State Route 49

Corridor System Management Plan

May 2009

CALTRANS DISTRICT 3

corridor system management plan

State Route 49
Corridor System Management Plan

APPROVED BY:

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I accept this Corridor System Management Plan for the State Route 49 Corridor as a document informing the regional transportation planning process.

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Corridor System Management Plan

May 2009

stakeholder acknowledgement

A Project Development Team (PDT) comprised of key stakeholders/partner agencies and organizations was formed and provided essential information, advice and feedback for the preparation of this CSMP. The stakeholders/partners include:

- California Highway Patrol;
- The Counties of Placer and Nevada;
- The Cities of Auburn and Grass Valley;
- Nevada County Transportation Commission (NCTC), Placer County Transportation Planning Agency (PCTPA), and the Sacramento Area Council of Governments (SACOG);
- Placer County Transit (PCT), Gold Country Stage (GCS), and Amtrak; and
- Citizens for Highway 49 Safety.

A website, **www.corridormobility.org**, has been created to support the development of the CSMPs and to provide stakeholders and the public with more information and an opportunity to provide input and review documents.

DISCLAIMER

The information, opinions, commitments, policies and strategies detailed in this document are those of Caltrans District 3 and do not necessarily represent the information, opinions, commitments, policies and strategies of partner agencies or other organizations identified in this document.

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executive summary

Caltrans and our partners are taking a dynamic turn in transportation planning with the creation of Corridor System Management Plans (CSMPs) for corridors associated with the ***Corridor Mobility Improvement Account (CMIA)*** and ***Highway 99 Bond Program*** projects! CSMP development recognizes the importance of multi-jurisdictional collaboration, to best support and manage multi-modal transportation services and facilities for the traveling public. Californians rely on transportation facilities and services to get to business, recreational, and service destinations, regardless of which agency may operate or fund a facility or service. The CSMP approach is consistent with the goals and objectives of the Governor's *Strategic Growth Plan*, including public accountability for bond funded projects.

This CSMP directly supports the implementation of the "La Barr Meadows Widening" CMIA project.

The CSMP outlines a foundation to support partnership based, integrated corridor management of various travel modes (transit, cars, trucks, bicycles) and infrastructure (rail tracks, roads, highways, information systems, bike routes), to provide mobility in the most efficient and effective manner possible. This approach brings facility operations and transportation service provision together with capital projects into a coordinated system management strategy that focuses on high demand travel corridors such as State Route 49 (SR 49).

This CSMP directly supports the implementation of the ***"La Barr Meadows Widening"*** CMIA project in the corridor, which includes widening a portion of SR 49 from Little Valley Road to south of Cornette Way, and related frontage roads and driveway consolidation improvements.

CSMPs are being developed to plan and manage transportation across modes and jurisdictional boundaries.

The objectives of the CSMP are to improve safety on the transportation system, reduce travel time or delay on all modes, reduce traffic congestion, improve connectivity between modes and facilities, improve travel time reliability, and expand mobility options along the corridor in a cost effective manner.

The managed transportation network for this *SR 49 CSMP* includes the portion of SR 49 that begins at the Interstate 80 (I-80)/SR 49 Interchange in Placer County and ends at the SR 49/SR 20 Junction in Nevada County, as well as select parallel and connector roadways, transit facilities and services, and bike routes.

This CSMP includes the following key sections:

CURRENT CORRIDOR SYSTEM MANAGEMENT STRATEGIES

Documents a variety of multi-modal system management technologies and elements, ranging from vehicle detection devices and traveler information systems to traffic flow control mechanisms. Given the somewhat rural nature of the corridor, there are very few system management strategies in operation along the SR 49 corridor.

MAJOR CORRIDOR MOBILITY CHALLENGES

Identifies key challenges to mobility along the corridor, which include, but are not limited to, recurrent highway and roadway traffic congestion, limited parallel roadway capacity, lack of signal coordination on key arterials, transit facilities in need of additional ridership, inadequate transit capital and operations funding needed to grow transit ridership, and gaps and barriers within the bicycle route network.

PERFORMANCE MEASURES

Evaluates system performance to better monitor outcomes for corridor management and investment decision-making. Performance measures include level of service, delay, distressed pavement, collision rate comparison, reliability, lost productivity, and capacity.

PLANNED CORRIDOR SYSTEM MANAGEMENT STRATEGIES

Identifies current and future Level of Service (LOS), existing and concept facility, and a primary set of 14 strategies and capital improvements that respond to the major corridor mobility challenges. To implement these strategies, key capital projects are identified. Projects in Nevada County have been prioritized under a Project Delivery Phasing Plan. The list is not inclusive of all projects in the corridor; this CSMP incorporates by reference all projects contained in the *NCTC 2005 Regional Transportation Plan* (RTP) and *SACOG 2035 Metropolitan Transportation Plan* (MTP).

Existing highway operations data shows that for the *SR 49 CSMP* corridor, the LOS is forecasted to deteriorate from LOS "B" through "E" to "C" through "F" conditions in 20 years under the *No-Build* and LOS "C" through "E" under the *Concept (Build)* scenarios. However, with the implementation of operational strategies and key capital projects, the severity and the duration of the traffic congestion can be significantly reduced, and safety and mobility improved.

The system will be continuously monitored using identified performance measures and Traffic Operations Systems data, and will be reported in an annual **State of the Corridor Report** and subsequent CSMP updates. This information will be used to continually improve system performance.

what is a CSMP?

A CSMP is a foundation document supporting the **partnership-based, integrated management** of various **travel modes** (transit, cars, trucks, bicycles) and **infrastructure** (rail, roads, highways, information systems, bike routes) in a corridor so that mobility along the corridor is provided in the most efficient and effective manner possible.

CSMP success is based on the premise of managing a selected set of transportation components within a designated corridor as a system rather than as independent units.

Caltrans has traditionally prepared a Transportation Concept Corridor Report (TCCR) that served as the long range planning document for SR 49. The TCCR would identify existing route conditions and future needs, including existing and forecasted travel data, concept LOS standard, and the facility needed to maintain the concept LOS over the next 20 years. With the development of the more comprehensive CSMP, the need for a separate TCCR is eliminated. This CSMP will serve as the TCCR for the segment of SR 49 within the CSMP boundaries and includes information regarding the future facility needed to maintain an acceptable LOS (Concept LOS and Concept Facility, see Table 8).

SR 49 at La Barr Meadows Road

The CSMP focuses on strengthening institutional partnerships, gathering and analyzing data, monitoring system performance, implementing operational strategies, and identifying and implementing strategic capital investments.

The *State Route 49 (SR 49) CSMP Network* includes the portion of SR 49 that begins at the Interstate 80 (I-80)/SR 49 Interchange in Placer County and ends at the SR 49/SR 20 Junction in Nevada County, as well as select parallel and connector roadways, transit services and bike routes. The segment length is 23 miles. Together, these facilities comprise the CSMP managed network, as indicated in Figure 1 and Table 1.

The parallel and connector roadways, transit, and bicycle route components were selected for inclusion in the corridor in consultation with the respective local agencies.

It is anticipated that as the CSMP concept matures, additional facilities will be added to the managed network.

The CSMP focuses on strengthening institutional partnerships, gathering and analyzing data, monitoring system performance, implementing operational strategies, and identifying strategic capital investments. The CSMP will evolve with changing development patterns, travel demands, and technological innovations. An annual **State of the Corridor Report** will be produced to document system performance and track CSMP implementation progress and the CSMP document will be updated every two years or more frequent as needed.

CSMPs are being created for corridors associated with the CMIA and Highway 99 Bond Programs, supported by the ***Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006,*** Proposition 1B.

SR 49 northbound at Luther Road in Auburn

Figure 2 shows the general location of each of the CSMP corridors within the Caltrans District 3 service area and identifies the Proposition 1B projects associated with the respective CSMP.

Each CSMP identifies key stakeholders, current management strategies, existing travel conditions, major challenges to maintaining and improving mobility, and potential future management strategies and capital improvements.

The CSMP is consistent with the NCTC and PCTPA RTPs, and SACOG MTP, and general plans, regional blueprint planning, and multimodal planning. The CSMP, by reference, incorporates all projects listed in the current MTP and RTP. Because the CSMP is corridor focused, it highlights key locations where modes interact and land use decisions may have the greatest potential of reducing the need for travel and influencing modal choice.

CSMPs will assist in fulfilling the goals of recently enacted legislation such as Assembly Bill 32 that addresses air quality and green house gas emissions and Senate Bill 375 that address land use by:

- Improving mobility on the state highway system to more optimum speeds to reduce vehicle emissions, and
- Providing viable transportation alternatives and accessibility across modes to encourage transit and bicycling and decrease single occupant auto use.

The CSMP also supports Caltrans policies such as Deputy Directive (DD) 64, *Complete Streets-Integrating the Transportation System*.

The CSMP is based on technical information depicted in four supporting working papers described as follows:

- Working Paper 1 provided an overview of the corridor system management planning process and a definition of the CSMP transportation network, including a rationale for the selection of the specific corridor limits and modes to be included in the corridor planning process.
- Working Paper 2 defined current services being provided by the CSMP transportation network, proposed performance measures for the corridor, and provided baseline data regarding the current CSMP transportation network for the proposed performance measures.
- Working Paper 3 described existing corridor management activities, including all facilities and services currently in use to maximize mobility within and through the corridor, such as traffic operations systems elements, facilities such as auxiliary lanes, traveler information services, and transportation demand management programs.
- Working Paper 4 provided an assessment of current corridor performance by identifying the major problems inhibiting efficient corridor operations for each element (mode) of the CSMP transportation network.

Figure 1: SR 49 CSMP Transportation Network

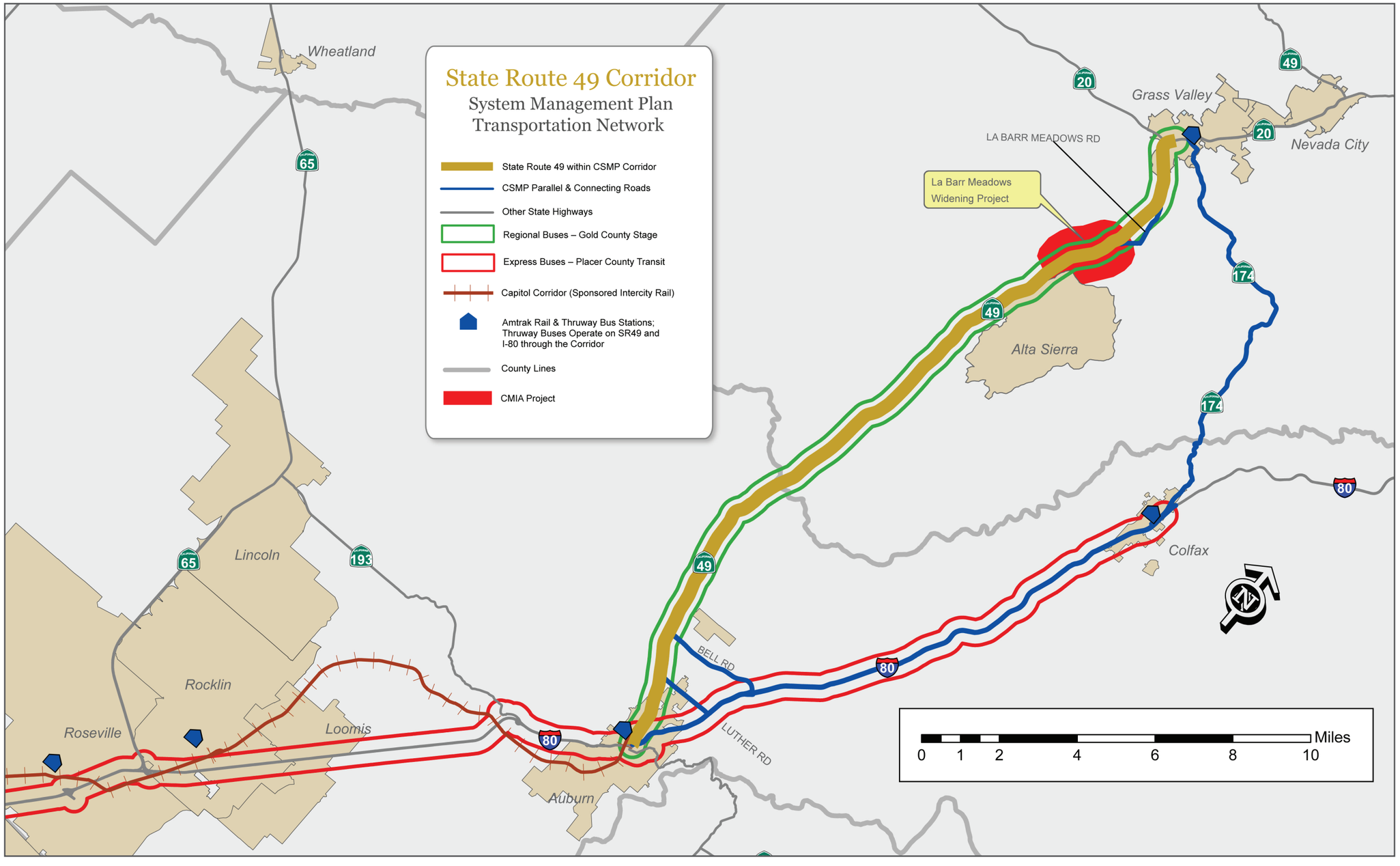
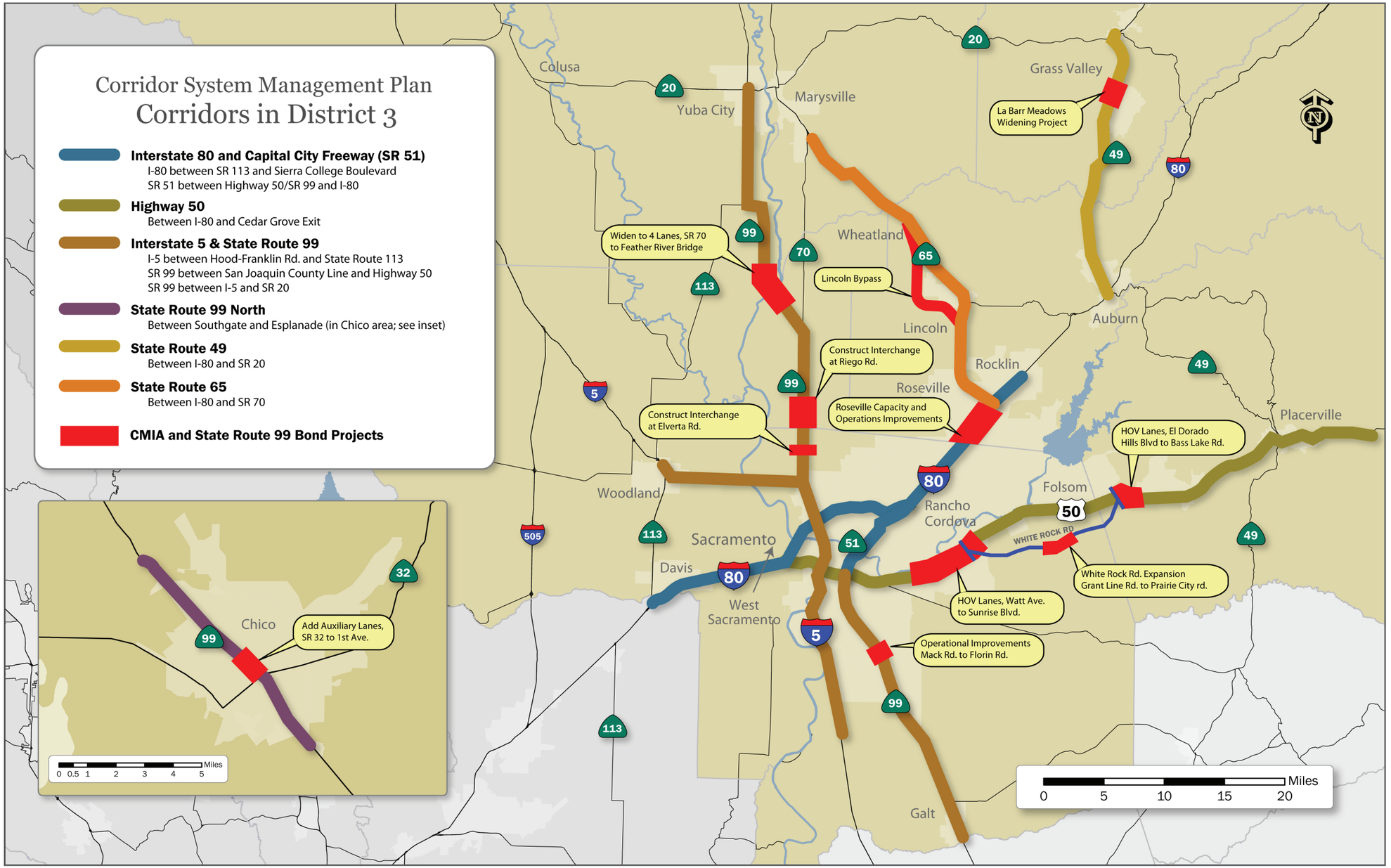


TABLE 1: SR 49 CSMP TRANSPORTATION NETWORK

Location	SR 49					Parallel and Connector Roads				Mass Transit						Bike Routes[7]		
										Heavy and Light Rail			Bus					
County	From	To	No. Lanes/ Facility Type[1]	HOV Lanes[2]	Auxi. Lanes[2]	Roadway	From	To	No. of Lanes[3]	Operator/ Service[4]	From	To	Operator/ Service/ Route[4]	From	To	Route	From	To
PLA	I-80	Placer/ Nevada County line	7C/5C	0	2E	Bell Rd.[6]	SR 49	I-80	4	None			PCT[5]	Auburn, SR 49	Colfax, I-80			
						Luther Rd.[6]	SR 49	I-80	2				PCT[5]	Auburn, SR 49	Light Rail, I-80/Watt			
						I-80[6]	SR 49	SR 174	6F				Amtrak CC[5]	Auburn	Grass Valley			
NEV	Placer/ Nevada County line	SR 20	5C/4C/3C/2C/4F	0	0	La Barr Meadows Rd.	S. Auburn St.	SR 49	2	None			GCS[5]	Grass Valley	Auburn	SR 49	Alta Sierra	Placer/ Nevada County line
						SR 174[5]	SR 49	I-80	2C							S. Auburn St.	SR 20/49	La Barr Meadows Rd.
																La Bar Meadows Rd.	SR 49	S. Auburn St.
																SR 49	E. Mc Knight Wy.	Alta Sierra

[1] F = Freeway, E = Expressway, C = Conventional. No. of Lanes includes HOV and Auxiliary Lanes
[2] E = Existing, PR = Programmed, PL = Planned, see text for specific locations
[3] Number of lanes does not include turn lanes
[4] PCT = Placer County Transit, GCS = Gold Country Stage
[5] Roadway or route extends through more than one TCR segment
[6] Connecting Road that connects a Parallel Arterial Road to SR 49
[7] All Bicycle routes are Unclassified. There are no *Class I Off-Street Bike Paths, Class II On-Street Bike Lanes,* or *Class III On-Street Bike Routes* along the SR 49 CSMP corridor.

Figure 2: CSMP Corridors in District 3



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need, purpose, goal and objectives

There is a **need** for a planning approach that brings facility operations and transportation service provision together with capital projects into one coordinated system management strategy that focuses on high demand travel corridors such as SR 49.

A CSMP is needed for the SR 49 corridor to address traffic congestion that often exceeds the capacity of existing facilities, the lack of parallel roadways that are in close proximity to the highway, transit facilities that are in need of additional ridership, and bicycle facilities that do not provide a fully linked network of bike routes.

The **purpose** of the CSMP is to create a partnership planning process and resulting guidance document that focuses on system management strategies and coordinated capital investments so that all the pieces of the corridor function as an efficient transportation system, and that includes performance evaluation measures to track the effectiveness of the strategies and projects.

The SR 49 CSMP directly supports the implementation of the Proposition 1B Bond "La Barr Meadows Widening" project located in Nevada County.

The **goal** of the CSMP is to improve mobility along the SR 49 corridor by focusing on the integrated management of a subset of the entire transportation network within the corridor, including select highways and freeways, parallel and connector roadways, transit, and bicycle facilities.

The **objectives** of the CSMP are to **improve safety** on the transportation system, **reduce travel time or delay** on all modes, **improve connectivity** between modes and facilities, **improve travel time reliability**, and **expand mobility options** along the corridor in a cost effective manner. Implementation of the CSMP will **improve safety** on the transportation system and **increase access** to jobs, housing, and commerce.

Southbound traffic on SR 49

The SR 49 CSMP is rather unique as compared with other CSMPs in that it includes detailed information regarding the phasing of corridor improvements. This is consistent with the desires of the NCTC, Caltrans, and other stakeholders who wish to use the CSMP as a tool to help reach consensus regarding a detailed delivery plan for needed corridor improvements.

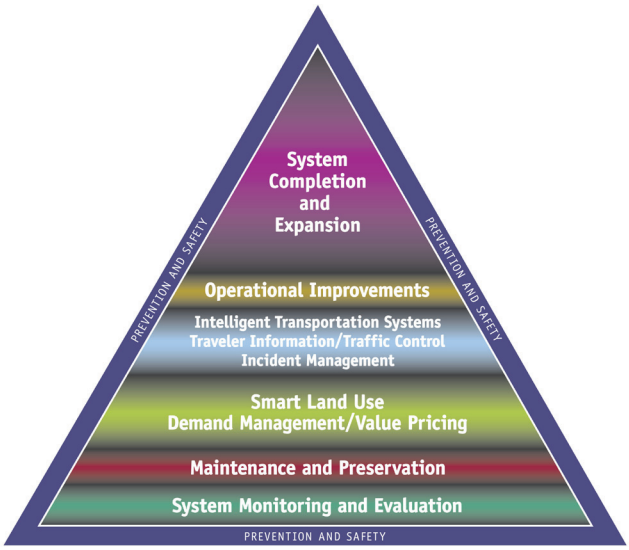

Figure 3: Strategic Growth Plan Strategy

CONSISTENCY WITH OTHER STATE TRANSPORTATION PLANS AND POLICIES

The CSMP approach is consistent with the goals and objectives of the Governor's ***Strategic Growth Plan***, which among other things commits to minimizing increases in traffic congestion. Key elements of the strategy are illustrated in Figure 3.

At the base of the pyramid, and the foundation of transportation system management, is system monitoring and evaluation. It is essential to understand what is happening on the transportation system so that the best decisions can be made based on reliable data. The next few layers up the pyramid are focused on making the best use of existing resources and reducing the demand for new transportation facilities, particularly for peak hour travel. The top layer of the pyramid is system expansion. This layer assumes that all the underlying components are being addressed and that system capacity expansion investments are necessary.

Corridor system management is consistent with the **Caltrans Mission:**

Improve Mobility Across California

Corridor system management is also consistent with **Caltrans' Goals:**

- **SAFETY:** Provide the safest transportation system in the nation for users and workers.
- **MOBILITY:** Maximize transportation system performance and accessibility.
- **DELIVERY:** Efficiently deliver quality transportation projects and services.
- **STEWARDSHIP:** Preserve and enhance California's resources and assets.
- **SERVICE:** Promote quality service through an excellent workforce.

The CSMP is also consistent with the *California Transportation Plan* (CTP), the statewide, long-range transportation plan for meeting future mobility needs. The CTP defines goals, policies, and strategies to achieve our collective vision for California's future transportation system.

AIR QUALITY PLANNING

Corridor System Management seeks to create conditions where vehicle flow on highways and roads occurs at a steady pace and travelers have a range of mobility options that enable them to travel other than by single occupant vehicle. System expansion is focused only where needed when travel demand exceeds the capacity of the well managed existing system. These conditions are beneficial to attaining air quality goals and reducing green house gas emissions.

current corridor system management strategies

The *SR 49 CSMP* corridor is an important route that serves local, regional, and interregional traffic. The route serves as a major connector for both automobile and truck traffic originating from the I-80 corridor in the Auburn area and the SR 49/20 corridor in the Grass Valley and Nevada City areas. SR 49 is evolving into a critical goods movement corridor as demonstrated by increasing truck traffic volumes, and the future ***"La Barr Meadows Widening Project",*** which will further enhance goods movement in the region by improving the operations and safety along the corridor.

SR 49 near SR 20 Interchange in Grass Valley

SR 49 is a significant interregional connector for natural resource based product shipments, including lumber and mining, and for travelers seeking tourist and recreational destinations. The corridor also serves as a vital link to regional employment centers in Placer County, and more affordable or rural housing opportunities in Nevada and Sierra Counties. Safety, mobility, and capacity are major issues on the SR 49 corridor.

There is not yet an extensive set of system management strategies in operation within this corridor. These strategies, which are often, referred to as traffic operations system (TOS) elements, and transportation management facilities and services, are discussed below by transportation mode.

STATE HIGHWAY SYSTEM

With the construction of California's State Highway System (SHS) virtually complete in the Sacramento region, Caltrans' major emphasis on highway projects has largely shifted from new construction to operation, maintenance of existing facilities, reconstruction, and focused capacity expansions.

At present, there are eight system management strategies utilized by Caltrans along the *SR 49 CSMP* corridor, which are described as follows:

There is not yet an extensive set of system management strategies in operation within the SR 49 corridor.

Traffic Signals are placed at 18 locations along the *SR 49 CSMP* corridor; 14 of these signals are in Placer County, while only four signals are in Nevada County. Twelve of the signals in Placer County are coordinated in synchronization with each other by either traffic responsiveness or by time of day; none of the four signals in Nevada County

are coordinated. Table 2 identifies the traffic signal locations and characteristics along SR 49 within this CSMP.

There is one **Weigh-In-Motion** facility along the *SR 49 CSMP* corridor, which is located at post mile 9.0 in Placer County near Lorenson Road.

The **Transportation Management Center** (TMC) located in the City of Rancho Cordova collects, analyzes, and responds to information about collisions, other incidents, road closures, and emergency notifications. Relevant information is also disseminated to public and private information users. The TMC operates 24 hours a day, seven days a week. TMC services along the SR 49 corridor are presently limited, but may be expanded with the implementation of TOS elements.

Auxiliary lanes are located on SR 49 north and south bound between Elm/Fulweiler Avenues and Bell Road within the City of Auburn in Placer County; there are no auxiliary lanes on SR 49 in Nevada County. A graphic depiction of an auxiliary lane is shown in Figure 4.

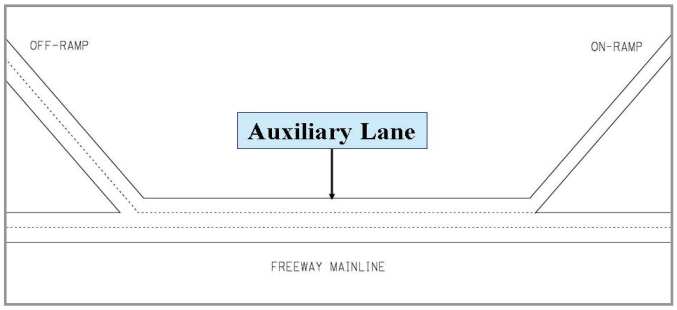

Figure 4: Auxiliary Lane

Park-and-Ride Lots provide a place for commuters to park their cars and meet carpools, vanpools, buses, and trains. Some park-and-ride lots provide bike lockers. A listing of the lots along the *SR 49 CSMP* corridor is identified on Table 3.

Transportation Management Plans (TMP) are required by Caltrans Deputy Directive DD-60-R1 for *"all construction, maintenance, and encroachment permit activities on the State Highway System"*. All projects must be TMP Certified prior to being designated as "Ready to List". TMPs detail how a construction project will be implemented so that its impact to existing travel is minimized or mitigated.

SR 49 at the Wolf and Combie Roads intersection

Traveler Information services for the corridor include web sites, the 511 system, and media feeds. Web sites with information regarding SR 49 are hosted by Caltrans, the California Highway Patrol, the U.S. Weather Service, and a private company.

PARALLEL AND CONNECTOR ROADWAYS

Traffic Signals are used on roadways where traffic conditions warrant their use to control intersection traffic. Ideally, a series of intersections with signals are synchronized to help maintain a steady flow of traffic from one intersection through the next. The steady flow of traffic reduces vehicle emissions, allows more vehicle through put, reduces travel time and delay, and improves safety.

Transportation Demand Management (TDM) services are sponsored by the PCTPA through its Congestion Management Agency. Area employers and office complex owners are often key supporters and funders of TDM programs at their work sites. The *Spare-the-Air* program is supported by the Placer County Air Pollution Control District, and encourages and offers incentives for drivers to use transit, carpool, or avoid vehicle trips on days when air quality is predicted to be of poor quality. There are no Transportation Management Associations (TMAs) along the *SR 49 CSMP* corridor.

TABLE 2: SR 49 CSMP TRAFFIC SIGNALS						
County and Intersection Location	**Post Mile**	**2070 Controller**	**Master Controller**	**Traffic Responsive**	**Time of Day**	**Coordinated**
PLACER						
I-80/SR 49 Ramps	3.21			X		X
Fulweiler/Elm Avs.	3.46	X	X	X		X
Palm Av.	3.78			X		X
Nevada St.	4.57		X	X	X	X
Edgewood Dr.	4.67				X	X
Luther Rd.	5.21	X		X		X
Hulbert Wy.	5.29	X				
New Airport Rd.	5.63	X		X		X
Atwood Rd.	5.86	X		X		X
Willow Creek Dr.	6.03			X		X
Bell Rd.	6.38		X	X		X
Education St.	6.54			X		X
Quartz Dr.	6.79			X		X
Dry Creek Rd.	7.43					
NEVADA						
Wolf/Combie Rds.	2.19	X				
Lime Kiln Rd.	7.14					
Alta Sierra Rd.	9.15					
McKnight Way/Auburn	10.71			X		
TOTALS		**6**	**3**	**12**	**2**	**12**

TABLE 3: SR 49 CSMP TRANSPORTATION NETWORK PARK AND RIDE LOTS

County	Facility Name and Location	Lot Use[1]			Transit Connection
		Total Spaces	Spaces Occupied	Occupancy Rate (%)	Provider and Route No.
NEV	Grass Valley- SR 20/SR 174	65	48	74	GCS Routes 5
NEV	Cornerstone Calvary Church- Wolf/Combie Rd and SR 49	16	8	38	GCS Routes 5
NEV	Daniels Rd.- SR 49 at Lime Kiln Rd.	47	3	6	GCS Routes 5
PLA	Bell Rd. at I-80	33	20	61	None
PLA	Atwood- Atwood Rd. and west side of SR 49	42	17	40	None
PLA	Auburn- Amtrak, Nevada St.	120	45-120[2]	37-100[2]	GCS, PCT, Amtrak

[1] 2007 Caltrans Park and Ride Lot Survey and 2006 Amtrak Capitol Corridor Park and Ride Survey
[2] Per PCTPA staff observation, lot usage has substantially increased since 2006 and is often 100% occupied

Due to the lack of large office and commercial complexes in the Nevada County portion of the SR 49 corridor, the NCTC does not currently provide TDM services. However, the 511 program does extend into Nevada County and is coordinated by SACOG.

TRANSIT AND RIDESHARING

Automatic Vehicle Locater (AVL) equipment is currently being secured by Placer County Transit (PCT) using Transit Safety Security (Proposition 1B) funds to place into all of its transit vehicles. Gold Country Stage (GCS) does not utilize AVL technologies, but is studying their feasibility.

Traffic signal at the Bell Road/SR 49 intersection.

BICYCLE FACILITIES

There is a very limited set of bicycle facilities in the corridor, and these facilities are not interconnected.

PEDESTRIAN FACILITIES

Pedestrian facilities are not included as part of the managed network because they do not directly provide corridor mobility. However, complete and safe pedestrian access to appropriate corridor modes, such as bike routes and transit services, is an important component of corridor system management. Therefore, subsequent updates of the CSMP will seek to identify key pedestrian facilities and barriers to pedestrian mobility with regard to access and modal connectivity.

There are other system management strategies that are available, but are not currently in use within the SR 49 corridor. These strategies include vehicle detection devices, changeable message signs, incident management services, and enhanced traveler information services such as the Sacramento Transportation Area Network (STARNET).

major corridor mobility challenges

High demand for mobility services of all sorts, especially during peak commute periods, is creating significant traffic congestion within portions of the corridor. Heavy congestion and stop and go traffic contributes to increased vehicle emissions and added travel costs. Buses must contend with the same congestion as automobiles. Bicyclists have few dedicated facilities in the corridor making apparent the need for improvements to address bicycle route gaps and barriers.

Traffic along the SR 49 corridor is expected to increase by up to 35 percent over the next 20 years.

The overall amount of travel in the corridor has increased substantially over the past ten years and is expected to continue to increase. Traffic along the SR 49 corridor is forecasted to increase by up to 35 percent over the next 20 years. Current and forecasted data is depicted in Table 4.

The sections of SR 49 with particularly severe traffic congestion containing the section in Nevada County that includes ***"The La Barr Meadows Widening Project"*** are depicted in Table 6. This congestion when combined with safety and operational issues led to the location being selected for Proposition 1B funding.

A critical component of identifying and resolving corridor mobility challenges is the need for detailed data, analysis, and communication regarding system performance. Data collection is insufficient to fully meet active system management needs but still provides useful information as detailed in the following pages. Improving data gathering, analysis, and dissemination of information is a major challenge for this corridor and is a component of Intelligent Transportation Systems planning.

Challenges along the corridor include:

- Recurrent highway and roadway traffic congestion at particular locations,
- Lack of parallel roadways that are in close proximity to SR 49,
- Lack of signal coordination on key arterials and the highway,
- Transit facilities in need of additional ridership during non-peak hours travel times,
- Inadequate transit capital and operations funding needed to grow transit ridership,
- Park-and-ride lot located at the Amtrak multi-modal transit station in the City of Auburn exceeding capacity,
- Poor pavement conditions for bicyclists and the need for routine road maintenance/sweeping,
- Lack of bicycle activated signal change devices and signage,
- Lack of bicycle lanes or sufficient shoulder width on SR 49 as well as on parallel and connecting roadways,
- Errant motorist driving behavior and excessive traffic speed, and
- Inadequate bicycle storage facilities at work sites, the Amtrak transit station in Auburn, park-and-ride lots, and other travel destinations.

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TABLE 4: SR 49 CSMP CURRENT AND FORECASTED TRAFFIC DATA

County	Location	Current Traffic Data—2007					Future Traffic Data — 2027 (No Build)[4]			Future Traffic Data — 2027 (Build)[4]		
		% of Trucks	Peak Directional Split[1]	Peak Hour Traffic	Average Annual Daily Traffic[2]	Volume over Capacity[3]	Peak Hour Traffic	Average Annual Daily Traffic[2]	Volume over Capacity[3]	Peak Hour Traffic	Average Annual Daily Traffic[2]	Volume over Capacity[3]
I-80												
PLA	I-80/SR 49 Interchange to Bell Rd.	3.0%	68%	5,900	51,000	Data not available	8,555	73,950	Data not available	8,555	73,950	Data not available
	Bell Rd. to Placer/ Nevada County line	3.0%	66%	2,750	29,000	0.46	4,125	42,750	0.73	4,125	42,750	0.71
NEV	Placer/ Nevada County line to Wolf/ Combie Rds.	3.5%	66%	3,200	34,000	0.57	4,960	52,700	0.92	4,960	52,700	0.92
	Wolf/ Combie Rds. to Grass Valley City Limits	5.0%	54%	3,200	28,000	0.79	4,490	39,291	1.11	4,800	42,000	1.11
	Grass Valley City Limits to SR 20 Junction	3.8%	55%	2,950	32,000	0.39	4,481	48,608	0.59	4,573	49,600	0.59

[1] Peak Directional Split: The percentage of total traffic in the heaviest traveled direction during the peak hour.
[2] Average Annual Daily Traffic (AADT): The average number of vehicles per day in both directions.
[3] Volume over Capacity (V/C): The volume of traffic compared to the capacity of the roadway.
[4] Data derived from Nevada County and SACOG's *Travel Demand* modal

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performance measures

Continuing corridor monitoring and performance measures are an integral part of corridor management and investment decision making and help identify immediate, efficient, and effective system operational strategies and capital improvements. Performance measures provide **the important dynamic daily information needed to rapidly address operational problems caused by recurrent and non-recurrent traffic congestion.** Measures are also used to identify the best improvement actions to generate the desired results.

Traffic congestion can be categorized as either recurrent or non-recurrent.

Recurrent congestion occurs repeatedly at the same place and time of day in a predictable pattern. Recurrent congestion is often associated with facility capacity limitations, changes in capacity, conflicting vehicle movements such lane merges, inadequate number of transit vehicles to handle passenger loads, or other persistent physical conditions of the transportation facility.

Performance measures provide a sound technical basis for describing corridor performance, and comparing different investments and anticipated return on the investments.

Non-recurrent congestion is usually attributed to collisions, equipment malfunction, community events, weather, construction projects and other occasional occurrences. When transportation systems are close to their maximum carrying capacity, non-recurrent congestion is more likely to occur as there is little excess capacity in the system.

Table 5 identifies the performance measures to be used as part of the corridor system management process.

BASELINE DATA FOR PERFORMANCE MEASURES

Tables 6 and 7 display performance baseline data for the CSMP transportation network.

The baseline data for the performance measures applicable to the SHS was primarily compiled from the Caltrans' *2007 Traffic Volumes Manual, 2000 Highway Capacity Manual, Traffic Accident Surveillance and Analysis System (TASAS)*, Division of Maintenance *2007 Pavement Summary Report*, and tachometer runs. Additional performance data was derived from the 2004 modification to the Nevada County *Corridor Management and Preservation Study* prepared by Prism Engineering, 2007 *Nevada County Regional Transportation Mitigation Fee Program-Capital Improvement Program Report* from Fehr and Peers.

The baseline data for the performance measures applicable to the parallel and connecting roadways, and transit facilities and services was secured from staff at each applicable county and city jurisdiction, and transit service provider.

Data collection for non-auto modes is not as robust as what is needed for active system management. Subsequent updates of this CSMP will seek to expand the availability of transit and bicycle performance data.

TABLE 5: PERFORMANCE MEASURES — DEFINITIONS AND APPLICABILITY

Performance Measure	Definition of Performance Measure	Applicability to Corridor
STATE HIGHWAY SYSTEM		
Level of Service (LOS)	A "report card" measurement with "A" being the least amount of congestion and "F" being the most congestion.	LOS is a relatively simple and widely used measure, which offers comparison opportunities.
Total Vehicle Hours of Delay	The additional travel time in hours experienced by **all** vehicles on the highway segment per day or at peak hour due to congestion.	This measurement is used to determine the cost, in time, which congestion can add to the regular travel time that it takes to traverse a segment of road, and is useful in quantifying the performance of a particular roadway in an understandable format.
Total Person Minutes of Delay	The additional travel time in minutes experienced by **all** persons in vehicles on the highway segment per day or at peak hour due to congestion.	This measurement is used to determine the cost, in time, which congestion can add to the regular travel time that it takes to traverse a given segment of road, and is useful in quantifying the performance of a particular roadway in an understandable format and for comparison of improvement options.
Minutes of Delay per Vehicle	The additional travel time in minutes experienced by **each** vehicle on the highway segment at peak hour due to congestion.	This measurement is used to determine the cost, in time, which congestion can add to the regular travel time that it takes to traverse a given segment of road.
Minutes of Delay per Person	The additional travel time in minutes experienced by **each** person in vehicles on the highway segment at peak hour due to congestion.	This measurement is used to determine the cost, in time, which congestion can add to the regular travel time that it takes to traverse a given segment of road.
Vehicle Travel Time (Minutes)	The average time spent by vehicles traversing between two points on a road or highway.	Travel time is a measure used to quantify travel time deficiencies and provide a personal indicator of congestion impacts.
Distressed Pavement	Pavement that rides rougher than established maximums and/or exhibits substantial structural problems as determined by the Pavement Condition Survey.	This measurement provides a ride quality indicator and an indicator for structural roadway problems.
Reported Collision Rate	Comparison of the actual total collision rate (%) along a highway segment above, or below, the statewide average for fatal, injury, and property damage-only collisions on comparable facilities.	Comparing the total collision and rate with statewide average rate provides an opportunity to assess safety conditions through the corridor.
Reliability	Identifies day-to-day variation in travel time for the same trip at the same time of day. Focuses on the predictability of travel time, particularly for repetitive trips.	Estimates reliability by defining the extra time travelers must add to their average travel time when planning trips to ensure on-time arrival (0 percent: no day-to-day variations, 100 percent: double allotted travel time).
Lost Productivity	Measures the capacity of the corridor to accommodate vehicle or person throughput and is calculated as actual volume divided by the capacity of the highway.	As traffic volumes increase to roadway capacity, speeds decline rapidly and vehicle throughput drops dramatically, which increases traffic congestion and delay, and results in lost productivity.

TABLE 5: PERFORMANCE MEASURES — DEFINITIONS AND APPLICABILITY (CONTINUED)		
Performance Measure	**Definition of Performance Measure**	**Applicability to Corridor**
PARALLEL AND CONNECTING ROADWAYS		
Level of Service (LOS)	A "report card" measurement with "A" being the least amount of congestion and "F" being the most congestion.	LOS is a relatively simple and often used measure, which offers comparison opportunities.
TRANSIT		
Available Capacity	Ratio (%) of available transit capacity alternatives within the corridor.	This measure indicates the available capacity to accommodate diverted travelers from single occupant vehicles.

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TABLE 6: SR 49 CSMP HIGHWAY AND ROADWAYS PERFORMANCE MEASURES

County	Location	Post Miles	Distance (Miles)	Average Daily Traffic[1]	Performance Measures												
					LOS[1]	Total Vehicle Hours of Delay[2]		Total Person Minutes of Delay[2]		Minutes of Delay per Vehicle[2]	Minutes of Delay per Person[2]	Vehicle Travel Time (Minutes)[2]	Distressed Pavement (Lane Miles)[4]	Reported Collision Rate Comparison (%)[5]	Reliability[6]		Lost Productivity[7]	
																	Lost Lane Miles	
						Daily	Peak Hour[3]	Daily	Peak Hour[3]	Peak Hour[3]	Peak Hour[3]	Peak Hour[3]			Northbound	Southbound	Northbound	Southbound
STATE HIGHWAY SYTEM:																		
SR 49																		
PLA	Jct. I-80 to Bell Rd.	3.21/6.38	3.17	51,000	D	985	325	80,386	21,456	3.31	3.01	8.06	9	25%	Place-holder	Place-holder	Place-holder	Place-holder
	Bell Rd. to PLA/NEV County Line	6.38/11.37	4.99	29,000	C	92	30	7,480	1,997	0.66	0.60	5.38	20		Place-holder	Place-holder	Place-holder	Place-holder
NEV	PLA/NEV County Line to Wolf/Combie Rds.	0.00/2.19	2.19	34,000	C	24	8	1,964	524	0.15	0.14	2.34	0	-45%	Place-holder	Place-holder	Place-holder	Place-holder
	Wolf/Combie Rds. To Jct. SR 20	2.19/15.06	12.87	32,000	E	651	215	53,147	14,185	4.03	3.66	18.78	11	-16%	Place-holder	Place-holder	Place-holder	Place-holder
	Total		**23.22**			**1,752**	**578**	**142,977**	**38,162**	**8.15**	**7.41**	**34.56**	**40**					
PARALLEL AND CONNECTOR ROADWAYS:																		
PLA	**I-80**																	
	SR 49 to SR 174	17.48/33.08	15.60	61,480	B													
PLA & NEV	**SR 174**																	
	I-80 to SR 49	0/2.9-0/10.2	13.05	8,849	E													
PLA	**Luther Rd.**																	
	I-80 to SR 49			8,872	C													
PLA	**Bell Rd.**																	
	I-80 to SR 49			16,958	A-C													
NEV	**La Barr Meadows Rd.**																	
	SR 49 to McKnight Way/So. Auburn St.			Data not available	C													

Data is unavailable for these performance measures at this time, however will be pursued in the next phase of the CSMP.

[1] Source: Average Daily Traffic and Level of Service (LOS) calculated based on 2007 Caltrans' *Traffic Volumes on California State Highways* and *Highway Capacity Manual*, and from City of Auburn and Nevada County traffic data. Reported LOS is for the typical most congested daily peak travel period.
[2] Source: Delay is the average additional travel time by vehicles/persons traveling under 60 mph. Data derived from 2008 NCTC RTMF CIP Study, SACMET Travel Demand Model, and Caltrans' District 3 Traffic Operations Tachometer runs.
[3] Peak Hour is during PM.
[4] Source: 2007 Caltrans' Division of Maintenance Pavement Summary Report. Distressed pavement is categorized as (1) "Major Structural Distress" which indicates the pavement has severe cracking and is likely to have a poor ride, (2) "Minor Structural Distress", which indicates the pavement has moderate cracking and may have a poor ride, and (3) "Poor Ride Quality (Only)", which indicates the pavement exhibits few cracks but has a poor ride condition.
[5] Source: 2004 through 2007 Caltrans' Traffic Accident Surveillance and Analysis System (TASAS) summary data of the percentage above, or below, the statewide average for fatal, injury, and property damage-only collisions on comparable facilities. Collision rate substantially decreased after 2005 in Nevada County due to placement of centerline rumble strips on SR 49. Note: This measure does not define safety "hot spots" within each corridor segment.
[6] Reliability: The Planning Time Index, is a measure of the reliability of the travel time on a particular route. It is the ratio of the 95th percentile of travel time on a route to the median free-flow travel time. This means it's the amount of time a traveler needs to allocate for a route if they want to show up on time 19 out of 20 trips. Reliability and Planning Time data will be calculated following completion of additional probe vehicle tachometer runs.
[7] Lost Productivity: Data will be calculated following completion of additional probe vehicle tachometer runs.

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TABLE 7: SR 49 CSMP TRANSIT PERFORMANCE MEASURE			
County	**Transit Provider**	**Route**	**Performance Measure**
			Available Daily/Peak Hour Capacity (%)[1]
TRANSIT:			
	Heavy Rail: Amtrak		
	Capitol Corridor	536-Sacramento to Auburn, 529-Auburn to Sacramento	No Data
	Bus:		
PLA	**PCT**	Dewitt and 1st to Auburn Amtrak and back	59/ No Data
PLA & NEV	**GCS**	5 (SR 49)-Auburn Amtrak to Dewitt and 1st	41/ No Data
BIKE:[2]			

[1] Available capacity calculated from each transit provider's route ridership data for daily and peak hours
[2] Bicycle performance measure(s) will be identified, applied, and included in subsequent CSMPs

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planned corridor system management strategies

CONCEPT LOS AND CONCEPT FACILITY

"Concept LOS" and *"Concept Facility"* have traditionally been used in Caltrans TCCRs to reflect the minimum level or quality of operations acceptable for each route segment within the 20-year planning period and the highway facility needed in the next 20-years to maintain the Concept LOS.

Typical Concept LOS standards in Caltrans District 3 are LOS "D" in rural areas and LOS "E" in urban areas. The application of multi-modal corridor management strategies should reduce the severity and duration of congestion and provide viable travel options and information that will enable a traveler to avoid severe highway congestion.

The Concept LOS and Concept Facility for SR 49 are shown in Table 8. Many of the SR 49 segments are forecasted to operate below LOS "D" conditions in 20 years under the *"No-Build"* and *"Concept"* (Build) scenarios.

CORRIDOR MANAGEMENT STRATEGIES

The *SR 49 CSMP* proposes a set of 14 implementation strategies to enhance corridor mobility (see Table 9), based on the following principles:

- Manage all modes and facilities in the corridor as a single system, beginning with the transportation network defined in this CSMP.
- Implement comprehensive and dynamic multimodal monitoring and reporting for the system and for all modes.
- Use Demand modeling to identify mobility challenges and to evaluate proposed solutions.
- Complete the projects included in the regional transportation plans, with an emphasis on the completion of the key mobility improvement projects identified in this CSMP (see Table 10).
- Implement the specific strategies outlined in this CSMP.

The implementation strategies have not been prioritized.

KEY CAPITAL PROJECTS

Tables 10 and 11 list key capital projects that support the strategies. These projects have been placed in one of three categories: *"Programmed", "Planned",* or *"Visionary".* The *Programmed* and *Planned* projects in Table 10 are already identified in the *NCTC 2005 RTP* and SACOG *MTP 2035* (MTP), and are either planned without any funding yet programmed, partially programmed, or entirely programmed. The key projects in Nevada County (see Phasing Plan below) were derived based on the 50-year design concept prepared cooperatively by Caltrans and NCTC with emphasis on alternatives with the least environmental impacts. Not all corridor projects in the RTP and MTP are included in the CSMP, since the CSMP focuses on the managed network and the NCTC RTP and SACOG MTP consider all streets and roads, bike routes, and transit services in the corridor.

The *Visionary* projects in Table 11 are not yet included in the RTP or MTP, but appear to offer considerable corridor mobility benefits and merit further analysis and consideration for inclusion in the next RTP and MTP.

TABLE 8: SR 49 CSMP CONCEPT LOS AND FACILITY TYPE

Location			Forecasted Level of Service[1] (LOS) and Facility Type					
County	**Location**	**Post Miles**	**Current LOS[1]**	**20-Yr No Build LOS[1,2]**	**20-Yr Concept LOS[1,3]**	**Existing Facility[4]**	**Concept Facility[4,5,6]**	**Ultimate Facility[4,5,7]**
PLA	Jct. I-80 to Bell Rd.	3.21/ 6.38	D	E	E	5C	5C	5C
	Bell Rd. to PLA/NEV County Line	6.38/ 11.37	C	D	D	5C	5C	5C
NEV	PLA/NEV County Line to Wolf/Combie Rds.	0.00/ 2.19	C	E	E	5C	5C	5C
	Wolf/ Combie Rds. to Grass Valley City Limits	2.19/ 13.26	E	F	D	4C, 2E, 3C, 2C	5C	5C
	Grass Valley City Limits to SR 20 Junction	13.26/14.48	B	C	C	4F	4F	4F

[1] Level of Service (LOS): A "report card" for evaluating traffic flow with "A" being the least congested and "F" being the most congested.
[2] 20-Year LOS (No Build): The LOS that would be expected at 20 years with no improvements.
[3] 20-Year Concept LOS: The minimum acceptable LOS over the next 20 years.
[4] Facility Type Codes: C=Conventional Highway; E=Expressway; F=Freeway; HOV=High Occupancy Vehicle Lanes; Aux=Auxiliary Lanes.
[5] Operational Improvements are included in future facilities for all segments. Examples of operational improvements include TOS improvements and Auxiliary lanes.
[6] Concept Facility: the future roadway with improvements needed in the next 20 years. If LOS "F," no further degradation of service from existing "F" is acceptable, as indicated by delay performance measurement.
[7] Ultimate Facility: The future roadway with improvements needed beyond a 20 year timeframe.

TABLE 9: SR 49 CSMP STRATEGY IMPLEMENTATION

Strategy	Description	Implementation Challenges
Maintain and operate the existing corridor multi-modal transportation infrastructure.	Maintain the existing investment for all modes of the transportation system and provide adequate resources for daily operations, including operating subsidies for transit services.	Funding availability, funding competition within the region.
Fully coordinate the delivery of transportation services and facilities in the corridor, including daily operations and system planning for enhancements.	Interagency operational coordination to maximize the efficiency and effectiveness of all modes operating in the corridor with a focus on the CSMP transportation network defined in this CSMP. Use of an existing group or committee to provide initial oversight for this strategy.	Diverse interests and competing priorities and limited resources.
Construct planned and programmed corridor capital improvement projects.	Implementation of the capital improvements in the corridor included within the approved Metropolitan/Regional Transportation Plan for all transportation modes within the scope, schedule, and cost specified.	Funding availability, funding competition within the region.
Comprehensive daily monitoring of the status of all modes providing service on the CSMP transportation network.	Full deployment of multimodal transportation service status detection systems for all CSMP network components, eventual placement of additional Traffic Operations Systems components (Changeable Message Signs, Cameras, etc.), and connection of components with Traffic Management Centers.	Funding availability, funding competition within region.
Provide traveler information to the public.	Provide the public with real-time easily accessible information regarding the status of all CSMP transportation system components so as to allow travelers to make informed decisions about trip mode, time, and routing options.	Funding availability, funding competition within region.
Continually monitor and analyze the CSMP transportation network to improve system performance.	Monitor transportation performance measures and make system modifications, as appropriate, on a frequent and timely basis.	Staff resources and data availability.
Enhance transit service.	Increase transit service frequency, provide express transit services, and reduce headways for buses.	Funding availability, funding competition within the region.
Optimize the timing and synchronization of traffic signals.	Coordinate the optimization and timing of traffic signals along parallel and connecting roadways within and between jurisdictions to improve traffic flow and reduce congestion. Provide signal priority systems for transit vehicles.	Funding availability and coordination between cities and counties.
Timely implementation of STARNET.	Expedite the implementation of the Sacramento Transportation Area Network (STARNET) operators of transportation facilities and emergency responders in the Sacramento region through real-time sharing of data and live video, and refinement of joint procedures pertaining to the operation of roadways and public transit, and public safety activities as well as enhance the region's 511 web site and interactive telephone service to provide more traveler information. Consider expansion into Nevada County.	Developmental time, acceptance by agencies, and integration into daily use, and identification of maintenance and operations funding.
Enhance Transportation Demand Management strategies.	Encourage employers to provide telecommuting and flexible work hour options to employees.	Acceptance by employers and resources to participate.

TABLE 9: SR 49 CSMP STRATEGY IMPLEMENTATION (CONTINUED)

Strategy	Description	Implementation Challenges
Improve access management practices for SR 49 and parallel/ connecting roadways.	Develop and implement access management strategies to maintain the operational efficiency of SR 49 and parallel/connecting roadways.	Agreement between responsible jurisdictions as to where increased access control is needed. Increased access control on some parallel/connecting roadways may increase traffic volumes on non-corridor roads.
Implement & expand Transit Automatic Vehicle Locator (AVL)/ Transit status information enhancements for system users.	Expand the use of AVL systems utilizing GPS technology to track in real-time the location of transit vehicles, monitor transit schedules, dispatch transit vehicles, and provide real-time passenger information such as “next bus” or “next train” arrival times.	Funding availability, funding competition within the region.
Expand Park-and-Ride lots at key locations and add new lots when warranted.	Add additional capacity to existing park-and-ride lots at or approaching capacity, and add additional new lots when appropriate near transit stations and other locations.	Funding availability, funding competition within the region.
Improve bike-pedestrian access in the CSMP transportation network.	Construct additional bicycle paths / lanes, and related improvements to improve access and connectivity to transit, park and ride lots, and destination points.	Funding availability and funding competition within the region.

TABLE 10: SR 49 CSMP KEY PROGRAMMED AND PLANNED CAPITAL PROJECTS

PROGRAMMED PROJECTS[1]

County	Route/ Roadway	From	To	Project Description	Programmed Funds	Additional Funding Needed	Total Cost Estimate (X $1,000)	Latest Completion Year
HIGHWAYS								
NEV	SR 49	Timberline Dr.	Lode Line Way	Widen SR 49 at La Barr Meadows	CMIA & 2006 STIP	$0.0	$40,500	2012

PLANNED PROJECTS[1]

County	Route/ Roadway	From	To	Project Description/Priority[3]	Total Cost Estimate (X $1,000)	Latest Completion Year[2]
HIGHWAYS						
PLA	SR 49	Nevada St.	Dry Creek Rd.	Widen SR 49 (portions already completed).	$3,500	2020
NEV	SR 49	**Phased Projects: 1-8[3]**				
		North of Wolf/ Combie Rds.	South of Wolf Creek Bridge	**Priority 1:** Extend NB passing lane. Note: SHOPP Minor A project funding approved by CTC April 16, 2009.	$1,000	2010
		Various locations		**Priority 2:** Construct turn lanes, median refuge areas, and frontage roads at various locations including, but not limited to, the following locations:	Varies	Various
			Cerrito Rd.	Construct NB right turn lane with sight-distance wedge, and re-stripe median as a TWLTL to south of intersection.		
			Ladybird Dr.	Construct SB right turn lane and NB left turn lane.		
			Carriage Rd.	Construct NB right turn lane and sight-distance wedge; eliminate existing Clivus Rd. connection and connect Clivus Rd. to Carriage Rd. intersection.		
			Brewer Rd.	Construct NB right turn lane and median refuge area.		
		Travertine Court	Auburn Rd.	Construct frontage roads and intersection improvements.		
		Round Valley Rd	Quail Creek Rd.			
		Alta Sierra Dr.	Pingree Rd.			
		Wellswood Way	Christian Life Way			
			Smith Rd.	Construct intersection improvements.		
		South of Cornette Way	Christian Life Way	**Priority 3:** Widen to 5 lanes; connect Wellswood to proposed intersection on north near church.	$39,000	2020

[1] "Programmed" projects are included in the SACOG *MTIP 2009/12*, or in the State Highways Operation and Protection Program (SHOPP); "Planned" projects are included in the SACOG *MTP 2035*, *Nevada County 2005 RTP*, Ten-Year SHOPP Plan, or the NEV Project Delivery Phasing Plan.

[2] Completion year may be sooner than 2030 if additional funding sources become available.

[3] Priority only identified for projects included in the SR 49 Delivery Phasing Plan. Cost-Benefit analysis results vary with Phasing Plan priorities. Priorities can be changed to meet funding availability.

TABLE 10: SR 49 CSMP KEY PROGRAMMED AND PLANNED CAPITAL PROJECTS (CONTINUED)

PLANNED PROJECTS[1]						
County	**Route/ Roadway**	**From**	**To**	**Project Description/Priority[3]**	**Total Cost Estimate (X $1,000)**	**Latest Completion Year[2]**
HIGHWAYS						
NEV	SR 49	Christian Life Way	McKnight Way Over X-ing	**Priority 4:** Widen to 5 lanes; at intersection near Crestview, limit turns to right only on east side to avoid traffic signal installation.	$38,000	2025
		South side of Alta Sierra	South of Kenwood Drive	**Priority 5:** Second SB through lane with median and shoulder widening; leave Pingree as T-inters., connect Ponderosa to Pingree; connect Lady Jane Rd. to Little Valley Rd. intersection.	$31,500	2030
		North of Lime Kiln Rd.	South of Alta Sierra Drive	**Priority 6:** Widen to 5 lanes; connect Auburn further south as T-intersection, leave Pekolee as T-intersection; combine Round Valley and Quail Creek intersections.	$42,000	2030
		South of Lime Kiln Rd.	North of Cherry Creek Rd.	**Priority 7:** Lengthen two SB lanes; eliminate southerly connection and improve northerly connection with Cherry Creek Rd..	$13,500	2030
		Cameo Drive	Holcomb/ Cherry Creek Rd.	**Priority 8:** Complete widening to 5 lanes, eliminate Cameo Dr. intersection.	$76,000	2030
		Phased Projects: Alternative 3-lane[3]				
		Wolf/Combie Rds.	South of La Barr Meadows near Lime Kiln Rd.	**Alternative:** Widen existing 2-lane portion of segment to 3-lanes. Interim project, may need to be altered to complete ultimate 5-lane facility. NOT RECOMMENDED	$44,500	2030
		Other Non Phased Projects:				
		Crestview Dr.	SR 49	Construct Interchange and east/west connector road (Allison Ranch Road) at Crestview Dr. Intersection.	$55,000	UNKNOWN
		Wolf-Combie Rds.	SR 49	Widen Wolf-Combie Rd. intersection at SR 49, 2nd SB left turn lane to Combie, extend right turn lane.	$2,345	2027
		McKnight Way	SR 49	Construct dual roundabouts and striping.	$5,500	2027
PARALLEL AND CONNECTOR ROADWAYS						
PLA	I-80	Bell Av.	I-80	Construct improvements to Bell Rd./I-80 Interchange in Auburn.	$3,000	2020
NEV	SR 174		Race St.	Improve curve and channelize at Race St..	$1,000	TBD
TRANSIT						
NEV				Grass Valley Transit Transfer Center.	$2,100	TBD

[1] "Programmed" projects are included in the SACOG *MTIP 2009/12*, or in the State Highways Operation and Protection Program (SHOPP); "Planned" projects are included in the SACOG *MTP 2035*, *Nevada County 2005 RTP*, Ten-Year SHOPP Plan, or the NEV Project Delivery Phasing Plan.

[2] Completion year may be sooner than 2030 if additional funding sources become available.

[3] Priority only identified for projects included in the SR 49 Delivery Phasing Plan. Cost-Benefit analysis results vary with Phasing Plan priorities. Priorities can be changed to meet funding availability.

TABLE 11: SR 49 CSMP KEY VISIONARY CAPITAL PROJECTS				
VISIONARY PROJECTS[1]				
County	**Route/ Roadway**	**From**	**To**	**Project Description**
HIGHWAYS				
PLA	SR 49	I-80	SR 49	Construct 4-lane bypass of SR 49 east of Auburn (2001 SR 49 Corridor Study Alternatives Analysis, PCTPA).
		I-80	NEV County line	Install Traffic Monitoring Detection Systems near key intersections along the SR 49 corridor (Caltrans).
NEV		PLA County line	SR 20	Install Traffic Monitoring Detection Systems near key intersections along the SR 49 corridor (Caltrans).
PARALLEL AND CONNECTOR ROADWAYS				
NEV	various			Expand STARNET services into Nevada County (Caltrans).
TRANSIT				
PLA	Nevada Str.			Expand park-and-ride lot capacity at the Amtrak transit station, Auburn (PCTPA).
NEV	SR 49			Implement and expand Automatic Vehicle Locator systems utilizing GPS technology to track in real-time the location of transit vehicles, motor transit schedules, and dispatch transit vehicles (Caltrans).
BICYCLE				
PLA	SR 49	Lincoln	NEV County line	Construct Class II bicycle lane (Placer 2001 Regional Bikeway Plan).
	Bell Rd.	Bowman	Dry Creek	Upgrade to Class II bicycle lane (Placer 2001 Regional Bikeway Plan).
	Luther Rd.	Bowman	SR 49	Upgrade to Class III bike route (Placer 2001 Regional Bikeway Plan).
NEV	SR 49	PLA County line	Alta Sierra Dr.	Construct Class III bicycle route (2007 Nevada County Bicycle Master Plan).
		Alta Sierra Dr.	McKnight	Construct Class II bicycle lane (2007 Nevada County Bicycle Master Plan).

[1] "Visionary" projects are not yet included in the RTP or MTP, but merit further analysis given their potential to maintain and enhance corridor mobility.

NCTC PROJECT DELIVERY PHASING PLAN

The *Planned* SR 49 projects from the RTP under Nevada County have been broken down into a series of smaller projects. The *SR 49 CSMP* is unique as a "first generation CSMP" in that two large major capital projects within the Nevada County portion of the corridor have been redefined as a series of smaller projects, which have been prioritized based on a separate prototype phasing plan that was created by Caltrans and the NCTC.

It was realized by the NCTC early-on in the CSMP development process that two projects contained within the existing RTP to complete the five-laning of SR 49 from south of the Wolf/Combie Roads intersection to the Mc Knight Way overcrossing will exceed a 2008 cost estimate of $256 million. Due to funding competition and limited funding resources, this large dollar amount will most likely not be available at any one time over the life of the RTP.

Therefore, NCTC requested that Caltrans develop a phasing plan for the five-laning projects as part of the CSMP, and that the phasing plan also examine a three-lane alternative. The five-lane concept for SR 49 consists of two lanes in each direction, with left and right turn deceleration lanes, and median acceleration lanes or refuge areas for left turns onto the highway at each intersection. Consolidating and relocating road approaches is also part of the concept to minimize the number of signalized intersections, which will improve safety and operations. Potential bottlenecks due to merging from two through lanes per direction back to one can be minimized by providing long merge areas in flat or downhill locations. The three-lane alternative concept consists of one lane in each direction, with left and right turn deceleration lanes, 12-foot wide median acceleration lanes or refuge areas for left turns onto the highway at each intersection, and some consolidation and relocation of road approaches.

The NCTC also requested that **Safety** be the number one factor in project phasing. In response to NCTC's request, Caltrans established an **internal** PDT that consisted of staff from the offices of Traffic Operations, Traffic Safety, Maintenance, Right of Way, Landscape Architecture, Environmental, Design, Project Management, Advance Planning, Travel Forecasting and Modeling, and Transportation Planning with the purpose of breaking down the two projects into smaller, multiple projects that could be phased and funded over time.

The internal PDT met four times and identified separate projects, potential environmental constraints, potential right-of-way and utility constraints, design challenges, safety issues, cost estimates, and phasing of the smaller projects, and prepared a Preliminary Environmental Assessment Report (PEAR). The Phasing Plan for the newly identified projects was developed by applying the performance measurement baseline data with a Benefit-Cost (B-C) analysis. The B-C analysis is a form of economic analysis used by Caltrans that considers factors such as travel delay savings, and safety benefits relative to project costs. Additional phasing prioritization considerations included capital costs, environmental and right-of-way constraints, and potential mobility and safety benefits.

Caltrans staff also met with the **external** PDT, NCTC staff, and NCTC on several occasions to provide progress reports and secure guidance on the progress of the Phasing Plan development. The external PDT consists of staff from NCTC, PCTPA, Nevada and Placer Counties, Cities of Grass Valley and Auburn, California Highway Patrol, PCT and GCS, and Caltrans.

As a result of this cooperative and comprehensive effort, a collection of projects was identified and prioritized into eight phases, and an ninth project, a three-lane alternative project between Wolf/ Combie Roads and Lime Kiln Road, was also identified. The planning level cost estimates for the collection of individual projects range from $1.0 to $76.0 million each. These cost estimates include environmental mitigation, landscaping, right-of-way acquisition, utility relocation, and sound walls where applicable.

After extensive analysis, the external PDT recommended that this three lane alternative option not be considered as

part of a preferred corridor phasing strategy, because this alternative will not provide sufficient capacity to relieve congestion, is projected to result in a LOS "F" by Year 2020, and has a short life span that would not be fiscally prudent.

Visual depictions of the SR 49 existing facility in Nevada County and of the projects by priority are shown on Figures 5 and 6. Table 12 contains a complete listing of the projects in the Phasing Plan, current and projected LOS, time savings, and a 20-year B-C investment analysis for each project. The 20-year investment analysis shows that the higher the dollar value, the greater the benefit.

As part of this Project Delivery Phasing Plan, the following **principles** are included for guiding the delivery of future projects along the corridor:

- Smaller, less costly safety and operational projects, which can be delivered at greater frequency, will have higher priority over larger, more costly projects.
- Projects, which include incremental improvements towards achieving the Ultimate Facility such as widening shoulders, reducing the number of left-turn lanes, and collecting encroachments on SR 49, will be added from time to time to the Plan.
- Projects, which follow the design principles of the corridor, such as T-Intersections, will have higher priority over projects that are inconsistent with the principles.
- Key capital projects contained in this Plan may be broken down further into additional priority phases, as needed, to expedite delivery.

To further guide the implementation of this CSMP an existing Technical Advisory Committee (TAC), such as the NCTC TAC will be utilized to provide oversight in the implementation of this CSMP. Additional parties, such as a representative from the *Citizens for State Route 49 Safety*, will participate with the TAC so that stakeholders' interests will be sufficiently represented.

An annual **State of the Corridor Report** will be prepared by Caltrans with cooperation with the TAC to monitor the progress in implementing the CSMP strategies. This CSMP will also be amended from time to time as warranted. The first update of this CSMP will be prepared to coincide with the update of the Nevada County General Plan Circulation Element and the NCTC RTP.

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Figure 5: SR 49 CSMP Existing Facility, Nevada County

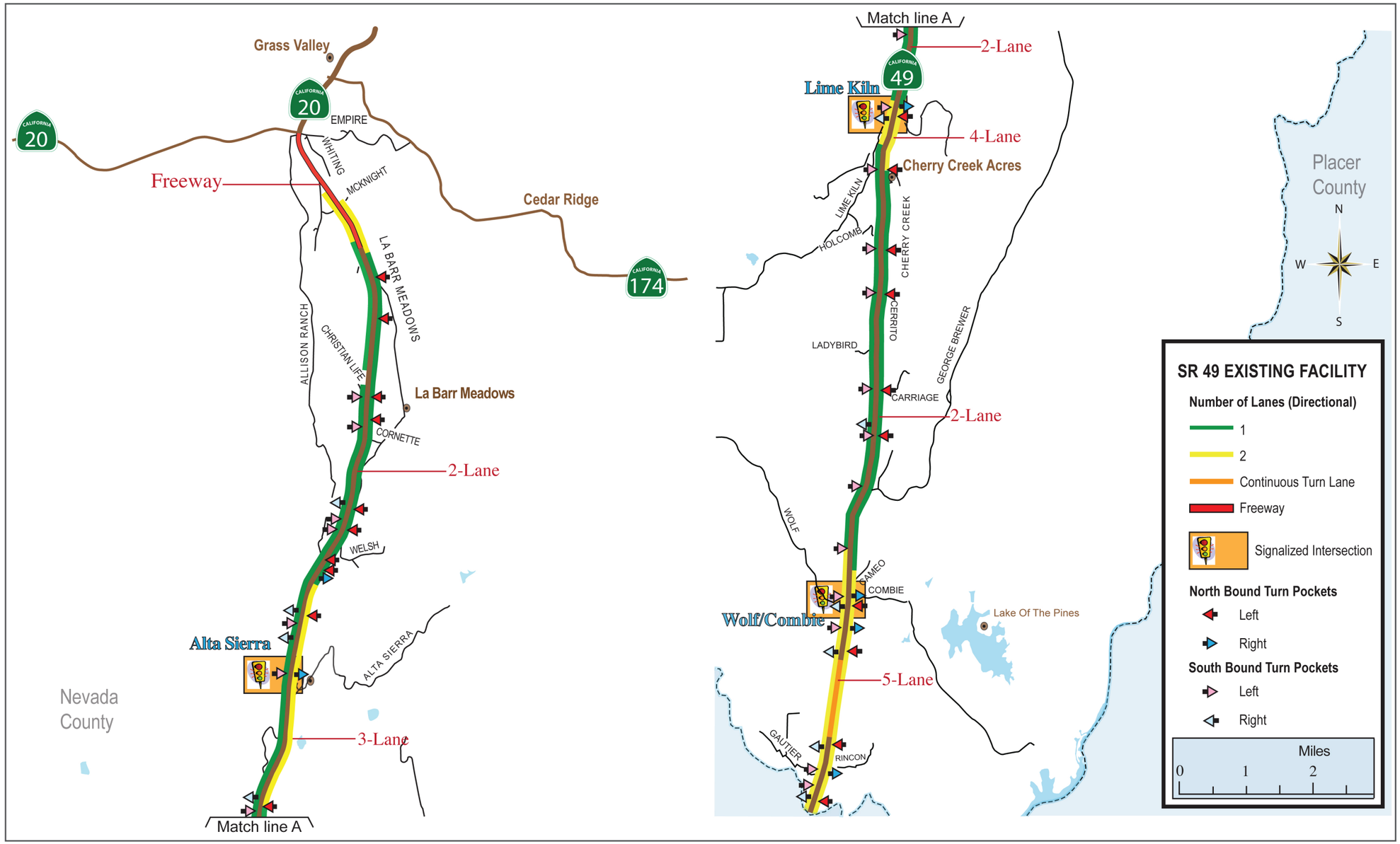

Figure 6: SR 49 CSMP Proposed Improvements By Priority, Nevada County

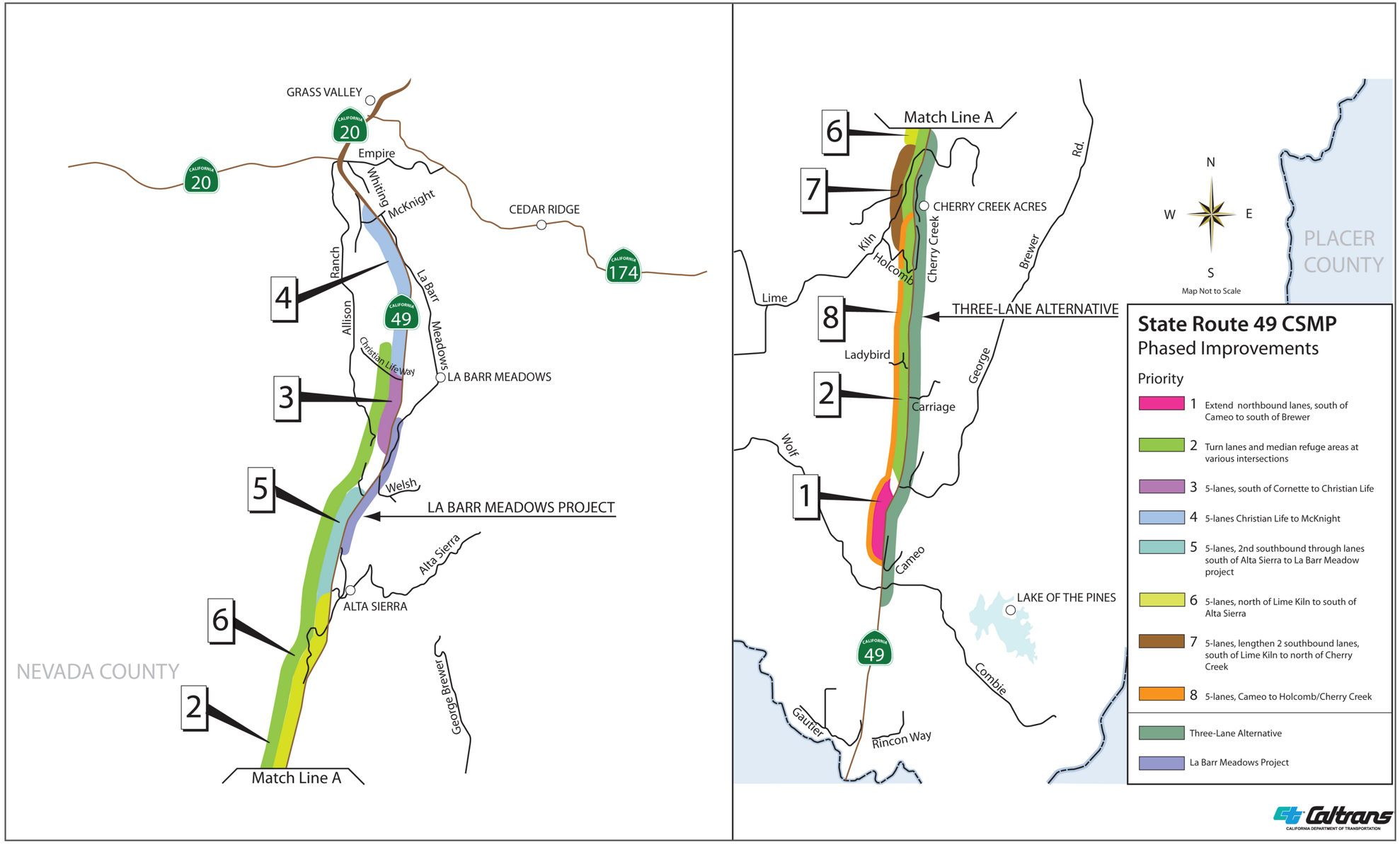

TABLE 12: SR 49 CSMP PHASING PLAN, LEVEL OF SERVICE AND BENEFIT-COST ANALYSIS

Project Description and Location	Total Cost Estimate (X 1,000)	Level of Service (LOS) Change			Total Vehicle-Hours Saved (X 1,000)[3]	20-Year Investment Analysis	
		2007 LOS (without Project)[1]	2027 LOS (without Project)[1]	2027 LOS (with Project)[1]		Annual Delay Savings (X 1,000)[4]	Annual Safety Benefits (X 1,000)[5]
		Peak Hr.	Peak Hr.	Peak Hr.	Daily		
Existing: No Project, Wolf/Combie Rds. to SR 20	$0	E	F				
La Barr Meadows Project: Widen to 5 lanes, add traffic signal, Little Valley Rd. to S. of Cornette.	$40,500	E	F	D	13.8	N/A	N/A
TOTAL (Priorities 1-7)	**$256,000**	**E**	**F**	**D**	**753**	**$1,800**	**$2,500**
Priority 1: Extend NB lane south of Cameo to south of Brewer	$1,000	E	F	F	10	$0	$0
Priority 2: Construct turn lanes, median refuge areas, and frontage roads at various intersection locations. Alternative to 3-lane project. Can be phased.	Varies			F	-12	$0	$0
Priority 3: Widen to 5 lanes, S. of Cornette to Christian Life Way.	$39,000			D	46	$100	$0
Priority 4: Widen to 5 lanes; Christian Life to McKnight Ways.	$38,000				87	$200	$1,200
Priority 5: Widen to 5 lanes, second SB through lane with median and shoulder widening, S. side of Alta Sierra to La Barr Meadows project.	$31,500				82	$200	$600
Priority 6: Widen to 5 lanes, N. of Lime Kiln Rd. to S. of Alta Sierra Dr..	$42,000				33	$100	$600
Priority 7: Widen to 5 lanes, extend two SB lanes, S. of Lime Kiln Rd. to N. of Cherry Creek Rd..	$13,500				20	$0	$0
Priority 8: Complete widening to 5 lanes, Cameo Dr. to Holcomb/Cherry Creek Rds..	$76,000			D	467	$1,200	$100
3-lane Alternative: Widen existing 2-lane portion of segment to 3-lanes, Wolf/Combie Rds. to N. of Lime Kiln Rd.. Not Recommended	$44,500	E	F	F[2]	30	$100	$100

[1] Source: Level of Service (LOS) calculated based on 2007 Caltrans' *Traffic Volumes on California State Highways* and *Highway Capacity Manual*, forecasted to future years by Caltrans District 3 Traffic Forecasting and Modeling Office using Nevada County Demand Model.
[2] 3-lane Alternative projected to reach LOS "F" by year 2020.
[3] Total Vehicle Hours Saved are the total number of extra hours used per day by all vehicles due to congestion and delay on the highway.
[4] Annual Delay Savings is a dollar value calculated for each year of a 20-year period for each project based on the annual total number of vehicle hours of delay saved per vehicle times the total number of vehicles. Value of Time: Cars - $11.60 per hour, Trucks - $28.70 per hour.
[5] Annual Safety Benefits is a dollar value calculated for each year of a 20-year period for each project based on a projected reduction of fatal, injury, and property damage only collisions. Cost by collision type: Fatal - $4.6 Million, Injury - $64,600, Property Damage Only - $9,400.