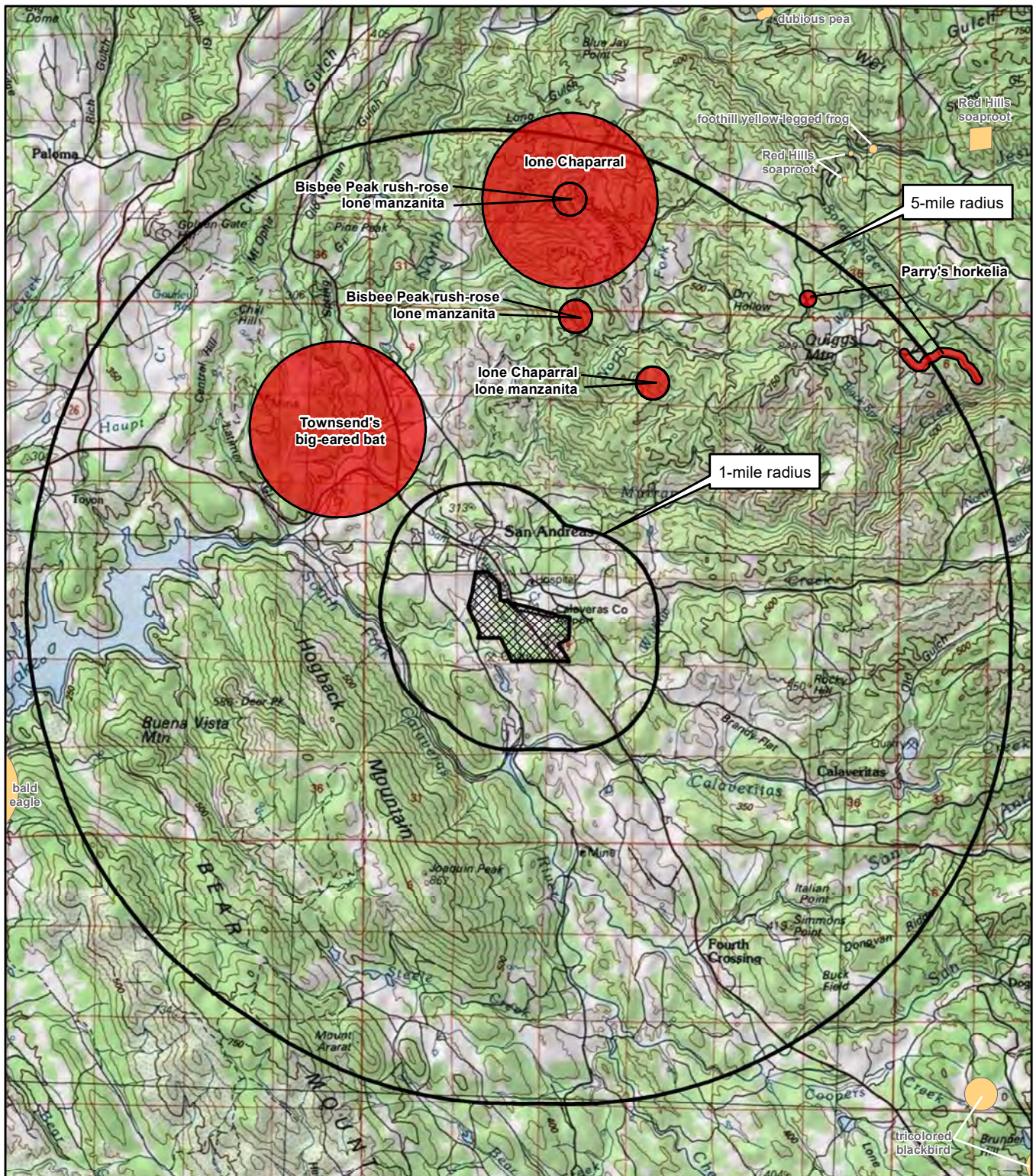
SR 49 CORRIDOR STUDY

Figure 3. Development Status

- Developed
- Underutilized
- Vacant





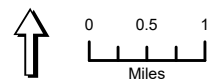


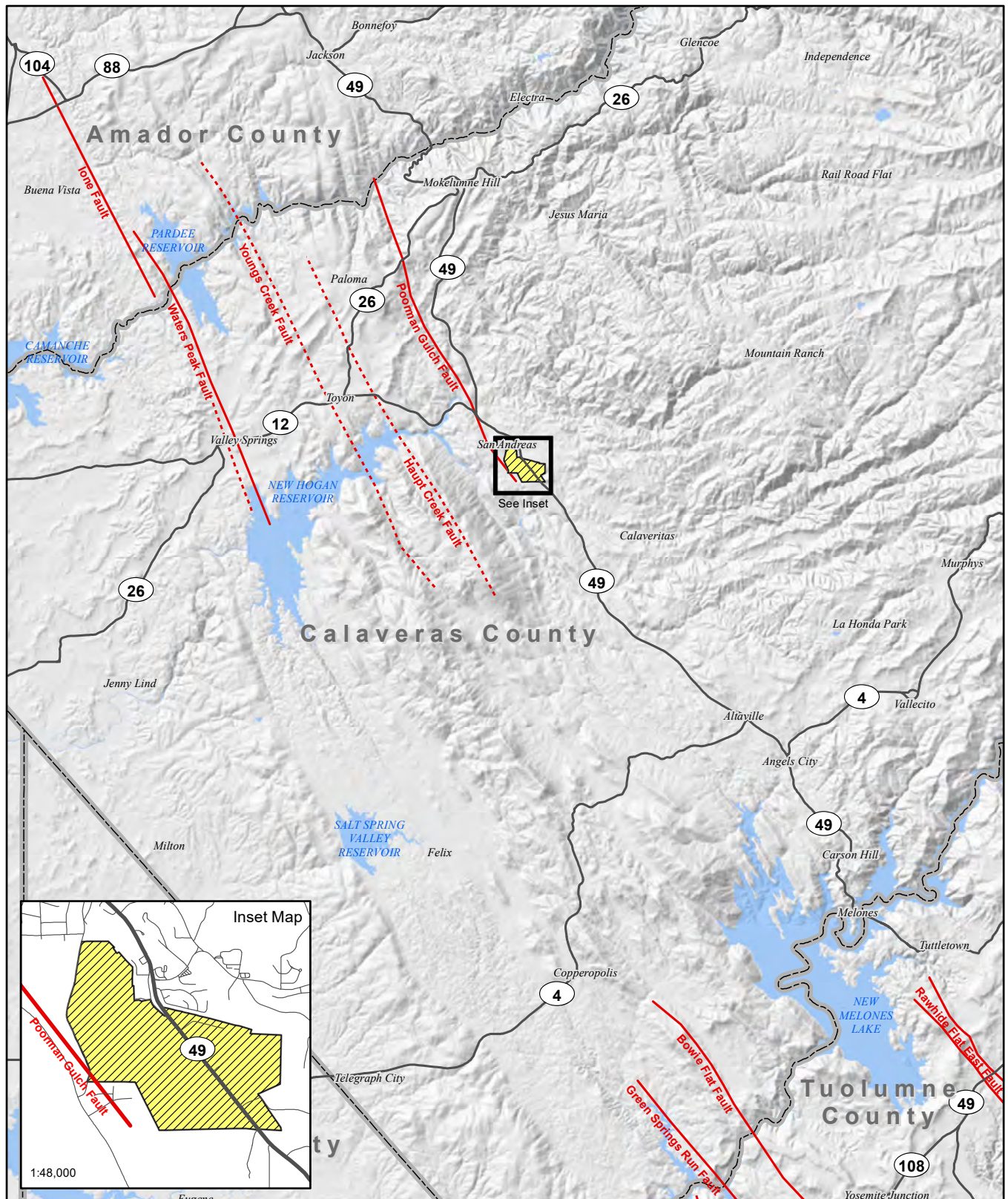
SR 49 CORRIDOR STUDY

Figure 5. California Natural Diversity Database (CNDDB) 5-mile Radius Search

Legend

-  Project Area
-  Special Status Species Occurrences within 5-mile Radius
-  Special Status Species Occurrences beyond 5-mile Radius



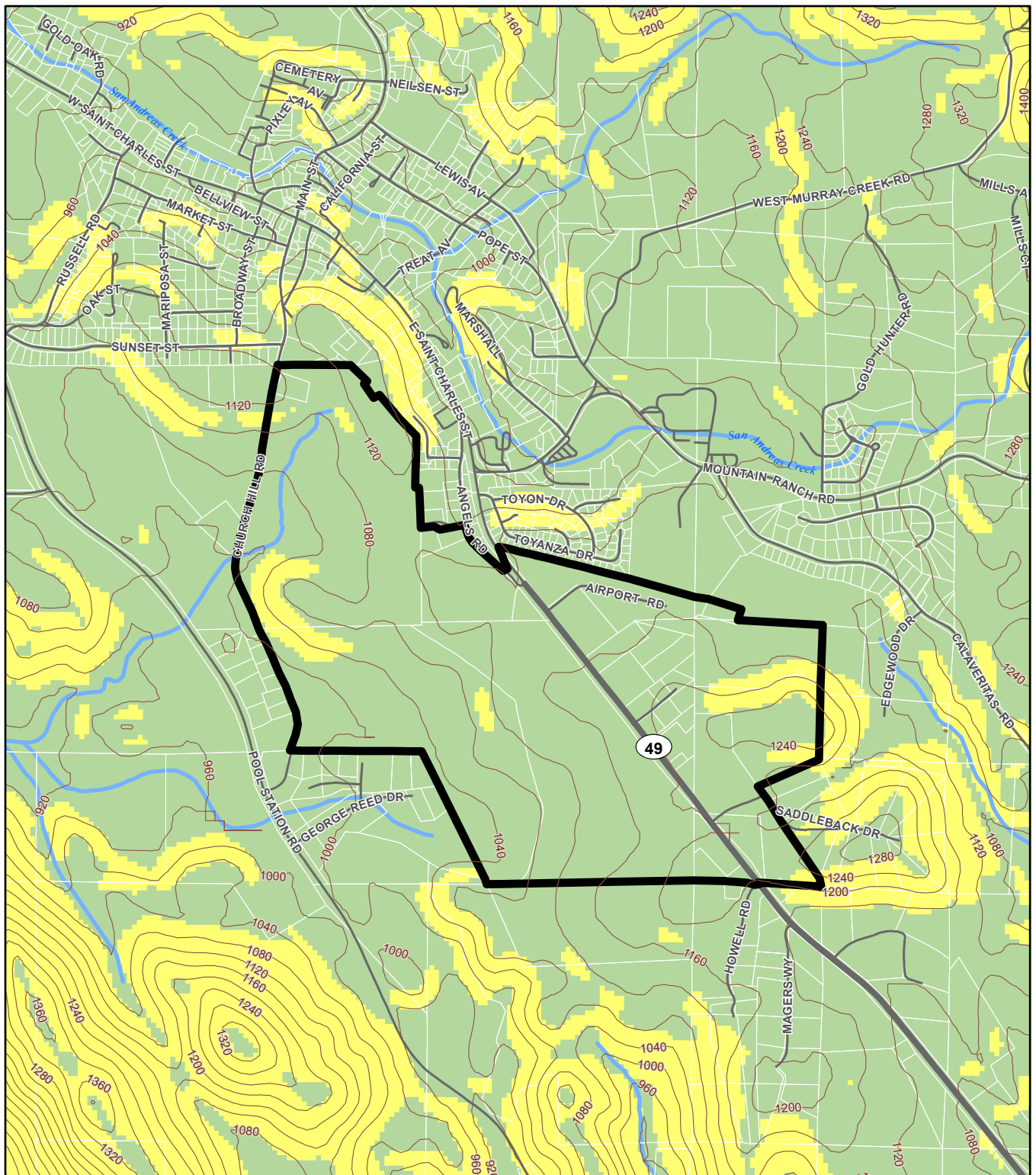


SR 49 CORRIDOR STUDY

Figure 6. Earthquake Fault Map

Data sources: USGS and California Geologic Survey, 2016, Quaternary fault and fold database for the United States, accessed February 10, 2016, from USGS web site: <http://earthquakes.usgs.gov/regional/qfaults/>. Map date: March 30, 2016.

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm



Legend

Project Boundary

USGS Stream/River

40-ft Contour

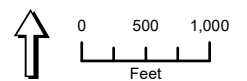
Percent Slope

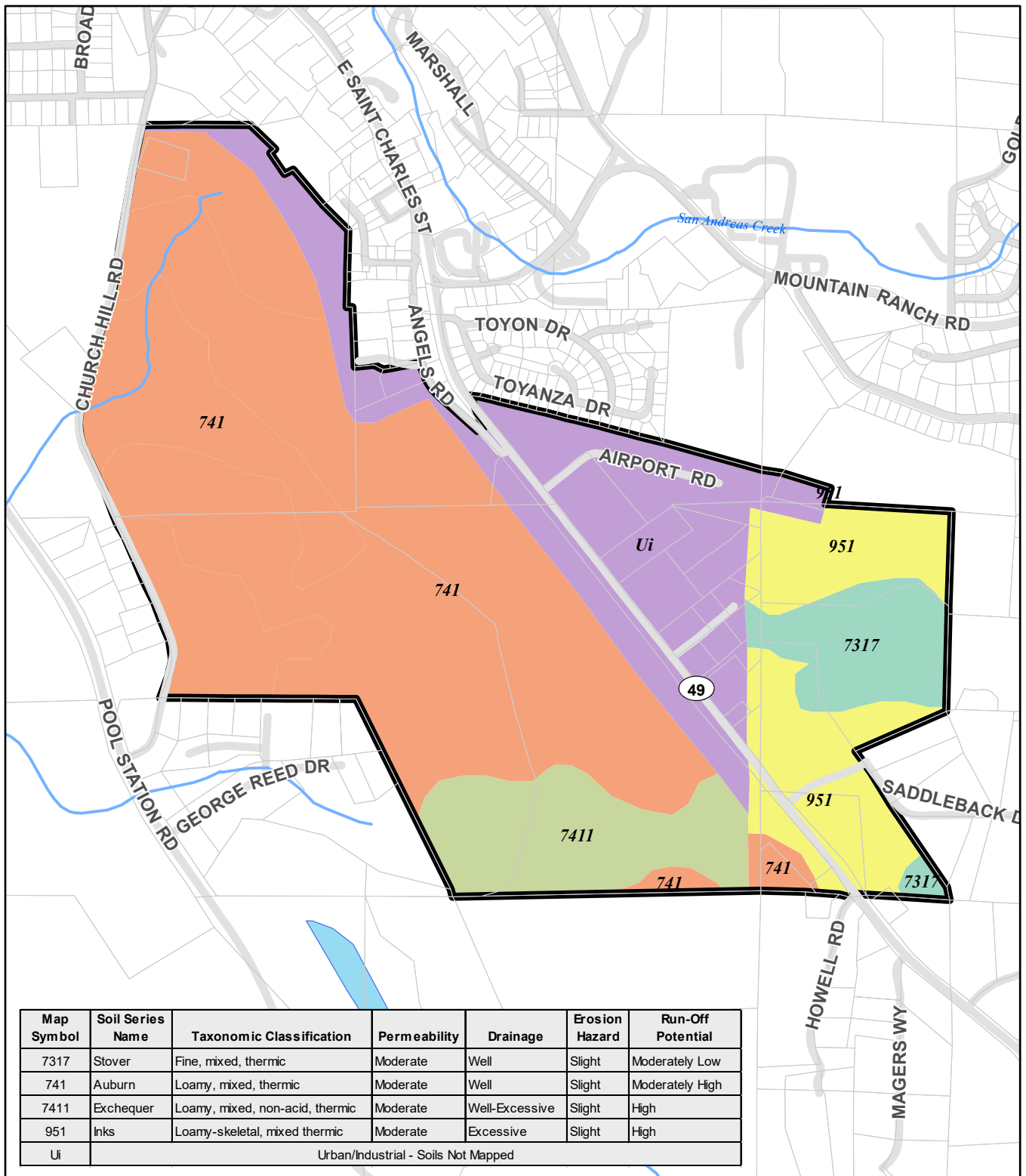
≤15%

>15%

SR 49 CORRIDOR STUDY

Figure 7. Slope Map





Legend

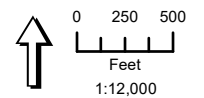
Project Boundary

Soil Series

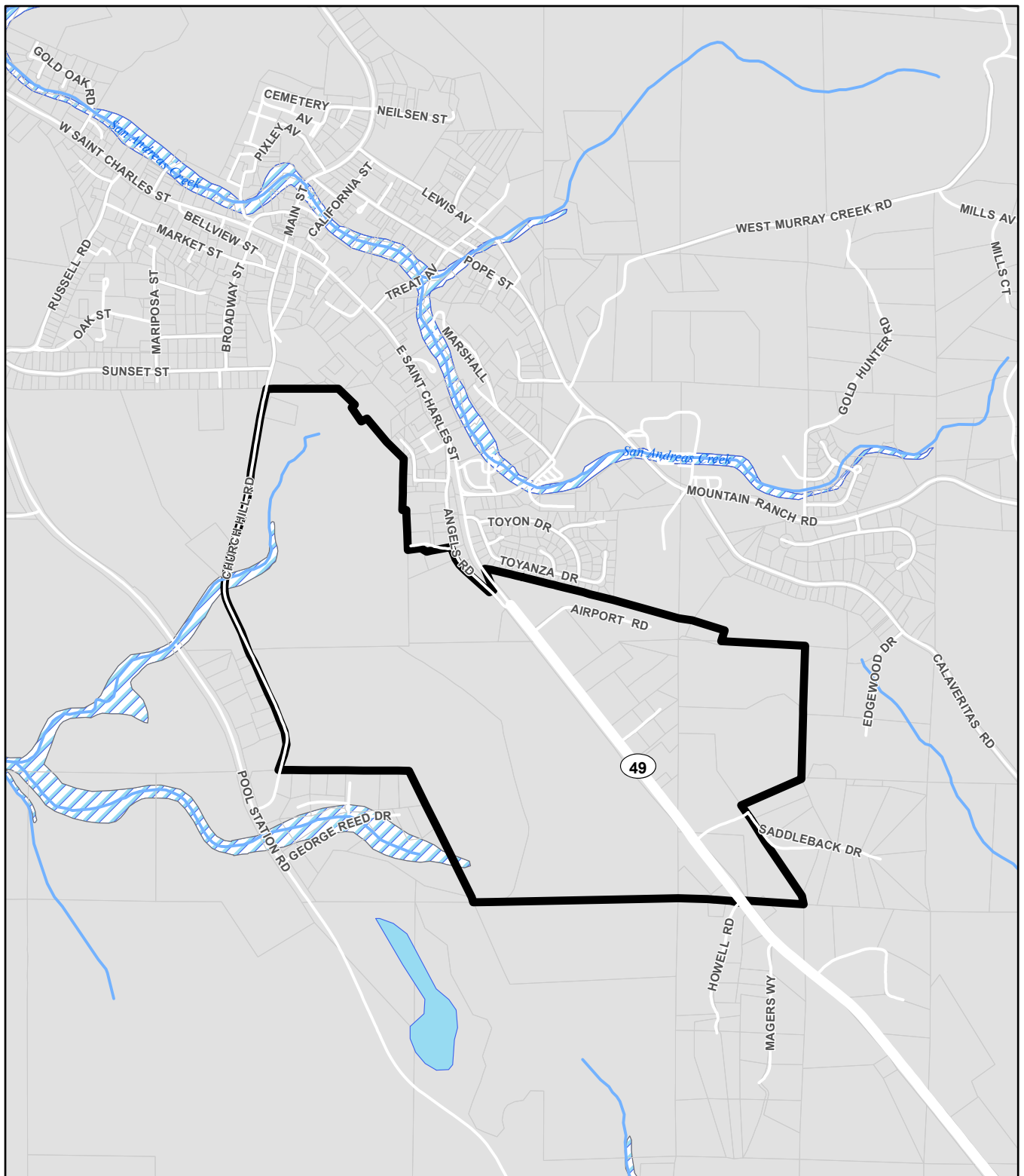
- 7317- Stover Series
- 741 - Auburn Series
- 7411 - Exchequer Series
- 951 - Inks Series
- Ui - Urban/Industrial

SR 49 CORRIDOR STUDY

Figure 8. Soils Map



Sources: Soil Data provided by Calaveras County and based on "Report and general soil map: Calaveras County California [1966]." Map date: March 30, 2016.

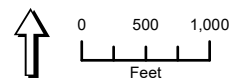


Legend

-  Project Boundary
-  USGS Stream/River
-  Lake
- FEMA Designation**
-  Zone A - 100-yr Flood
-  Zone X - Area of Minimal Flood Hazard

SR 49 CORRIDOR STUDY

Figure 9. FEMA Flood Hazard Map



**B. San Andreas State Route 49 Commercial
Gateway Corridor Study - Market Analysis -
New Economics & Advisory**

San Andreas State Route 49 Commercial Gateway Corridor Study Market Analysis

FINAL REPORT

Prepared by New Economics & Advisory

October 4, 2016

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Section 1: Executive Summary

Introduction

In support of the San Andreas State Route 49 Commercial Gateway Corridor Study, New Economics & Advisory (New Economics) has analyzed the market for real estate development in San Andreas and the surrounding area. This Market Analysis will be used to inform comprehensive transportation planning activities to ensure that transportation-related improvements will meet the needs of future residents, employees, and visitors to the area based on likely levels of future development. While San Andreas and the surrounding region possess large quantities of developable land, historical growth rates have been slow and unsteady, and the market potential for future development is uncertain. This Market Analysis is meant as a tool to provide a more realistic depiction of potential future levels of growth in the area.

Key questions that this Market Analysis addresses include:

- What is a realistic range of market-based demand for residential and commercial development in and around San Andreas over the next twenty years?
- What are the most likely uses for future development, and in what quantities?
- Are there potential methods to capture additional market activity such that additional growth might be sustained in San Andreas?

The Market Analysis provides information on the overall economic makeup of San Andreas and the surrounding area, including statistics on population, household size, household income, commuting patterns, primary industries, and other factors. Building from the existing economic and demographic base, the Market Analysis provides an assessment of the market for housing development based on San Andreas's regional competitive position and likely population growth scenarios, and commercial development given existing retail leakage, retail support from spending from residents, employees, and visitors to the area, and anticipated future levels of employment.

The findings below encapsulate the key observations derived in this Market Analysis. These findings are broken out into three primary categories, including the "Overall Findings" which summarize the likely amount of future growth, "Residential Findings" which pertain to residential growth and "Commercial Findings" which pertain to the market for retail, office, and industrial development. Following these findings, Sections 2, 3, and 4 provide detailed discussions of the data, calculations, and methodologies that form the basis of the Market Analysis. **Appendix A** provides supporting calculations and other more detailed data.

Overall Findings

- **Despite its role as a jobs hub within the County, San Andreas remains a challenged market for new development.** The primary favorable attribute for San Andreas is its relatively large amount of jobs, with concentrations in government and health care. However, employees in these fields are reticent to live in San Andreas-- even though it would allow them to live near their place of work-- because “quality of life” factors such as quality building stock, shopping opportunities, and recreational/ cultural amenities are perceived to be lacking.
- **San Andreas has not captured new residential growth over the last several real estate cycles.** While the County experienced approximately 500 new home sales from 2006 to 2015 (most of which were in Valley Springs and Copperopolis), while San Andreas grew at a much slower pace with only 7 new homes sold during this period. As such, San Andreas continues to rely on existing housing stock, which continues to age and become less modern and desirable.
- **Assuming “business as usual” conditions, San Andreas can expect to experience approximately 180 to 220 units of new residential growth over the next twenty years.** This estimate is based on future expectation of growth in the County, and San Andreas’ current share of countywide growth. If San Andreas is able to capture a larger share of countywide growth by significantly improving its competitive position—or if the County experiences a greater share of growth than is currently anticipated—San Andreas could potentially achieve the higher levels of growth.
- **San Andreas may support up to approximately 20,000 square feet (approximately 2.0 acres) of new retail development over the next twenty years, which could include up to one small “convenience-oriented” shopping center.** This estimate is based San Andreas’ capture of spending from a variety of potential sources, including future residents and employees. A recently-completed market study of the development potential in nearby Angels Camp found that a community-oriented shopping center may be supported by the spending from regional market comprising all of Calaveras County, plus small portions of Amador County and Tuolumne County; however, the geographic position of San Andreas makes it inferior as a potential community-serving retail destination compared to other communities such as Angels Camp, Jackson, and Sonora.
- **Office development is not anticipated to undergo tremendous growth in San Andreas in the near future, but given anticipated growth in employment and population, it is reasonable to expect approximately 2.0 to 4.0 acres of office development in the next twenty years.** In a location as small as San Andreas, it is difficult to predict office and industrial growth with great precision, since the addition of just one or two new users can represent a relatively large impact on growth. However, New Economics has provided these estimates of future growth in these land use categories given historical growth rates, existing building space patterns, and foreseeable levels of future growth in population and employment.

- Similarly to office space, industrial space in San Andreas is tied to residential and employment growth, it is estimated that approximately 1.5 to 3.5 acres of industrial space will be needed by 2035. Again, these estimates are based on likely levels of future growth in San Andreas and County, and do not account for any potential major business relocations or business startups, which could have a substantive impact on results but are difficult to predict.
- Figure 1 below summarizes total expected development in San Andreas by 2035.

1 San Andreas Area Development Projections 2016 through 2035		
Item	20-Year Total: 2016 - 2035	
	Moderate Estimate	High Estimate
Residential Growth		
New Residential Units	180	220
Commercial Growth		
Retail Acres	1.8	1.9
Office Acres	1.8	4.1
Industrial Acres	1.5	3.4
Subtotal Commercial Growth (Acres)	5.2	9.5

Prepared by NewEconomics & Advisory, March 2016.

Source: New Economics

Detailed Findings - Residential

- San Andreas is a small, rural community, with a population of approximately 2,800 residents, which is up from approximately 2,600 residents in 2000.
- At \$40,600, the median household income in San Andreas is lower than the County median and significantly below the statewide median, indicating a relatively poor community.
- As the County seat and location of a regional hospital, San Andreas is a primary employment center for Calaveras County, and San Andreas is characterized by a large degree of commuting activity, in which most residents work in areas outside the community. In 2014, only approximately 7 percent of San Andreas employees lived in San Andreas, and only 13 percent of San Andreas employed residents hold jobs within the community.
- The housing stock in San Andreas primarily consists of single-family detached units, and over 70 percent of the homes in the community are at least 25 years old.

- **San Andreas is among the lower-priced communities in the County, with an average sales price in 2015 of \$189,000, as compared to \$235,000 on average throughout the County.**
- **New home development activity in San Andreas has been extremely limited, especially during the past ten years.** Calaveras County overall has undergone a significant slowdown in the amount of new homes built starting in 2006, and although activity appears has picked up slightly in the past two years, sales rates have not yet begun to approach pre-2006 levels. San Andreas' new home growth in particular has been negligible, totaling only seven new units sold over the past ten years.
- **Over the long-term, residential growth in San Andreas has been limited, and its proportion of growth in the region has been declining over the past forty years.** Historical housing unit growth in Calaveras County overall has averaged slightly over 500 units per year since 1970. Of this, San Andreas has accounted for approximately 20 units per year, or 3.6 percent. Much of this growth occurred in the 1970s and 1980's, after which, San Andreas' growth has slowed significantly.
- **Assuming that San Andreas can achieve a similar countywide market share as has occurred over the long-term, it should expect to grow by approximately 0.69 percent per year, accounting for approximately 180 residential units between 2016 and 2035.** If San Andreas is able to achieve a slightly larger capture of regional growth, it may be able to support up to 220 residential units over the next twenty years. Overall, these levels of growth suggest an average rate of 10 to 12 new residential units per year, which will likely occur in short bursts that follow market fluctuations and small projects being constructed in discrete time periods.
- **Although the market for new development in San Andreas is challenged, as the County seat and as the primary job center in the County, it does have an opportunity to attract future development to serve workers who are employed in San Andreas and wish to live close to their place of work.** Some enhancements to certain "quality of life" elements in San Andreas—such as enhanced shopping and cultural opportunities and a new/ improved housing stock—would improve potential buyers' view of the area and may increase San Andreas' prospects to capture additional future demand.

Detailed Findings - Commercial

- **The Primary Trade Area (PTA) for potential retail development is a 6-mile radius around the center of town.** The PTA will capture spending from residents within San Andreas and the immediately-surrounding area. However, it does not include residents of the areas near Jackson and Angels Camp, as these residents are not likely to travel to San Andreas for shopping purposes since they have a larger selection of shopping opportunities that are more proximate to their home.
- **San Andreas' retail environment is limited to basic necessities. For most shopping, San Andreas residents travel to other areas such as Jackson and Angels Camp.** Other

shopping destinations include Lodi, Stockton, and other areas in the Central Valley, which provide a full complement of shopping goods not easily found in the more rural Calaveras County (apparel, furniture, automobiles, etc.).

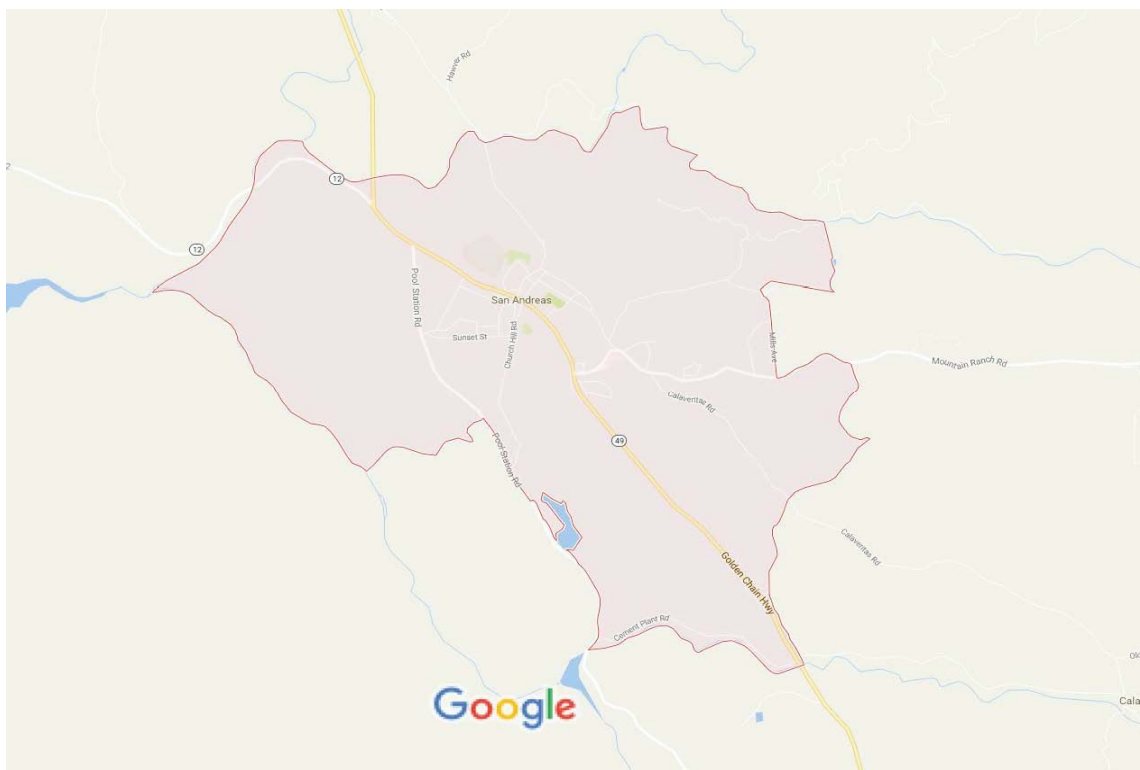
- **Retail buildings in San Andreas are largely aged and of poor quality by today's standards.** No new retail development has occurred in several decades, and much of the existing retail stock is within buildings that were originally designed and constructed for other purposes.
- **Most existing retail supply in San Andreas consists of small "mom and pop" businesses that cater primarily to the area's residents and to travelers along State Route 49.** The commercial space in San Andreas has a relatively low number of retail vacancies. As a small town, the business offerings in San Andreas are relatively stable and, while some turnover does occur, many of the businesses in San Andreas have been in existence for many years.
- **Given the amount of retail existing leakage to other areas, a small general merchandise discount retailer such as Dollar General or a similar store may be supportable in San Andreas.** Any new retail development that occurs in San Andreas must be well-located, which involves adjacency to State Route 49, high visibility, and easy ingress/ egress.
- **Office space in San Andreas is primarily occupied by a small number of "institutional" users, including the County offices and Mark Twain Medical Center. Other office space in San Andreas is local-serving, such as dentists, real estate offices, insurance, etc.** There may be some limited opportunities for future growth in these types of users as the residential and employee populations expand over time.
- **Industrial space in San Andreas primarily serves the surrounding businesses and residents, and appears to be fairly stable.** Given the existing ratio of industrial space to residents and employees, San Andreas may support up to 3.5 acres of new industrial development by 2035.

Section 2: Economic Context

Geographic Overview

San Andreas is a small, unincorporated, rural community in Calaveras County, located approximately mid-way between the cities of Jackson and Angels Camp along State Route 49 and approximately 40 miles east of the City of Stockton. Being an unincorporated community that has been in existence since the mid-1800's and has undergone several cycles of development, there are several unique definitions of San Andreas. For the purposes of this analysis, New Economics uses the San Andreas Census-Designated Place (CDP) as the geographic definition, which comprises the area shown in **Map 1**. Other geographic definitions of San Andreas were also considered and are referred to as needed during discussions on specific topics in this report, including the San Andreas Census County Division (which comprises a much broader area than the CDP) as well as two separate Community Plan Areas, one of which was adopted in 1988 and another more recent version which has been in various stages of progress for several years, but has not yet been officially adopted by the County.

Map 1
San Andreas CDP



Economic Profile

Regional Context

San Andreas comprises a relatively small portion of the County, and there are several other communities that are spread throughout various areas. **Figure 2** below shows population (as of 2010) of each of the census-designated places in the County. As shown, San Andreas represents approximately 6 percent of the total population in the County; while more populous than many of the County's communities, San Andreas is smaller than Rancho Calaveras, Arnold, Angels Camp, Copperopolis, and Valley Springs.

2 *Population of Calaveras County Communities 2010*

Employer	Population	Percent of Total
Rancho Calaveras	5,325	11.7%
Arnold	3,843	8.4%
Angels Camp (City)	3,836	8.4%
Copperopolis	3,671	8.1%
Valley Springs	3,553	7.8%
San Andreas	2,783	6.1%
Murphys	2,213	4.9%
Mountain Ranch	1,628	3.6%
Forest Meadows	1,249	2.7%
West Point	674	1.5%
Avery	646	1.4%
Mokelumne Hill	646	1.4%
Dorrington	609	1.3%
Rail Road Flat	475	1.0%
Vallecito	442	1.0%
Wallace	403	0.9%
All Other Areas	13,582	29.8%
Total Calaveras County	45,578	100.0%

Prepared by NewEconomics & Advisory, March 2016.

Source: US Census Bureau Census 2010

Population Attributes

San Andreas was home to approximately 2,800 residents as of 2010, which was up from approximately 2,600 residents in 2000 according to the US Census Bureau. **Figure 3** below shows various demographic attributes of San Andreas in 2000 and 2010. As shown, San

Andreas was home to approximately 1,146 households in 2010, and the average household size was 2.26 (up slightly from a decade before). The median age in San Andreas is 45.7 (significantly older than the state average of 35.2), and the median household income is \$40,600 (which is considerably lower than the state average of 61,500). Approximately 55 percent of San Andreas households own their own home, while 45 percent are renters, which is similar to state averages. Of note, approximately 12.6 percent of housing units were vacant in 2010, which is significantly higher than the state average of 8.1 percent.

3

San Andreas Attributes

San Andreas CDP, 2000 and 2010

Item	San Andreas CDP			California (2010)
	2000	2010	% Change	
Population	2,615	2,783	6.4%	37,253,956
Households	1,097	1,146	4.5%	12,617,280
Average Household Size	2.24	2.26	0.9%	2.9
Housing Units	1,167	1,311	12.3%	13,680,081
Median Age	42.6	45.7	7.3%	35.2
Median HH Income	\$32,500	\$40,613	25.0%	\$61,489
Tenure				
Rent	43.8%	44.9%		45.2%
Own	56.2%	55.1%		54.8%
Vacant Housing Units	6.0%	12.6%	110.0%	8.1%

Prepared by NewEconomics & Advisory, March 2016.

Source: US Census 2000 and 2010

Commuting Patterns

San Andreas (and Calaveras County in general) is clearly characterized by a large degree of commuting activity, both inward and outward. **Figure 4** shows that only 13.3 percent of employed residents of San Andreas actually work in San Andreas, and that only 7.0 percent of employees who hold jobs in San Andreas live within the community. Some of these workers do commute from or to nearby areas such as Angels Camp, Valley Springs, and Jackson, but it appears that a large portion commutes to and/or from areas outside the vicinity.

4 *Calaveras County Commute Patterns* *San Andreas - 2014*

Employer	Employees	Percent of Total
<u>San Andreas Employed Residents</u>		
Work in San Andreas	135	13.3%
Work in Other Locations	878	86.7%
Total	1,013	100.0%
<u>San Andreas Employees</u>		
Live in San Andreas	135	7.0%
Live in Other Locations	1,792	93.0%
Total	1,927	100.0%

Prepared by NewEconomics & Advisory, March 2016.

Source: US Census Bureau LED/ LEHD

These commute patterns would seem to present several implications and opportunities as related to future growth in and around San Andreas. First, it may be possible to capture additional economic activity from the spending of employees of this area. For example, if employees whose jobs are located in San Andreas were to make purchases in new retail offerings in San Andreas, additional commercial development may be supported. Second, it is possible that through repositioning of San Andreas as a more desirable residential enclave, the area may be able to support enhanced residential development in order to better-serve San Andreas employees who are interested in living near their place of employment. These possibilities will be explored in greater detail in subsequent sections of this report.

Jobs in San Andreas

San Andreas had just over 1,000 employed residents in 2014, up 29 percent from 786 in 2002, as shown in **Figure 5** below. These workers hold jobs in variety of fields (which are primarily located in areas outside of San Andreas, as described above), most prominently including industries such as Health Care, Retail, Public Administration, Accommodations & Food Services, and Education.

5

Employment by Industry of San Andreas Employed Residents
San Andreas CDP, 2002 and 2014

Sector	2002		2014		% Change 2002 - 2014
	Count	Percent	Count	Percent	
Construction	61	7.8%	66	6.5%	8.2%
Manufacturing	37	4.7%	58	5.7%	56.8%
Wholesale Trade	8	1.0%	44	4.3%	450.0%
Retail Trade	106	13.5%	107	10.6%	0.9%
Admin., Support, Waste Mgt, Remediation Svcs.	31	3.9%	45	4.4%	45.2%
Educational Services	102	13.0%	99	9.8%	-2.9%
Health Care and Social Assistance	96	12.2%	151	14.9%	57.3%
Accommodation and Food Services	86	10.9%	102	10.1%	18.6%
Public Administration	81	10.3%	105	10.4%	29.6%
All Other Sectors [1]	178	22.6%	236	23.3%	32.6%
Total Employment	786	100.0%	1,013	100.0%	28.9%

Prepared by NewEconomics & Advisory, March 2016.

[1] Includes all sectors with less than 5 percent of total employment in 2014.

Source: US Census Bureau LED/ LEHD OnTheMap Application

Figure 6 shows the jobs actually located in San Andreas in 2002 and 2014, organized among the major categories that comprise at least two percent of the total (in 2014). As shown, the jobs located within San Andreas are primarily within the public and quasi-public sectors. By far, the largest sector (at nearly 30 percent of total jobs) is in the Public Administration sector, owing to the County offices and other governmental agencies located in San Andreas. Health Care and Educational Services are also very prominent sectors in San Andreas, owing to the Mark Twain Medical Center, San Andreas Elementary School, and Calaveras High School being located in in San Andreas.

Sector	San Andreas CDP		California	San Andreas Employment Concentration [1]
	Count	Percent		
Utilities	80	4.2%	0.7%	565.16%
Construction	112	5.8%	4.5%	129.79%
Retail Trade	54	2.8%	10.2%	27.38%
Information	42	2.2%	3.3%	66.97%
Educational Services	342	17.7%	8.9%	198.55%
Health Care and Social Assistance	499	25.9%	13.0%	198.63%
Accommodation and Food Services	35	1.8%	8.8%	20.69%
Other Services (Except Public Administration)	40	2.1%	3.2%	64.61%
Public Administration	571	29.6%	5.1%	578.96%
All Other Sectors [2]	152	7.9%	42.2%	18.69%
Total Jobs	1,927	100.0%	100.0%	

Prepared by NewEconomics & Advisory, March 2016.

[1] A percentage of 120% or more denotes a concentration in the industry as compared to state averages, and indicates an industry of relative strength. A score below 80% indicates a relative weakness in a particular industry.

[2] Includes all sectors with less than 2 percent of total jobs.

Source: US Census Bureau LED/ LEHD OnTheMap Application

Figure 7 shows the top employers in San Andreas by the number of employees. As shown, every one of the top employers in San Andreas falls within the public or quasi-public category, with a large emphasis on County employment, schools, hospitals, and utilities. There are no private businesses in the top ten employers in San Andreas.

7

Major Employers in San Andreas
San Andreas - 2016

Employer	Number Employed	Category
Mark Twain Medical Center	250-499	Hospital
Forestry & Fire Protection	250-499	Government
Rite-Passage-Sierra Ridge Academy	100-249	Residential Care Homes; School
Calaveras County Human Services	50-99	Government
Calaveras County Sheriff	50-99	Government
Calaveras Water District	50-99	Utility
Calaveras High School	50-99	School
Calaveras Public Works Department	50-99	Libraries-Public
Independent Learning Center	50-99	School
Rail Road Falt Elementary School	50-99	School
West Point Elementary School	50-99	School

Prepared by NewEconomics & Advisory, March 2016.

Source: State of California Employment Development Department, 2016.

Section 3: Residential Real Estate Market

Residential Market Overview

As a residential market, San Andreas is considered to be a submarket of the broader Calaveras County market, which is itself a component of what is commonly referred to as the “Mother Lode” region, which generally refers to the foothill portions of Calaveras, Amador, Mariposa, and Tuolumne Counties. Calaveras County is seen as a charming, quiet, rural county that can provide a “laid back” lifestyle and affordable home prices, yet still be within a reasonable commuting distance to major urban job centers in Stockton, Lodi, and other areas of the Central Valley. Industry in the region has historically been driven by natural resource extraction and processing (primarily timber, aggregate, and precious metals), but are now primarily consist of resident-serving sectors such as health care, retail, and government. The western half of the County comprises the most developed portion that is situated at a lower elevation, offering a pleasant, temperate climate. San Andreas is fairly centrally located amongst the County’s primary developed communities, such as Angels Camp, Murphy’s, Copperopolis, Arnold, and Valley Springs, although there are many other more sparsely-populated enclaves located throughout the County.

The residential real estate supply in San Andreas consists primarily of single-family detached structures, occupied by family households. **Figure 8** below shows that approximately 60 percent of San Andreas’ housing units are single family detached units, while 35 percent are multi-family structures and 5 percent are mobile homes.

8 Housing Units by Building Type

San Andreas CDP, 2010-2014 Estimates

Item	Number of Units	% of Total
<u>Single Family</u>		
Detached	854	59.7%
<u>Multi-Family</u>		
2 units	123	8.6%
3 or 4 units	109	7.6%
5 to 9 units	119	8.3%
10 to 19 units	53	3.7%
20 or more units	102	7.1%
Subtotal Multi-Family	506	35.4%
<u>Other</u>		
Mobile Home	71	5.0%
Total	1,431	100.0%

Prepared by NewEconomics & Advisory, March 2016.

[1] Source: US Census Bureau 2010-2014 American Community Survey 5-Year Estimates.

Much of the housing stock in San Andreas is aged and of marginal quality, according to real estate experts familiar with the area. **Figure 9** below shows that approximately 70 percent of the housing stock in San Andreas was built before 1990, thus being at least 25 years old. Much of this housing was built in the 1950's and 1970's, while approximately 16 percent was built before 1950. Some older structures have undergone restoration and are maintained as charming historic homes; however, according to local experts as well as through New Economics' own review of the building stock, much of the housing stock has become run-down and is in a state of disrepair.

9 Year Housing Units Constructed San Andreas CDP, 2010-2014 Estimates

Item	Number of Units	% of Total
Built 2010 or Later	0	0.0%
Built 2000 to 2009	126	8.8%
Built 1990 to 1999	303	21.2%
Built 1980 to 1989	193	13.5%
Built 1970 to 1979	292	20.4%
Built 1960 to 1969	31	2.2%
Built 1950 to 1959	259	18.1%
Built 1940 to 1949	102	7.1%
Built 1939 or Earlier	125	8.7%
Total	1,431	100.0%

Prepared by NewEconomics & Advisory, March 2016.

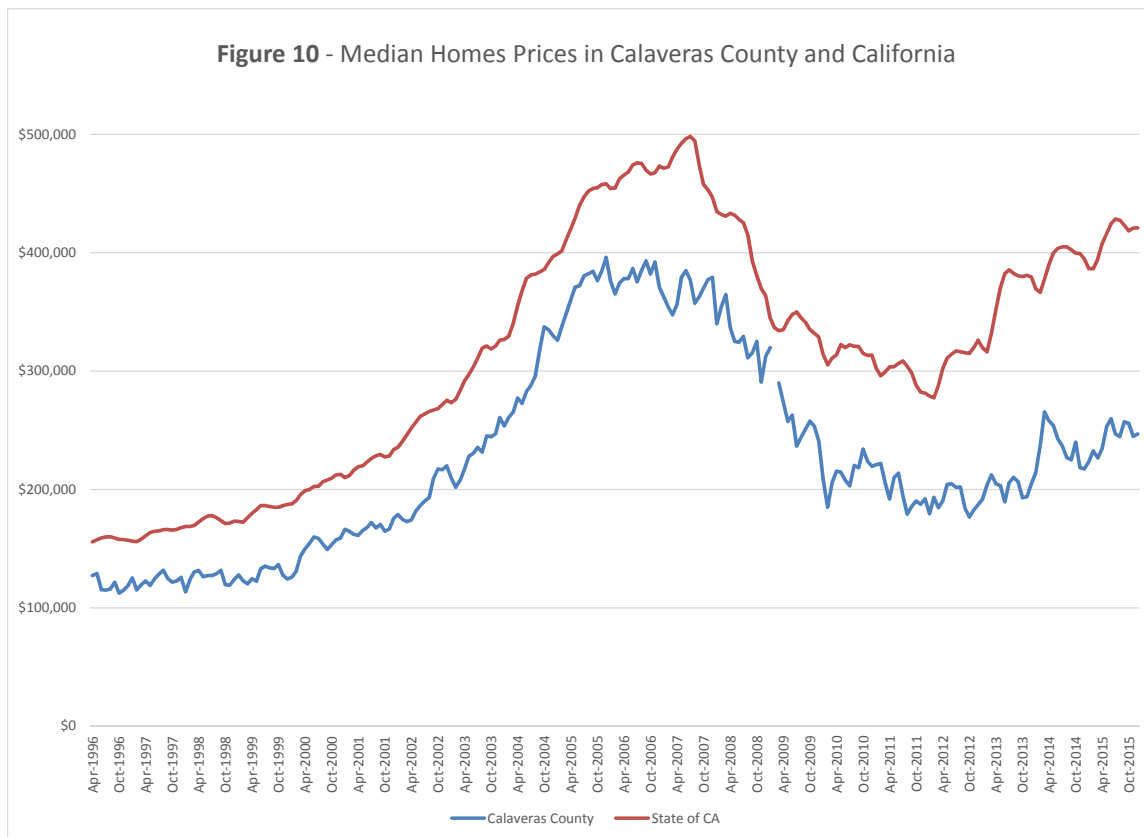
[1] Source: US Census Bureau 2010-2014 American Community
Survey 5-Year Estimates.

According to local realtors, buyers of Calaveras County homes fit a variety of customer cohorts, including move-up/ move-down buyers, families who are “fleeing” urban environments for a more rural lifestyle, retirees, and second home buyers. Calaveras County residential real estate is also heavily influenced by the purchase of second homes or vacation homes, largely by buyers in the Central Valley and Bay Area markets. As referenced in **Section 2**, approximately 12.6 percent of homes in San Andreas are “vacant,” according to the US Census Bureau.

Residential Market Activity

Residential real estate has undergone a rather tumultuous period over the past decade in nearly all areas throughout California, as home pricing and sales activity ramped up during the early 2000’s, followed by an extreme reduction of prices and sales rates as the “bubble burst” during the Great Recession which lingered for years before finally regaining some losses more recently. **Figure 10** shows the long-term residential pricing dynamics in California and Calaveras County, which illustrates this trend. As shown, while California has nearly returned to the “peak” pricing levels of 2007, Calaveras County remains approximately 38 percent below its peak value of \$400,000, which occurred in 2006. This trend indicates that Calaveras County is “behind” other areas in recapturing

losses experienced during the Great Recession, and points to its softness as a residential real estate market as compared to other areas in the state.



Currently, the home market in San Andreas and the rest of Calaveras County has begun performing more favorably, with both sales rates and pricing on upward trajectories; San Andreas, however, has shown considerably lower figures in both sales volumes and home pricing than other nearby residential areas. **Figure 11**, below, shows annual residential sales in 2015, and the annual sales over the past ten years, along with median sales price trends over this same period.

As shown, Valley Springs, Arnold, and Copperopolis represent the largest residential submarkets in the County, accounting for approximately 60 percent of real estate sales over the past ten years. Each of these areas generally exhibit higher price points, ranging from \$225,000 to \$304,000, than San Andreas, whose median sale price is \$189,000. Although San Andreas has experienced fairly strong price appreciation since 2006, at a total growth rate of 46.5 percent, this rate is not quite as high as the rate seen in Valley Springs, which experienced nearly 63 percent appreciation.

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Residential Sales and Pricing Calaveras County Submarkets [1]

Submarket	Annual Sales		Median Sale Price		
	2015	10-Yr Avg.	2006	2015	% Change
Valley Springs	332	313	\$152,000	\$247,500	62.8%
Arnold	205	196	\$257,500	\$250,000	-2.9%
Copperopolis	132	168	\$229,000	\$304,000	32.8%
Angels Camp	100	74	\$193,000	\$225,000	16.6%
Murphys	85	90	\$253,000	\$311,000	22.9%
Mokelumne Hill	55	36	\$121,000	\$177,500	46.7%
San Andreas	35	39	\$129,000	\$189,000	46.5%
Mountain Ranch	25	24	\$162,500	\$185,000	13.8%
All Other Locations	366	255	n/a	n/a	n/a
County Total/ Average	666	518	\$185,000	\$235,000	27.0%

Prepared by NewEconomics & Advisory, March 2016.

[1] Includes all home types, and both new and existing home sales.

Source: Dataquick

Residential development in the area tends to occur on a marginal, ad-hoc basis and does not typically involve large master-planned development areas that absorb in a concise period of time. Instead, growth is spread among the various geographic areas within the County, although there are certain areas that have experienced more recent development as of late.

New Home Activity

The vast majority of home sales in the County are existing homes, as new home sales have been nearly non-existent in this market area over the past several years, especially in San Andreas. Large-scale production homebuilding has not comprised a significant portion of Calaveras real estate activity in recent years, especially after the Great Recession. Even before the Great Recession, however, Calaveras County did not possess a large amount of new homebuilding. **Figure 12** below shows annual new home sales in Calaveras County in 2006 and 2015. As shown, Calaveras has seen just over 500 new homes sold over the past ten years, at an average rate of 56 per year. San Andreas represents only a very tiny fraction of this activity, seeing only 7 new homes sold during this entire decade. As shown, Copperopolis and Valley Springs have comprised the majority of new home sales, accounting for over two-thirds of the County's total.

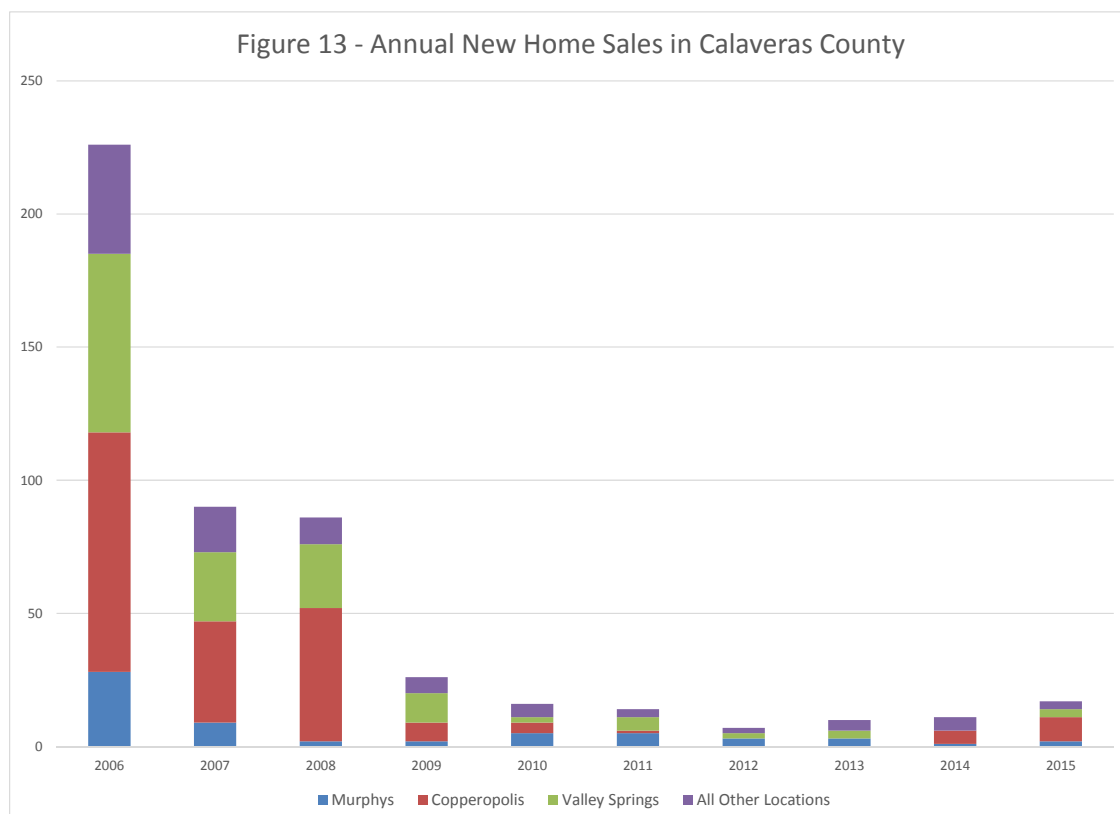
12 New Home Sales, Calaveras County 2006 through 2015

Submarket	2006	2015	Total 2006-2015	Average Annual
Angels Camp	11	0	23	3
Copperopolis	90	9	204	23
Murphys	28	2	60	7
San Andreas	3	0	7	1
Valley Springs	67	3	143	16
All Other Locations	23	3	55	6
County Total	226	17	503	56

Prepared by NewEconomics & Advisory, March 2016.

Source: Dataquick

Figure 13 shows the annual new home sales in each year beginning in 2006 for each of the major sub-areas within the County. As shown, homebuilding in the County suffered a major decline after 2006, and new home sales have essentially been dormant since 2008. Even more recently, as the national economy has improved and homebuilding activity has recovered nationwide, Calaveras County has not shared in this increased activity.



Planned and Proposed Residential Development

Planned development in the Calaveras County market is essentially non-existent at the current time. As of the writing of this report, there are no major development projects proposed or actively being processed for consideration. This level of inactivity reflects the slow and sluggish nature of development in this area, and the notion that Calaveras is not on the radar for builders or developers as a market poised to experience significant growth. However, many observers interviewed for this study are optimistic that Calaveras County may be able to assert itself in the future as a location where a rural lifestyle can be had (and at an affordable price), but allowing for commuting (or telecommuting) to nearby job centers such as Stockton. To this end, as Calaveras County continues to improve itself as a residential enclave, and to the extent that consumer tastes evolve toward this type of environment, Calaveras County may be able to capture a stronger presence in new residential development.

Future Residential Growth

Predicting the quantity of future residential growth in San Andreas is a challenging and imprecise endeavor. A small and rural area, San Andreas does not have readily available detailed household projection data as would be available in a larger community. In order to frame the potential growth rates in population and employment, New Economics reviewed a variety of economic and market studies pertaining to the area, analyzed historical growth rates that have occurred over a long-term period, and considered the potential for San Andreas to capture varying portions of future regional growth. The following sections display the results of this research and analysis.

Historical Growth Rates

New Economics has carefully analyzed historical growth in the County and San Andreas in order to frame future growth. **Figure 14** below shows historical growth in population and housing units in Calaveras County and the San Andreas CDP. As shown, Calaveras County has grown in population at an average annual rate of just over 3.0 percent from 1970 to 2010. However, San Andreas has experienced much slower growth rates during this period, at just 1.45% annually.

It bears noting that San Andreas' share of population and housing units in the County has been eroding over time, as other development areas have emerged. For instance, in 1970, San Andreas accounted for approximately 11.5 percent of the County's population, but by 2010 it only accounted for 6.1 percent. Furthermore, San Andreas' growth has been slowing over time. While San Andreas' overall average annual population growth rate from 1970 to 2010 was 1.45 percent, it only achieved 0.6 percent annual growth from 2000 to 2010.

14 Historical Population and Housing Units San Andreas and Calaveras County

Item	1970	1980	1990	2000	2010	Avg. Ann. Growth 1970 - 2010
Population						
Calaveras County	13,585	20,710	31,998	40,554	45,578	3.07%
San Andreas CDP	1,564	1,912	2,115	2,615	2,783	1.45%
10-Year Avg. Ann. Growth Rate [1]	n/a	2.0%	1.0%	2.1%	0.6%	
San Andreas CDP as a % of County	11.5%	9.2%	6.6%	6.4%	6.1%	
Housing Units						
Calaveras County	7,037	12,746	19,153	22,946	27,925	3.51%
San Andreas CDP	564	825	985	1,167	1,311	2.13%
10-Year Avg. Ann. Growth Rate [1]	n/a	3.9%	1.8%	1.7%	1.2%	
San Andreas CDP as a % of County	8.0%	6.5%	5.1%	5.1%	4.7%	

Prepared by NewEconomics & Advisory, March 2016.

[1] Represents the average annual growth rate registered during the preceding ten years.

Source: US Census Bureau

Projections of Population, Household, and Housing Unit Growth

While growth in San Andreas has slowed in recent years, available future projections take an even more subdued outlook. Since detailed and accurate projections for the small sub-county areas are not readily available, New Economics has compiled several population and household projections from various sources that are available on a countywide basis. These various projections are shown in **Figure 15** below.

- County population projections range from average annual growth rates of 0.44 percent per year to 0.85 percent per year. The average among all four sources is 0.69 percent per year.
- County household projections range from average annual growth rates of 0.61 percent per year to 1.11 percent per year. The average among all three sources is 0.69 percent per year.
- ***For the purposes of this analysis and projecting future growth in San Andreas, New Economics has selected the average growth rate for both population and households, at 0.69 percent per year.***

15 Population and Households Projections Calaveras County

Item	2010	2020	2030	2040	Nominal Growth	Avg. Ann. Growth	Avg. Ann. Growth Rate
Population Projections							
Woods & Poole	45,900	49,930	54,590	59,220	13,320	444	0.85%
DOF	45,654	48,957	53,317	55,881	10,227	341	0.68%
Caltrans	45,457	47,193	50,024	51,820	6,363	212	0.44%
GPU [1]	45,578	49,245	53,206	57,487	11,909	397	0.78%
Average All Estimates	45,647	48,831	52,784	56,102	10,455	348	0.69%
Households Projections							
Woods & Poole	18,850	21,380	23,110	24,610	5,760	192	0.89%
DOF [2]	18,886	21,184	23,546	26,291	7,405	247	1.11%
Caltrans	18,900	19,900	21,600	22,700	3,800	127	0.61%
Average All Estimates	18,879	20,821	22,752	24,534	5,655	188	0.69%

Prepared by New Economics & Advisory, March 2016.

[1] From the GPU Technical Background Report, 2015. Projections provided in GPU are from 2010 to 2035. Annualized via straightline average and interpolated for 2020, 2030, and 2040.

[2] DOF forecast only goes to 2030. 2040 figures were estimated by NEA using the average annual growth rate between 2010 and 2030.

Sources: Woods and Poole 2012 California projections; California Department of Finance State and County Population Projections, December 15, 2014; Caltrans 2015 County-Level Economic Forecast; Calaveras County General Plan Background Report, December 18, 2014.

San Andreas' Share of County Growth

Historically, San Andreas has accounted for between 6.1 percent and 11.5 percent of the County's annual growth, depending on the decade, as shown in **Figure 14** above. This percentage has been declining over time (as described above), as other development areas have grown in market share at the expense of San Andreas. Our projections assume that this decline has "stabilized," and San Andreas will be able to capture similar proportions of County growth as has been registered over the past twenty years, which is approximately 6.0 percent. This is consistent with discussions with local experts, who foresee San Andreas' role in the region as remaining largely static, unless significant changes can be made to the area's "quality of life" factors that would support a larger share. As shown in **Figure 16**, this "stabilized" level of growth and market share would equate to growth of approximately 420 persons from 2016 to 2035, or approximately 20 new residents per year.

New Economics has also considered the potential for San Andreas to capture a larger portion of Calaveras County growth, and thus grow at a slightly faster rate than the "moderate" growth scenario described above. Under this "high growth" scenario, San Andreas would grow at 0.8 percent per year (rather than 0.69 under the "moderate" scenario). If San Andreas is able to achieve this level of growth, it would see population grow by 550 during the next twenty years, or approximately 28 new residents per year.

16 Population Projections Calaveras County and San Andreas

Item	2016	2035	Nominal Change	Average Annual Change	Average Annual Growth Rate
[1]					
Calaveras County Population [2]	45,539	51,854	6,315	332	0.69%
San Andreas Population					
Moderate Estimate: Same Rate as County	2,868	3,266	380	20	0.69%
High Estimate: 0.8% Avg. Ann. Growth	2,874	3,344	470	25	0.80%

Prepared by NewEconomics & Advisory, March 2016.

[1] 2016 population uses US Census Bureau American Community Survey estimated for 2010-2014, projected to 2016.

[2] Assumes the average growth rate among projections shown in Figure 15.

Source: Various county growth projections and New Economics

Next, New Economics calculated the amount of new housing unit growth that would be required in order to meet the needs of this projected population growth over the next twenty years. **Figure 17** shows the average persons per housing unit in Calaveras County and San Andreas over the past 40 years. As shown, this metric has been declining in San Andreas for the past forty years, and sits at approximately 2.12 persons per housing unit in 2010.

17 Historical Population and Housing Unit Ratios San Andreas and Calaveras County

Item	1970	1980	1990	2000	2010
Persons per Housing Unit					
Calaveras County	1.93	1.62	1.67	1.77	1.63
San Andreas CDP	2.77	2.32	2.15	2.24	2.12

Prepared by NewEconomics & Advisory, March 2016.

Source: US Census Bureau

Estimated Residential Growth

By analyzing previous growth levels, projections of future population growth, and population densities, and considering the current and possible future competitive position of San Andreas, we have provided a likely estimate of future growth in housing.

Figure 18 shows that San Andreas is estimated to grow by approximately 180 residential units between 2016 and 2035, under a “moderate” growth scenario in which residential growth in San Andreas occurs in a similar fashion as it has over the past twenty years. A more favorable scenario is also considered, in which over time San Andreas is able to

accomplish a shift in market share, allowing the area to grow more quickly than the baseline projections. Under this scenario, it is reasonable to assume that San Andreas grows at rates that approach those that were experienced over the past 40 years, which included some “lean” years with very little growth, mixed with more “booming” years that included a substantial amount of growth. Given this more aggressive growth rate, San Andreas could grow by up to 220 residential units by 2035.

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Projected Housing Unit Growth
San Andreas CDP, 2016 - 2035

Item	20-Year Total	
	Moderate Estimate	High Estimate
San Andreas Projected Population Growth	380	470
Assumed Persons per Housing Unit	2.12	2.12
Estimated New Housing Units (Rounded)	180	220

Prepared by NewEconomics & Advisory, March 2016.

Source: US Census Bureau

Section 4: Commercial Real Estate Market

New Economics has evaluated the likely levels of future growth in commercial development, including retail, office, and industrial sub-classes.

Retail Development

This sub-section analyzes the market for retail in San Andreas and assesses the prospects for development in the near-term and long-term. Before delving into the detailed specific site characteristics and analysis of retail supply and demand in San Andreas, it is first worth describing some of the permanent changes that have occurred to the retail development industry that have bearing on the Project. Industry experts have documented a number of permanent market changes since the Great Recession that impact land use planning going forward. These trends include:

- **Retail Anchors Are Shrinking.** Prolonged increases in market share by e-commerce businesses, (e.g. Amazon, Staples.com), have caused a reduction of footprint for major retail anchors that sell comparison goods. This trend has been accompanied by the propensity for large-format department stores to venture into the grocery market. Increased competition for grocery (as well as prepared foods) has resulted in both smaller-format traditional grocery stores as well as new, small-format grocery versions of department stores. This trend has manifested itself in rural areas in recent years with the proliferation of “small box” general merchandise stores such as Dollar General which offer convenient locations, small floor plans (typically between 7,000 and 9,000 square feet), and a variety of low-priced goods including groceries, clothing, household cleaners, and more.
- **Retail Centers are Becoming More Aggressive in Considering Options to Expand Revenues.** All types of retail centers, from small neighborhood-serving shopping centers to large regional malls are seeking a wide variety of opportunities to diversify revenues. Retail centers are now more likely to expand their tenanting options to include service providers (gyms, post offices, massage, insurance, small appliance repair), medical uses (urgent care centers, physical rehabilitation, radiology/dialysis centers), and other “non-traditional” users including new/ independent retailers that may not have a proven track record of success.¹
- **Retail is Increasingly “Experiential.”** Because shoppers can buy more things on-line that can be delivered in a very short time, shopping is evolving to emphasize an experience, beyond the instant gratification offered by a traditional commercial transaction. For example, these experiences can include outlet/thrift shopping,

¹ “Cultivating Independent Tenants can be a Worthwhile Investment, Panel Says,” Shopping Centers Today, International Council of Shopping Centers, published November, 20 2014.

(finding a unique item for a “steal”), services combined with retail (a bike repair shop with a coffee counter), or a restaurant with exceptional community views.

San Andreas Retail Dynamics

San Andreas currently has approximately 120,000 square feet of retail space, according to Loopnet, as summarized in **Figure A-1** in **Appendix A**. Although there are not any active retail spaces currently being advertised in traditional listing services, lease rates for San Andreas commercial space range generally from around \$1.00 to \$1.25 per square foot. According to commercial brokers familiar with this market, rates tend to be slightly lower than the lease rates that could be achieved in other areas of the County, most notably the “stronger” retail markets of Jackson, Murphys, and Angels Camp.

The retail building space that exists within San Andreas is largely what would be considered highway-oriented strip retail, and much of space exists within older historic buildings that were not designed with retail in mind, and thus are not ideal for today’s type of shopping. However, this type of retail can be conducive to creating a walkable tourism district, although the character of retail in San Andreas is not considered to be as appealing as other nearby tourism/ shopping destinations, such as Angels Camp, Murphy’s, or Sutter Creek.

Surrounding Retail Supply

The closest “standard” community shopping area to San Andreas is in Angels Camp, which is an approximate 15-minute drive south down State Route 49. The Frog Jump Plaza and Angels Towne Center combined provide approximately 121,000 square feet of retail space, and shopping options including grocery (Save Mart), pharmacies, (CVS and Rite Aid), and various restaurants and services. By traveling the opposite direction to Jackson (an approximately 20-minute drive), San Andreas residents can choose from several additional shopping options. Jackson and the adjacent community of Martell offer several shopping center options which comprise nearly 800,000 square feet of building space, and include major general merchandise stores (Walmart and Kmart), a large home supply store (Lowes), four supermarket/ grocery stores, and more. If the selections offered at Angels Camp or Jackson still do not meet the shopping needs of residents of the area for certain types of purchases, the City of Stockton (approximately 40 miles away) and other nearby cities in the Central Valley can provide all essential goods and services, including regional malls, new car dealerships, regional big box food stores (Costco), etc. **Figure 19** shows the major shopping centers that exist in Jackson and Angels Camp, which comprise over 900,000 square feet of leasable area.

19 Surrounding Market Area Shopping Centers Angels Camp and Jackson/ Martell, 2016

Location/ Center	Address	Leaseable Sqft	Anchor/ Major Tenants
Angels Camp (15-Minute Drive from San Andreas)			
Frog Jump Plaza	51 North Main Street	43,000	CVS Pharmacy, Starbucks, Round Table
Angels Towne Center	260 South Main Street	78,000	Save Mart, Rite Aid, Taco Bell, Burger King
Subtotal Angels Camp		121,000	
Jackson/ Martell (20-Minute Drive from San Andreas)			
Walmart Shopping Center	10355 Wicklow Way	100,000	Walmart
Amador Shopping Plaza	11980 Highway 88	150,000	Save Mart, Big 5 Sporting Goods, Aaron's, Dollar Tree, Baskin Robbins
Kmart	10500 Wicklow Way	85,000	Kmart
Amador Ridge	Hwy 49 and Industry Way	273,000	Lowe's, Safeway, Autozone, Staples, Petco
Jackson Creek Plaza	Hwy 49 and French Bar Rd.	104,000	CVS Pharmacy, Cost Less Food Company
Gold Country Center	711-781 Highway 49	75,000	Raley's, Tractor Supply Co., Payless Shoe Source
Subtotal Jackson/ Martell		787,000	
TOTAL		908,000	

Prepared by NewEconomics & Advisory, March 2016.

Source: Loopnet, Listing Brokers, and New Economics.

Spending Analysis

Because of San Andreas' geographic positioning approximately mid-way between the cities of Jackson and Angels Camp—which each include intersections of prominent state highways that transmit travelers between the rural upland areas and the more urban destinations in the valley—the ability for San Andreas to capture significant shopping from the larger region is limited. Shoppers will likely prefer the more proximate and convenient locations of Jackson to the north and Angels Camp or Sonora to the south.

Because of the limited shopping options for residents of San Andreas and the vicinity, a large degree of retail leakage occurs. In order to assess this issue, New Economics has reviewed geographic nuances of the region, including transportation routes and competing retail supply, and delineated the Primary Trade Area (PTA) from which the majority of spending will originate. In this case, we have defined the PTA as the area within a 6-mile radius around the center of San Andreas. This PTA was chosen upon careful consideration of the geographic facets of San Andreas and the surrounding area and is reflective of the fact that residents who are outside this six-mile radius are close to the communities of Jackson to the north and Angels Camp to the south, and would be unlikely to travel to San Andreas to shop unless there were unique alternatives not found closer to home.

New Economics has collected retail spending and retail sales data that occur within the PTA in order to assess the capture of retail spending, and whether additional retail development to stem retail “leakage” could be supported.

Figure A-2 in **Appendix A** includes retail spending and sales receipts at stores within the PTA. As shown, the 1,700 households with the PTA expend approximately \$51.9 million annually on retail goods, while only approximately \$30.8 million of retail sales occur within the PTA. Thus, approximately \$21.1 million of “net” retail spending from residents within the PTA occurs in other areas (this is referred to as “retail leakage”). The most prominent categories of retail leakage include automobile dealers, grocery stores, clothing stores, and general merchandise/ department stores.

New Economics closely evaluated the various categories of retail leakage, which are summarized **Figure 20** below. As shown, over \$27 million of spending from PTA households in these retail categories occurs in other areas. If San Andreas were able to re-capture a portion of this leakage using reasonable capture rates for each category derived by New Economics, it could support approximately 10,000 square feet of retail building space in San Andreas. It is important to note that this scale of capture would need to occur in a retail format that has the ability to offer goods from multiple categories, mostly notably grocery and general merchandise. Certain other categories, such as restaurants, could be added to the market in a small format.

20 Supportable Retail Building Space

Primary Trade Area: 6-Mile Radius Around San Andreas

List	Retail Leakage	Annual Sales Per Sqft	Potential Sqft	Estimated Capture	Supportable Sqft
	[1]	[2]		[3]	
Motor Vehicle & Parts Dealers					
Automobile Dealers	(\$7,695,530)	n/a	n/a	0%	0
Furniture & Home Furnishings Stores					
Furniture Stores	(\$830,594)	\$400	2,076	10%	208
Electronics & Appliance Stores	(\$220,653)	\$400	552	10%	55
Food & Beverage Stores					
Grocery Stores	(\$4,895,169)	\$400	12,238	25%	3,059
Specialty Food Stores	(\$643,789)	\$400	1,609	25%	402
Beer, Wine & Liquor Stores	(\$249,198)	\$400	623	25%	156
Gasoline Stations	(\$98)	\$400	0	0%	0
Clothing & Clothing Accessories Stores					
Clothing Stores	(\$1,804,283)	\$400	4,511	10%	451
Shoe Stores	(\$322,066)	\$400	805	10%	81
Jewelry, Luggage & Leather Goods Stores	(\$462,555)	\$400	1,156	10%	116
Sporting Goods, Hobby, Book & Music Stores					
Sporting Goods/Hobby/Musical Instr Stores	(\$541,126)	\$400	1,353	10%	135
Book, Periodical & Music Stores	(\$149,883)	\$400	375	10%	37
General Merchandise Stores					
Department Stores Excluding Leased Depts.	(\$4,665,589)	\$400	11,664	25%	2,916
Other General Merchandise Stores	(\$2,447,845)	\$400	6,120	25%	1,530
Miscellaneous Store Retailers					
Office Supplies, Stationery & Gift Stores	(\$234,468)	\$400	586	10%	59
Other Miscellaneous Store Retailers	(\$911,197)	\$400	2,278	10%	228
Food Services & Drinking Places					
Full-Service Restaurants	(\$724,439)	\$400	1,811	25%	453
Limited-Service Eating Places	(\$610,451)	\$400	1,526	25%	382
Special Food Services	(\$38,459)	\$400	96	25%	24
Drinking Places - Alcoholic Beverages	(\$47,130)	\$400	118	25%	29
Total (Rounded)	(\$27,494,522)		49,500		10,300
Potential Supportable Retail/ Comm. Acres [4]			4.5		0.9

Prepared by NewEconomics & Advisory, March 2016.

[1] Only categories that are estimated to incur leakage are shown. See Figure A-1 for full detailed spending data for the PTA.

[2] Estimated sales per square foot from the ULI Dollars & Cents of Shopping Centers for Neighborhood Shopping Centers in the West. Inflated to 2016 dollars.

[3] New Economics has provided an estimate of the potential amount of retail spending among each category that could reasonably be expected to occur in San Andreas. Preliminary assumption subject to refinement.

[4] Assumes a 25% FAR.

Source: ESRI, ULI, and New Economics

Future Growth

New Economics has assessed the amount of new retail development that could be supported from the spending from new residents of San Andreas as the area continues to grow over time. As discussed in the Residential Market Section above, New Economics

has estimated that San Andreas will grow by between 180 and 220 housing units between 2016 and 2035. We have estimated the amount of new household spending that the residents of these housing units will bring, the likely amounts that could be “captured” within San Andreas, and the resulting retail building space that could be supported by this spending. **Figure 21** below shows that the spending from new residents could bring support for up to 0.5 acres of new retail development by 2035.

21 **Support for Retail Space From Future Growth** 2016-2035

Item	Moderate Estimate	High Estimate
Assumptions		
Number of New Housing Units by 2035 [1]	180	220
Average Household Income [2]	\$68,000	\$68,000
TOTAL SUPPORTABLE RETAIL SPACE		
Portion of HH Income Spent on Brick & Mortar Retail [3]	31%	31%
Total Retail Spending Power	\$3,794,400	\$4,637,600
Median Sales Per Sq. Ft. (Rounded) [4]	\$400	\$400
Total Supportable Brick & Mortar Retail (Rounded)	9,000	12,000
Additional Services Demand (33%) [5]	3,000	4,000
Total Supportable Commercial Space	12,000	16,000
Assumed San Andreas Capture (33%)	3,960	5,280
Assumed San Andreas Capture (Rounded)	4,000	5,300
Potential Supportable Retail/ Comm. Acres [6]	0.4	0.5

Prepared by New Economics & Advisory, March 2016.

[1] See Figure 18.

[2] Estimated annual income for new households in San Andreas, who would purchase newly-constructed homes. Income estimate is based upon the approximate income required to purchase a \$250,000 home.

[3] This estimate is from spending patterns as tracked by the Consumer Expenditure Survey, for households between \$60,000 - \$90,000 in annual income.

[4] Average sales per sq. ft. for a neighborhood supermarket from ULI. Reflects Western region figures. Inflated to 2016 dollars.

[5] This planning-level estimate reflects the portion of commercial space that is dedicated to services, such as fitness, personal services, medical/dental, banking, etc. that constitute an increasing presence in retail centers.

[6] Assumes a 25% FAR.

Source: BLS, ULI, and New Economics

Employee Spending

Employees who hold jobs in San Andreas represent another source of demand that supports retail space in San Andreas. We have considered the spending that these employees, and potential future spending that could be captured if new and unique retail spaces were added to the supply, as well as the spending from new employees who are estimated to be added in San Andreas by 2035. **Figure 22** below shows the results of this analysis, which estimates that an additional 5,600 square feet (or approximately 0.5 acres) could be added to accommodate existing and future employee spending by 2035.

Sector	22 Demand for Commercial Space from San Andreas Employees 2016-2035		
	Existing Employees	New Employees (2016-2035)	Total
San Andreas Employees [1]	1,927	406	2,333
Assumed Spending per Work Day [2]	\$15	\$15	
Total Spending [3]	\$7,322,600	\$1,542,800	\$8,865,400
Assumed San Andreas Capture	75%	75%	75%
Estimated Employee Spending in San Andreas	\$5,491,950	\$1,157,100	\$6,649,050
Retail Sales per Sq. Ft. [4]	\$400	\$400	\$400
Total Supportable Retail Sq. Ft. From Emp. Spending	13,730	2,893	16,623
Assumed Portion Already Spent in San Andreas [5]	80%	0%	
Estimated Supportable Retail Sq. Ft. (Rounded)	2,700	2,900	5,600
Acres	0.2	0.3	0.5

Prepared by NewEconomics & Advisory, May 2015.

[1] Employment projections are from Caltrans. Assumes that San Andreas accounts for 20% of future employment in the County, which is San Andreas' approximate share of countywide employment over the past ten years. See Figure A-3 for details.

[2] From ICSC "Office Worker Retail Spending in a Digital Age," 2012. Represents total daily employee spending (less transportation and online) in rural areas with limited offerings.

[3] Assumes 250 work days per year.

[4] Average sales per sq. ft. for a neighborhood supermarket from ULI. Reflects Western region figures. Inflated to 2016 dollars.

[5] Assumes that most existing employee spending already occurs in San Andreas retail space, but that some additional spending could occur if new offerings were provided. New employees added in future years represent "net new" demand.

Source: ULI and New Economics

Visitor Spending

Visitor spending is another segment of retail demand, which could potentially be expanded upon in future years. San Andreas is not seen as a primary tourism destination in the County at the current time, but it does serve as an outpost for visitors who are traveling through the County to or from various destinations. However, given its historic

nature, its downtown environment, and its proximity to the Central Valley markets, San Andreas could potentially increase its tourism base in future years by leveraging some of its promising attributes. Growth in tourism spending is difficult to quantify, since the quantity of potential spending will be dependent on many uncertain variables and primarily will rely on the ability to attract visitors by offering a compelling draw. Murphys provides a good example of a community that was able to establish such a draw and has been successful in increasing tourism in recent years. Murphys offers a pleasant downtown, various shopping and dining opportunities, wine tasting and related activities, and a large degree of visitation occurs to the Ironstone Vineyards Amphitheater, which holds music performances and other events that provide a regional draw. If San Andreas were to work to enhance its tourist amenities in a way similar to Murphys has, it is possible that it can tap into future tourism spending. Nonetheless, this prospect is speculative, and New Economics has not quantified the potential amount of retail spending or retail space that could be captured by future growth in visitation. If San Andreas is successful in capturing additional tourism spending in future years, it may be able to support a greater amount of retail space within its boundaries than is shown in this Market Analysis.

Summary of Retail Market Analysis

Figure 23 summarizes the potential retail support that could be supported in San Andreas from existing leakage within the PTA, future residential growth, and employee spending. As shown, up to 21,000 square feet (or 1.9 acres) of new retail development is estimated to be supportable in San Andreas by 2035 from these spending categories.

23 *Estimated Supportable Retail Development* *San Andreas, 2016 - 2035*

Item	Moderate Estimate		High Estimate	
	(sqft)	(acres)	(sqft)	(acres)
Supportable Retail From Existing Leakage	10,300	0.9	10,300	0.9
Supportable Retail From New Development (2016 - 2035)	4,000	0.4	5,300	0.5
Supportable Retail from Employee Spending	5,600	0.5	5,600	0.5
Total Long-Term Supportable Retail	19,900	1.8	21,200	1.9

Prepared by New Economics & Advisory, March 2016.

Source: New Economics & Advisory

It should be acknowledged that a recent report prepared by BAE Urban Economics as part of a planning process underway in Angels Camp considered a larger “Market Area” that could pull shoppers from the larger geographic area that comprises all of Calaveras County and portions of Amador and Tuolumne Counties. This study suggested that this entire trade area could support up to 1,000,000 square feet of retail, and that Angels

Camp could reasonable expect to accommodate a community shopping center of approximately 100,000 to 200,000 square feet.

In theory, San Andreas stands to tap into this potential demand, if it were successful in drawing enough residents to San Andreas such that it could attract a major retail center. However, San Andreas' relatively remote location hinders its ability to attract such a retail, as San Andreas is considered an inferior retail destination as compared to its closest neighbors to the north (Jackson) and south (Angels Camp). In particular, the intersection of Highway 4 and Highway 49 in Angels Camp may present a more compelling location for larger-scale retail development, as it is a "hard corner" that sits in the confluence of two heavily-traveled state highways, offers good visibility and synergy with existing retail shopping centers, and is at the center of Angels Camp which is itself a larger residential population base. Since San Andreas is more "out of the way" and presents neither the traffic volumes nor the population base available in other nearby areas, its ability to attract a major retail center will be challenged.

Office Development

San Andreas has approximately 160,000 square feet of office space, according to Loopnet (as summarized in **Figure A-4** in **Appendix A**). At the current time, there are no active office listings in San Andreas, but brokers familiar with office space in the region have indicated that lease rates typically run between \$1.00 and \$1.50 per square foot per year, and that most of the office space in San Andreas is occupied by County administration buildings.

New Economics has assessed the scale of potential new office space development that is likely to be supported in San Andreas over the next twenty years. Forecasting the demand for office space in a small rural area such as San Andreas can be a difficult endeavor, as one or two new users who locate in San Andreas for one reason or another can have a large impact on the overall rate of office growth. Since such events are speculative and difficult to predict, we have based our estimate upon likely levels of future growth in both employment and population. Essentially, we have tied the amount of office space to the existing amount of users (both residents and employees), and then forecast future levels assuming that these ratios remain constant into the future.

Figure 23 provides two illustrative approaches to forecasting the demand for new office space:

- **Approach #1** calculates the existing level of office space per housing unit (111 sq. ft.). This ratio implies that future office space in San Andreas will be mostly local-serving and will grow proportionately to existing office space ratios as new homes are added to the community. As such, Approach #1 applies this office space to housing unit ratio to projected housing growth between 2016 and 2035 to calculate the amount of new office space that would need to be added to maintain this ratio as the population grows.

- **Approach #2** calculates the level of office space per job as of 2014 (82 sq. ft.). In reality, jobs occur in a variety of spaces, including retail, industrial, government, owner-occupied space, etc. This ratio should be viewed as an illustrative metric. Approach #2 assumes that the proportion of office space to overall jobs will remain the same over time and applies this ratio to projected housing growth between 2016 and 2035 to calculate the amount of new office space that would need to be added to maintain this ratio as the number of employees grows.

While each of the approaches described above reflects a potential range of growth, together they frame a reasonable range of the amount of office development that San Andreas can expect over the next 20 years. The resulting projections indicate that San Andreas could experience demand in the range of 20,000 to 45,000 square feet of new office space between 2016 and 2035, or between 1.8 and 4.1 acres.

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Estimated Demand for New Office Space San Andreas, 2016 - 2035

Projection	Amount		
Approach #1: Constant Space Ratio Per Housing Unit			
Office Inventory (sqft), 2016 [1]	158,429		
Number of Housing Units, 2014 [2]	1,431		
Office Inventory Swft per Housing Unit, 2016	111		
	<u>Housing</u>	<u>Office Space</u>	<u>Office Space</u>
Projected Office Space Growth: 2015-2035	<u>Growth</u>	<u>Growth (Sqft)</u>	<u>Growth (Acres) [3]</u>
Moderate Projection	180	19,900	1.8
High Projection	220	24,400	2.2
Approach #2 Constant Space Ratio per Job			
Office Inventory (sqft), 2016 [1]	158,429		
Number of Jobs, 2014 [4]	1,927		
Office Inventory Sqft per Job 2014	82		
	<u>Job Growth</u>	<u>Office Space</u>	<u>Office Space</u>
Projected Office Space Growth: 2016-2035		<u>Growth (Sqft)</u>	<u>Growth (Acres) [3]</u>
Base Projection [5]	406	44,900	4.1

Prepared by New Economics & Advisory, March 2016.

[1] From Loopnet.

[2] From US Census Bureau American Community Survey, 5-year estimated for 2010-2014.

[3] Assumes a 25% FAR.

[4] From US Census Bureau LED/ LEHD employment estimates.

[5] Employment projections from Caltrans and assumes San Andreas retains current share of Countywide growth.

Source: Loopnet, various population and growth projections, and New Economics & Advisory.

Industrial Development

San Andreas has a very small amount of industrial space, which is primarily occupied by businesses that serve local residents, such as automobile repair shops, metal fabrication, warehouse/ storage areas, etc. **Figure A-5 in Appendix A** shows the total industrial space present within San Andreas, which totals approximately 104,000 square feet. Listing brokers for industrial spaces in San Andreas state that the asking rates for industrial can vary depending on the quality, location, and amenities offered at each individual property, but that lease rates generally range from \$0.30 to \$0.80 per square foot (per month), and are holding steady. According to Loopnet, most of the industrial building space in San Andreas is at least 25 years old, and no new industrial space has been developed since 2004, which reflects the slow and unsteady nature of this property type.

New Economics has assessed the future amount of industrial development in the same way as office development. As with office, industrial development can be difficult to predict with extreme precision in an area as small as San Andreas, as one or two new users can have a greatly impact on the number of industrial space required. In order to frame the likely amount of new industrial space that will be needed over the next ten years, New Economics tied the amount of industrial space to both population growth and employment growth, using existing building space ratios. As shown, depending upon the approach utilized to estimate space, it is expected that San Andreas can support between 13,000 and 30,000 square feet of new industrial space (or 1.5 to 3.5 acres) by 2035.

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Estimated Demand for New Industrial Space San Andreas, 2016 - 2035

Projection	Amount		
Approach #1: Constant Space Ratio Per Housing Unit			
Industrial Inventory (sqft), 2016 [1]	104,463		
Number of Housing Units, 2014 [2]	1,431		
Industrial Inventory Sq. Ft. per Housing Unit, 2016	73		
	<u>Housing</u>	<u>Industrial Space</u>	<u>Industrial Space</u>
Projected Industrial Space Growth: 2016-2035	<u>Growth</u>	<u>Growth (Sqft)</u>	<u>Growth (Acres) [3]</u>
Moderate Projection	180	13,100	1.5
High Projection	220	16,100	1.8
Approach #2 Constant Space Ratio per Job			
Industrial Inventory, (sqft), 2016	104,463		
Number of Jobs, 2014 [4]	1,927		
Industrial Inventory Sqft per Job 2014	54		
	<u>Job Growth</u>	<u>Industrial Space</u>	<u>Industrial Space</u>
Projected Industrial Space Growth: 2016-2035		<u>Growth (Sqft)</u>	<u>Growth (Acres) [3]</u>
Base Projection [5]	406	29,600	3.4

Prepared by NewEconomics & Advisory, March 2016.

[1] From Loopnet.

[2] From US Census Bureau American Community Survey, 5-year estimated for 2010-2014.

[3] Assumes a 20% FAR.

[4] From US Census Bureau LED/ LEHD employment estimates.

[5] Employment projections from Caltrans and assumes San Andreas retains current share of Countywide growth.

Source: Loopnet, various population and growth projections, and New Economics & Advisory.

Appendix A: Technical Support

A-1 *Retail Building Supply*
San Andreas, 2016

#	Address	Building Size	Year Built	Lot Size
1	282 E. St. Charles Street	3,000	n/a	0.00
2	833 Highway 49	24,709	1989	45.64
3	146 W. St. Charles Street	7,980	1948	0.69
4	197 W. St. Charles Street	660	1900	0.51
5	23 E. St. Charles Street	15,000	1959	0.25
6	440 W. St. Charles Street	n/a	1900	0.60
7	376 Russel Road	5,472	1955	0.45
8	126 W. St. Charles Street	15,850	1900	0.58
9	57 W. St. Charles Street	n/a	1900	0.04
10	95 W. St. Charles Street	n/a	1900	0.09
11	162 Bell Street	n/a	1900	0.07
12	35 Main Street	n/a	1900	0.24
13	37 St. Charles Street	n/a	1900	0.09
14	577 W. St. Charles Street	1,179	1940	0.79
15	345 W. St. Charles Street	1,464	1983	0.23
16	632 W. St. Charles Street	2,400	2001	0.61
17	309 W. St. Charles Street	1,210	1950	0.08
18	326 W. St. Charles Street	1,500	1973	0.31
19	314 W. St. Charles Street	4,064	1988	0.44
20	238 W. St. Charles Street	n/a	n/a	0.34
21	332 W. St. Charles Street	1,204	1948	0.25
22	608 W. St. Charles Street	1,124	1946	0.19
23	698 W. St. Charles Street	1,333	1949	0.33
24	317 E. St. Charles Street	1,800	n/a	n/a
25	314 E. St. Charles Street	1,000	n/a	n/a
26	284 W. St. Charles Street	2,000	n/a	0.48
27	319 E. St. Charles Street	n/a	n/a	n/a
28	440 E. St. Charles Street	2,500	1965	0.69
29	81 W. St. Charles Street	1,958	n/a	0.48
30	282 E. St. Charles Street	3,000	1997	0.60
31	72 St. Charles Street	n/a	1900	0.32
32	373 W. St. Charles Street	3,200	1988	0.35
33	327 E. St. Charles Street	2,710	1946	0.15
34	282 W. St. Charles Street	2,032	n/a	0.58
35	146 E. St. Charles Street	8,040	n/a	0.55
TOTAL/ AVERAGE		116,389	1943	57.02

Prepared by New Economics & Advisory, March 2016.

Source: Loopnet

A-2 *Retail Supply and Demand*
Primary Trade Area: 6-Mile Radius Around San Andreas

Item/ Retail Category	Supply (Retail Sales)	Demand (Retail Potential)	Retail Gap
2015 Population	4,106		
2015 Households	1,715		
2015 Median HH Income	\$97,276		
2015 Per Capita Income	\$50,859		
Motor Vehicle & Parts Dealers	\$4,919,571	\$10,562,879	(\$5,643,308)
Automobile Dealers	\$940,526	\$8,636,056	(\$7,695,530)
Other Motor Vehicle Dealers	\$2,089,503	\$1,304,567	\$784,936
Auto Parts, Accessories & Tire Stores	\$1,889,543	\$622,255	\$1,267,288
Furniture & Home Furnishings Stores	\$1,469,377	\$1,546,229	(\$76,852)
Furniture Stores	\$0	\$830,594	(\$830,594)
Home Furnishings Stores	\$1,469,377	\$715,635	\$753,742
Electronics & Appliance Stores	\$2,200,117	\$2,420,770	(\$220,653)
Bldg Materials, Garden Equip. & Supply Stores	\$4,192,786	\$2,283,644	\$1,909,142
Bldg Material & Supplies Dealers	\$3,764,140	\$2,018,552	\$1,745,588
Lawn & Garden Equip & Supply Stores	\$428,646	\$265,091	\$163,555
Food & Beverage Stores	\$3,233,668	\$9,021,825	(\$5,788,157)
Grocery Stores	\$2,857,940	\$7,753,109	(\$4,895,169)
Specialty Food Stores	\$181,580	\$825,369	(\$643,789)
Beer, Wine & Liquor Stores	\$194,148	\$443,346	(\$249,198)
Health & Personal Care Stores	\$4,346,338	\$3,258,716	\$1,087,622
Gasoline Stations	\$2,914,406	\$2,914,504	(\$98)
Clothing & Clothing Accessories Stores	\$410,683	\$2,999,588	(\$2,588,905)
Clothing Stores	\$362,978	\$2,167,261	(\$1,804,283)
Shoe Stores	\$0	\$322,066	(\$322,066)
Jewelry, Luggage & Leather Goods Stores	\$47,705	\$510,260	(\$462,555)
Sporting Goods, Hobby, Book & Music Stores	\$655,418	\$1,346,426	(\$691,008)
Sporting Goods/Hobby/Musical Instr Stores	\$630,717	\$1,171,843	(\$541,126)
Book, Periodical & Music Stores	\$24,701	\$174,584	(\$149,883)
General Merchandise Stores	\$0	\$7,113,435	(\$7,113,435)
Department Stores Excluding Leased Depts.	\$0	\$4,665,589	(\$4,665,589)
Other General Merchandise Stores	\$0	\$2,447,845	(\$2,447,845)
Miscellaneous Store Retailers	\$1,564,241	\$2,563,980	(\$999,739)
Florists	\$168,465	\$97,473	\$70,992
Office Supplies, Stationery & Gift Stores	\$117,477	\$351,945	(\$234,468)
Used Merchandise Stores	\$232,687	\$157,753	\$74,934
Other Miscellaneous Store Retailers	\$1,045,612	\$1,956,809	(\$911,197)
Nonstore Retailers	\$1,636,020	\$1,184,029	\$451,991
Electronic Shopping & Mail-Order Houses	\$1,455,458	\$915,694	\$539,764
Vending Machine Operators	\$180,562	\$26,494	\$154,068
Direct Selling Establishments	\$0	\$241,842	(\$241,842)
Food Services & Drinking Places	\$3,289,346	\$4,709,825	(\$1,420,479)
Full-Service Restaurants	\$1,901,873	\$2,626,312	(\$724,439)
Limited-Service Eating Places	\$1,298,444	\$1,908,895	(\$610,451)
Special Food Services	\$56,760	\$95,219	(\$38,459)
Drinking Places - Alcoholic Beverages	\$32,269	\$79,399	(\$47,130)
Total	\$30,831,973	\$51,925,849	(\$21,093,876)

Prepared by New Economics & Advisory, March 2016.

Source: ESRI and New Economics

A-3 *Employment Projections* *Calaveras County*

Item	2010	2020	2030	2035	2040	Avg. Ann. Growth 2010 - 2040
County Employment						
Caltrans [1]	7,820	9,260	9,630	9,850	10,070	0.85%
San Andreas as a % of County	20%	20%	20%	20%	20%	
San Andreas Emploment	1,564	1,852	1,926	1,970	2,014	0.85%
New Employees	0	288	362	406	450	

Prepared by New Economics & Advisory, March 2016.

[1] Caltrans projections are only available for 2020, 2030, and 2040. New Economics estimated the projected employment in 2035 by taking the mid-point between the 2030 and 2040 projections.

Sources: Caltrans 2015 County-Level Economic Forecast, and New Economics

A-4 *Office Building Supply
San Andreas, 2016*

Page 1 of 2

#	Property	Building Size	Year Built	Lot Size
1	130 St. Charles Street	3,662	1950	0.47
2	486 W. St. Charles Street	1,134	1950	0.79
3	16 Main Street	2,000	1900	0.04
4	53 W. St. Charles Street	1,500	1930	0.05
5	65 W. St. Charles Street	1,952	1900	0.09
6	700 Mountain Ranch Road	18,000	2006	1.78
7	Address Not Available	1,200	1952	0.09
8	556 Toyon Drive	7,600	1965	0.44
9	52 Main Street	3,880	1989	0.24
10	692 Marshall Avenue	1,932	1978	0.26
11	704 Mountain Ranch Road	n/a	2005	1.16
12	702 Mountain Ranch Road	7,518	2005	0.79
13	900 Mountain Ranch Road	7,632	1966	2.54
14	75 Main Street	744	1945	0.20
15	891 Mountain Ranch Road	n/a	1900	12.64
16	272 W. St. Charles Street	1,140	1974	0.12
17	45 Church Hill Street	n/a	1900	0.11
18	785 Mountain Ranch Road	n/a	1900	2.50
19	596 Mountain Ranch Road	760	1950	0.10
20	677 W. St. Charles Street	1,052	1940	0.36
21	509 E. St. Charles Street	31,271	2001	3.33
22	749 Mountain Ranch Road	6,232	1982	1.75
23	372 Luddy Lane	911	1979	0.15
24	20 E. St. Charles Street	3,128	1961	0.28
25	40 St. Charles Street	1,131	1961	0.06
26	394 E. St. Charles Street	2,018	1942	0.48
27	30 Main Street	n/a	1900	0.46
28	1074 Calaveritas Road	n/a	1900	11.06
29	1107 Mountain Ranch	n/a	1900	35.00
30	505 Pope St.	n/a	1900	0.29
31	105 St. Charles Street	n/a	1900	0.16
32	43 Main Street	n/a	1900	0.06
33	171 N. California Street	n/a	1900	0.29
34	98 Main Street	n/a	1900	0.40
35	45 St. Charles Street	n/a	1900	0.13
36	46 Main Street	n/a	1900	0.21
37	231 Bell View Street	n/a	1900	0.43
38	564 Mountain Ranch Road	n/a	n/a	0.71

A-4 *Office Building Supply*
San Andreas, 2016

Page 2 of 2

#	Property	Building Size	Year Built	Lot Size
39	40 Main Street	n/a	n/a	0.06
40	3 Main Street	n/a	n/a	0.20
41	127 Bellview Street	1,266	1952	0.45
42	103 W. St. Charles Street	1,130	1955	0.11
43	990 Park Drive	924	1982	15.13
44	576 St. Charles Street	13,068	1954	0.21
45	990 Mountain Ranch Road	5,280	1992	2.13
46	169 W. St. Charles Street	5,495	1968	1.08
47	105 W. St. Charles Street	3,872	1955	0.16
48	462 W. St. Charles Street	1,440	1994	0.70
49	184 W. St. Charles Street	6,000	1960	0.89
50	444 E. St. Charles Street	4,007	1992	0.65
51	579 Highway 49	7,070	n/a	0.71
52	378 W. St. Charles Street	n/a	n/a	n/a
53	596 E. St. Charles Street	1,280	1960	0.05
54	Address Not Available	n/a	n/a	n/a
55	96 E. St. Charles Street	1,200	1952	0.09
56	Address Not Available	n/a	n/a	0.02
57	Address Not Available	n/a	n/a	15.80
58	Address Not Available	n/a	n/a	0.04
59	Address Not Available	n/a	n/a	0.10
60	Address Not Available	n/a	n/a	0.03
61	Address Not Available	n/a	n/a	0.76
62	Address Not Available	n/a	n/a	0.16
63	Address Not Available	n/a	n/a	0.15
64	Address Not Available	n/a	n/a	0.18
TOTAL/ AVERAGE		158,429	1946	119.88

Prepared by New Economics & Advisory, March 2016.

Source: Loopnet

A-5 *Industrial Building Supply
San Andreas, 2016*

#	Property	Building Size	Year Built
1	182 N. California Street	4,380	1980
2	812 Church Hill Street	12,100	1986
3	884 Highway 49	776	1945
4	806 Pool Station Road	n/a	1900
5	709 Pool Station Road	14,000	1900
6	3397 Highway 12	8,090	1987
7	3365 Highway 12	2,000	1980
8	2918 Highway 12	3,300	1963
9	2685 Highway 12	n/a	1900
10	1033 Highway 49	5,500	1900
11	1031 Highway 49	28,100	2001
12	812 Church Hill Road	12,100	1986
13	144 Truck Street	1,872	1999
14	160 Wendell Court	6,000	n/a
15	270 George Reed Drive	2,300	2004
16	4566 California Highway 12	3,945	n/a
TOTAL/ AVERAGE		104,463	1959

Prepared by New Economics & Advisory, March 2016.

Source: Loopnet

C. Community Needs Summary

Public Outreach Summary

Prepared by De Novo Planning Group

SAN ANDREAS STATE ROUTE 49 COMMERCIAL GATEWAY CORRIDOR STUDY

Outreach Summary

Various public and private meetings have been held to discuss the San Andreas State Route 49 (SR 49) Commercial Gateway Corridor Study. This includes two Public Workshops, three Advisory Committee Meetings, and two Property Owner Meetings. A summary of each meeting and workshop is included below.

Public Workshops

Public Workshop #1 was held on May 11, 2016. At this Workshop, the project scope was discussed, the project team was introduced to the attendees, and the workshop agenda and goals were summarized. The project scope discussion included an overview of project milestones as well as a summary of the existing conditions of the SR 49 corridor study area, roadway network, and collision history. This discussion was followed by a summary of the issues and opportunities identified for the corridor.

Public Workshop #2 was held on August 24, 2016. At this Workshop, the project and previous public input was discussed, short- and long-term corridor concerns were summarized, preliminary near- and long-term improvements concepts were explained, and feedback regarding the preliminary improvements was provided by the attendees. Some attendees believe that the buildout projections are a bit aggressive, particularly for the southern end of the corridor. Many community members supported the proposed gateway entrances on both ends of the corridor and suggested improvements at these two locations in order to reduce speeding along the corridor. Additionally, many attendees favored the bicycle and pedestrian improvements that also provided aesthetic improvements, such as tree plantings, textured pavers, and landscaped bulbouts. Further, some attendees identified Airport Road as an appropriate location for a roundabout.

Advisory Committee Meetings

Advisory Committee Meeting #1 was held on April 18, 2016. At this Meeting, the Committee was provided with study area maps, and existing zoning and General Plan land use maps. Matt Boyer facilitated a discussion on major issues and challenges, as well as opportunities, as revealed through community experience, previous planning documents, and insight from the Calaveras Council of Governments (CCOG) and Calaveras County. Overall, the primary concerns within the community included matters of traffic flow and safety on SR 49 through the Main Street Corridor. The following challenges were discussed: speeding, access points on SR 49, SR 49/Mountain Roach intersection, emergency response, alternative transportation, and new development. When asked whether traffic congestion or speed was a bigger threat to the community, the Committee unanimously agreed that speed was the greater challenge.

Advisory Committee Meeting #2 was held on May 11, 2016. At this Meeting, a summary of the responses from the online surveys, as well as the results from Public Workshop #1, were discussed. Key information and takeaways from the Existing Conditions Report were summarized, and the major components from the Rural Mobility Plan which should be abandoned and pursued were discussed. The online surveys and responses concluded that, in order to promote pedestrian, bicycle, and alternative transportation use and alleviate traffic congestion, the major roadways in San Andreas need to be improved to include traffic calming measures, crosswalks, sidewalks, and bicycle lanes. Additionally, the

community would benefit by improving existing commercial uses along the corridor, developing new commercial and retail uses, increasing the amount of community spaces, and providing aesthetic improvements, such as gateway monuments or signs. The Committee members discussed access issues at the driveways in the southern portion of the study area, and determined that speed reduction is a high priority. Some Committee members expressed that some improvements could solve multiple issues, and these improvements should be a priority due to cost effectiveness.

Advisory Committee Meeting #3 was held on August 17, 2016. At this Meeting, theoretical buildout scenarios were summarized, key issues and concerns were discussed, and near- and long-term concerns were provided by the Committee. Design alternatives and sidewalk gaps were identified for the near-term along the corridor, including potential pedestrian improvements near High School Road and sidewalk gaps on Pope Street. While bicycle improvements were discussed, including a bike path connection to the existing Community Park off Mountain Ranch Road, the Committee determined that walkability should be a priority in the near-term as pedestrian traffic along the corridor is likely higher than bicycle traffic. In the long-term, the Committee stated that alternative intersection concepts (i.e., roundabouts) may be useful, and any future traffic signals should prioritize safety over traffic flow.

Property Owner Meetings

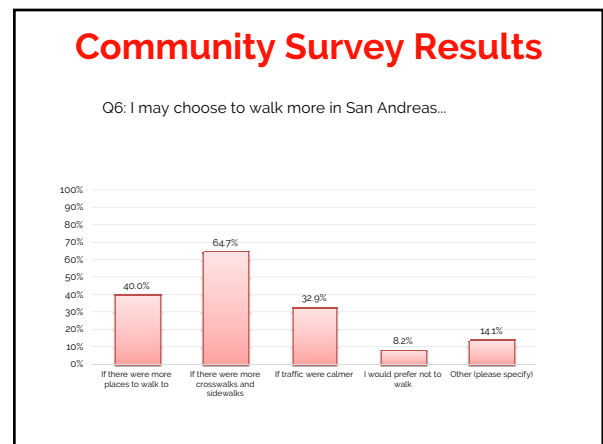
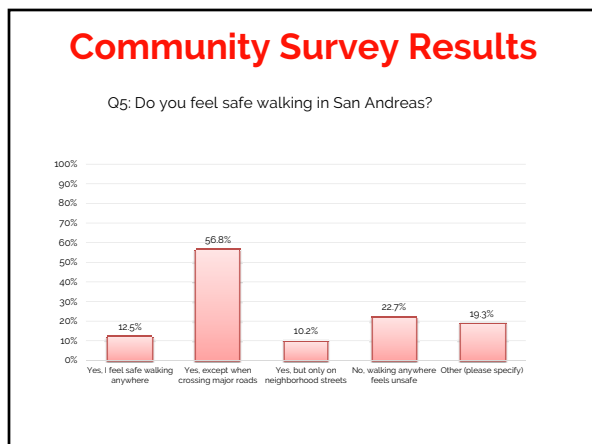
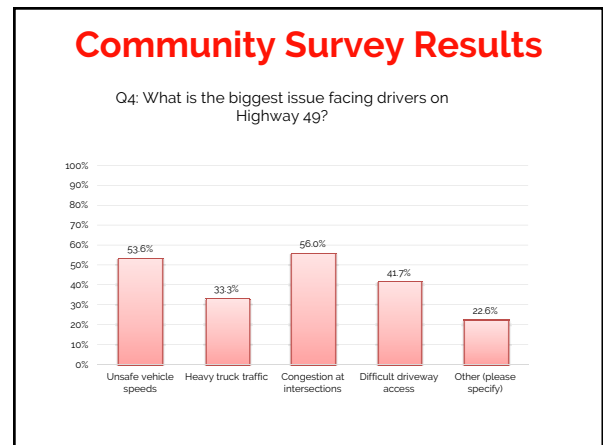
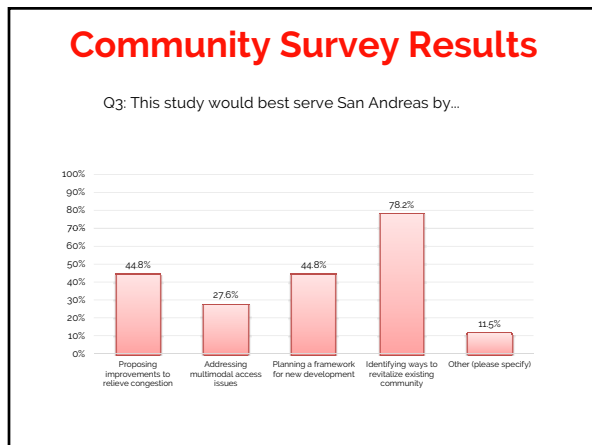
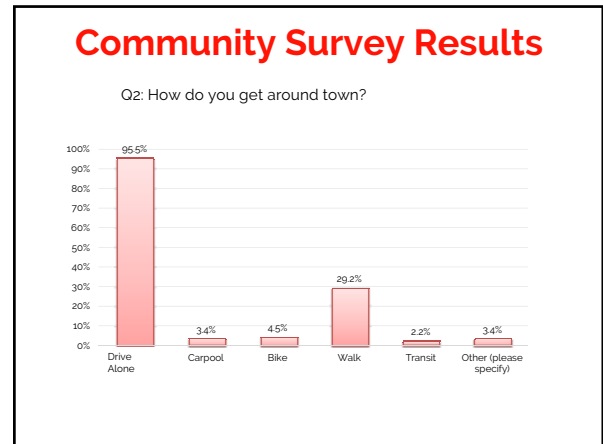
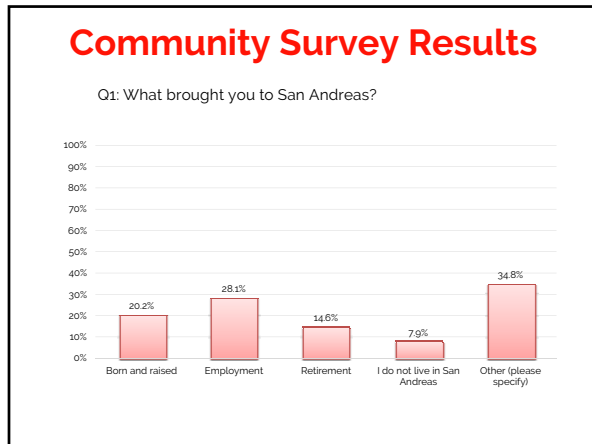
Property Owner Meeting #1 was held on March 31, 2016. At this Meeting, property owners were briefed on the project background, purpose, and schedule. Property owners were invited to voice any concerns or fears, as well as hopes, regarding these potential circulation improvements in southern San Andreas.

Property Owner Meeting #2 was held on August 17, 2016. At this Meeting, a summary of the concerns and issues for both the northern and southern portions of the corridor were summarized, and potential near- and long-term improvement concepts were discussed. According to the property owners, many generally support installation of a roundabout at Airport Road, while some property owners do not want a roundabout in the downtown area. Questions and concerns regarding the cost of the various improvements were brought up, including the cost of a roundabout versus a signal. Funding mechanisms, such as state, regional, or federal grants, as well as development impact fees, were discussed. The property owners concluded that inclusion of funding details and finance mechanisms within the Corridor Study would be helpful for future developers, particularly for those properties located along the southern, undeveloped portion of the corridor.

Project Website and Online Surveys

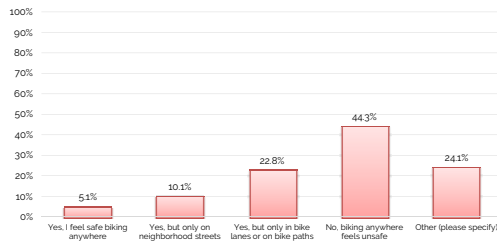
Throughout the duration of the project, the consultant team has maintained a website dedicated to the project. The website serves as a document clearinghouse, and identifies past and pending meetings and workshops, draft reports and maps, and all meeting materials. The project team also prepared and disseminated an online survey to gather public input and feedback regarding key issues, challenges, priorities, safety concerns, and other questions relevant to plan development.

Online Survey: Public Responses



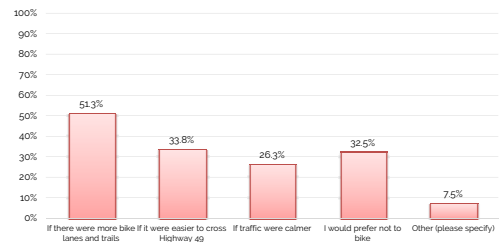
Community Survey Results

Q7: Do you feel safe biking in San Andreas?



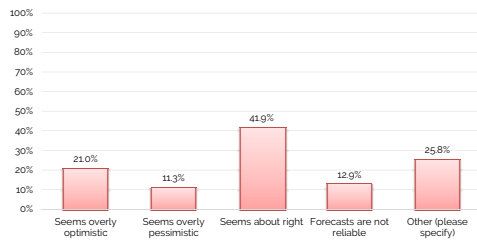
Community Survey Results

Q8: I may choose to bike more in San Andreas...



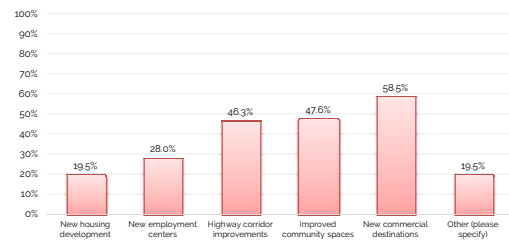
Community Survey Results

Q9: The market analysis for San Andreas (found in the Public Meeting #1 PowerPoint) ...



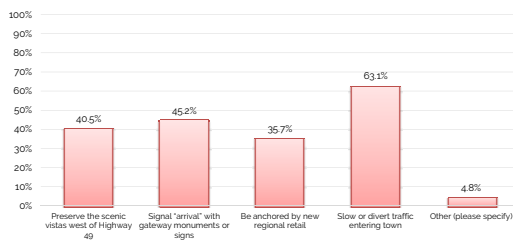
Community Survey Results

Q10: What change would most likely encourage you to stay in or move to San Andreas?



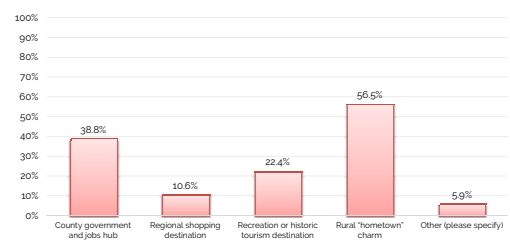
Community Survey Results

Q11: It is critical that the southern gateway to San Andreas...



Community Survey Results

Q12: If you could choose a single entity for San Andreas it would be...



Issues & Concerns Maps
Presented at Public Meetings

CORRIDOR ISSUES & CONCERNS (A)

Source: Esri, DigitalGlobe, GeoEye, I-sat, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User

Pool Station Road/SR 49

AM Peak Hour LOS: D
PM Peak Hour LOS: E

5-Year Collision Rate: 1.4 x higher than Statewide average rate

Primary Collision Type: Rear End

Russell Road/SR 49

AM Peak Hour LOS: C
PM Peak Hour LOS: B

5-Year Collision Rate: 1.8 x higher than Statewide average rate

Primary Collision Type: Rear End and Broadside

Overturned Vehicle, 2011: Vehicle making right turn, traveling in the southbound direction

High School Street/SR 49

AM Peak Hour LOS: E
PM Peak Hour LOS: C

Primary Collision Type: Rear End and Broadside

Vehicle/Bicycle Collision, 2010: Bicyclist traveling southbound in the northbound lane; Vehicle making right turn onto SR 49 from High School Street

Court Street/SR 49

AM Peak Hour LOS: D
PM Peak Hour LOS: D

Primary Collision Type: Sideswipe and Broadside

Vehicle/Pedestrian Collision, 2011: Pedestrian crossing SR 49 in the eastbound direction; Vehicle proceeding straight in the southbound direction

Main Street/Church Hill Road/SR 49

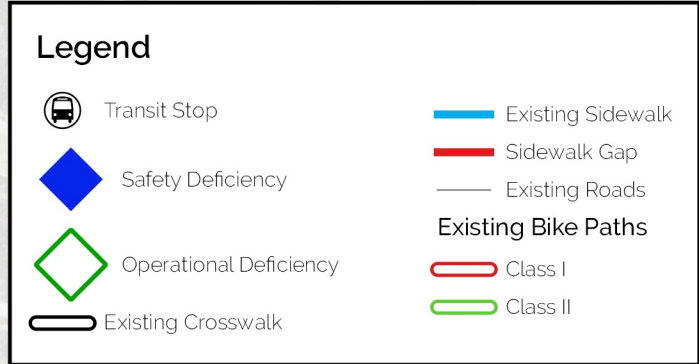
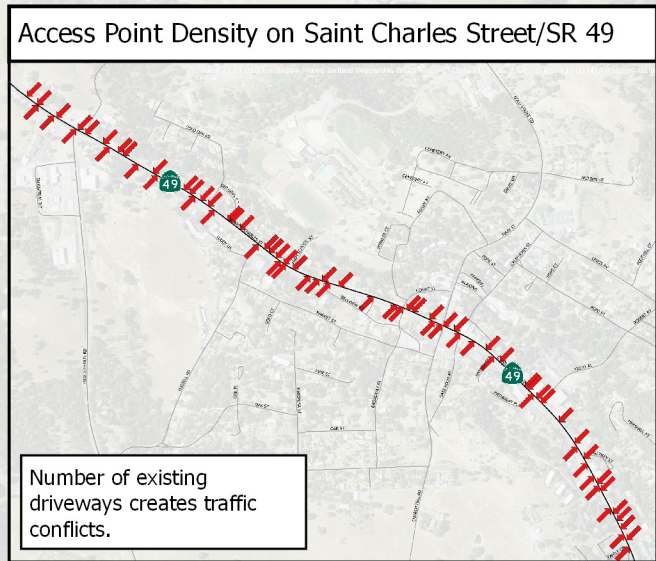
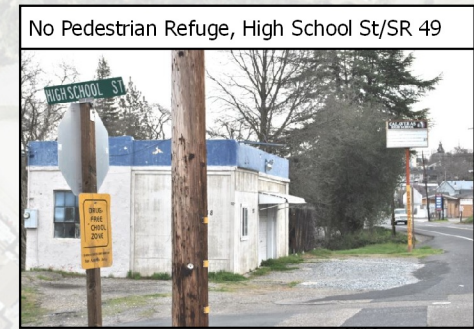
AM Peak Hour LOS: C
PM Peak Hour LOS: B

5-Year Collision Rate: 1.9 x higher than Statewide average rate

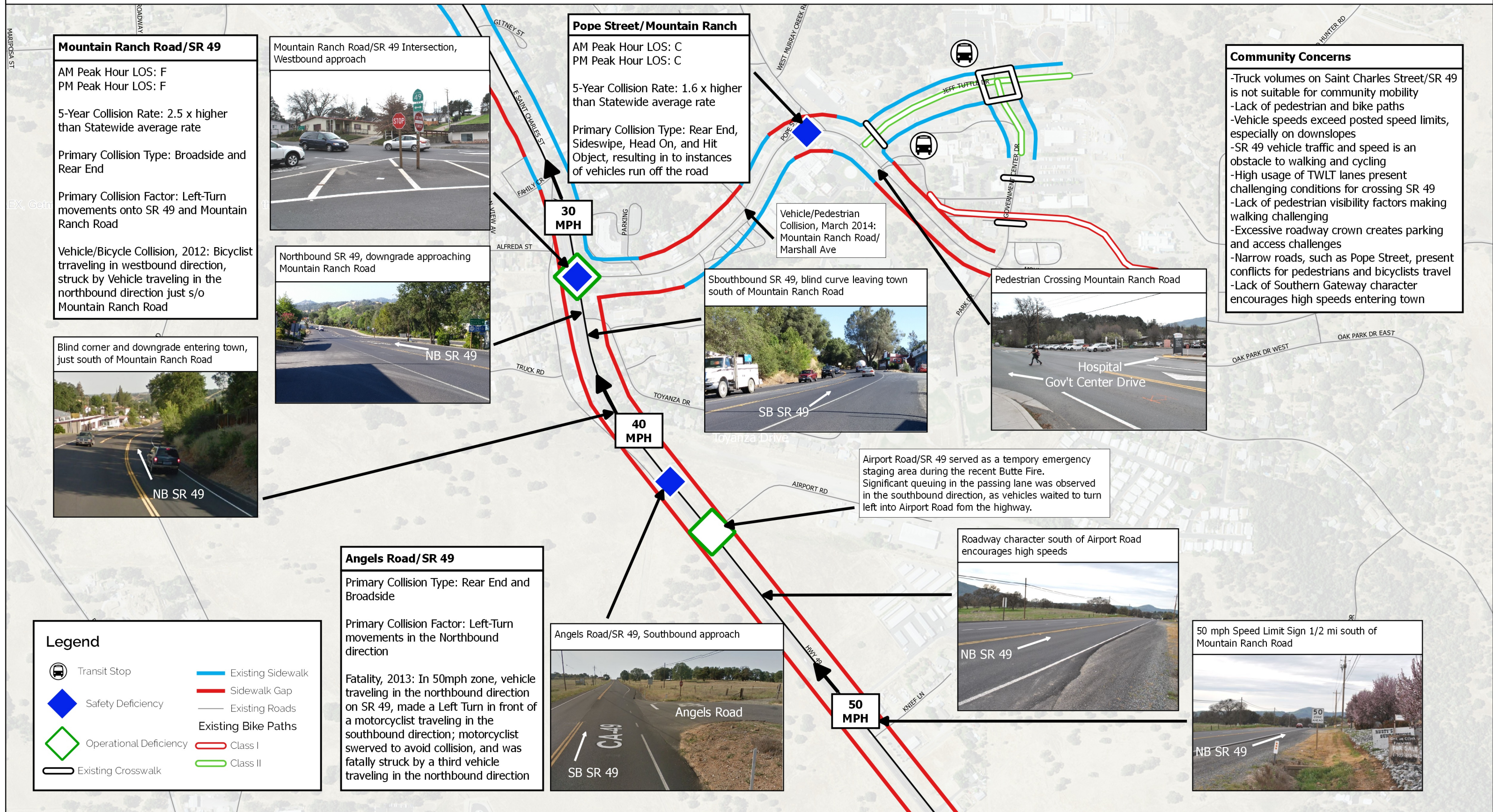
Primary Collision Type: Rear End, Broadside and Sideswipe

Community Concerns

- Truck volumes on Saint Charles Street/SR 49 is not suitable for community mobility
- Lack of pedestrian and bike paths
- Vehicle speeds exceed posted speed limits, especially on downslopes
- SR 49 vehicle traffic and speed is an obstacle to walking and cycling
- High usage of TWLT lanes present challenging conditions for crossing SR 49
- Lack of pedestrian visibility factors making walking challenging
- Excessive roadway crown creates parking and access challenges
- Narrow roads, such as Pope Street, present conflicts for pedestrians and bicyclists travel
- Pope Street, used as an alternative route to SR 49 during peak hours, lacks pedestrian and bicycle facilities



CORRIDOR ISSUES & CONCERNS (B)



D. Improvements Cost Opinions Summary

Saint Charles Street (SR 49) Corridor: Segment 1 (SR 12 to Gold Oak Road)

Item Description	Units	Quantity	Opinion of Base Unit Cost	Total	Contingency (50%)	Engineering (15%)	Construction (10%)	Opinion of Total Unit Cost
Sidewalk	LF	1060	\$ 150.00	\$ 159,000.00	\$ 79,500.00	\$ 35,775.00	\$ 23,850.00	\$ 298,125
Bike Lane	LF	2816	\$ 3.00	\$ 8,448.00	\$ 4,224.00	\$ 1,900.80	\$ 1,267.20	\$ 15,840
Bulb Out	EA		\$ 20,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Crosswalk	EA		\$ 2,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Traffic Signal	EA		\$ 400,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Roundabout	EA	1	\$2,500,000.00	\$2,500,000.00	-	-	-	\$ 2,500,000
								\$ 2,813,965

Saint Charles Street (SR 49) Corridor: Segment 2 (Gold Oak Road Court Street)

Item Description	Units	Quantity	Opinion of Base Unit Cost	Total	Contingency (50%)	Engineering (15%)	Construction (10%)	Opinion of Total Unit Cost
Sidewalk	LF	2230	\$ 150.00	\$334,500.00	\$167,250.00	\$ 75,262.50	\$ 50,175.00	\$ 627,188
Bike Lane	LF	4094	\$ 3.00	\$ 12,282.00	\$ 6,141.00	\$ 2,763.45	\$ 1,842.30	\$ 23,029
Bulb Out	EA	2	\$ 20,000.00	\$ 40,000.00	\$ 20,000.00	\$ 9,000.00	\$ 6,000.00	\$ 75,000
Crosswalk	EA	1	\$ 2,000.00	\$ 2,000.00	\$ 1,000.00	\$ 450.00	\$ 300.00	\$ 3,750
Traffic Signal	EA	1	\$ 400,000.00	\$400,000.00	\$200,000.00	\$ 90,000.00	\$ 60,000.00	\$ 750,000
Roundabout	EA		\$2,500,000.00	\$ -	-	-	-	\$ -
								\$ 1,478,966

Saint Charles Street (SR 49) Corridor: Segment 3 (Court Street to Treat Avenue)

Item Description	Units	Quantity	Opinion of Base Unit Cost	Total	Contingency (50%)	Engineering (15%)	Construction (10%)	Opinion of Total Unit Cost
Sidewalk	LF	560	\$ 150.00	\$ 84,000.00	\$ 42,000.00	\$ 18,900.00	\$ 12,600.00	\$ 157,500
Bike Lane	LF	3086	\$ 3.00	\$ 9,258.00	\$ 4,629.00	\$ 2,083.05	\$ 1,388.70	\$ 17,359
Bulb Out	EA	4	\$ 20,000.00	\$ 80,000.00	\$ 40,000.00	\$ 18,000.00	\$ 12,000.00	\$ 150,000
Crosswalk	EA	1	\$ 2,000.00	\$ 2,000.00	\$ 1,000.00	\$ 450.00	\$ 300.00	\$ 3,750
Traffic Signal	EA	1	\$ 400,000.00	\$400,000.00	\$200,000.00	\$ 90,000.00	\$ 60,000.00	\$ 750,000
Roundabout	EA		\$2,500,000.00	\$ -	-	-	-	\$ -
								\$ 1,078,609

*Adams Avenue/Church Hill Road Circulation Improvements not included.

Saint Charles Street (SR 49) Corridor: Segment 4 (Treat Avenue to Mountain Ranch Road)

Item Description	Units	Quantity	Opinion of Base Unit Cost	Total	Contingency (50%)	Engineering (15%)	Construction (10%)	Opinion of Total Unit Cost
Sidewalk	LF	1000	\$ 150.00	\$150,000.00	\$ 75,000.00	\$ 33,750.00	\$ 22,500.00	\$ 281,250
Bike Lane	LF	4180	\$ 3.00	\$ 12,540.00	\$ 6,270.00	\$ 2,821.50	\$ 1,881.00	\$ 23,513
Bulb Out	EA	2	\$ 20,000.00	\$ 40,000.00	\$ 20,000.00	\$ 9,000.00	\$ 6,000.00	\$ 75,000
Crosswalk	EA	1	\$ 2,000.00	\$ 2,000.00	\$ 1,000.00	\$ 450.00	\$ 300.00	\$ 3,750
Traffic Signal	EA	1	\$ 400,000.00	\$400,000.00	\$200,000.00	\$ 90,000.00	\$ 60,000.00	\$ 750,000
Roundabout	EA		\$2,500,000.00	\$ -	-	-	-	\$ -
								\$ 1,133,513
(Long Term)								
Traffic Signal	EA	1	\$ 400,000.00	\$400,000.00	\$200,000.00	\$ 90,000.00	\$ 60,000.00	\$ 750,000
								\$ 1,883,513

Southern Gateway Plan Area: SR 49 (Mountain Ranch Road to Buckskin Way)

<i>Item Description</i>	<i>Units</i>	<i>Quantity</i>	<i>Opinion of Base Unit Cost</i>	<i>Total</i>	<i>Contingency (50%)</i>	<i>Engineering (15%)</i>	<i>Construction (10%)</i>	<i>Opinion of Total Unit Cost</i>
Sidewalk	LF	1920	\$ 150.00	\$ 288,000.00	\$ 144,000.00	\$ 64,800.00	\$ 43,200.00	\$ 540,000
Bike Lane	LF	3276	\$ 3.00	\$ 9,828.00	\$ 4,914.00	\$ 2,211.30	\$ 1,474.20	\$ 18,428
Bulb Out	EA		\$ 20,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Crosswalk	EA		\$ 2,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Traffic Signal	EA		\$ 400,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Roundabout	EA	1	\$ 3,000,000.00	\$ 3,000,000.00	-	-	-	\$ 3,000,000
<i>*Angels Road realignment not included.</i>								\$ 3,558,428
(Long Term)								
Traffic Signal	EA	1	\$ 400,000.00	\$ 400,000.00	\$ 200,000.00	\$ 90,000.00	\$ 60,000.00	\$ 750,000
<i>*New roadway connections not included.</i>								\$ 4,308,428

E. Synchro Intersection Worksheets

Intersection						
Int Delay, s/veh	11.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	201	10	231	185	14	651
Future Vol, veh/h	201	10	231	185	14	651
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	0	-	-	-	130	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	11	11	11	11	11	11
Mvmt Flow	216	11	248	199	15	700
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	978	248	0	-	248	0
Stage 1	248	-	-	-	-	-
Stage 2	730	-	-	-	-	-
Critical Hdwy	6.51	6.31	-	-	4.21	-
Critical Hdwy Stg 1	5.51	-	-	-	-	-
Critical Hdwy Stg 2	5.51	-	-	-	-	-
Follow-up Hdwy	3.599	3.399	-	-	2.299	-
Pot Cap-1 Maneuver	267	769	-	0	1267	-
Stage 1	773	-	-	0	-	-
Stage 2	461	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	264	769	-	-	1267	-
Mov Cap-2 Maneuver	264	-	-	-	-	-
Stage 1	773	-	-	-	-	-
Stage 2	456	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	59.4		0		0.2	
HCM LOS	F					
Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT			
Capacity (veh/h)	- 274	1267	-			
HCM Lane V/C Ratio	- 0.828	0.012	-			
HCM Control Delay (s)	- 59.4	7.9	-			
HCM Lane LOS	- F	A	-			
HCM 95th %tile Q(veh)	- 6.7	0	-			

Intersection							
Int Delay, s/veh	2.9						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Vol, veh/h	46	77	44	372	784	58	
Future Vol, veh/h	46	77	44	372	784	58	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	5	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	9	9	9	9	9	9	
Mvmt Flow	50	84	48	404	852	63	
Major/Minor	Minor2	Major1		Major2			
Conflicting Flow All	1384	884	915	0	-	0	
Stage 1	884	-	-	-	-	-	
Stage 2	500	-	-	-	-	-	
Critical Hdwy	6.49	6.29	4.19	-	-	-	
Critical Hdwy Stg 1	5.49	-	-	-	-	-	
Critical Hdwy Stg 2	5.49	-	-	-	-	-	
Follow-up Hdwy	3.581	3.381	2.281	-	-	-	
Pot Cap-1 Maneuver	153	334	717	-	-	-	
Stage 1	393	-	-	-	-	-	
Stage 2	595	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	140	334	717	-	-	-	
Mov Cap-2 Maneuver	140	-	-	-	-	-	
Stage 1	393	-	-	-	-	-	
Stage 2	544	-	-	-	-	-	
Approach	EB	NB		SB			
HCM Control Delay, s	28.7	1.1		0			
HCM LOS	D						
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	717	-	140	334	-	-	
HCM Lane V/C Ratio	0.067	-	0.357	0.251	-	-	
HCM Control Delay (s)	10.4	0	44.4	19.3	-	-	
HCM Lane LOS	B	A	E	C	-	-	
HCM 95th %tile Q(veh)	0.2	-	1.5	1	-	-	

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	10	49	9	5	75
Future Vol, veh/h	14	10	49	9	5	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	17	17	17	17	17	17
Mvmt Flow	19	14	66	12	7	101
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	187	72	0	0	78	0
Stage 1	72	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.57	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	769	950	-	-	1431	-
Stage 1	914	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	765	950	-	-	1431	-
Mov Cap-2 Maneuver	765	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	870	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	9.5		0		0.5	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 833	1431	-		
HCM Lane V/C Ratio	-	- 0.039	0.005	-		
HCM Control Delay (s)	-	- 9.5	7.5	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0.1	0	-		

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	35	40	437	874	18
Future Vol, veh/h	8	35	40	437	874	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	75	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	9	38	44	480	960	20
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1538	970	980	0	-	0
Stage 1	970	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Critical Hdwy	6.48	6.28	4.18	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.372	2.272	-	-	-
Pot Cap-1 Maneuver	123	299	681	-	-	-
Stage 1	359	-	-	-	-	-
Stage 2	555	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	115	299	681	-	-	-
Mov Cap-2 Maneuver	244	-	-	-	-	-
Stage 1	359	-	-	-	-	-
Stage 2	519	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	20	0.9		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	681	-	287	-	-	
HCM Lane V/C Ratio	0.065	-	0.165	-	-	
HCM Control Delay (s)	10.7	-	20	-	-	
HCM Lane LOS	B	-	C	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.6	-	-	

Intersection						
Int Delay, s/veh	4.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘		↑	↗	↘	↑
Traffic Vol, veh/h	39	69	416	57	184	709
Future Vol, veh/h	39	69	416	57	184	709
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	40	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	42	74	447	61	198	762
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1605	447	0	0	447	0
Stage 1	447	-	-	-	-	-
Stage 2	1158	-	-	-	-	-
Critical Hdwy	6.48	6.28	-	-	4.18	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.372	-	-	2.272	-
Pot Cap-1 Maneuver	112	599	-	-	1082	-
Stage 1	632	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	92	599	-	-	1082	-
Mov Cap-2 Maneuver	92	-	-	-	-	-
Stage 1	632	-	-	-	-	-
Stage 2	238	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	45.3	0		1.9		
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 200	1082	-		
HCM Lane V/C Ratio	-	- 0.581	0.183	-		
HCM Control Delay (s)	-	- 45.3	9.1	-		
HCM Lane LOS	-	- E	A	-		
HCM 95th %tile Q(veh)	-	- 3.2	0.7	-		

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↖	↗		↖	↗	
Traffic Vol, veh/h	11	0	44	18	4	59	26	445	3	48	636	4
Future Vol, veh/h	11	0	44	18	4	59	26	445	3	48	636	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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	13	0	50	20	5	67	30	506	3	55	723	5
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1436	1402	725	1425	1402	507	727	0	0	509	0	0
Stage 1	834	834	-	566	566	-	-	-	-	-	-	-
Stage 2	602	568	-	859	836	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.62	6.32	7.22	6.62	6.32	4.22	-	-	4.22	-	-
Critical Hdwy Stg 1	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.108	3.408	3.608	4.108	3.408	2.308	-	-	2.308	-	-
Pot Cap-1 Maneuver	106	133	409	108	133	546	832	-	-	1007	-	-
Stage 1	348	370	-	492	492	-	-	-	-	-	-	-
Stage 2	470	491	-	337	369	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	84	121	409	88	121	546	832	-	-	1007	-	-
Mov Cap-2 Maneuver	84	121	-	88	121	-	-	-	-	-	-	-
Stage 1	335	350	-	474	474	-	-	-	-	-	-	-
Stage 2	394	473	-	280	349	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	26.3			30			0.5			0.6		
HCM LOS	D			D								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	832	-	-	231	234	1007	-	-				
HCM Lane V/C Ratio	0.036	-	-	0.271	0.393	0.054	-	-				
HCM Control Delay (s)	9.5	-	-	26.3	30	8.8	-	-				
HCM Lane LOS	A	-	-	D	D	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	1.1	1.8	0.2	-	-				

Intersection												
Int Delay, s/veh		1.4										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔					↔	↔		↔	↔	
Traffic Vol, veh/h	7	6	31	0	0	0	29	472	49	73	560	4
Future Vol, veh/h	7	6	31	0	0	0	29	472	49	73	560	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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	11	11	11	11	11	11	11	11	11	11	11	11
Mvmt Flow	8	7	34	0	0	0	32	524	54	81	622	4
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	1403	1430	624				627	0	0	579	0	0
Stage 1	787	787	-				-	-	-	-	-	-
Stage 2	616	643	-				-	-	-	-	-	-
Critical Hdwy	6.51	6.61	6.31				4.21	-	-	4.21	-	-
Critical Hdwy Stg 1	5.51	5.61	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.61	-				-	-	-	-	-	-
Follow-up Hdwy	3.599	4.099	3.399				2.299	-	-	2.299	-	-
Pot Cap-1 Maneuver	147	129	469				913	-	-	952	-	-
Stage 1	433	390	-				-	-	-	-	-	-
Stage 2	522	455	-				-	-	-	-	-	-
Platoon blocked, %								-	-			
Mov Cap-1 Maneuver	130	0	469				913	-	-	952	-	-
Mov Cap-2 Maneuver	130	0	-				-	-	-	-	-	-
Stage 1	396	0	-				-	-	-	-	-	-
Stage 2	504	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	18.4						0.5			1		
HCM LOS	C											
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR					
Capacity (veh/h)	913	-	-	317	952	-	-					
HCM Lane V/C Ratio	0.035	-	-	0.154	0.085	-	-					
HCM Control Delay (s)	9.1	-	-	18.4	9.1	-	-					
HCM Lane LOS	A	-	-	C	A	-	-					
HCM 95th %tile O(veh)	0.1	-	-	0.5	0.3	-	-					

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	37	687	28	22	636
Future Vol, veh/h	19	37	687	28	22	636
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	23	44	818	33	26	757
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1645	835	0	0	851	0
Stage 1	835	-	-	-	-	-
Stage 2	810	-	-	-	-	-
Critical Hdwy	6.49	6.29	-	-	4.19	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	-	-	2.281	-
Pot Cap-1 Maneuver	105	357	-	-	758	-
Stage 1	414	-	-	-	-	-
Stage 2	426	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	101	357	-	-	758	-
Mov Cap-2 Maneuver	234	-	-	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	411	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	20.2	0		0.3		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	303	758	-	
HCM Lane V/C Ratio	-	-	0.22	0.035	-	
HCM Control Delay (s)	-	-	20.2	9.9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-	

Intersection												
Int Delay, s/veh	14.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔		↔		↔		↔		↔
Traffic Vol, veh/h	1	1	0	69	0	192	0	319	131	312	302	3
Future Vol, veh/h	1	1	0	69	0	192	0	319	131	312	302	3
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	-	-	Yield	-	-	Yield	-	-	None
Storage Length	-	-	-	0	-	240	-	-	-	120	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	87	92	87	92	87	87	87	87	92
Heavy Vehicles, %	2	2	2	10	2	10	2	10	10	10	10	2
Mvmt Flow	1	1	0	79	0	221	0	367	151	359	347	3
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1433	1433	349	1434	-	367	350	0	0	367	0	0
Stage 1	1066	1066	-	367	-	-	-	-	-	-	-	-
Stage 2	367	367	-	1067	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.2	-	6.3	4.12	-	-	4.2	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.2	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.2	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.59	-	3.39	2.218	-	-	2.29	-	-
Pot Cap-1 Maneuver	112	134	694	107	0	661	1209	-	-	1149	-	-
Stage 1	269	299	-	636	0	-	-	-	-	-	-	-
Stage 2	653	622	-	259	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	57	92	694	80	-	661	1209	-	-	1149	-	-
Mov Cap-2 Maneuver	57	92	-	80	-	-	-	-	-	-	-	-
Stage 1	269	206	-	636	-	-	-	-	-	-	-	-
Stage 2	435	622	-	177	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	58.1			59.9			0			4.8		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	1209	-	-	70	80	661	1149	-	-			
HCM Lane V/C Ratio	-	-	-	0.031	0.991	0.334	0.312	-	-			
HCM Control Delay (s)	0	-	-	58.1	189.8	13.2	9.5	-	-			
HCM Lane LOS	A	-	-	F	F	B	A	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.1	5.4	1.5	1.3	-	-			

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑		↕	
Traffic Vol, veh/h	13	355	235	0	0	22
Future Vol, veh/h	13	355	235	0	0	22
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	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	15	413	273	0	0	24
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	273	0	-	0	716	273
Stage 1	-	-	-	-	273	-
Stage 2	-	-	-	-	443	-
Critical Hdwy	4.18	-	-	-	6.48	6.28
Critical Hdwy Stg 1	-	-	-	-	5.48	-
Critical Hdwy Stg 2	-	-	-	-	5.48	-
Follow-up Hdwy	2.272	-	-	-	3.572	3.372
Pot Cap-1 Maneuver	1256	-	-	0	388	752
Stage 1	-	-	-	0	759	-
Stage 2	-	-	-	0	635	-
Platoon blocked, %		-		-		
Mov Cap-1 Maneuver	1256	-	-	-	382	752
Mov Cap-2 Maneuver	-	-	-	-	382	-
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	625	-
Approach	EB		WB		SB	
HCM Control Delay, s	0.3		0		9.9	
HCM LOS					A	
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	1256	-	-	752		
HCM Lane V/C Ratio	0.012	-	-	0.032		
HCM Control Delay (s)	7.9	0	-	9.9		
HCM Lane LOS	A	A	-	A		
HCM 95th %tile Q(veh)	0	-	-	0.1		

Intersection

Int Delay, s/veh 1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	92	315	267	1	0	15
Future Vol, veh/h	92	315	267	1	0	15
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	-	-	-	0	130
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	111	380	322	1	0	18

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	323	0	923
Stage 1	-	-	322
Stage 2	-	-	601
Critical Hdwy	4.17	-	6.47
Critical Hdwy Stg 1	-	-	5.47
Critical Hdwy Stg 2	-	-	5.47
Follow-up Hdwy	2.263	-	3.563
Pot Cap-1 Maneuver	1209	-	293
Stage 1	-	-	723
Stage 2	-	-	538
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1209	-	266
Mov Cap-2 Maneuver	-	-	266
Stage 1	-	-	723
Stage 2	-	-	489

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1209	-	-	-	-	707
HCM Lane V/C Ratio	0.092	-	-	-	-	0.026
HCM Control Delay (s)	8.3	-	-	-	0	10.2
HCM Lane LOS	A	-	-	-	A	B
HCM 95th %tile Q(veh)	0.3	-	-	-	-	0.1

Intersection

Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↔				↔				↔	
Traffic Vol, veh/h	0	32	8	25	0	4	6	1	0	14	4	2
Future Vol, veh/h	0	32	8	25	0	4	6	1	0	14	4	2
Peak Hour Factor	0.92	0.69	0.69	0.69	0.92	0.69	0.69	0.69	0.92	0.92	0.69	0.69
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	46	12	36	0	6	9	1	0	15	6	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.3	7.2	7.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	70%	49%	36%	0%
Vol Thru, %	20%	12%	55%	22%
Vol Right, %	10%	38%	9%	78%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	65	11	9
LT Vol	14	32	4	0
Through Vol	4	8	6	2
RT Vol	2	25	1	7
Lane Flow Rate	24	94	16	11
Geometry Grp	1	1	1	1
Degree of Util (X)	0.028	0.101	0.018	0.011
Departure Headway (Hd)	4.213	3.872	4.082	3.676
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	846	926	875	967
Service Time	2.256	1.893	2.114	1.723
HCM Lane V/C Ratio	0.028	0.102	0.018	0.011
HCM Control Delay	7.4	7.3	7.2	6.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.1	0

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↔	
Traffic Vol, veh/h	0	0	2	7
Future Vol, veh/h	0	0	2	7
Peak Hour Factor	0.92	0.69	0.69	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	3	8
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	6.8
HCM LOS	A

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	40	161	4	2	246	17	1	0	2	7	0	4
Future Vol, veh/h	40	161	4	2	246	17	1	0	2	7	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	10
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8	8	8	8	8	8	8
Mvmt Flow	43	175	4	2	267	18	1	0	2	8	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	286	0	0	179	0	0	545	554	177	546	547	277
Stage 1	-	-	-	-	-	-	264	264	-	281	281	-
Stage 2	-	-	-	-	-	-	281	290	-	265	266	-
Critical Hdwy	4.18	-	-	4.18	-	-	7.18	6.58	6.28	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	5.58	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	5.58	-	6.18	5.58	-
Follow-up Hdwy	2.272	-	-	2.272	-	-	3.572	4.072	3.372	3.572	4.072	3.372
Pot Cap-1 Maneuver	1242	-	-	1361	-	-	440	432	851	439	436	748
Stage 1	-	-	-	-	-	-	728	679	-	713	668	-
Stage 2	-	-	-	-	-	-	713	662	-	727	678	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1242	-	-	1361	-	-	424	415	851	425	419	748
Mov Cap-2 Maneuver	-	-	-	-	-	-	424	415	-	425	419	-
Stage 1	-	-	-	-	-	-	700	653	-	686	667	-
Stage 2	-	-	-	-	-	-	707	661	-	698	652	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0.1	10.7	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	637	1242	-	-	1361	-	-	425	748
HCM Lane V/C Ratio	0.005	0.035	-	-	0.002	-	-	0.018	0.006
HCM Control Delay (s)	10.7	8	0	-	7.6	0	-	13.6	9.8
HCM Lane LOS	B	A	A	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.1	0

HCM 2010 TWSC
14: Calaveritas Road & Mountain Ranch Road

Existing Conditions
AM Peak Hour

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	140	30	4	217	47	1
Future Vol, veh/h	140	30	4	217	47	1
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, %	8	8	8	8	8	8
Mvmt Flow	147	32	4	228	49	1
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	179	0	400	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	237	-
Critical Hdwy	-	-	4.18	-	6.48	6.28
Critical Hdwy Stg 1	-	-	-	-	5.48	-
Critical Hdwy Stg 2	-	-	-	-	5.48	-
Follow-up Hdwy	-	-	2.272	-	3.572	3.372
Pot Cap-1 Maneuver	-	-	1361	-	594	866
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1361	-	592	866
Mov Cap-2 Maneuver	-	-	-	-	592	-
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	786	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		11.6	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	596	-	-	1361	-	
HCM Lane V/C Ratio	0.085	-	-	0.003	-	
HCM Control Delay (s)	11.6	-	-	7.7	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Traffic Vol, veh/h	0	355	235	54	53	0
Future Vol, veh/h	0	355	235	54	53	0
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	83
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	413	273	63	62	0
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	718	305
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	413	-
Critical Hdwy	-	-	-	-	6.48	6.28
Critical Hdwy Stg 1	-	-	-	-	5.48	-
Critical Hdwy Stg 2	-	-	-	-	5.48	-
Follow-up Hdwy	-	-	-	-	3.572	3.372
Pot Cap-1 Maneuver	0	-	-	-	387	721
Stage 1	0	-	-	-	734	-
Stage 2	0	-	-	-	655	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	387	721
Mov Cap-2 Maneuver	-	-	-	-	387	-
Stage 1	-	-	-	-	734	-
Stage 2	-	-	-	-	655	-
Approach	EB		WB		SB	
HCM Control Delay, s	0		0		16.1	
HCM LOS					C	
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	387		
HCM Lane V/C Ratio	-	-	-	0.159		
HCM Control Delay (s)	-	-	-	16.1		
HCM Lane LOS	-	-	-	C		
HCM 95th %tile Q(veh)	-	-	-	0.6		

Intersection						
Int Delay, s/veh	6.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	194	4	432	313	15	232
Future Vol, veh/h	194	4	432	313	15	232
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	0	-	-	-	130	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	218	4	485	352	17	261
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	779	485	0	-	485	0
Stage 1	485	-	-	-	-	-
Stage 2	294	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	363	580	-	0	1073	-
Stage 1	617	-	-	0	-	-
Stage 2	754	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	357	580	-	-	1073	-
Mov Cap-2 Maneuver	357	-	-	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	742	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	29.4		0		0.5	
HCM LOS	D					
Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT			
Capacity (veh/h)	- 363	1073	-			
HCM Lane V/C Ratio	- 0.613	0.016	-			
HCM Control Delay (s)	- 29.4	8.4	-			
HCM Lane LOS	- D	A	-			
HCM 95th %tile Q(veh)	- 3.9	0	-			

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	67	39	66	685	386	33
Future Vol, veh/h	67	39	66	685	386	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	5	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	43	73	753	424	36
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1340	442	460	0	-	0
Stage 1	442	-	-	-	-	-
Stage 2	898	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	168	615	1101	-	-	-
Stage 1	648	-	-	-	-	-
Stage 2	398	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	149	615	1101	-	-	-
Mov Cap-2 Maneuver	149	-	-	-	-	-
Stage 1	648	-	-	-	-	-
Stage 2	353	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	36.2	0.7		0		
HCM LOS	E					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1101	-	149	615	-	-
HCM Lane V/C Ratio	0.066	-	0.494	0.07	-	-
HCM Control Delay (s)	8.5	0	50.7	11.3	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.3	0.2	-	-

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	3	42	11	11	29
Future Vol, veh/h	7	3	42	11	11	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	8	3	46	12	12	32
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	107	52	0	0	58	0
Stage 1	52	-	-	-	-	-
Stage 2	55	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	893	1019	-	-	1553	-
Stage 1	973	-	-	-	-	-
Stage 2	970	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	886	1019	-	-	1553	-
Mov Cap-2 Maneuver	886	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	962	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	9		0		2	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 922	1553	-		
HCM Lane V/C Ratio	-	- 0.012	0.008	-		
HCM Control Delay (s)	-	- 9	7.3	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0	0	-		

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	49	40	730	433	17
Future Vol, veh/h	13	49	40	730	433	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	75	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	14	53	43	793	471	18
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1360	480	489	0	-	0
Stage 1	480	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	163	584	1069	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	156	584	1069	-	-	-
Mov Cap-2 Maneuver	284	-	-	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	388	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.8	0.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1069	-	478	-	-	
HCM Lane V/C Ratio	0.041	-	0.141	-	-	
HCM Control Delay (s)	8.5	-	13.8	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-	

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑	↑	↓	↑
Traffic Vol, veh/h	16	65	695	18	38	453
Future Vol, veh/h	16	65	695	18	38	453
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	40	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	18	72	772	20	42	503
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1360	772	0	0	772	0
Stage 1	772	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	163	398	-	-	839	-
Stage 1	454	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	155	398	-	-	839	-
Mov Cap-2 Maneuver	155	-	-	-	-	-
Stage 1	454	-	-	-	-	-
Stage 2	525	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	21.7		0		0.7	
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 304	839	-		
HCM Lane V/C Ratio	-	- 0.296	0.05	-		
HCM Control Delay (s)	-	- 21.7	9.5	-		
HCM Lane LOS	-	- C	A	-		
HCM 95th %tile Q(veh)	-	- 1.2	0.2	-		

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↵		↵		↵	
Traffic Vol, veh/h	20	6	46	25	3	59	37	642	7	11	432	6
Future Vol, veh/h	20	6	46	25	3	59	37	642	7	11	432	6
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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	22	7	51	28	3	66	41	713	8	12	480	7
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1342	1311	483	1336	1310	717	487	0	0	721	0	0
Stage 1	508	508	-	799	799	-	-	-	-	-	-	-
Stage 2	834	803	-	537	511	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.236	-	-	2.236	-	-
Pot Cap-1 Maneuver	128	157	580	129	158	426	1066	-	-	872	-	-
Stage 1	544	535	-	376	395	-	-	-	-	-	-	-
Stage 2	360	393	-	524	534	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	102	149	580	109	150	426	1066	-	-	872	-	-
Mov Cap-2 Maneuver	102	149	-	109	150	-	-	-	-	-	-	-
Stage 1	523	528	-	362	380	-	-	-	-	-	-	-
Stage 2	290	378	-	465	527	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	29.1			32.7			0.5			0.2		
HCM LOS	D			D								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1066	-	-	228	224	872	-	-				
HCM Lane V/C Ratio	0.039	-	-	0.351	0.432	0.014	-	-				
HCM Control Delay (s)	8.5	-	-	29.1	32.7	9.2	-	-				
HCM Lane LOS	A	-	-	D	D	A	-	-				
HCM 95th %tile O(veh)	0.1	-	-	1.5	2	0	-	-				

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔					↔	↔		↔	↔	
Traffic Vol, veh/h	3	3	36	0	0	0	37	687	40	27	475	6
Future Vol, veh/h	3	3	36	0	0	0	37	687	40	27	475	6
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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	3	3	40	0	0	0	41	763	44	30	528	7
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	1459	1481	531				534	0	0	808	0	0
Stage 1	591	591	-				-	-	-	-	-	-
Stage 2	868	890	-				-	-	-	-	-	-
Critical Hdwy	6.43	6.53	6.23				4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.53	-				-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327				2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	142	125	546				1029	-	-	813	-	-
Stage 1	551	493	-				-	-	-	-	-	-
Stage 2	409	360	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	131	0	546				1029	-	-	813	-	-
Mov Cap-2 Maneuver	131	0	-				-	-	-	-	-	-
Stage 1	531	0	-				-	-	-	-	-	-
Stage 2	393	0	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	14.2			0.4			0.5					
HCM LOS	B											
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1029	-	-	439	813	-	-					
HCM Lane V/C Ratio	0.04	-	-	0.106	0.037	-	-					
HCM Control Delay (s)	8.6	-	-	14.2	9.6	-	-					
HCM Lane LOS	A	-	-	B	A	-	-					
HCM 95th %tile O(veh)	0.1	-	-	0.4	0.1	-	-					

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	62	687	28	46	490
Future Vol, veh/h	18	62	687	28	46	490
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	19	67	739	30	49	527
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1380	754	0	0	769	0
Stage 1	754	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	158	407	-	-	841	-
Stage 1	463	-	-	-	-	-
Stage 2	531	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	149	407	-	-	841	-
Mov Cap-2 Maneuver	287	-	-	-	-	-
Stage 1	463	-	-	-	-	-
Stage 2	500	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	17.6		0		0.8	
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 372	841	-		
HCM Lane V/C Ratio	-	- 0.231	0.059	-		
HCM Control Delay (s)	-	- 17.6	9.5	-		
HCM Lane LOS	-	- C	A	-		
HCM 95th %tile Q(veh)	-	- 0.9	0.2	-		

Intersection												
Int Delay, s/veh	29											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	0	147	0	345	0	309	69	158	317	0
Future Vol, veh/h	1	0	0	147	0	345	0	309	69	158	317	0
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	-	-	Yield	-	-	Yield	-	-	None
Storage Length	-	-	-	0	-	240	-	-	-	120	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	74	92	74	92	87	87	87	87	92
Heavy Vehicles, %	2	2	2	8	2	8	2	3	3	3	3	2
Mvmt Flow	1	0	0	199	0	466	0	355	79	182	364	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1083	1083	364	1083	-	355	364	0	0	355	0	0
Stage 1	728	728	-	355	-	-	-	-	-	-	-	-
Stage 2	355	355	-	728	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.18	-	6.28	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.18	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.18	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.572	-	3.372	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	195	217	681	~ 190	0	676	1195	-	-	1198	-	-
Stage 1	415	429	-	650	0	-	-	-	-	-	-	-
Stage 2	662	630	-	406	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	53	184	681	~ 168	-	676	1195	-	-	1198	-	-
Mov Cap-2 Maneuver	53	184	-	~ 168	-	-	-	-	-	-	-	-
Stage 1	415	364	-	650	-	-	-	-	-	-	-	-
Stage 2	205	630	-	344	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	74.3			69.3			0			2.8		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	1195	-	-	53	168	676	1198	-	-			
HCM Lane V/C Ratio	-	-	-	0.021	1.182	0.69	0.152	-	-			
HCM Control Delay (s)	0	-	-	74.3	181.9	21.3	8.5	-	-			
HCM Lane LOS	A	-	-	F	F	C	A	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.1	10.8	5.5	0.5	-	-			
Notes												
~: Volume exceeds capacity	\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon					

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑		↕	
Traffic Vol, veh/h	18	221	381	0	0	17
Future Vol, veh/h	18	221	381	0	0	17
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	85	85	85	85	85	85
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	21	260	448	0	0	20
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	448	0	-	0	750	448
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	302	-
Critical Hdwy	4.15	-	-	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	2.245	-	-	-	3.545	3.345
Pot Cap-1 Maneuver	1097	-	-	0	375	604
Stage 1	-	-	-	0	637	-
Stage 2	-	-	-	0	743	-
Platoon blocked, %		-		-		
Mov Cap-1 Maneuver	1097	-	-	-	367	604
Mov Cap-2 Maneuver	-	-	-	-	367	-
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	727	-
Approach	EB		WB		SB	
HCM Control Delay, s	0.6		0		11.2	
HCM LOS					B	
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	1097	-	-	604		
HCM Lane V/C Ratio	0.019	-	-	0.033		
HCM Control Delay (s)	8.3	0	-	11.2		
HCM Lane LOS	A	A	-	B		
HCM 95th %tile Q(veh)	0.1	-	-	0.1		

Intersection

Int Delay, s/veh 1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	32	228	366	0	0	72
Future Vol, veh/h	32	228	366	0	0	72
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	-	-	-	0	130
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	37	262	421	0	0	83

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	421	0	421
Stage 1	-	-	421
Stage 2	-	-	336
Critical Hdwy	4.14	-	6.24
Critical Hdwy Stg 1	-	-	6.14
Critical Hdwy Stg 2	-	-	6.14
Follow-up Hdwy	2.236	-	3.336
Pot Cap-1 Maneuver	1127	-	628
Stage 1	-	-	606
Stage 2	-	-	674
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1127	-	628
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	586
Stage 2	-	-	652

Approach	EB	WB	SB
HCM Control Delay, s	1	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1127	-	-	-	-	628
HCM Lane V/C Ratio	0.033	-	-	-	-	0.132
HCM Control Delay (s)	8.3	-	-	-	0	11.6
HCM Lane LOS	A	-	-	-	A	B
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.5

Intersection

Intersection Delay, s/veh	7.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↔				↔				↔	
Traffic Vol, veh/h	0	6	12	15	0	0	24	0	0	15	0	3
Future Vol, veh/h	0	6	12	15	0	0	24	0	0	15	0	3
Peak Hour Factor	0.92	0.60	0.60	0.60	0.92	0.60	0.60	0.60	0.92	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	10	20	25	0	0	40	0	0	25	0	5
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.1	7.3	7.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	83%	18%	0%	4%
Vol Thru, %	0%	36%	100%	13%
Vol Right, %	17%	45%	0%	83%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	18	33	24	23
LT Vol	15	6	0	1
Through Vol	0	12	24	3
RT Vol	3	15	0	19
Lane Flow Rate	30	55	40	38
Geometry Grp	1	1	1	1
Degree of Util (X)	0.035	0.059	0.045	0.039
Departure Headway (Hd)	4.196	3.847	4.095	3.635
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	850	928	872	979
Service Time	2.237	1.88	2.129	1.679
HCM Lane V/C Ratio	0.035	0.059	0.046	0.039
HCM Control Delay	7.4	7.1	7.3	6.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.1	0.1

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↔	
Traffic Vol, veh/h	0	1	3	19
Future Vol, veh/h	0	1	3	19
Peak Hour Factor	0.92	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	5	32
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	6.8
HCM LOS	A

Intersection

Int Delay, s/veh 1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Vol, veh/h	11	203	6	1	241	4	19	0	5	13	1	39
Future Vol, veh/h	11	203	6	1	241	4	19	0	5	13	1	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	10
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	251	7	1	298	5	23	0	6	16	1	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	302	0	0	258	0	0	584	586	254	587	587	300
Stage 1	-	-	-	-	-	-	281	281	-	302	302	-
Stage 2	-	-	-	-	-	-	303	305	-	285	285	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1259	-	-	1307	-	-	423	422	785	421	422	740
Stage 1	-	-	-	-	-	-	726	678	-	707	664	-
Stage 2	-	-	-	-	-	-	706	662	-	722	676	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1259	-	-	1307	-	-	390	416	785	413	416	740
Mov Cap-2 Maneuver	-	-	-	-	-	-	390	416	-	413	416	-
Stage 1	-	-	-	-	-	-	717	669	-	698	663	-
Stage 2	-	-	-	-	-	-	658	661	-	707	667	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0			13.9			11.2		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	436	1259	-	-	1307	-	-	413	740
HCM Lane V/C Ratio	0.068	0.011	-	-	0.001	-	-	0.042	0.065
HCM Control Delay (s)	13.9	7.9	0	-	7.8	0	-	14.1	10.2
HCM Lane LOS	B	A	A	-	A	A	-	B	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1	0.2

HCM 2010 TWSC
14: Calaveritas Road & Mountain Ranch Road

Existing Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	179	42	0	204	41	0
Future Vol, veh/h	179	42	0	204	41	0
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	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	203	48	0	232	47	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	251	0	459	227
Stage 1	-	-	-	-	227	-
Stage 2	-	-	-	-	232	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1309	-	558	810
Stage 1	-	-	-	-	808	-
Stage 2	-	-	-	-	804	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1309	-	558	810
Mov Cap-2 Maneuver	-	-	-	-	558	-
Stage 1	-	-	-	-	808	-
Stage 2	-	-	-	-	804	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		12	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	558	-	-	1309	-	
HCM Lane V/C Ratio	0.083	-	-	-	-	
HCM Control Delay (s)	12	-	-	0	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Traffic Vol, veh/h	0	221	381	53	38	0
Future Vol, veh/h	0	221	381	53	38	0
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	85	85	85	85	85	85
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	0	260	448	62	45	0
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	739	479
Stage 1	-	-	-	-	479	-
Stage 2	-	-	-	-	260	-
Critical Hdwy	-	-	-	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	-	-	3.545	3.345
Pot Cap-1 Maneuver	0	-	-	-	380	581
Stage 1	0	-	-	-	617	-
Stage 2	0	-	-	-	777	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	380	581
Mov Cap-2 Maneuver	-	-	-	-	380	-
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	777	-
Approach	EB		WB		SB	
HCM Control Delay, s	0		0		15.7	
HCM LOS					C	
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	380		
HCM Lane V/C Ratio	-	-	-	0.118		
HCM Control Delay (s)	-	-	-	15.7		
HCM Lane LOS	-	-	-	C		
HCM 95th %tile Q(veh)	-	-	-	0.4		

Intersection						
Int Delay, s/veh	47.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰		↱		↰	↱
Traffic Vol, veh/h	246	13	282	226	18	795
Future Vol, veh/h	246	13	282	226	18	795
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	0	-	-	-	130	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	11	11	11	11	11	11
Mvmt Flow	265	14	303	243	19	855
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1197	303	0	-	303	0
Stage 1	303	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Critical Hdwy	6.51	6.31	-	-	4.21	-
Critical Hdwy Stg 1	5.51	-	-	-	-	-
Critical Hdwy Stg 2	5.51	-	-	-	-	-
Follow-up Hdwy	3.599	3.399	-	-	2.299	-
Pot Cap-1 Maneuver	~ 197	716	-	0	1208	-
Stage 1	729	-	-	0	-	-
Stage 2	385	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 194	716	-	-	1208	-
Mov Cap-2 Maneuver	~ 194	-	-	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	246.4		0		0.2	
HCM LOS	F					
Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT			
Capacity (veh/h)	- 201	1208	-			
HCM Lane V/C Ratio	- 1.386	0.016	-			
HCM Control Delay (s)	- 246.4	8	-			
HCM Lane LOS	- F	A	-			
HCM 95th %tile Q(veh)	- 16.2	0	-			
Notes						
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined		*: All major volume in platoon		

Intersection							
Int Delay, s/veh	5.8						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Vol, veh/h	57	94	54	454	957	71	
Future Vol, veh/h	57	94	54	454	957	71	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	5	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	9	9	9	9	9	9	
Mvmt Flow	62	102	59	493	1040	77	
Major/Minor	Minor2	Major1		Major2			
Conflicting Flow All	1690	1079	1117	0	-	0	
Stage 1	1079	-	-	-	-	-	
Stage 2	611	-	-	-	-	-	
Critical Hdwy	6.49	6.29	4.19	-	-	-	
Critical Hdwy Stg 1	5.49	-	-	-	-	-	
Critical Hdwy Stg 2	5.49	-	-	-	-	-	
Follow-up Hdwy	3.581	3.381	2.281	-	-	-	
Pot Cap-1 Maneuver	99	257	600	-	-	-	
Stage 1	316	-	-	-	-	-	
Stage 2	528	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	86	257	600	-	-	-	
Mov Cap-2 Maneuver	86	-	-	-	-	-	
Stage 1	316	-	-	-	-	-	
Stage 2	457	-	-	-	-	-	
Approach	EB	NB		SB			
HCM Control Delay, s	61.3	1.2		0			
HCM LOS	F						
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	600	-	86	257	-	-	
HCM Lane V/C Ratio	0.098	-	0.72	0.398	-	-	
HCM Control Delay (s)	11.7	0	116.3	28	-	-	
HCM Lane LOS	B	A	F	D	-	-	
HCM 95th %tile Q(veh)	0.3	-	3.5	1.8	-	-	

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	13	60	11	7	92
Future Vol, veh/h	18	13	60	11	7	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	17	17	17	17	17	17
Mvmt Flow	20	15	68	13	8	105
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	194	74	0	0	81	0
Stage 1	74	-	-	-	-	-
Stage 2	120	-	-	-	-	-
Critical Hdwy	6.57	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	762	947	-	-	1427	-
Stage 1	912	-	-	-	-	-
Stage 2	869	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	757	947	-	-	1427	-
Mov Cap-2 Maneuver	757	-	-	-	-	-
Stage 1	912	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	9.5		0		0.5	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 827	1427	-		
HCM Lane V/C Ratio	-	- 0.043	0.006	-		
HCM Control Delay (s)	-	- 9.5	7.5	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0.1	0	-		

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	43	49	534	1067	22
Future Vol, veh/h	10	43	49	534	1067	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	75	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	11	47	53	580	1160	24
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1859	1172	1184	0	-	0
Stage 1	1172	-	-	-	-	-
Stage 2	687	-	-	-	-	-
Critical Hdwy	6.48	6.28	4.18	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.372	2.272	-	-	-
Pot Cap-1 Maneuver	78	228	569	-	-	-
Stage 1	286	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	71	228	569	-	-	-
Mov Cap-2 Maneuver	189	-	-	-	-	-
Stage 1	286	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	27.2	1		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	569	-	219	-	-	
HCM Lane V/C Ratio	0.094	-	0.263	-	-	
HCM Control Delay (s)	12	-	27.2	-	-	
HCM Lane LOS	B	-	D	-	-	
HCM 95th %tile Q(veh)	0.3	-	1	-	-	

Intersection						
Int Delay, s/veh	16.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↙		↑	↗	↘	↑
Traffic Vol, veh/h	48	85	508	70	225	866
Future Vol, veh/h	48	85	508	70	225	866
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	40	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	52	91	546	75	242	931
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1961	546	0	0	546	0
Stage 1	546	-	-	-	-	-
Stage 2	1415	-	-	-	-	-
Critical Hdwy	6.48	6.28	-	-	4.18	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.372	-	-	2.272	-
Pot Cap-1 Maneuver	67	526	-	-	994	-
Stage 1	569	-	-	-	-	-
Stage 2	218	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 51	526	-	-	994	-
Mov Cap-2 Maneuver	~ 51	-	-	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	165	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	208		0		2	
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 121	994	-		
HCM Lane V/C Ratio	-	- 1.182	0.243	-		
HCM Control Delay (s)	-	- 208	9.8	-		
HCM Lane LOS	-	- F	A	-		
HCM 95th %tile Q(veh)	-	- 8.8	1	-		
Notes						
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined		*: All major volume in platoon		

Intersection												
Int Delay, s/veh	8.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↖	↗		↖	↗	
Traffic Vol, veh/h	14	0	54	22	5	72	32	543	4	59	777	5
Future Vol, veh/h	14	0	54	22	5	72	32	543	4	59	777	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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	16	0	61	25	6	82	36	617	5	67	883	6
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1756	1714	886	1743	1715	619	889	0	0	622	0	0
Stage 1	1020	1020	-	692	692	-	-	-	-	-	-	-
Stage 2	736	694	-	1051	1023	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.62	6.32	7.22	6.62	6.32	4.22	-	-	4.22	-	-
Critical Hdwy Stg 1	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.108	3.408	3.608	4.108	3.408	2.308	-	-	2.308	-	-
Pot Cap-1 Maneuver	63	85	329	64	85	471	722	-	-	912	-	-
Stage 1	273	302	-	419	430	-	-	-	-	-	-	-
Stage 2	395	429	-	263	301	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	45	75	329	47	75	471	722	-	-	912	-	-
Mov Cap-2 Maneuver	45	75	-	47	75	-	-	-	-	-	-	-
Stage 1	259	280	-	398	409	-	-	-	-	-	-	-
Stage 2	306	408	-	198	279	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	56.4			86.7			0.6			0.6		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	722	-	-	143	144	912	-	-				
HCM Lane V/C Ratio	0.05	-	-	0.54	0.781	0.074	-	-				
HCM Control Delay (s)	10.2	-	-	56.4	86.7	9.3	-	-				
HCM Lane LOS	B	-	-	F	F	A	-	-				
HCM 95th %tile O(veh)	0.2	-	-	2.7	4.8	0.2	-	-				

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔					↔↔			↔↔		
Traffic Vol, veh/h	9	8	38	0	0	0	36	576	60	90	684	5
Future Vol, veh/h	9	8	38	0	0	0	36	576	60	90	684	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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	2	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	11	11	11	11	11	11	11	11	11	11	11	11
Mvmt Flow	10	9	41	0	0	0	39	626	65	98	743	5
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	1679	1712	746				749	0	0	691	0	0
Stage 1	942	942	-				-	-	-	-	-	-
Stage 2	737	770	-				-	-	-	-	-	-
Critical Hdwy	6.51	6.61	6.31				4.21	-	-	4.21	-	-
Critical Hdwy Stg 1	5.51	5.61	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.61	-				-	-	-	-	-	-
Follow-up Hdwy	3.599	4.099	3.399				2.299	-	-	2.299	-	-
Pot Cap-1 Maneuver	99	86	399				821	-	-	863	-	-
Stage 1	365	330	-				-	-	-	-	-	-
Stage 2	458	397	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	84	0	399				821	-	-	863	-	-
Mov Cap-2 Maneuver	236	0	-				-	-	-	-	-	-
Stage 1	324	0	-				-	-	-	-	-	-
Stage 2	436	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	17.3						0.5			1.1		
HCM LOS	C											
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR					
Capacity (veh/h)	821	-	-	352	863	-	-					
HCM Lane V/C Ratio	0.048	-	-	0.17	0.113	-	-					
HCM Control Delay (s)	9.6	-	-	17.3	9.7	-	-					
HCM Lane LOS	A	-	-	C	A	-	-					
HCM 95th %tile O(veh)	0.1	-	-	0.6	0.4	-	-					

Intersection						
Int Delay, s/veh	1.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	46	839	35	27	777
Future Vol, veh/h	24	46	839	35	27	777
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	27	52	953	40	31	883
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1917	973	0	0	993	0
Stage 1	973	-	-	-	-	-
Stage 2	944	-	-	-	-	-
Critical Hdwy	6.49	6.29	-	-	4.19	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	-	-	2.281	-
Pot Cap-1 Maneuver	71	297	-	-	669	-
Stage 1	356	-	-	-	-	-
Stage 2	367	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	68	297	-	-	669	-
Mov Cap-2 Maneuver	245	-	-	-	-	-
Stage 1	356	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	23.1		0		0.4	
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 277	669	-		
HCM Lane V/C Ratio	-	- 0.287	0.046	-		
HCM Control Delay (s)	-	- 23.1	10.6	-		
HCM Lane LOS	-	- C	B	-		
HCM 95th %tile Q(veh)	-	- 1.2	0.1	-		

Intersection												
Int Delay, s/veh	33.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖		↗	↔			↖		↗
Traffic Vol, veh/h	2	2	0	85	0	235	0	390	160	381	369	4
Future Vol, veh/h	2	2	0	85	0	235	0	390	160	381	369	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	-	-	Yield	-	-	Yield	-	-	None
Storage Length	-	-	-	0	-	240	-	-	-	120	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	2	10	2	10	10	10	10	2
Mvmt Flow	2	2	0	92	0	255	0	424	174	414	401	4
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1656	1656	403	1657	-	424	405	0	0	424	0	0
Stage 1	1232	1232	-	424	-	-	-	-	-	-	-	-
Stage 2	424	424	-	1233	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.2	-	6.3	4.12	-	-	4.2	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.2	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.2	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.59	-	3.39	2.218	-	-	2.29	-	-
Pot Cap-1 Maneuver	78	98	647	~ 75	0	613	1154	-	-	1094	-	-
Stage 1	217	249	-	592	0	-	-	-	-	-	-	-
Stage 2	608	587	-	208	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	61	647	~ 52	-	613	1154	-	-	1094	-	-
Mov Cap-2 Maneuver	32	61	-	~ 52	-	-	-	-	-	-	-	-
Stage 1	217	155	-	592	-	-	-	-	-	-	-	-
Stage 2	355	587	-	127	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	100.4			155			0			5.2		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	1154	-	-	42	52	613	1094	-	-			
HCM Lane V/C Ratio	-	-	-	0.104	1.777	0.417	0.379	-	-			
HCM Control Delay (s)	0	-	-	100.4	542.1	15	10.3	-	-			
HCM Lane LOS	A	-	-	F	F	C	B	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.3	8.9	2	1.8	-	-			
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑		↕	
Traffic Vol, veh/h	16	434	287	0	0	27
Future Vol, veh/h	16	434	287	0	0	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	88	88	88	88	88	88
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	18	493	326	0	0	31
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	326	0	-	0	856	326
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	530	-
Critical Hdwy	4.18	-	-	-	6.48	6.28
Critical Hdwy Stg 1	-	-	-	-	5.48	-
Critical Hdwy Stg 2	-	-	-	-	5.48	-
Follow-up Hdwy	2.272	-	-	-	3.572	3.372
Pot Cap-1 Maneuver	1201	-	-	0	320	702
Stage 1	-	-	-	0	718	-
Stage 2	-	-	-	0	578	-
Platoon blocked, %		-		-		
Mov Cap-1 Maneuver	1201	-	-	-	313	702
Mov Cap-2 Maneuver	-	-	-	-	313	-
Stage 1	-	-	-	-	718	-
Stage 2	-	-	-	-	566	-
Approach	EB		WB		SB	
HCM Control Delay, s	0.3		0		10.4	
HCM LOS					B	
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	1201	-	-	702		
HCM Lane V/C Ratio	0.015	-	-	0.044		
HCM Control Delay (s)	8	0	-	10.4		
HCM Lane LOS	A	A	-	B		
HCM 95th %tile Q(veh)	0	-	-	0.1		

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	113	385	326	2	0	19
Future Vol, veh/h	113	385	326	2	0	19
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	-	-	-	0	130
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	128	438	370	2	0	22
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	373	0	-	0	1066	372
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	694	-
Critical Hdwy	4.17	-	-	-	6.47	6.27
Critical Hdwy Stg 1	-	-	-	-	5.47	-
Critical Hdwy Stg 2	-	-	-	-	5.47	-
Follow-up Hdwy	2.263	-	-	-	3.563	3.363
Pot Cap-1 Maneuver	1159	-	-	-	241	663
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	487	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1159	-	-	-	214	663
Mov Cap-2 Maneuver	-	-	-	-	214	-
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	433	-
Approach	EB		WB		SB	
HCM Control Delay, s	1.9		0		10.6	
HCM LOS					B	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1159	-	-	-	-	663
HCM Lane V/C Ratio	0.111	-	-	-	-	0.033
HCM Control Delay (s)	8.5	-	-	-	0	10.6
HCM Lane LOS	A	-	-	-	A	B
HCM 95th %tile Q(veh)	0.4	-	-	-	-	0.1

Intersection

Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	40	10	31	0	5	8	2	0	18	5	3
Future Vol, veh/h	0	40	10	31	0	5	8	2	0	18	5	3
Peak Hour Factor	0.92	0.86	0.88	0.88	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	47	11	35	0	6	9	2	0	20	6	3
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.4	7.2	7.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	69%	49%	33%	0%
Vol Thru, %	19%	12%	53%	25%
Vol Right, %	12%	38%	13%	75%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	26	81	15	12
LT Vol	18	40	5	0
Through Vol	5	10	8	3
RT Vol	3	31	2	9
Lane Flow Rate	30	93	17	14
Geometry Grp	1	1	1	1
Degree of Util (X)	0.035	0.101	0.019	0.014
Departure Headway (Hd)	4.205	3.89	4.065	3.697
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	847	921	878	961
Service Time	2.25	1.915	2.103	1.748
HCM Lane V/C Ratio	0.035	0.101	0.019	0.015
HCM Control Delay	7.4	7.4	7.2	6.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.1	0

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	0	3	9
Future Vol, veh/h	0	0	3	9
Peak Hour Factor	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	3	10
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	6.8
HCM LOS	A

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	49	197	5	3	301	21	2	0	3	9	0	5
Future Vol, veh/h	49	197	5	3	301	21	2	0	3	9	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	10
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8	8	8	8	8	8	8
Mvmt Flow	53	214	5	3	327	23	2	0	3	10	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	350	0	0	220	0	0	668	680	217	670	671	339
Stage 1	-	-	-	-	-	-	323	323	-	345	345	-
Stage 2	-	-	-	-	-	-	345	357	-	325	326	-
Critical Hdwy	4.18	-	-	4.18	-	-	7.18	6.58	6.28	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	5.58	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	5.58	-	6.18	5.58	-
Follow-up Hdwy	2.272	-	-	2.272	-	-	3.572	4.072	3.372	3.572	4.072	3.372
Pot Cap-1 Maneuver	1176	-	-	1314	-	-	364	366	808	363	370	690
Stage 1	-	-	-	-	-	-	677	640	-	658	626	-
Stage 2	-	-	-	-	-	-	658	618	-	675	638	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1176	-	-	1314	-	-	346	346	808	347	350	690
Mov Cap-2 Maneuver	-	-	-	-	-	-	346	346	-	347	350	-
Stage 1	-	-	-	-	-	-	642	607	-	624	624	-
Stage 2	-	-	-	-	-	-	651	616	-	638	605	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0.1	11.9	13.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	527	1176	-	-	1314	-	-	347	690
HCM Lane V/C Ratio	0.01	0.045	-	-	0.002	-	-	0.028	0.008
HCM Control Delay (s)	11.9	8.2	0	-	7.7	0	-	15.7	10.3
HCM Lane LOS	B	A	A	-	A	A	-	C	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.1	0

HCM 2010 TWSC
14: Calaveritas Road & Mountain Ranch Road

Market-Based Growth Scenario

AM Peak Hour

Intersection						
Int Delay, s/veh	1.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	171	37	5	265	58	2
Future Vol, veh/h	171	37	5	265	58	2
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, %	8	8	8	8	8	8
Mvmt Flow	180	39	5	279	61	2
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	219	0	488	199
Stage 1	-	-	-	-	199	-
Stage 2	-	-	-	-	289	-
Critical Hdwy	-	-	4.18	-	6.48	6.28
Critical Hdwy Stg 1	-	-	-	-	5.48	-
Critical Hdwy Stg 2	-	-	-	-	5.48	-
Follow-up Hdwy	-	-	2.272	-	3.572	3.372
Pot Cap-1 Maneuver	-	-	1316	-	528	827
Stage 1	-	-	-	-	820	-
Stage 2	-	-	-	-	747	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1316	-	526	827
Mov Cap-2 Maneuver	-	-	-	-	526	-
Stage 1	-	-	-	-	820	-
Stage 2	-	-	-	-	744	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		12.7	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	532	-	-	1316	-	
HCM Lane V/C Ratio	0.119	-	-	0.004	-	
HCM Control Delay (s)	12.7	-	-	7.7	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.4	-	-	0	-	

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Traffic Vol, veh/h	0	434	287	66	65	0
Future Vol, veh/h	0	434	287	66	65	0
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	88	88	88	88	88	88
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	493	326	75	74	0
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	857	364
Stage 1	-	-	-	-	364	-
Stage 2	-	-	-	-	493	-
Critical Hdwy	-	-	-	-	6.48	6.28
Critical Hdwy Stg 1	-	-	-	-	5.48	-
Critical Hdwy Stg 2	-	-	-	-	5.48	-
Follow-up Hdwy	-	-	-	-	3.572	3.372
Pot Cap-1 Maneuver	0	-	-	-	320	668
Stage 1	0	-	-	-	690	-
Stage 2	0	-	-	-	602	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	320	668
Mov Cap-2 Maneuver	-	-	-	-	320	-
Stage 1	-	-	-	-	690	-
Stage 2	-	-	-	-	602	-
Approach	EB		WB		SB	
HCM Control Delay, s	0		0		19.6	
HCM LOS					C	
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	320		
HCM Lane V/C Ratio	-	-	-	0.231		
HCM Control Delay (s)	-	-	-	19.6		
HCM Lane LOS	-	-	-	C		
HCM 95th %tile Q(veh)	-	-	-	0.9		

Intersection						
Int Delay, s/veh	15.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	237	5	528	382	19	284
Future Vol, veh/h	237	5	528	382	19	284
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	0	-	-	-	130	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	258	5	574	415	21	309
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	924	574	0	-	574	0
Stage 1	574	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	298	516	-	0	994	-
Stage 1	561	-	-	0	-	-
Stage 2	711	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	292	516	-	-	994	-
Mov Cap-2 Maneuver	292	-	-	-	-	-
Stage 1	561	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	66.2		0		0.5	
HCM LOS	F					
Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT			
Capacity (veh/h)	- 296	994	-			
HCM Lane V/C Ratio	- 0.889	0.021	-			
HCM Control Delay (s)	- 66.2	8.7	-			
HCM Lane LOS	- F	A	-			
HCM 95th %tile Q(veh)	- 8.1	0.1	-			

Intersection						
Int Delay, s/veh	9.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	48	81	836	471	41
Future Vol, veh/h	82	48	81	836	471	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	5	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	52	88	909	512	45
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1619	534	557	0	-	0
Stage 1	534	-	-	-	-	-
Stage 2	1085	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	114	546	1014	-	-	-
Stage 1	588	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	94	546	1014	-	-	-
Mov Cap-2 Maneuver	94	-	-	-	-	-
Stage 1	588	-	-	-	-	-
Stage 2	267	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	105.5	0.8		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1014	-	94	546	-	-
HCM Lane V/C Ratio	0.087	-	0.948	0.096	-	-
HCM Control Delay (s)	8.9	0	160	12.3	-	-
HCM Lane LOS	A	A	F	B	-	-
HCM 95th %tile Q(veh)	0.3	-	5.5	0.3	-	-

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	4	52	14	14	36
Future Vol, veh/h	9	4	52	14	14	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	10	4	57	15	15	39
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	134	64	0	0	72	0
Stage 1	64	-	-	-	-	-
Stage 2	70	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	862	1003	-	-	1534	-
Stage 1	961	-	-	-	-	-
Stage 2	955	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	853	1003	-	-	1534	-
Mov Cap-2 Maneuver	853	-	-	-	-	-
Stage 1	961	-	-	-	-	-
Stage 2	945	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	9.1		0		2.1	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 894	1534	-		
HCM Lane V/C Ratio	-	- 0.016	0.01	-		
HCM Control Delay (s)	-	- 9.1	7.4	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0	0	-		

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	60	49	891	529	21
Future Vol, veh/h	16	60	49	891	529	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	75	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	17	65	53	968	575	23
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1661	586	598	0	-	0
Stage 1	586	-	-	-	-	-
Stage 2	1075	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	106	508	974	-	-	-
Stage 1	554	-	-	-	-	-
Stage 2	326	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	100	508	974	-	-	-
Mov Cap-2 Maneuver	221	-	-	-	-	-
Stage 1	554	-	-	-	-	-
Stage 2	308	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	16.4	0.5		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	974	-	399	-	-	
HCM Lane V/C Ratio	0.055	-	0.207	-	-	
HCM Control Delay (s)	8.9	-	16.4	-	-	
HCM Lane LOS	A	-	C	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.8	-	-	

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	80	849	22	47	553
Future Vol, veh/h	20	80	849	22	47	553
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	40	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	22	87	923	24	51	601
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1626	923	0	0	923	0
Stage 1	923	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	112	326	-	-	736	-
Stage 1	385	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	104	326	-	-	736	-
Mov Cap-2 Maneuver	104	-	-	-	-	-
Stage 1	385	-	-	-	-	-
Stage 2	455	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	34.4	0		0.8		
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 228	736	-		
HCM Lane V/C Ratio	-	- 0.477	0.069	-		
HCM Control Delay (s)	-	- 34.4	10.3	-		
HCM Lane LOS	-	- D	B	-		
HCM 95th %tile Q(veh)	-	- 2.4	0.2	-		

Intersection												
Int Delay, s/veh	9.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↖	↗		↖	↗	
Traffic Vol, veh/h	25	8	57	31	4	72	46	784	9	14	528	8
Future Vol, veh/h	25	8	57	31	4	72	46	784	9	14	528	8
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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	27	9	62	34	4	78	50	852	10	15	574	9
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1607	1571	578	1601	1570	857	583	0	0	862	0	0
Stage 1	609	609	-	957	957	-	-	-	-	-	-	-
Stage 2	998	962	-	644	613	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.236	-	-	2.236	-	-
Pot Cap-1 Maneuver	84	109	512	84	109	354	982	-	-	772	-	-
Stage 1	479	482	-	307	334	-	-	-	-	-	-	-
Stage 2	291	332	-	458	480	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	60	101	512	65	101	354	982	-	-	772	-	-
Mov Cap-2 Maneuver	60	101	-	65	101	-	-	-	-	-	-	-
Stage 1	455	473	-	291	317	-	-	-	-	-	-	-
Stage 2	212	315	-	387	471	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	67.3			84.3			0.5			0.2		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	982	-	-	148	149	772	-	-				
HCM Lane V/C Ratio	0.051	-	-	0.661	0.781	0.02	-	-				
HCM Control Delay (s)	8.9	-	-	67.3	84.3	9.8	-	-				
HCM Lane LOS	A	-	-	F	F	A	-	-				
HCM 95th %tile O(veh)	0.2	-	-	3.7	4.9	0.1	-	-				

Intersection												
Int Delay, s/veh		1										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕					↙	↗		↙	↗	
Traffic Vol, veh/h	4	4	44	0	0	0	46	839	49	33	580	8
Future Vol, veh/h	4	4	44	0	0	0	46	839	49	33	580	8
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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	4	4	48	0	0	0	50	912	53	36	630	9
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	1746	1772	635				639	0	0	965	0	0
Stage 1	707	707	-				-	-	-	-	-	-
Stage 2	1039	1065	-				-	-	-	-	-	-
Critical Hdwy	6.43	6.53	6.23				4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.53	-				-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327				2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	94	83	477				940	-	-	710	-	-
Stage 1	487	437	-				-	-	-	-	-	-
Stage 2	339	298	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	84	0	477				940	-	-	710	-	-
Mov Cap-2 Maneuver	84	0	-				-	-	-	-	-	-
Stage 1	462	0	-				-	-	-	-	-	-
Stage 2	321	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	17.6						0.4			0.5		
HCM LOS	C											
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR					
Capacity (veh/h)	940	-	-	343	710	-	-					
HCM Lane V/C Ratio	0.053	-	-	0.165	0.051	-	-					
HCM Control Delay (s)	9	-	-	17.6	10.3	-	-					
HCM Lane LOS	A	-	-	C	B	-	-					
HCM 95th %tile O(veh)	0.2	-	-	0.6	0.2	-	-					

Intersection						
Int Delay, s/veh	1.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	76	839	35	57	598
Future Vol, veh/h	22	76	839	35	57	598
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	24	82	902	38	61	643
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1687	921	0	0	940	0
Stage 1	921	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	103	326	-	-	725	-
Stage 1	386	-	-	-	-	-
Stage 2	457	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	94	326	-	-	725	-
Mov Cap-2 Maneuver	226	-	-	-	-	-
Stage 1	386	-	-	-	-	-
Stage 2	419	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	23.6	0		0.9		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 297	725	-		
HCM Lane V/C Ratio	-	- 0.355	0.085	-		
HCM Control Delay (s)	-	- 23.6	10.4	-		
HCM Lane LOS	-	- C	B	-		
HCM 95th %tile Q(veh)	-	- 1.6	0.3	-		

Intersection												
Int Delay, s/veh	45.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔		↖↗		↖↗		↔↔		↖↗		↖↗
Traffic Vol, veh/h	2	0	0	180	0	421	0	378	85	193	387	0
Future Vol, veh/h	2	0	0	180	0	421	0	378	85	193	387	0
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	-	-	Yield	-	-	Yield	-	-	None
Storage Length	-	-	-	0	-	240	-	-	-	120	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	8	2	8	2	3	3	3	3	2
Mvmt Flow	2	0	0	196	0	458	0	411	92	210	421	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1251	1251	421	1251	-	411	421	0	0	411	0	0
Stage 1	840	840	-	411	-	-	-	-	-	-	-	-
Stage 2	411	411	-	840	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.18	-	6.28	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.18	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.18	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.572	-	3.372	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	149	172	632	~ 145	0	628	1138	-	-	1142	-	-
Stage 1	360	381	-	606	0	-	-	-	-	-	-	-
Stage 2	618	595	-	351	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	35	140	632	~ 125	-	628	1138	-	-	1142	-	-
Mov Cap-2 Maneuver	35	140	-	~ 125	-	-	-	-	-	-	-	-
Stage 1	360	311	-	606	-	-	-	-	-	-	-	-
Stage 2	168	595	-	286	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	114.6			122.6			0			2.9		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	1138	-	-	35	125	628	1142	-	-			
HCM Lane V/C Ratio	-	-	-	0.062	1.565	0.729	0.184	-	-			
HCM Control Delay (s)	0	-	-	114.6	351.9	24.6	8.9	-	-			
HCM Lane LOS	A	-	-	F	F	C	A	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.2	14.1	6.2	0.7	-	-			
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑		↕	
Traffic Vol, veh/h	22	270	465	0	0	21
Future Vol, veh/h	22	270	465	0	0	21
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	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	25	307	528	0	0	24
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	528	0	-	0	885	528
Stage 1	-	-	-	-	528	-
Stage 2	-	-	-	-	357	-
Critical Hdwy	4.15	-	-	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	2.245	-	-	-	3.545	3.345
Pot Cap-1 Maneuver	1024	-	-	0	312	544
Stage 1	-	-	-	0	586	-
Stage 2	-	-	-	0	702	-
Platoon blocked, %		-		-		
Mov Cap-1 Maneuver	1024	-	-	-	303	544
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	682	-
Approach	EB		WB		SB	
HCM Control Delay, s	0.6		0		11.9	
HCM LOS					B	
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	1024	-	-	544		
HCM Lane V/C Ratio	0.024	-	-	0.044		
HCM Control Delay (s)	8.6	0	-	11.9		
HCM Lane LOS	A	A	-	B		
HCM 95th %tile Q(veh)	0.1	-	-	0.1		

Intersection							
Int Delay, s/veh	1.7						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Vol, veh/h	40	279	447	0	0	88	
Future Vol, veh/h	40	279	447	0	0	88	
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	-	-	-	0	130	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	88	88	88	88	88	88	
Heavy Vehicles, %	4	4	4	4	4	4	
Mvmt Flow	45	317	508	0	0	100	
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	508	0	-	0	916	508	
Stage 1	-	-	-	-	508	-	
Stage 2	-	-	-	-	408	-	
Critical Hdwy	4.14	-	-	-	6.44	6.24	
Critical Hdwy Stg 1	-	-	-	-	5.44	-	
Critical Hdwy Stg 2	-	-	-	-	5.44	-	
Follow-up Hdwy	2.236	-	-	-	3.536	3.336	
Pot Cap-1 Maneuver	1047	-	-	-	300	561	
Stage 1	-	-	-	-	600	-	
Stage 2	-	-	-	-	667	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1047	-	-	-	287	561	
Mov Cap-2 Maneuver	-	-	-	-	287	-	
Stage 1	-	-	-	-	600	-	
Stage 2	-	-	-	-	638	-	
Approach	EB		WB		SB		
HCM Control Delay, s	1.1		0		12.8		
HCM LOS					B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	1047	-	-	-	-	561	
HCM Lane V/C Ratio	0.043	-	-	-	-	0.178	
HCM Control Delay (s)	8.6	-	-	-	0	12.8	
HCM Lane LOS	A	-	-	-	A	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.6	

Intersection	
Intersection Delay, s/veh	7.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↔				↔				↔	
Traffic Vol, veh/h	0	8	15	19	0	0	30	0	0	19	0	4
Future Vol, veh/h	0	8	15	19	0	0	30	0	0	19	0	4
Peak Hour Factor	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	9	17	22	0	0	34	0	0	22	0	5
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.1	7.3	7.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	83%	19%	0%	7%
Vol Thru, %	0%	36%	100%	13%
Vol Right, %	17%	45%	0%	80%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	23	42	30	30
LT Vol	19	8	0	2
Through Vol	0	15	30	4
RT Vol	4	19	0	24
Lane Flow Rate	26	48	34	34
Geometry Grp	1	1	1	1
Degree of Util (X)	0.03	0.051	0.039	0.034
Departure Headway (Hd)	4.161	3.83	4.073	3.627
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	858	934	878	982
Service Time	2.2	1.859	2.103	1.668
HCM Lane V/C Ratio	0.03	0.051	0.039	0.035
HCM Control Delay	7.3	7.1	7.3	6.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.1	0.1

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	2	4	24
Future Vol, veh/h	0	2	4	24
Peak Hour Factor	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	5	27
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	6.8
HCM LOS	A

Intersection

Int Delay, s/veh 2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Vol, veh/h	14	248	8	2	295	5	24	0	7	16	2	48
Future Vol, veh/h	14	248	8	2	295	5	24	0	7	16	2	48
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	10
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	282	9	2	335	6	27	0	8	18	2	55

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	341	0	0	291	0	0	662	663	286	665	666	338
Stage 1	-	-	-	-	-	-	318	318	-	343	343	-
Stage 2	-	-	-	-	-	-	344	345	-	322	323	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1218	-	-	1271	-	-	375	382	753	374	380	704
Stage 1	-	-	-	-	-	-	693	654	-	672	637	-
Stage 2	-	-	-	-	-	-	671	636	-	690	650	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1218	-	-	1271	-	-	340	375	753	365	373	704
Mov Cap-2 Maneuver	-	-	-	-	-	-	340	375	-	365	373	-
Stage 1	-	-	-	-	-	-	682	644	-	661	636	-
Stage 2	-	-	-	-	-	-	616	635	-	672	640	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	15.2	11.8
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	388	1218	-	-	1271	-	-	366	704
HCM Lane V/C Ratio	0.091	0.013	-	-	0.002	-	-	0.056	0.077
HCM Control Delay (s)	15.2	8	0	-	7.8	0	-	15.4	10.5
HCM Lane LOS	C	A	A	-	A	A	-	C	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2	0.3

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	219	52	0	249	51	0
Future Vol, veh/h	219	52	0	249	51	0
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	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	249	59	0	283	58	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	308	0	561	278
Stage 1	-	-	-	-	278	-
Stage 2	-	-	-	-	283	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1247	-	487	758
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	763	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1247	-	487	758
Mov Cap-2 Maneuver	-	-	-	-	487	-
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	763	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		13.4	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	487	-	-	1247	-	
HCM Lane V/C Ratio	0.119	-	-	-	-	
HCM Control Delay (s)	13.4	-	-	0	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0	-	

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Traffic Vol, veh/h	0	270	465	65	47	0
Future Vol, veh/h	0	270	465	65	47	0
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	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	0	307	528	74	53	0
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	872	565
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	307	-
Critical Hdwy	-	-	-	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	-	-	3.545	3.345
Pot Cap-1 Maneuver	0	-	-	-	317	519
Stage 1	0	-	-	-	563	-
Stage 2	0	-	-	-	739	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	317	519
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	563	-
Stage 2	-	-	-	-	739	-
Approach	EB		WB		SB	
HCM Control Delay, s	0		0		18.6	
HCM LOS					C	
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	317		
HCM Lane V/C Ratio	-	-	-	0.168		
HCM Control Delay (s)	-	-	-	18.6		
HCM Lane LOS	-	-	-	C		
HCM 95th %tile Q(veh)	-	-	-	0.6		

Intersection						
Int Delay, s/veh	278.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰		↱		↰	↱
Traffic Vol, veh/h	350	18	402	322	25	1131
Future Vol, veh/h	350	18	402	322	25	1131
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	0	-	-	-	130	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	11	11	11	11	11	11
Mvmt Flow	376	19	432	346	27	1216
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1702	432	0	-	432	0
Stage 1	432	-	-	-	-	-
Stage 2	1270	-	-	-	-	-
Critical Hdwy	6.51	6.31	-	-	4.21	-
Critical Hdwy Stg 1	5.51	-	-	-	-	-
Critical Hdwy Stg 2	5.51	-	-	-	-	-
Follow-up Hdwy	3.599	3.399	-	-	2.299	-
Pot Cap-1 Maneuver	~ 96	605	-	0	1081	-
Stage 1	636	-	-	0	-	-
Stage 2	~ 253	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 94	605	-	-	1081	-
Mov Cap-2 Maneuver	~ 94	-	-	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	~ 247	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	\$ 1455.9		0		0.2	
HCM LOS	F					
Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT			
Capacity (veh/h)	- 98	1081	-			
HCM Lane V/C Ratio	- 4.038	0.025	-			
HCM Control Delay (s)	\$ 1455.9	8.4	-			
HCM Lane LOS	- F	A	-			
HCM 95th %tile Q(veh)	- 40.8	0.1	-			
Notes						
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined		*: All major volume in platoon		

Intersection							
Int Delay, s/veh	62.6						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Vol, veh/h	80	134	77	647	1363	101	
Future Vol, veh/h	80	134	77	647	1363	101	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	5	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	9	9	9	9	9	9	
Mvmt Flow	87	146	84	703	1482	110	
Major/Minor	Minor2	Major1		Major2			
Conflicting Flow All	2407	1536	1591	0	-	0	
Stage 1	1536	-	-	-	-	-	
Stage 2	871	-	-	-	-	-	
Critical Hdwy	6.49	6.29	4.19	-	-	-	
Critical Hdwy Stg 1	5.49	-	-	-	-	-	
Critical Hdwy Stg 2	5.49	-	-	-	-	-	
Follow-up Hdwy	3.581	3.381	2.281	-	-	-	
Pot Cap-1 Maneuver	~ 35	~ 137	393	-	-	-	
Stage 1	189	-	-	-	-	-	
Stage 2	398	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	~ 23	~ 137	393	-	-	-	
Mov Cap-2 Maneuver	~ 23	-	-	-	-	-	
Stage 1	189	-	-	-	-	-	
Stage 2	258	-	-	-	-	-	
Approach	EB	NB		SB			
HCM Control Delay, s	\$ 696.7	1.8		0			
HCM LOS	F						
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	393	-	23	137	-	-	
HCM Lane V/C Ratio	0.213	-	3.781	1.063	-	-	
HCM Control Delay (s)	16.6	\$ 1598.2	158.5	-	-	-	
HCM Lane LOS	C	A	F	F	-	-	
HCM 95th %tile Q(veh)	0.8	-	11	8	-	-	
Notes							
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined		*: All major volume in platoon			

Intersection						
Int Delay, s/veh	1.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	18	86	16	9	131
Future Vol, veh/h	25	18	86	16	9	131
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	17	17	17	17	17	17
Mvmt Flow	28	20	98	18	10	149
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	276	107	0	0	116	0
Stage 1	107	-	-	-	-	-
Stage 2	169	-	-	-	-	-
Critical Hdwy	6.57	6.37	-	-	4.27	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.453	-	-	2.353	-
Pot Cap-1 Maneuver	683	908	-	-	1384	-
Stage 1	881	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	678	908	-	-	1384	-
Mov Cap-2 Maneuver	678	-	-	-	-	-
Stage 1	881	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	10.1		0		0.5	
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 758	1384	-		
HCM Lane V/C Ratio	-	- 0.064	0.007	-		
HCM Control Delay (s)	-	- 10.1	7.6	0		
HCM Lane LOS	-	- B	A	A		
HCM 95th %tile Q(veh)	-	- 0.2	0	-		

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	61	70	760	1519	32
Future Vol, veh/h	14	61	70	760	1519	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	75	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	15	66	76	826	1651	35
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	2646	1668	1686	0	-	0
Stage 1	1668	-	-	-	-	-
Stage 2	978	-	-	-	-	-
Critical Hdwy	6.48	6.28	4.18	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.372	2.272	-	-	-
Pot Cap-1 Maneuver	24	115	363	-	-	-
Stage 1	163	-	-	-	-	-
Stage 2	355	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	19	115	363	-	-	-
Mov Cap-2 Maneuver	102	-	-	-	-	-
Stage 1	163	-	-	-	-	-
Stage 2	281	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	95.4	1.5		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	363	-	112	-	-	
HCM Lane V/C Ratio	0.21	-	0.728	-	-	
HCM Control Delay (s)	17.5	-	95.4	-	-	
HCM Lane LOS	C	-	F	-	-	
HCM 95th %tile Q(veh)	0.8	-	3.9	-	-	

Intersection						
Int Delay, s/veh	202.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑	↑	↑	↑
Traffic Vol, veh/h	68	120	723	100	320	1232
Future Vol, veh/h	68	120	723	100	320	1232
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	40	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	73	129	777	108	344	1325
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2790	777	0	0	777	0
Stage 1	777	-	-	-	-	-
Stage 2	2013	-	-	-	-	-
Critical Hdwy	6.48	6.28	-	-	4.18	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.372	-	-	2.272	-
Pot Cap-1 Maneuver	~ 20	387	-	-	813	-
Stage 1	443	-	-	-	-	-
Stage 2	109	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 12	387	-	-	813	-
Mov Cap-2 Maneuver	~ 12	-	-	-	-	-
Stage 1	443	-	-	-	-	-
Stage 2	~ 63	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	\$ 2735.9		0		2.6	
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 31	813	-		
HCM Lane V/C Ratio	-	- 6.521	0.423	-		
HCM Control Delay (s)	-	\$ 2735.9	12.6	-		
HCM Lane LOS	-	- F	B	-		
HCM 95th %tile Q(veh)	-	- 24.5	2.1	-		
Notes						
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined		*: All major volume in platoon		

Intersection												
Int Delay, s/veh	184.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↘		↙	↘	
Traffic Vol, veh/h	20	0	77	32	7	103	46	774	6	84	1105	7
Future Vol, veh/h	20	0	77	32	7	103	46	774	6	84	1105	7
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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	23	0	88	36	8	117	52	880	7	95	1256	8
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2501	2442	1260	2481	2442	883	1264	0	0	886	0	0
Stage 1	1451	1451	-	987	987	-	-	-	-	-	-	-
Stage 2	1050	991	-	1494	1455	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.62	6.32	7.22	6.62	6.32	4.22	-	-	4.22	-	-
Critical Hdwy Stg 1	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.108	3.408	3.608	4.108	3.408	2.308	-	-	2.308	-	-
Pot Cap-1 Maneuver	~ 18	29	198	~ 19	29	331	517	-	-	724	-	-
Stage 1	154	186	-	286	313	-	-	-	-	-	-	-
Stage 2	263	311	-	146	185	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 7	23	198	~ 9	23	331	517	-	-	724	-	-
Mov Cap-2 Maneuver	~ 7	23	-	~ 9	23	-	-	-	-	-	-	-
Stage 1	139	162	-	257	282	-	-	-	-	-	-	-
Stage 2	149	280	-	71	161	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	\$ 1475.3			\$ 1921.5			0.7			0.8		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	517	-	-	30	34	724	-	-				
HCM Lane V/C Ratio	0.101	-	-	3.674	4.746	0.132	-	-				
HCM Control Delay (s)	12.7	-	-	\$ 1475.3	\$ 1921.5	10.7	-	-				
HCM Lane LOS	B	-	-	F	F	B	-	-				
HCM 95th %tile Q(veh)	0.3	-	-	13.2	19.1	0.5	-	-				
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Intersection												
Int Delay, s/veh		6.6										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔					↔	↔		↔	↔	
Traffic Vol, veh/h	13	11	54	0	0	0	51	820	86	127	973	7
Future Vol, veh/h	13	11	54	0	0	0	51	820	86	127	973	7
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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	11	11	11	11	11	11	11	11	11	11	11	11
Mvmt Flow	14	12	59	0	0	0	55	891	93	138	1058	8
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	2387	2434	1061				1065	0	0	985	0	0
Stage 1	1338	1338	-				-	-	-	-	-	-
Stage 2	1049	1096	-				-	-	-	-	-	-
Critical Hdwy	6.51	6.61	6.31				4.21	-	-	4.21	-	-
Critical Hdwy Stg 1	5.51	5.61	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.51	5.61	-				-	-	-	-	-	-
Follow-up Hdwy	3.599	4.099	3.399				2.299	-	-	2.299	-	-
Pot Cap-1 Maneuver	35	30	261				621	-	-	667	-	-
Stage 1	234	213	-				-	-	-	-	-	-
Stage 2	324	279	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	25	0	261				621	-	-	667	-	-
Mov Cap-2 Maneuver	25	0	-				-	-	-	-	-	-
Stage 1	186	0	-				-	-	-	-	-	-
Stage 2	295	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	155.1						0.6			1.4		
HCM LOS	F											
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR					
Capacity (veh/h)	621	-	-	92	667	-	-					
HCM Lane V/C Ratio	0.089	-	-	0.922	0.207	-	-					
HCM Control Delay (s)	11.4	-	-	155.1	11.8	-	-					
HCM Lane LOS	B	-	-	F	B	-	-					
HCM 95th %tile O(veh)	0.3	-	-	5.2	0.8	-	-					

Intersection						
Int Delay, s/veh	3.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	34	65	1194	49	39	1105
Future Vol, veh/h	34	65	1194	49	39	1105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	39	74	1357	56	44	1256
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2729	1385	0	0	1413	0
Stage 1	1385	-	-	-	-	-
Stage 2	1344	-	-	-	-	-
Critical Hdwy	6.49	6.29	-	-	4.19	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	-	-	2.281	-
Pot Cap-1 Maneuver	~ 21	169	-	-	461	-
Stage 1	224	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 19	169	-	-	461	-
Mov Cap-2 Maneuver	108	-	-	-	-	-
Stage 1	224	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	89.5		0		0.5	
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 142	461	-		
HCM Lane V/C Ratio	-	- 0.792	0.096	-		
HCM Control Delay (s)	-	- 89.5	13.6	-		
HCM Lane LOS	-	- F	B	-		
HCM 95th %tile Q(veh)	-	- 4.9	0.3	-		
Notes						
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

Intersection												
Int Delay, s/veh	329											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	0	120	0	334	0	555	228	543	525	6
Future Vol, veh/h	2	2	0	120	0	334	0	555	228	543	525	6
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	-	-	Yield	-	-	Yield	-	-	None
Storage Length	-	-	-	0	-	240	-	-	-	120	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	2	10	2	10	10	10	10	2
Mvmt Flow	2	2	0	130	0	363	0	603	248	590	571	7
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2357	2357	574	2358	-	603	577	0	0	603	0	0
Stage 1	1754	1754	-	603	-	-	-	-	-	-	-	-
Stage 2	603	603	-	1755	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.2	-	6.3	4.12	-	-	4.2	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.2	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.2	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.59	-	3.39	2.218	-	-	2.29	-	-
Pot Cap-1 Maneuver	25	36	518	~ 23	0	485	996	-	-	937	-	-
Stage 1	108	139	-	472	0	-	-	-	-	-	-	-
Stage 2	486	488	-	~ 103	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	3	13	518	~ 10	-	485	996	-	-	937	-	-
Mov Cap-2 Maneuver	3	13	-	~ 10	-	-	-	-	-	-	-	-
Stage 1	108	51	-	472	-	-	-	-	-	-	-	-
Stage 2	122	488	-	~ 37	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	\$ 1227.3			\$ 1648.6			0			7.7		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	996	-	-	5	10	485	937	-	-			
HCM Lane V/C Ratio	-	-	-	0.87	13.043	0.749	0.63	-	-			
HCM Control Delay (s)	0	-	\$ 1227.3	\$ 6149.8	31.4	15.1	-	-	-			
HCM Lane LOS	A	-	-	F	F	D	C	-	-			
HCM 95th %tile Q(veh)	0	-	-	1.2	17.8	6.3	4.6	-	-			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↱	↑		↰	
Traffic Vol, veh/h	23	617	409	0	0	39
Future Vol, veh/h	23	617	409	0	0	39
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	88	88	88	88	88	88
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	26	701	465	0	0	44
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	465	0	-	0	1218	465
Stage 1	-	-	-	-	465	-
Stage 2	-	-	-	-	753	-
Critical Hdwy	4.18	-	-	-	6.48	6.28
Critical Hdwy Stg 1	-	-	-	-	5.48	-
Critical Hdwy Stg 2	-	-	-	-	5.48	-
Follow-up Hdwy	2.272	-	-	-	3.572	3.372
Pot Cap-1 Maneuver	1066	-	-	0	194	585
Stage 1	-	-	-	0	620	-
Stage 2	-	-	-	0	455	-
Platoon blocked, %		-		-		
Mov Cap-1 Maneuver	1066	-	-	-	186	585
Mov Cap-2 Maneuver	-	-	-	-	186	-
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	437	-
Approach	EB		WB		SB	
HCM Control Delay, s	0.3		0		11.7	
HCM LOS					B	
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	1066	-	-	585		
HCM Lane V/C Ratio	0.025	-	-	0.076		
HCM Control Delay (s)	8.5	0	-	11.7		
HCM Lane LOS	A	A	-	B		
HCM 95th %tile Q(veh)	0.1	-	-	0.2		

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	160	548	464	2	0	27
Future Vol, veh/h	160	548	464	2	0	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	-	-	-	0	130
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	182	623	527	2	0	31
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	530	0	-	0	1514	528
Stage 1	-	-	-	-	528	-
Stage 2	-	-	-	-	986	-
Critical Hdwy	4.17	-	-	-	6.47	6.27
Critical Hdwy Stg 1	-	-	-	-	5.47	-
Critical Hdwy Stg 2	-	-	-	-	5.47	-
Follow-up Hdwy	2.263	-	-	-	3.563	3.363
Pot Cap-1 Maneuver	1012	-	-	-	128	541
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	354	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1012	-	-	-	105	541
Mov Cap-2 Maneuver	-	-	-	-	105	-
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	290	-
Approach	EB		WB		SB	
HCM Control Delay, s	2.1		0		12.1	
HCM LOS					B	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1012	-	-	-	-	541
HCM Lane V/C Ratio	0.18	-	-	-	-	0.057
HCM Control Delay (s)	9.3	-	-	-	0	12.1
HCM Lane LOS	A	-	-	-	A	B
HCM 95th %tile Q(veh)	0.7	-	-	-	-	0.2

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	56	14	44	0	7	11	2	0	25	7	4
Future Vol, veh/h	0	56	14	44	0	7	11	2	0	25	7	4
Peak Hour Factor	0.92	0.86	0.88	0.88	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	65	16	50	0	8	13	2	0	28	8	5
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	7.3	7.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	69%	49%	35%	0%
Vol Thru, %	19%	12%	55%	24%
Vol Right, %	11%	39%	10%	76%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	36	114	20	17
LT Vol	25	56	7	0
Through Vol	7	14	11	4
RT Vol	4	44	2	13
Lane Flow Rate	41	131	23	19
Geometry Grp	1	1	1	1
Degree of Util (X)	0.049	0.143	0.026	0.02
Departure Headway (Hd)	4.287	3.921	4.147	3.771
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	828	912	857	936
Service Time	2.353	1.958	2.202	1.847
HCM Lane V/C Ratio	0.05	0.144	0.027	0.02
HCM Control Delay	7.6	7.6	7.3	6.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.5	0.1	0.1

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	0	4	13
Future Vol, veh/h	0	0	4	13
Peak Hour Factor	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	5	15
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	6.9
HCM LOS	A

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Vol, veh/h	70	280	7	4	428	30	2	0	4	13	0	7
Future Vol, veh/h	70	280	7	4	428	30	2	0	4	13	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	10
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8	8	8	8	8	8	8
Mvmt Flow	76	304	8	4	465	33	2	0	4	14	0	8
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	498	0	0	312	0	0	950	967	308	952	954	482
Stage 1	-	-	-	-	-	-	460	460	-	490	490	-
Stage 2	-	-	-	-	-	-	490	507	-	462	464	-
Critical Hdwy	4.18	-	-	4.18	-	-	7.18	6.58	6.28	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	5.58	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	5.58	-	6.18	5.58	-
Follow-up Hdwy	2.272	-	-	2.272	-	-	3.572	4.072	3.372	3.572	4.072	3.372
Pot Cap-1 Maneuver	1036	-	-	1215	-	-	234	248	718	233	253	572
Stage 1	-	-	-	-	-	-	570	556	-	549	539	-
Stage 2	-	-	-	-	-	-	549	529	-	568	554	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1036	-	-	1215	-	-	214	225	718	215	229	572
Mov Cap-2 Maneuver	-	-	-	-	-	-	214	225	-	215	229	-
Stage 1	-	-	-	-	-	-	519	507	-	500	536	-
Stage 2	-	-	-	-	-	-	539	526	-	514	505	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.7			0.1			14.1			18.9		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	402	1036	-	-	1215	-	-	215	572			
HCM Lane V/C Ratio	0.016	0.073	-	-	0.004	-	-	0.066	0.013			
HCM Control Delay (s)	14.1	8.8	0	-	8	0	-	22.9	11.4			
HCM Lane LOS	B	A	A	-	A	A	-	C	B			
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	0.2	0			

Intersection						
Int Delay, s/veh	1.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	244	53	7	377	82	2
Future Vol, veh/h	244	53	7	377	82	2
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, %	8	8	8	8	8	8
Mvmt Flow	257	56	7	397	86	2
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	313	0	697	285
Stage 1	-	-	-	-	285	-
Stage 2	-	-	-	-	412	-
Critical Hdwy	-	-	4.18	-	6.48	6.28
Critical Hdwy Stg 1	-	-	-	-	5.48	-
Critical Hdwy Stg 2	-	-	-	-	5.48	-
Follow-up Hdwy	-	-	2.272	-	3.572	3.372
Pot Cap-1 Maneuver	-	-	1214	-	398	740
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	656	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1214	-	395	740
Mov Cap-2 Maneuver	-	-	-	-	395	-
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	651	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		16.6	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	399	-	-	1214	-	
HCM Lane V/C Ratio	0.222	-	-	0.006	-	
HCM Control Delay (s)	16.6	-	-	8	0	
HCM Lane LOS	C	-	-	A	A	
HCM 95th %tile Q(veh)	0.8	-	-	0	-	

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Traffic Vol, veh/h	0	617	409	94	93	0
Future Vol, veh/h	0	617	409	94	93	0
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	88	88	88	88	88	88
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	701	465	107	106	0
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1219	518
Stage 1	-	-	-	-	518	-
Stage 2	-	-	-	-	701	-
Critical Hdwy	-	-	-	-	6.48	6.28
Critical Hdwy Stg 1	-	-	-	-	5.48	-
Critical Hdwy Stg 2	-	-	-	-	5.48	-
Follow-up Hdwy	-	-	-	-	3.572	3.372
Pot Cap-1 Maneuver	0	-	-	-	194	546
Stage 1	0	-	-	-	586	-
Stage 2	0	-	-	-	481	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	194	546
Mov Cap-2 Maneuver	-	-	-	-	194	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	481	-
Approach	EB		WB		SB	
HCM Control Delay, s	0		0		43.8	
HCM LOS					E	
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	194		
HCM Lane V/C Ratio	-	-	-	0.545		
HCM Control Delay (s)	-	-	-	43.8		
HCM Lane LOS	-	-	-	E		
HCM 95th %tile Q(veh)	-	-	-	2.9		

Intersection						
Int Delay, s/veh	136.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	338	7	751	544	27	404
Future Vol, veh/h	338	7	751	544	27	404
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	0	-	-	-	130	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	367	8	816	591	29	439
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1314	816	0	-	816	0
Stage 1	816	-	-	-	-	-
Stage 2	498	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	~ 174	375	-	0	807	-
Stage 1	433	-	-	0	-	-
Stage 2	609	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	~ 168	375	-	-	807	-
Mov Cap-2 Maneuver	~ 168	-	-	-	-	-
Stage 1	433	-	-	-	-	-
Stage 2	587	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	\$ 605.1		0		0.6	
HCM LOS	F					
Minor Lane/Major Mvmt	NBTWBLn1	SBL	SBT			
Capacity (veh/h)	- 170	807	-			
HCM Lane V/C Ratio	- 2.206	0.036	-			
HCM Control Delay (s)	-\$ 605.1	9.6	-			
HCM Lane LOS	- F	A	-			
HCM 95th %tile Q(veh)	- 30.3	0.1	-			
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Intersection							
Int Delay, s/veh	157.2						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Vol, veh/h	117	68	115	1191	671	58	
Future Vol, veh/h	117	68	115	1191	671	58	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	5	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	127	74	125	1295	729	63	
Major/Minor	Minor2	Major1		Major2			
Conflicting Flow All	2306	761	792	0	-	0	
Stage 1	761	-	-	-	-	-	
Stage 2	1545	-	-	-	-	-	
Critical Hdwy	6.42	6.22	4.12	-	-	-	
Critical Hdwy Stg 1	5.42	-	-	-	-	-	
Critical Hdwy Stg 2	5.42	-	-	-	-	-	
Follow-up Hdwy	3.518	3.318	2.218	-	-	-	
Pot Cap-1 Maneuver	~ 42	405	829	-	-	-	
Stage 1	461	-	-	-	-	-	
Stage 2	194	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	~ 19	405	829	-	-	-	
Mov Cap-2 Maneuver	~ 19	-	-	-	-	-	
Stage 1	461	-	-	-	-	-	
Stage 2	~ 90	-	-	-	-	-	
Approach	EB	NB		SB			
HCM Control Delay, s	\$ 1879.6	0.9		0			
HCM LOS	F						
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR	
Capacity (veh/h)	829	-	19	405	-	-	
HCM Lane V/C Ratio	0.151	-	6.693	0.183	-	-	
HCM Control Delay (s)	10.1	\$ 2962.7	15.9	-	-	-	
HCM Lane LOS	B	A	F	C	-	-	
HCM 95th %tile Q(veh)	0.5	-	16.4	0.7	-	-	
Notes							
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined		*: All major volume in platoon			

HCM 2010 TWSC
3: Pool Station Road & Russell Road

Theoretical Buildout Growth Scenario

PM Peak Hour

Intersection						
Int Delay, s/veh	1.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	6	73	20	20	51
Future Vol, veh/h	13	6	73	20	20	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	14	7	79	22	22	55
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	189	90	0	0	101	0
Stage 1	90	-	-	-	-	-
Stage 2	99	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	802	971	-	-	1498	-
Stage 1	936	-	-	-	-	-
Stage 2	927	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	790	971	-	-	1498	-
Mov Cap-2 Maneuver	790	-	-	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	913	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	9.4		0		2.1	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 839	1498	-		
HCM Lane V/C Ratio	-	- 0.025	0.015	-		
HCM Control Delay (s)	-	- 9.4	7.4	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0.1	0	-		

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	86	70	1269	753	30
Future Vol, veh/h	23	86	70	1269	753	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	75	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	25	93	76	1379	818	33
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	2367	835	851	0	-	0
Stage 1	835	-	-	-	-	-
Stage 2	1532	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	38	366	783	-	-	-
Stage 1	424	-	-	-	-	-
Stage 2	196	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	34	366	783	-	-	-
Mov Cap-2 Maneuver	127	-	-	-	-	-
Stage 1	424	-	-	-	-	-
Stage 2	177	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	29.6	0.5		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	783	-	262	-	-	
HCM Lane V/C Ratio	0.097	-	0.452	-	-	
HCM Control Delay (s)	10.1	-	29.6	-	-	
HCM Lane LOS	B	-	D	-	-	
HCM 95th %tile Q(veh)	0.3	-	2.2	-	-	

Intersection						
Int Delay, s/veh	22.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	28	113	1208	32	67	787
Future Vol, veh/h	28	113	1208	32	67	787
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	40	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	30	123	1313	35	73	855
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2314	1313	0	0	1313	0
Stage 1	1313	-	-	-	-	-
Stage 2	1001	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	41	193	-	-	523	-
Stage 1	250	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	35	193	-	-	523	-
Mov Cap-2 Maneuver	35	-	-	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	305	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	\$ 344.8		0		1	
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 102	523	-		
HCM Lane V/C Ratio	-	- 1.503	0.139	-		
HCM Control Delay (s)	-	-\$ 344.8	13	-		
HCM Lane LOS	-	- F	B	-		
HCM 95th %tile Q(veh)	-	- 11.4	0.5	-		
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Intersection												
Int Delay, s/veh	201.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	35	11	80	44	6	103	65	1116	13	20	751	11
Future Vol, veh/h	35	11	80	44	6	103	65	1116	13	20	751	11
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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	38	12	87	48	7	112	71	1213	14	22	816	12
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2287	2234	822	2276	2233	1220	828	0	0	1227	0	0
Stage 1	866	866	-	1361	1361	-	-	-	-	-	-	-
Stage 2	1421	1368	-	915	872	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.236	-	-	2.236	-	-
Pot Cap-1 Maneuver	~ 27	42	371	~ 28	42	217	795	-	-	561	-	-
Stage 1	345	368	-	181	214	-	-	-	-	-	-	-
Stage 2	167	212	-	324	365	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 10	37	371	~ 15	37	217	795	-	-	561	-	-
Mov Cap-2 Maneuver	~ 10	37	-	~ 15	37	-	-	-	-	-	-	-
Stage 1	314	354	-	165	195	-	-	-	-	-	-	-
Stage 2	71	193	-	230	351	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	\$ 1797			\$ 1483.6			0.5			0.3		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	795	-	-	31	43	561	-	-				
HCM Lane V/C Ratio	0.089	-	-	4.418	3.868	0.039	-	-				
HCM Control Delay (s)	10	-	-	\$ 1797	\$ 1483.6	11.7	-	-				
HCM Lane LOS	A	-	-	F	F	B	-	-				
HCM 95th %tile Q(veh)	0.3	-	-	16.4	18.7	0.1	-	-				
Notes												
~: Volume exceeds capacity	\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon					

Intersection												
Int Delay, s/veh		2.1										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔					↖	↗		↖	↗	
Traffic Vol, veh/h	6	6	63	0	0	0	65	1194	70	47	826	11
Future Vol, veh/h	6	6	63	0	0	0	65	1194	70	47	826	11
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	-	-	-	-	-	-	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	7	7	68	0	0	0	71	1298	76	51	898	12
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	2483	2521	904				910	0	0	1374	0	0
Stage 1	1006	1006	-				-	-	-	-	-	-
Stage 2	1477	1515	-				-	-	-	-	-	-
Critical Hdwy	6.43	6.53	6.23				4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.53	-				-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327				2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	32	28	334				744	-	-	496	-	-
Stage 1	352	318	-				-	-	-	-	-	-
Stage 2	208	181	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	26	0	334				744	-	-	496	-	-
Mov Cap-2 Maneuver	26	0	-				-	-	-	-	-	-
Stage 1	316	0	-				-	-	-	-	-	-
Stage 2	188	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	46.4						0.5			0.7		
HCM LOS	E											
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR					
Capacity (veh/h)	744	-	-	165	496	-	-					
HCM Lane V/C Ratio	0.095	-	-	0.494	0.103	-	-					
HCM Control Delay (s)	10.3	-	-	46.4	13.1	-	-					
HCM Lane LOS	B	-	-	E	B	-	-					
HCM 95th %tile O(veh)	0.3	-	-	2.4	0.3	-	-					

Intersection						
Int Delay, s/veh	7.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	108	1194	49	80	852
Future Vol, veh/h	32	108	1194	49	80	852
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	34	116	1284	53	86	916
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2398	1310	0	0	1337	0
Stage 1	1310	-	-	-	-	-
Stage 2	1088	-	-	-	-	-
Critical Hdwy	7.13	6.23	-	-	4.13	-
Critical Hdwy Stg 1	6.13	-	-	-	-	-
Critical Hdwy Stg 2	6.13	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	~ 23	193	-	-	513	-
Stage 1	195	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 20	193	-	-	513	-
Mov Cap-2 Maneuver	103	-	-	-	-	-
Stage 1	195	-	-	-	-	-
Stage 2	216	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	110.8		0		1.2	
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 161	513	-		
HCM Lane V/C Ratio	-	- 0.935	0.168	-		
HCM Control Delay (s)	-	- 110.8	13.4	-		
HCM Lane LOS	-	- F	B	-		
HCM 95th %tile Q(veh)	-	- 6.9	0.6	-		
Notes						
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined		*: All major volume in platoon		

Intersection												
Int Delay, s/veh	306.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖		↗		↕		↖		↗
Traffic Vol, veh/h	2	0	0	256	0	600	0	537	120	275	551	0
Future Vol, veh/h	2	0	0	256	0	600	0	537	120	275	551	0
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	-	-	Yield	-	-	Yield	-	-	None
Storage Length	-	-	-	0	-	240	-	-	-	120	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	8	2	8	2	3	3	3	3	2
Mvmt Flow	2	0	0	278	0	652	0	584	130	299	599	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1781	1781	599	1781	-	584	599	0	0	584	0	0
Stage 1	1197	1197	-	584	-	-	-	-	-	-	-	-
Stage 2	584	584	-	1197	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.18	-	6.28	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.18	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.18	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.572	-	3.372	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	64	82	502	~ 62	0	~ 500	978	-	-	986	-	-
Stage 1	227	259	-	487	0	-	-	-	-	-	-	-
Stage 2	498	498	-	~ 221	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	57	502	~ 47	-	~ 500	978	-	-	986	-	-
Mov Cap-2 Maneuver	-	57	-	~ 47	-	-	-	-	-	-	-	-
Stage 1	227	180	-	487	-	-	-	-	-	-	-	-
Stage 2	-	498	-	~ 154	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s				\$ 835.8			0			3.4		
HCM LOS	-			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	978	-	-	-	47	500	986	-	-			
HCM Lane V/C Ratio	-	-	-	-	5.92	1.304	0.303	-	-			
HCM Control Delay (s)	0	-	-	\$ 2384.4	175.1	10.2	-	-	-			
HCM Lane LOS	A	-	-	-	F	F	B	-	-			
HCM 95th %tile Q(veh)	0	-	-	-	32.2	27.8	1.3	-	-			
Notes												
~: Volume exceeds capacity	\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon				

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↑		↘	
Traffic Vol, veh/h	32	384	662	0	0	30
Future Vol, veh/h	32	384	662	0	0	30
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	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	36	436	752	0	0	34
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	752	0	-	0	1261	752
Stage 1	-	-	-	-	752	-
Stage 2	-	-	-	-	509	-
Critical Hdwy	4.15	-	-	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	2.245	-	-	-	3.545	3.345
Pot Cap-1 Maneuver	844	-	-	0	185	405
Stage 1	-	-	-	0	460	-
Stage 2	-	-	-	0	597	-
Platoon blocked, %		-		-		
Mov Cap-1 Maneuver	844	-	-	-	175	405
Mov Cap-2 Maneuver	-	-	-	-	175	-
Stage 1	-	-	-	-	460	-
Stage 2	-	-	-	-	564	-
Approach	EB		WB		SB	
HCM Control Delay, s	0.7		0		14.7	
HCM LOS					B	
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1		
Capacity (veh/h)	844	-	-	405		
HCM Lane V/C Ratio	0.043	-	-	0.084		
HCM Control Delay (s)	9.5	0	-	14.7		
HCM Lane LOS	A	A	-	B		
HCM 95th %tile Q(veh)	0.1	-	-	0.3		

Intersection							
Int Delay, s/veh	2.3						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Vol, veh/h	56	397	636	0	0	126	
Future Vol, veh/h	56	397	636	0	0	126	
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	-	-	-	0	130	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	88	88	88	88	88	88	
Heavy Vehicles, %	4	4	4	4	4	4	
Mvmt Flow	64	451	723	0	0	143	
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	723	0	-	0	1301	723	
Stage 1	-	-	-	-	723	-	
Stage 2	-	-	-	-	578	-	
Critical Hdwy	4.14	-	-	-	6.44	6.24	
Critical Hdwy Stg 1	-	-	-	-	5.44	-	
Critical Hdwy Stg 2	-	-	-	-	5.44	-	
Follow-up Hdwy	2.236	-	-	-	3.536	3.336	
Pot Cap-1 Maneuver	870	-	-	-	176	423	
Stage 1	-	-	-	-	477	-	
Stage 2	-	-	-	-	557	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	870	-	-	-	163	423	
Mov Cap-2 Maneuver	-	-	-	-	163	-	
Stage 1	-	-	-	-	477	-	
Stage 2	-	-	-	-	516	-	
Approach	EB		WB		SB		
HCM Control Delay, s	1.2		0		17.8		
HCM LOS					C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	870	-	-	-	-	423	
HCM Lane V/C Ratio	0.073	-	-	-	-	0.338	
HCM Control Delay (s)	9.5	-	-	-	0	17.8	
HCM Lane LOS	A	-	-	-	A	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	-	1.5	

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↔				↔				↔	
Traffic Vol, veh/h	0	11	21	27	0	0	42	0	0	27	0	6
Future Vol, veh/h	0	11	21	27	0	0	42	0	0	27	0	6
Peak Hour Factor	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	13	24	31	0	0	48	0	0	31	0	7
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.2	7.4	7.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	82%	19%	0%	5%
Vol Thru, %	0%	36%	100%	14%
Vol Right, %	18%	46%	0%	81%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	33	59	42	42
LT Vol	27	11	0	2
Through Vol	0	21	42	6
RT Vol	6	27	0	34
Lane Flow Rate	38	67	48	48
Geometry Grp	1	1	1	1
Degree of Util (X)	0.044	0.072	0.055	0.049
Departure Headway (Hd)	4.224	3.879	4.132	3.684
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	842	919	862	963
Service Time	2.279	1.925	2.178	1.742
HCM Lane V/C Ratio	0.045	0.073	0.056	0.05
HCM Control Delay	7.5	7.2	7.4	6.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.2	0.2

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↔	
Traffic Vol, veh/h	0	2	6	34
Future Vol, veh/h	0	2	6	34
Peak Hour Factor	0.92	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	7	39
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	6.9
HCM LOS	A

Intersection

Int Delay, s/veh 2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Vol, veh/h	20	353	11	2	419	7	34	0	9	23	2	68
Future Vol, veh/h	20	353	11	2	419	7	34	0	9	23	2	68
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	10
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	401	13	2	476	8	39	0	10	26	2	77

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	484	0	0	414	0	0	939	942	407	943	944	480
Stage 1	-	-	-	-	-	-	453	453	-	485	485	-
Stage 2	-	-	-	-	-	-	486	489	-	458	459	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1079	-	-	1145	-	-	244	263	644	243	262	586
Stage 1	-	-	-	-	-	-	586	570	-	563	552	-
Stage 2	-	-	-	-	-	-	563	549	-	583	566	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1079	-	-	1145	-	-	206	255	644	234	254	586
Mov Cap-2 Maneuver	-	-	-	-	-	-	206	255	-	234	254	-
Stage 1	-	-	-	-	-	-	570	554	-	547	551	-
Stage 2	-	-	-	-	-	-	486	548	-	558	550	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	23.8	14.9
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	240	1079	-	-	1145	-	-	235	586
HCM Lane V/C Ratio	0.204	0.021	-	-	0.002	-	-	0.121	0.132
HCM Control Delay (s)	23.8	8.4	0	-	8.2	0	-	22.4	12.1
HCM Lane LOS	C	A	A	-	A	A	-	C	B
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0	-	-	0.4	0.5

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	311	73	0	355	72	0
Future Vol, veh/h	311	73	0	355	72	0
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	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	353	83	0	403	82	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	436	0	798	395
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	403	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1118	-	354	652
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	673	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1118	-	354	652
Mov Cap-2 Maneuver	-	-	-	-	354	-
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	673	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		18.2	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	354	-	-	1118	-	
HCM Lane V/C Ratio	0.231	-	-	-	-	
HCM Control Delay (s)	18.2	-	-	0	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.9	-	-	0	-	

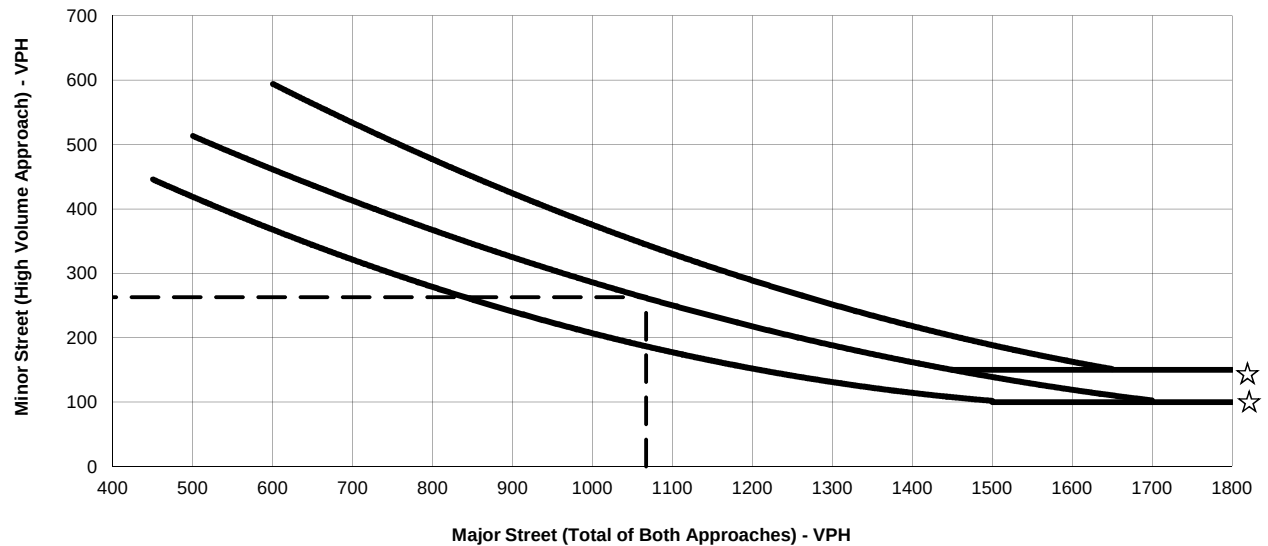
Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Traffic Vol, veh/h	0	384	662	93	67	0
Future Vol, veh/h	0	384	662	93	67	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	0	436	752	106	76	0
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1241	805
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	436	-
Critical Hdwy	-	-	-	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	-	-	3.545	3.345
Pot Cap-1 Maneuver	0	-	-	-	190	378
Stage 1	0	-	-	-	435	-
Stage 2	0	-	-	-	646	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	190	378
Mov Cap-2 Maneuver	-	-	-	-	190	-
Stage 1	-	-	-	-	435	-
Stage 2	-	-	-	-	646	-
Approach	EB		WB		SB	
HCM Control Delay, s	0		0		36.1	
HCM LOS					E	
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	190		
HCM Lane V/C Ratio	-	-	-	0.401		
HCM Control Delay (s)	-	-	-	36.1		
HCM Lane LOS	-	-	-	E		
HCM 95th %tile Q(veh)	-	-	-	1.8		

F. Mountain Ranch Road Signal Warrant Worksheets

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation

Peak Hour Volume (Warrant 3) Urban Areas



☆ NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

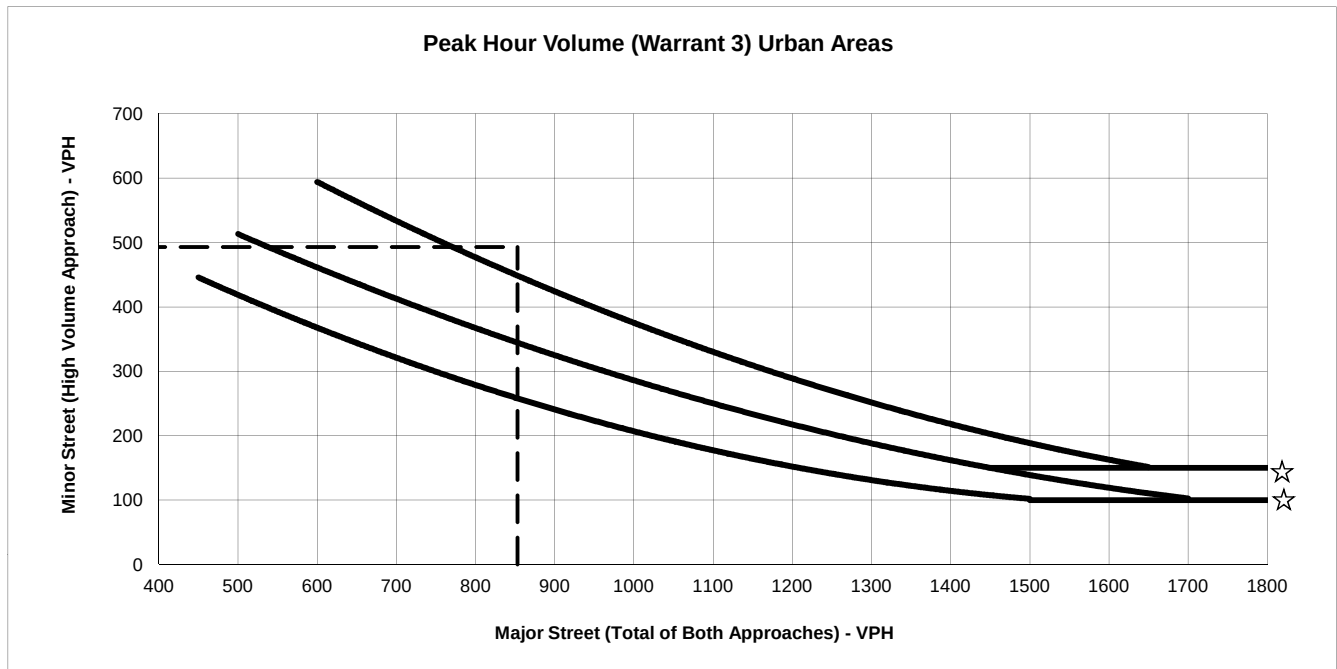
Existing AM Peak Hour

Major Approach	SR 49	Number of Lanes	1
Minor Approach	Mountain Ranch Road		1
Major St. Volume:	1067		
Minor St. Volume:	263		
Warrant Met?:	Yes		

	X	Y
Series 1	0	263
	1067	263
Series 2	1067	0
	1067	263

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

* Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation



☆ NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Existing PM Peak Hour

Major Approach	SR 49	Number of Lanes	1
Minor Approach	Mountain Ranch Road		1

Major St. Volume: 853
Minor St. Volume: 493
Warrant Met?: Yes