Corridor System Management Plan

State Route 51

District 3

Disclaimer: The information and data contained in this document are for planning purposes only and should not be relied upon for final design of any project. Any information in this Corridor System Management Plan (CSMP) is subject to modification as conditions change and new information is obtained. Although planning information is dynamic and continually changing, the District 3 Office of System and Freight Planning makes every effort to ensure the accuracy and timeliness of the information contained in the CSMP. The information in the CSMP does not constitute a standard, specification, or regulation, nor is it intended to address design policies and procedures.

California Department of Transportation

Provide a safe, sustainable, integrated and efficient transportation system
to enhance California's economy and livability.

Approvals:

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Further Transportation Concept Report Information:

Caltrans District 3 Website: http://www.dot.ca.gov/dist3/departments/planning
(Select Corridor System Management Planning, then the SR 51 Corridor System Management Plan)

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ABOUT THIS DOCUMENT

System Planning is the long-range transportation planning process for the California Department of Transportation (Caltrans). The System Planning process fulfills Caltrans' statutory responsibility as owner/operator of the State Highway System (SHS) (Gov. Code §65086) by identifying deficiencies and proposing improvements to the SHS. Through System Planning, Caltrans focuses on developing an integrated multimodal transportation system that meets Caltrans' goals of safety, mobility, delivery, stewardship, and service.

The System Planning process is primarily composed of four parts: the District System Management and Development Plan (DSMDP), the Transportation Concept Report (TCR), the Corridor System Management Plan (CSMP), and the DSMDP Project List. The district-wide **DSMDP** is a strategic policy and planning document that focuses on maintaining, operating, managing, and developing the transportation system. The **TCR** is a planning document that identifies the existing and future route conditions as well as future needs for each route on the SHS. The **CSMP** is a complex, multi-jurisdictional planning document that identifies future needs within corridors experiencing or expected to experience high levels of congestion, and is a foundation document that supports 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. The **DSMDP Project List** is a list of planned and partially programmed transportation projects used to recommend projects for funding. These System Planning products are also intended as resources for external stakeholders, the public, related Caltrans functional units, tribal governments, and partner regional and local agencies.

CSMP Purpose

California's SHS needs long-range planning documents to guide the logical development of transportation systems as required by CA Gov. Code §65086 and as necessitated by the public, stakeholders, and system users. The purpose of the CSMP is to evaluate current and projected conditions along the route, and communicate the vision for the development of each route in each Caltrans District during a 20 year planning horizon. The CSMP is developed with the goals of increasing safety, improving mobility, providing excellent stewardship, and meeting community and environmental needs along the corridor through integrated management of the transportation network, including the highway, parallel and connecting roadways, transit, pedestrian, bicycle, freight, operational improvements, and travel demand management components of the corridor, and to continue with the momentum from the first generation document to achieve a seamless transportation system on urbanized segments of the corridor by revisiting the managed transportation network, updating the traffic forecast and performance measure data, and upgrading the key capital project lists with an emphasis on inclusion of projects such as Intelligent Transportation Systems (ITS) and Traffic Operations Systems (TOS) improvements.

STAKEHOLDER PARTICIPATION

Stakeholder participation was sought throughout the development of the State Route (SR) 51 CSMP. Outreach involved internal and external stakeholders, regional and local agencies, advocacy groups, and the public. During the initial information resource gathering for the CSMP, stakeholders were contacted for their input related to their particular specializations, and to verify data sources used and data accuracy. As the document was finalized, stakeholders were asked to review the document for comments, edits, and for consistency with existing plans, policies, and procedures. The process of including and working closely with stakeholders adds value to the CSMP, allows for outside input and ideas to be reflected in the document, increases credibility, and helps strengthen public support and trust.

STATE AND LOCAL RESPONSIBILITY

Improvements to the SHS are the responsibility of both Caltrans and local agencies. Developments that add cumulative impacts to this route and the regional SHS may necessitate that local jurisdictions provide nexus based, proportional fair-share funding for future highway improvements. Developments or local circulation changes that will have significant traffic impacts to the highway should provide improvements to mitigate those impacts.

EXECUTIVE SUMMARY

This CSMP serves as the TCR for SR 51. The CSMP provides short, mid, and long-term planning for the entire length of SR 51 with a base year of 2012 and a horizon year of 2035. SR 51, or the Capital City Freeway, is a freeway facility spanning 8.86 miles, beginning at the US 50/SR 99 junction near Broadway in Sacramento, and ending at the Interstate 80 (I-80) junction near Auburn Boulevard (Blvd.) in Sacramento. Also known as "Business Loop 80," the SR 51 Corridor has historically been managed as a part of the I-80 Corridor. The SR 51 CSMP outlines a foundation to support the partnership-based, integrated management of various travel modes (transit, cars, trucks, bicycles) and infrastructure (rail tracks, roads, highways, information systems, bike routes), to provide corridor mobility in the most efficient and effective manner possible. This approach brings facility operations and transportation services together with capital projects into a coordinated system management strategy. The managed transportation network for this CSMP includes the entirety of SR 51, select parallel and connector roadways, transit facilities and services, and bicycle routes. SR 51 is divided into 2 urban segments. These segments are summarized in Tables 1 and 2, and shown in Figure 1.

Concept Summary

The SR 51 CSMP evaluates current and projected future traffic conditions with 2012 as the base year and with the 20-year build facility. Table 1 provides a summary of the existing facility, the 20-year build facility, and the ultimate facility concept. As discussed further in this document, the concept level of service (LOS) for state highways in urban areas is LOS E. Because it is recognized that the two segments of SR 51 will not attain their respective concept LOS after the 20-year build of the facility, ongoing efforts to manage and improve system performance will emphasize on system operations and other management strategies discussed further on in this document.

TABLE 1: SR 51 CONCEPT SUMMARY

Segment #	Segment Description	Existing Facility*	20-Year Build Facility*	Ultimate Facility*
1	U.S. 50/SR 99 Interchange to Arden Wy./SR-160 Interchange	6F+2HOV (SB E St. to US 50/SR 99 and NB US 50/SR 99 to N St.) +2AUX (US 50/SR 99 to H St.), 6F (SB Arden Wy./SR 160 to E St. and NB N St. to Arden Wy./SR 160), +ITS	+2AUX/TRANS (H St. to Arden Wy./SR 160), +ITS	+HOV (NB N St to E St.), +2HOV (E St. to Arden Wy./SR 160), +ITS+ICM
2	Arden Wy./SR-160 Interchange to I-80 Junction	6F+2AUX (Arden Wy./SR 160 to Marconi Ave.), 6F (Marconi Ave. to I-80), +ITS	+2AUX/TRANS (Marconi Ave. to Watt Ave.), +ITS	+2HOV (Arden Wy./SR 160 to I-80), +ITS+ICM

* Facility Codes: C=Conventional Highway, E=Expressway, F=Freeway, HOV=High Occupancy Vehicle Lanes, Aux=Auxiliary Lanes, Trans=Transition Lanes, ITS=Intelligent Transportation Systems, ICM=Integrated Corridor Management. SB=Southbound. NB=Northbound.

Concept Rationale

The 20-year build facility for SR 51 describes the long-term vision for the facility how the facility will operate and what its configuration will be in the horizon year. The 20-year build facility is based on planned and programmed projects. The ultimate facility is envisioned beyond the 20-year planning horizon, and includes conceptual projects such as the construction of bus/carpool (HOV), transition lanes and auxiliary (Aux) lanes, and the implementation of Intelligent Transportation Systems (ITS) and Integrated Corridor Management (ICM). In the Corridor Performance section, Concept LOS is given for each segment in the base and horizon year. A minimum acceptable LOS is E for both segments of this urban facility.

In addition to its interregional travel function, SR 51 is an important transportation facility for the communities within Sacramento County, in particular the City of Sacramento, with trip attractors in its dense urban core, and the Arden-Arcade community, with major trip attractors including Cal Expo and the Arden Fair Mall. SR 51 also provides interregional connectivity between US 50, SR 99, SR 160, and I-80, connectivity to local roads, transit, and rail. This CSMP proposes changes to the facility that balance mobility with the cost of improvements.

Proposed Projects and Strategies

A number of capacity expansion, operational and ITS improvements are proposed for SR 51. These improvements include the installation of various ITS technologies, bridge widening, auxiliary lanes, transition lanes, ramp metering, interchange improvements entailing wider ramps, the addition of bus/carpool lanes and connectors, and other improvements appropriate to the context of the facility.

ICM is part of the Ultimate Facility concept for the SR 51 corridor. ICM is a multimodal, multi-jurisdictional approach to managing recurring and non-recurring bottlenecks along a transportation corridor, by treating a transportation corridor as a single asset, including the movement of freight. ICM highlights the need to increase stakeholder outreach and multijurisdictional coordination. A major component of this necessary coordination will be through enhancements to data sharing across jurisdictional boundaries, including standardization of data formats and the identification and implementation of ITS and operational projects. District 3 is developing an ITS/Operations Plan to establish a methodology for prioritizing targeted investments based on performance measures and outcomes to maximize returns. The ITS/Operations Plan will provide a dynamic list of projects identified through Benefit-Cost (BC) ratio analysis.

Additionally, increased multijurisdictional collaboration and data sharing as described above will facilitate the examination of emergency and evacuation scenarios, and the identification of evacuation route concepts in future CSMP updates, including potential bottlenecks and route coordination.

District 3 is preparing a Concept of Operations (ConOps) Plan for SR 51. The SR 51 ConOps Plan will be a management tool to assist in collaboratively planning and implementing management and operations strategies in the near-term to long-term. It will provide general guidance on and articulate the District operational concept for system management, highway and arterial management, incident management, traveler information, operational improvements, and alternative modes for major transportation corridors within the District, consistent with the boundaries identified in the CSMP.

Looking southwest from the I-80/SR 51 interchange

CORRIDOR OVERVIEW

ROUTE SEGMENTATION

SR 51 is divided into 2 segments, shown in Table 2 below. As shown in Figure 1, the facility spans the eastern portion of the City of Sacramento. It is an entirely urban facility.

TABLE 2: SR 51 ROUTE SEGMENTATION

Segment #	Location Description	County	Begin Post Mile	End Post Mile
1	U.S. 50/SR 99 Interchange to Arden Wy./SR-160 Interchange	SAC	0.00	4.35
2	Arden Wy./SR-160 Interchange to I-80 Junction	SAC	4.35	8.86

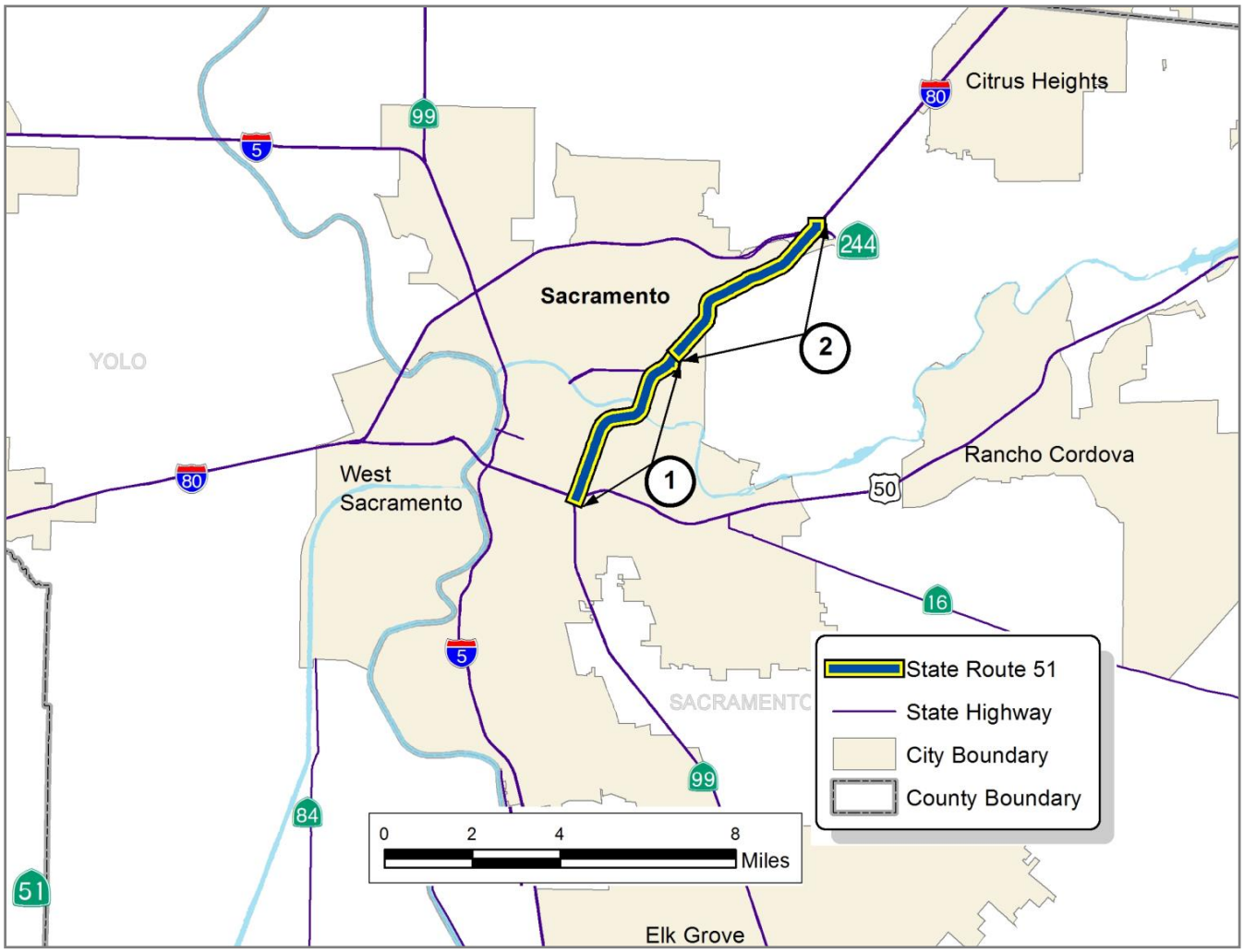

Figure 1: SR 51 Route Segmentation Map

CSMP Transportation Network

The SR 51 CSMP Transportation Network (managed network) includes SR 51 from the US 50/SR 99 interchange to the I-80/SR 51 junction, as well as select parallel roads, transit services, and bike routes. The parallel and connector roadways, transit, and bicycle route components of the managed network were selected for inclusion in the corridor in consultation with the respective local agencies. Changes in the managed network from the original I-80/SR 51 CSMP include the following additions:

- Parallel and connecting roadways to SR 51 from midtown Sacramento to Auburn Blvd. were added to close a gap that existed in the original CSMP. These roadways include portions of 29th Street (St.), 30th St., H St., J St., N St., P St., T St., SR 160, Del Paso Blvd. and Marconi Avenue (Ave.).
- The 2009 I-80/SR 51 CSMP did not list individual routes on the I-80/SR 51 network. This 2014 CSMP includes specific routes that serve the updated I-80/SR51 network (Table 9), and will be revised in subsequent updates.
- Bicycle routes in downtown and midtown Sacramento including, but not limited to portions of T St., 28th St., E St., 21st St., C St., Sacramento Northern Railroad Bikeway, American River Bike Trail, Tribute Road (Rd.), Fee Drive (Dr.), Blumenfeld Dr., Harvard Dr., Auburn Blvd., Marconi Ave., Auburn Blvd., Haggin Oaks Bike Trail and Fulton Ave.

As the CSMP concept matures, additional facilities may be added to the managed CSMP transportation network.

ROUTE DESCRIPTION

Route Location

SR 51 begins at the SR 51/US 50/SR 99 interchange and continues to the SR 51/I-80 junction all within the City of Sacramento. Because of its connectivity to SR 99 and I-80, it also serves multiple communities in Sacramento County, in particular the Cities of Sacramento, Elk Grove, and Citrus Heights, as well as Arden-Arcade, Fair Oaks, McClellan, North Highlands, and Carmichael communities. It also provides connectivity to local roads, transit, rail, SR 16, US 50 and I-5 via local roads and freeways. SR 51 and parallel and connecting roadways appear in Figure 2. Transit services for the corridor are shown in Figure 7. Bicycle components are illustrated in Figure 8.

Route Purpose and Major Route Features

As noted above, SR 51 serves a large portion of the Sacramento Metropolitan Area by providing convenient regional access to jobs and services in downtown Sacramento, as well as multiple other communities within Sacramento County. The SR 51 freeway facility is an elevated structure from the interchange with US 50/SR 99 to just north of the American River Bridge. Some of the larger trip attractors that access this freeway include government and private sector employment in downtown Sacramento: the California State Fair Exposition and office facilities off of Cal Expo Blvd., business-professional offices, restaurants, hotels, and regional mall retail services off of Arden Way (Wy.), hotels and auto dealerships off of and between Howe Ave. and Fulton Ave., a community golf course facility, community park, and several sports fields off of and between Howe Ave. and I-80. Along with this, SR 51 provides access via connecting roadways from Arden Wy. to Watt Ave. to a large number of residential subdivisions.

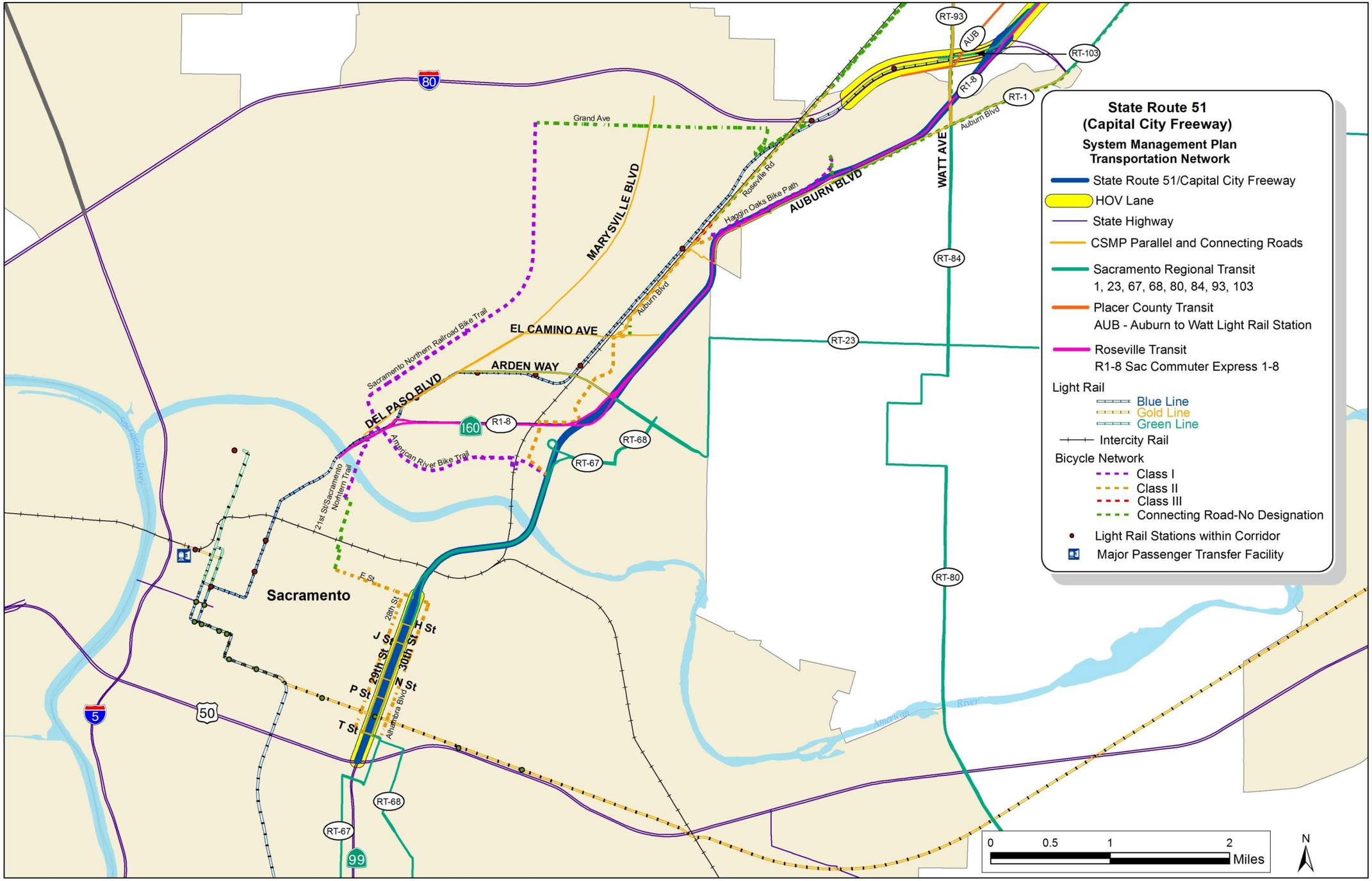

Figure 2: SR 51 CSMP Transportation Network

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Route Designations and Characteristics

SR 51 is designated a freeway and is included in the National Highway System and Strategic Highway Network. SR 51 is also a part of the Surface Transportation Assistance Act (STAA) National Network, which permits larger trucks to traverse the route. This designation facilitates freight movement to the large population areas. For more information on truck routes and sizes allowed in District 3, please visit the Caltrans Office of Engineering Truck Lengths and Routes Quick Guide located at http://www.dot.ca.gov/hq/traffops/engineering/trucks/truck-length-routes.htm.

Route designations and characteristics of SR 51 are identified in Tables 3 and 4.

TABLE 3: SR 51 ROUTE DESIGNATIONS AND CHARACTERISTICS

Seg. #	Freeway & Express-way	National Highway System	Strategic Highway Network	Scenic Highway	Inter-regional Road System	High Emphasis	Focus Route	Federal Functional Classification	Goods Movement Route	Truck Designation	Rural/ Urban/ Urbanized
1	F	Yes	Yes	No	No	No	No	Other Freeway or Expressway	Yes	STAA National Network	Urbanized
2	F	Yes	Yes	No	No	No	No	Other Freeway or Expressway	Yes	STAA National Network	Urbanized

TABLE 4: SR 51 ROUTE AGENCIES, TRIBES AND TERRAIN

Seg. #	Metropolitan Planning Organization	Regional Transportation Planning Agency	Congestion Management Agency	County Transportation Commission	Local Agency	Tribes	Air District	Terrain
1	Sacramento Area Council of Governments (SACOG)	None	Sacramento Transportation Authority	N/A	City of Sacramento	-	Sacramento Metro	Flat and low terrain
2		None		N/A	City of Sacramento[1]	-		

[1] Segment 2 Right of Way abuts Sacramento County

COMMUNITY CHARACTERISTICS

SR 51 runs within the boundaries of the City of Sacramento. The 2012 U.S. Census American Community Survey (ACS) show that within the City of Sacramento there are approximately 192,715 total housing units in the City of Sacramento, with an estimated 176,061 households (for an occupancy rate of 91.4%) . The population density is over 4,660 persons per square mile. The city's population is approximately 467,467, of which 197,486 are workers who commute to work as follows: 72.6 percent of workers drive alone, 12.8 percent carpool, 3.8 percent use public transportation, 3.2 percent walk, 2.5 percent bike and 1.2 percent use other means. An additional 3.9 percent worked at home. The median household income in 2012 was $50,661 in the City of Sacramento.

LAND USE

SR 51 is located within the urban core of Sacramento, where land uses include residential, commercial and industrial activities. North of the E St. on ramp, land use density reduces, until it becomes open space just as it crosses the American River. North of the American River, land use density increases and includes major attractors such as Cal Expo and the Arden Fair Mall. North of the Arden Wy. ramps, residential, commercial and industrial uses characterize the surroundings of SR 51 until its junction with I-80.

SYSTEM CHARACTERISTICS

For the purpose of analysis, SR 51 is divided into two segments shown in Figures 3 and 4 below.

Segment 1 consists of 4.35 miles of freeway from the facility's beginning at the junction of SR 99/US 50, extending through the midtown portion of the City of Sacramento. SR 51 provides access to the midtown and downtown areas and the community of East Sacramento. Segment 1 also provides access to Cal Expo and the Arden-Arcade community of Sacramento, terminating at the Arden Wy./SR 160 junction in Sacramento.

Segment 2 consists of 4.51 miles of freeway that extends from the Arden Wy./SR 160 junction to the I-80 junction. It provides access to residences, offices, commercial and industrial activities along its length.

The system characteristics for the Existing, 20-Year Build, and Ultimate Facility are summarized in Table 5. Table 5 provides basic information about SR 51 on each segment, including HOV characteristics and auxiliary lanes. The existing facility identifies the highway under current conditions. The 20-Year Build Facility identifies the highway with improvements planned and programmed to be completed by the horizon year of 2035. The post 25-year Ultimate Facility is listed in order to identify how the highway is envisioned for beyond the horizon year. The segments are determined based on logical termini including intersections, jurisdiction, changes in land use, and status of construction. All segment lengths are given in centerline miles.

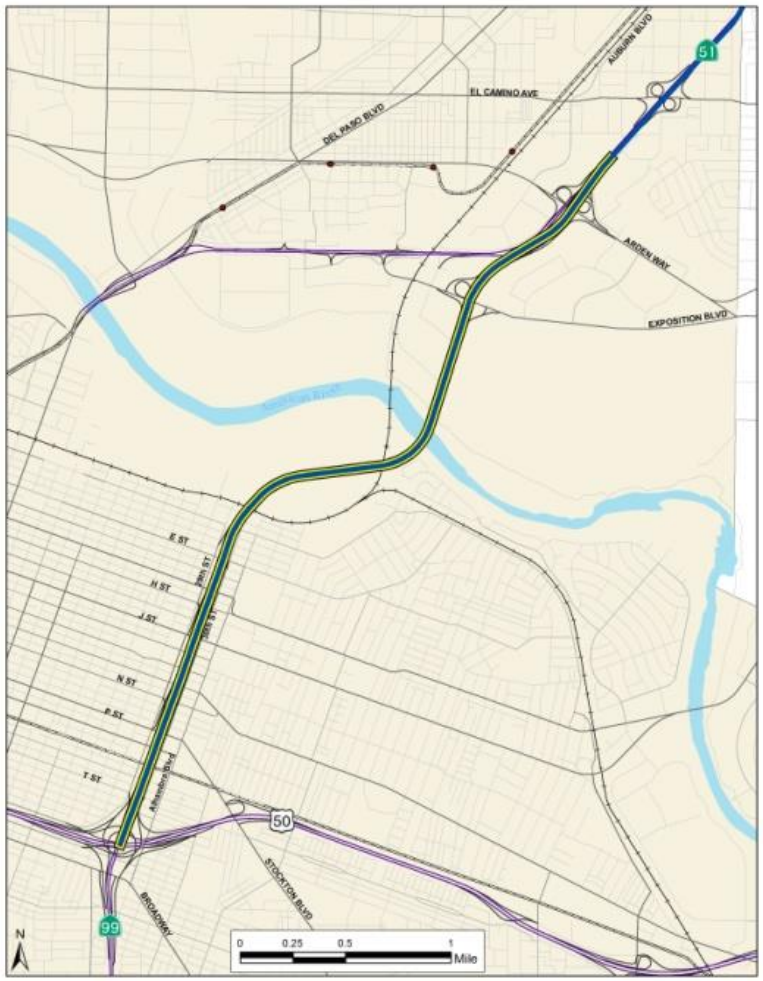

Figure 3: Segment 1 Map

Figure 4: Segment 2 Map

TABLE 5: SR 51 SYSTEM CHARACTERISTICS								
Seg. #	Existing Facility[1)]							
	Facility Type	General Purpose Lanes	Lane Miles	Centerline Miles	HOV Lanes	HOV Characteristics	Auxiliary Lanes	Passing Lanes
1	F	6	26.10	4.35	2	SB E St. to US 50/SR 99 and NB US 50/SR 99 to N St.	SB H St. to US 50/SR 99 and NB US 50/SR 99 to H St.	-
2	F	6	27.06	4.51	-	--	Arden Wy./SR 160 to Marconi Ave.	-
Seg. #	20-Year Build Facility[1) 2)]							
	Facility Type	General Purpose Lanes	Lane Miles	Centerline Miles	HOV Lanes	HOV Characteristics	Auxiliary/ Transition Lanes	Passing Lanes
1	F	6	26.10	4.35	2	SB E St. to US 50/SR 99 and NB US 50/SR 99 to N St.	SB Arden Wy./SR-160 to US 50/SR 99 and NB US 50/SR 99 to to Arden Wy./SR 160	-
2	F	6	27.06	4.51	-	-	Arden Wy./SR 160 to Watt Ave.	-
Seg. #	Ultimate Facility[1) 3)]							
	Facility Type	General Purpose Lanes	Lane Miles	Centerline Miles	HOV Lanes	HOV Characteristics	Auxiliary/Transition Lanes	Passing Lanes
1	F	6	26.10	4.35	2	US 50/SR 99 to Arden Wy./SR 160	SB Arden Wy./SR-160 to US 50/SR 99 and NB US 50/SR 99 to Arden Wy./SR 160	-
2	F	6	27.06	4.51	2	Arden Wy./SR 160 to I-80	Arden Wy./SR 160 to Watt Ave.	-

[1)] F = Freeway, HOV=High Occupancy Vehicle Lanes, Aux=Auxiliary Lane, Trans=Transition Lane, SB=Southbound, NB=Northbound, ITS=Intelligent Transportation System, ICM=Integrated Corridor Management.
[2)] ITS Elements are proposed throughout the facility in the 20-Year Build Scenario
[3)] ICM is proposed throughout the Ultimate Facility

TRAFFIC OPERATIONS SYSTEM ELEMENTS

Caltrans District 3 continuously seeks to optimize the transportation system. Two cost-effective methods include operational improvements and ITS improvements. Operational improvements include capital improvements that improve efficiency such as auxiliary/transition lanes, express bus/carpool lanes, and the implementation of technologies and management strategies for incident management, traffic demand management, as well as park and ride facilities. ITS improvements can be categorized into four general classifications: traveler information, monitoring, vehicle detection, and operations. These traffic operations system (TOS) elements, and transportation management facilities and services are discussed below by transportation mode.

Given the complexity of the corridor, there are a wide variety of system management strategies and elements currently being implemented by jurisdictions and transportation service providers. Strategies and elements

range from vehicle detection devices to traveler information systems to traffic flow control mechanisms. A common element among all the strategies and elements is data collection and analysis. Caltrans, SACOG, and local governments have partnered together on corridor performance data and system management in the Sacramento Transportation Area Network (STARNET).

The STARNET web application initial release took place in 2010. Features implemented so far include: Changeable Message Sign (CMS) display, speed data from Caltrans and Google, integration with Regional Transit and Yolo Transit to provide schedule and routing data, California Highway Patrol (CHP) incident data, connectivity to the SACOG-managed 511 systems (web and telephone), personalized traveler information with alerts based on time of day, lane closure data, Closed Circuit Television (CCTV) displays from Caltrans, City of Roseville and County of Sacramento. Near term initiatives include national weather service (NWS) alert data, increased transit data including real time location feed data from Yolo Transit and a City of Sacramento Police Computer Aided Dispatch (CAD) feed. Web based applications include a commercial vehicle page, full feature website, low bandwidth page, mobile device page and under development applications for iPhone and Android smart phones. Caltrans Commercial Web Portal, City of Sacramento Traffic Operation Center (TOC), Sacramento County TOC, Roseville TOC, Elk Grove TOC and Citrus Heights TOC are contributing sources for the STARNET application. STARNET's associated management strategies can and will evolve as the application is implemented throughout the region and as additional features are added as development proceeds.

The SHS has an extensive set of system management strategies in operation, for which the Caltrans Traffic Management Center (TMC) serves as the information and control hub for the various systems. The TMC operates 24 hours a day, seven days a week. Along SR 51, data from Closed Circuit Television (CCTV) systems, Ramp Metering Stations (RMS) and Road Weather Information Systems (RWIS) feeds to the TMC. Information about collisions, other incidents, road closures, and emergency notifications are disseminated to public from the TMC via Changeable Message Signs (CMS) and Extinguishable Message Signs (EMS). There are also specific instances of system management linkages among transportation modes and services at particular locations. SACOG and some cities, counties, and transit operators also have robust system management elements and programs applied to their facilities or services, such as the 511 web telephone system. Information regarding conditions on the SHS, local routes and transit systems is gathered via automated systems and feed via the STARNET System in a standard format to be made available to the public and private information users.

Caltrans seeks to provide the latest in ITS technology on its urban freeways. These elements help improve travel times and overall facility performance. As summarized in Table 6 and depicted in Figure 6, SR 51 has numerous ITS elements installed along the facility. Additional ITS elements are planned under "Future Build ITS Elements." Due to the low costs of ITS, and the high benefits they provide to facility performance, Caltrans recognizes the need to comprehensively plan for ITS infrastructure. Caltrans Distinct 3 is implementing a systematic process to plan for and fund ITS components through two new documents currently under development: 1) The SR 51 Concept of Operations Plan, which will act as the strategy document for SR 51, outlining the ITS and operational concepts that will be implemented in short, medium, and long term timeframes, and 2) The District 3 ITS/Operations Plan, which will serve as a prioritized inventory of actual ITS and operational projects that will provide the highest benefits in relation to their costs. With these two documents in conjunction with traditional planning documents, such as the CSMP and TCR, Caltrans District 3 will be able to systematically plan for ITS, as well as position ITS projects for competitive funding opportunities.

In order to standardize activity and incident logging, Caltrans is assessing the establishment of the Traffic Management Center Activity Log (TMCAL). TMCAL will provide a centralized source of incident information with a uniform interface and standardized operation for use throughout California. In addition to the provision of centralized logging, it is envisioned that TMCAL will provide post incident reports and performance measurement and reporting for TMC operations, and simplify data archiving and retrieval.

The ultimate SR 51 facility includes implementation of ICM strategies in collaboration with SACOG, the City of Sacramento, the Sacramento Regional Transit District (SacRT) and other stakeholders. ICM strategies include the evaluation and implementation of multijurisdictional engagement and data sharing and the use of the STARNET application in conjunction with TMCAL.

Operational improvements and services utilized by Caltrans along the SR 51 corridor are identified as follows:

Auxiliary lanes are utilized between interchange on- and off-ramps for weaving, truck climbing, speed change, or for other purposes supplementary to through movement. These non-capacity increasing lanes give drivers more room to speed up and slow down when getting on or off a freeway. An auxiliary lane makes it easier for drivers to merge into freeway traffic, and reduces ramp congestion. Auxiliary lanes currently exist along a portion of SR 51 in midtown Sacramento. The Ultimate Facility for SR 51 is includes Auxiliary lanes along the entire corridor.

Transition lanes are similar to auxiliary lanes in function, but facilitate merging transitions for traffic over the distance of two or more interchanges, and may include acceleration lanes. By functioning as "on-system frontage," transition lanes provide broader service for merging traffic and therefore alleviate bottleneck conditions and enhance travel lane throughput along freeway segments spread out over two or more interchanges. The 20- Build and Ultimate Facility scenarios for SR 51 identify placement of transition lanes along portions of the corridor from E St. to Watt Ave. A graphic depiction of auxiliary and transition lanes is shown in Figure 5.

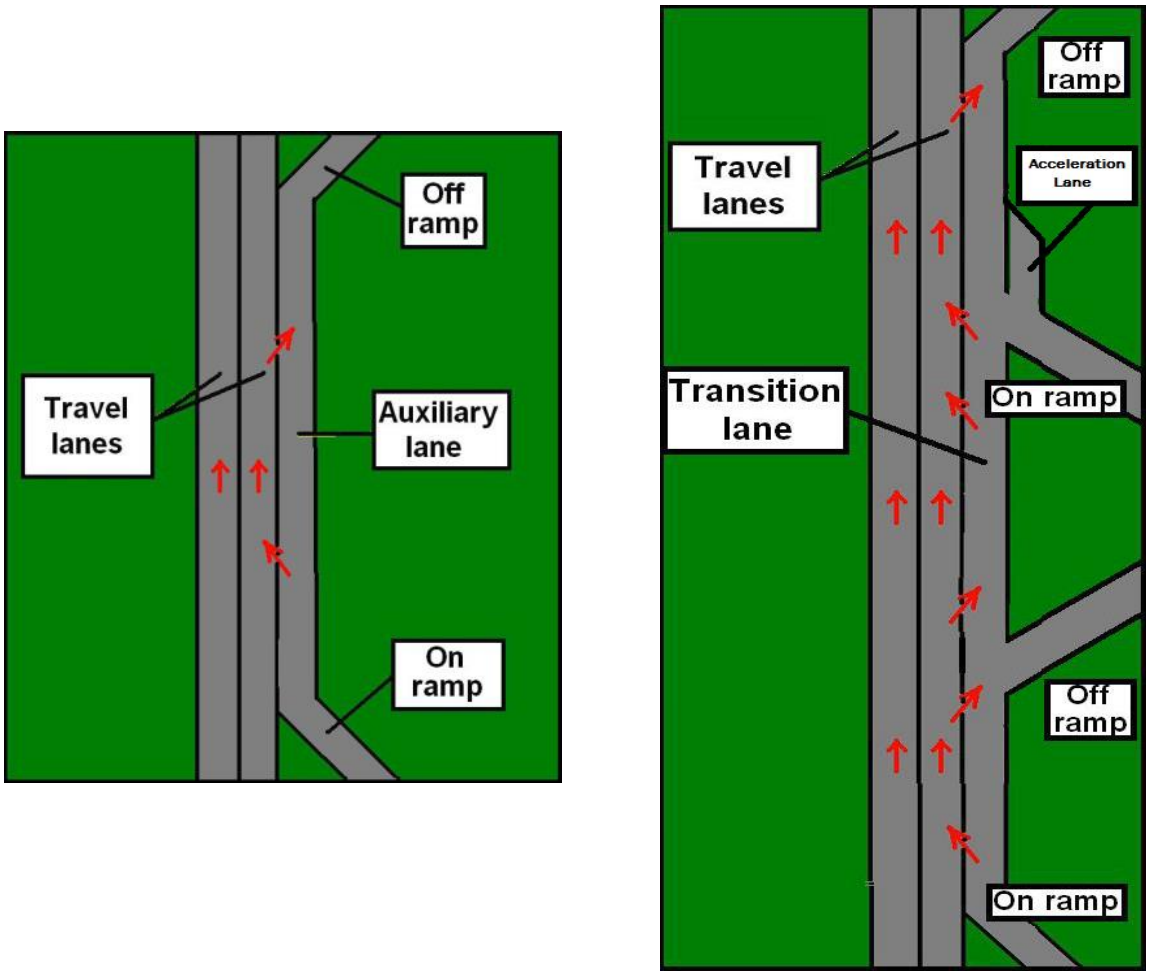

Figure 3: Auxiliary and Transition Lanes

HOV lanes are lanes for the exclusive use of vehicles carrying two or more occupants during the posted times dedicated to their use and can provide a travel time advantage to people who use the lanes. HOV lanes currently exist on SR 51 from the US 50/SR 99 interchange to E St. in the southbound direction and to J St. in the northbound direction. The Ultimate Facility for SR 51 includes HOV lanes along the entire corridor.

Transportation Demand Management services include Transportation Management Associations (TMAs), employer subsidized transit passes and vanpools, the *511 Traveler Information Service*, carpool ride matching, the *Guaranteed Ride Home* program, and vanpool services. The overall intent is to reduce the number of vehicle trips using highways and roads. Many of these services are financially supported by or directly provided by EDCTC and SACOG. Area employers and office complex owners are also key supporters and funders of TDM programs at their work sites. A listing of TMAs is provided in the Stakeholders Acknowledgement section. Additional TMA information including a list of contacts can be found at http://www.sacregion511.org/rideshare/tma.html.

Incident Management is an essential component of highway operations. Timely response to incidents reduces the amount of time lanes are blocked, speeds emergency response and reduces secondary/end of queue collisions. A popular aspect of this program is the *Freeway Service Patrol,* which assists motorists whose vehicles experience flat tires, are out of gas or have a mechanical failure. Future CSMP updates will examine the SR 51 corridor in terms of emergency evacuation routes, including potential bottlenecks and planning impacts, based on a range of evacuation scenarios.

Traveler Information services for the corridor include various web sites and telephone systems, which are hosted by Caltrans, SACOG, the CHP, the U.S. Weather Service, and third party feeds. Caltrans provides real-time data feeds to commercial/media information services, such as radio and TV stations, as well as to CMS and EMS systems to help inform travelers of highway and traffic conditions.

TABLE 6: SR 51 ITS ELEMENTS

Seg. #	Cnty	PM	Existing ITS Elements[1]									
			BTR	CCTV	CMS	EMS	ETR	HAR	RMS	RWIS	TMS	Grand Total
1	SAC	0.00 – 4.35	-	6	2	-	-	-	5	1	10	**24**
2	SAC	4.35 – 8.86	-	4	2	1	-	-	11	-	6	**24**
TOTAL			-	10	4	1	-	-	16	1	16	**48**
Seg. #	**Cnty**	**PM**	**Future Build ITS Elements[1]**									
			BTR	**CCTV**	**CMS**	**EMS**	**ETR**	**HAR**	**RMS**	**RWIS**	**TMS**	**Grand Total**
1	SAC	0.00 – 4.35	4	6	2	-	-	-	13	1	10	**36**
2	SAC	4.35 – 8.86	2	4	2	1	-	-	12	-	6	**27**
TOTAL			6	10	4	1	-	-	25	1	16	**63**

Source: D3 TOS Asset Export September 2014

[1] BTR = Blue Tooth Reader, CCTV = Closed Circuit Television, CMS = Changeable Message Sign, EMS = Extinguishable Message Sign, ETR = Electronic Tag Reader, HAR = Highway Advisory Radio, RMS = Ramp Metering Stations, RWIS = Road Weather Information System, TMS = Traffic Management Systems.

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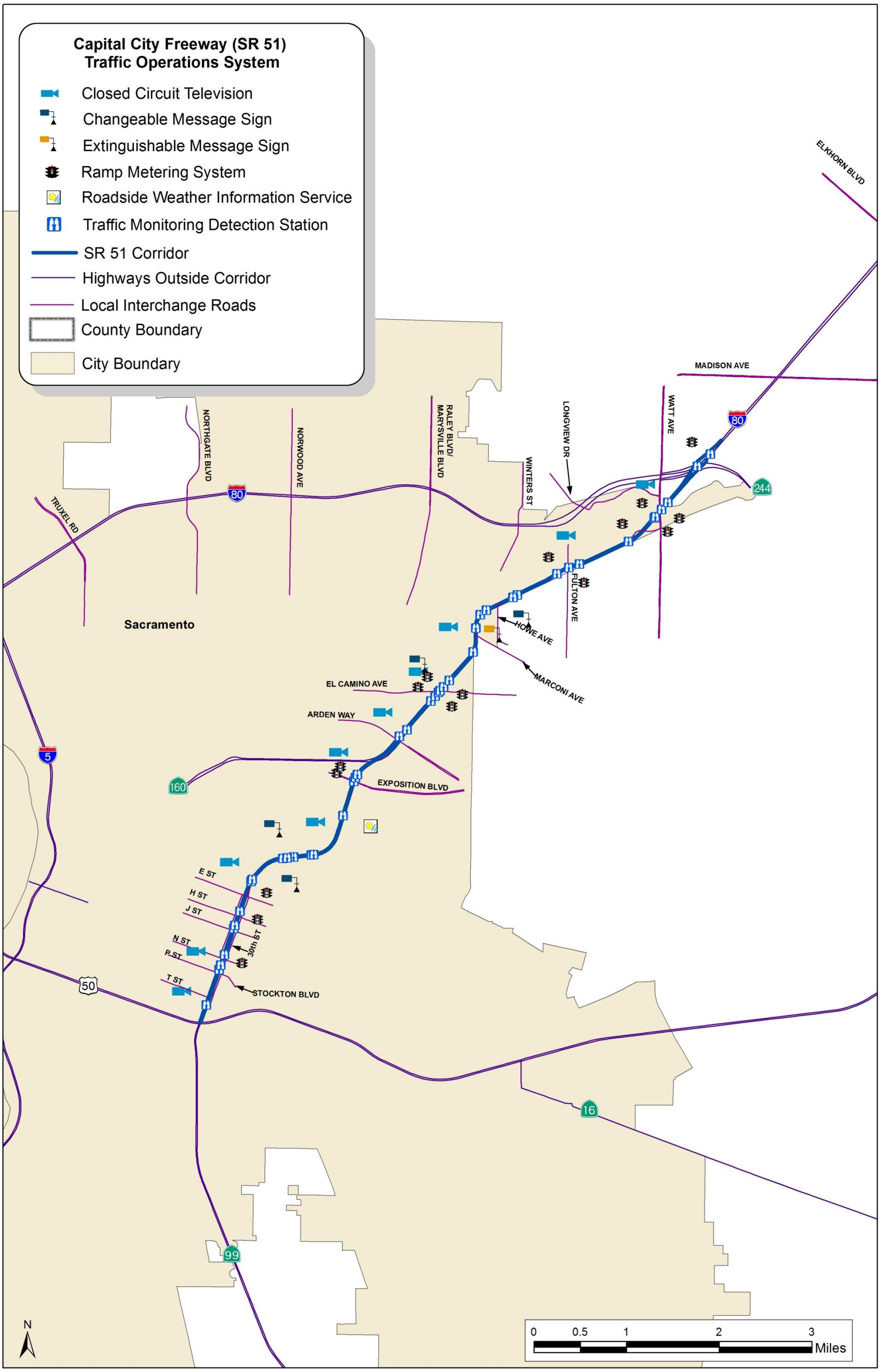

Figure 4: SR 51 Traffic Operations System Map (Existing)

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PARALLEL AND CONNECTING ROADWAYS

Working with local agencies, Caltrans District 3 has identified several roads parallel to and connecting to SR 51, as identified in Table 7 and shown in Figure 2 on page 11. Together with transit and bicycle/pedestrian paths, the corridor functions as a whole to provide optimal system performance. It accomplishes this principally by offering transportation alternatives along SR 51 during times of peak commute or during an incident. Compared to 2009, the network of parallel and connecting roadways was expanded to include more roadways, creating a more complete system of urban streets. Major parallel and connecting roadways on the corridor include, but are not limited to, 29th St., 30th St., SR 160, Del Paso Blvd., Marysville Blvd., Roseville Rd., Marconi Ave., El Camino Ave., Arden Wy., and Auburn Blvd.

A number of ITS elements utilized along the parallel and connecting roadways are as follows:

City of Sacramento operates a Traffic Operations Center (TOC). Sensors in the street detect the passage of vehicles, vehicle speed, and the level of congestion. This information is received on a second-by-second (real-time) basis and is analyzed at the TOC. Along various parallel and connecting roadways in the corridor, additional signal coordination capabilities have been developed. For example, signal preemption systems and route coordination occur across jurisdictional boundaries along the managed network.

Sacramento County also operates a TOC by gathering information through CCTV cameras, CMS, HAR, and a Fiber Optics (FO) network placed along major traffic corridors throughout the county. Sacramento County also implements signal coordination, such as emergency vehicle preemption and route coordination as described above.

TABLE 7: SR 51 CSMP PARALLEL ROADWAY NETWORK

Seg. #	Location		SR 51		Parallel and Connector Roads		
	County	City	From	To	Roadway	From	To
1	SAC	Sacramento	U.S. 50/SR 99 Junction	Arden Wy./SR-160 Interchange	29th St.	T St.	H St.
					30th St.	P St.	H St.
					H St.	29th St.	30th St.
					J St.	29th St.	30th St.
					N St.	29th St.	30th St.
					P St.	29th St.	30th St.
					T St.	29th St.	30th St.
					Break in Parallel Road Connectors between H St. and Arden Wy./SR 160		
2	SAC	Sacramento	Arden Wy./SR-160 Interchange	I-80 Interchange	SR 160	SR 51 @ Arden Wy.	Del Paso Blvd.-16th
					Del Paso Blvd./ Marysville Blvd.	Northgate Blvd.	I-80
					Roseville Rd.	Auburn Blvd. @ Marconi Ave.	Watt Ave./I-80 LR Station Driveway
					Auburn Blvd.	El Camino Ave.	SR 244
					Arden Wy./ Garden Hwy.	SR 51	Marysville Blvd.
					El Camino Ave.	SR 51	Marysville Blvd.
					Marconi Ave.	Auburn Blvd.	Marconi Cir.
					Marconi Cir.	Marconi Ave.	Auburn Blvd.
					Watt Ave.	Roseville Rd.	Auburn Blvd.
					SR 244	SR 51	Auburn Blvd.

TRANSIT AND RIDESHARE FACILITIES

Transit and rideshare services within the SR 51 corridor are identified in Table 8 and delineated in Figure 7. Transit makes the transportation system more efficient by increasing the number of people who travel together in a bus or train, creating more capacity for other vehicles on the roadways. Transit also gives people transportation options to get to and from jobs, housing, colleges and schools, medical appointments and other services in other areas. For many, transit is an important lifeline to people who may not have an automobile.

In the second segment of SR 51, SacRT provides light rail service and the majority of traditional bus service in this area. All SacRT buses feed into five light rail stations on the Blue Line. These stations include Watt/I-80, Watt/I-80 West, Roseville Rd., Marconi/Arcade, and Swanston. The Watt Ave./I-80 Station is a major transfer point for several SacRT buses routes to South Sacramento, Citrus Heights, the College Greens, and the Louise and Orlando areas. During special events, such as the California State Fair and the holiday season, SacRT operates additional bus service to connect events to light rail stations and offers free service to promote transit use during select events. SacRT uses a Global Positioning System (GPS) for transit route analysis. SacRT has also installed pre-emptive traffic signals at at-grade intersections along light-rail stations. Computer-aided dispatch and Bus Rapid Transit (BRT) are in planning stages. Currently, SacRT is testing the implementation of a Connect Card, a universal transit fare card, at light rail stations. In the future, SacRT envisions light rail, the Gold Line, will extend from Watt Ave./I-80 Station to Citrus Heights and Roseville. Traditional and express bus services will also be expanded. In addition, all light rail stations and key bus stops will be upgraded.

There are presently no Park and Ride lot facilities along SR 51. However, information on nearby Park and Ride lots including specific location, capacity, and occupancy rates can be found at: http://www.dot.ca.gov/dist3/departments/planning/systemplanningPR.htm.

SACOG manages the 511 and rideshare programs that cost approximately $600,000 per year, region-wide, to foster carpooling, transit ridership, vanpooling, and bicycling in all areas and corridors. The *Regional Rideshare* Program covers Placer, El Dorado, Sacramento, Yolo, Yuba, and Sutter counties. The *Regional Rideshare* program can be accessed by telephone or by dialing 511 or by internet at the website: www.sacregion511.org/rideshare/.

SacRT, Placer County Transit, and Roseville Transit use the existing HOV lanes on I-80 for their commuter express buses. Roseville Transit operates commuter buses that use SR 51 and SR 160. All of the transit providers work closely with SACOG, PCTPA, Caltrans, cities and counties, TMAs, private employers, and others to coordinate scheduling and offer discounted, subsidized transit tickets to increase transit use.

TABLE 8: SR 51 CORRIDOR TRANSIT SYSTEM					
Seg. #	**Mode & Collateral Facility**	**Name**	**Route End Points**	**Headway[4]**	**Bikes Allowed**
1	Transit Center	29th Street Station[3]			
	Light Rail	Sacramento Regional Transit (SacRT) Gold Line[3]	Downtown Sacramento, Folsom	Short	Yes
1-2	Traditional Bus	SacRT[1]	Florin Town Centre to Arden Fair Transit Center	Med	Yes
	Traditional Bus	SacRT[1]	Florin Town Centre to Arden Fair Transit Center	Long	Yes
2	Light Rail	SacRT Gold Line[3]	Watt &I-80 Station to Meadowview Station	Short	Yes
	Traditional Bus	SacRT [1]	Watt Ave. & I-80 Station to Sunrise Transit Center	Short	Yes
	Traditional Bus	Sac RT[1]	Arden Del Paso Station to Sunrise Transit Center	Med	Yes
	Transit Center	Arden Fair Transit Center			
	Traditional Bus	SacRT[1]	Arden Fair Transit Center to Florin Town Center	Long	Yes
	Transit Center	Swanston Station[3]			
	Transit Center	Marconi/Arcade Station[3]			
	Transit Center	Roseville Rd. Station[3]			
	Transit Center	Watt/I-80 West Station[3]			
	Transit Center	Watt & I-80 Station[3]			
	Traditional Bus	SacRT[1]	Watt/Manlove Station to Greenback & Auburn	Long	Yes
	Traditional Bus	SacRT[1]	Watt/Manlove Station to Watt/Elverta	Long	Yes
	Traditional Bus	SacRT[1]	Louise & Orlando Transit Center to Watt & I-80 Station	Med	Yes
	Commuter Bus	SacRT[1]	Louise & Orlando Transit Center to Watt & I-80 Station	Med	Yes
	Commuter Bus	Roseville Commuter[1]	Downtown Sacramento, Roseville	Med	Yes
	Traditional Bus	Placer County Transit	Watt Ave./I-80 Station to Auburn	Long	Yes

[1]Rider alerts for real-time bus arrival information on mobile devices.
[2]WiFi available on Amtrak California trains only, not buses and Amtrak California Zephyr.
[3]ITS next train information at light-rail stations.
[4]Short Headways = 15 minutes or less, Medium Headways = 16 to 30 minutes, Long Headways = 32 minutes to upwards of 60 minutes

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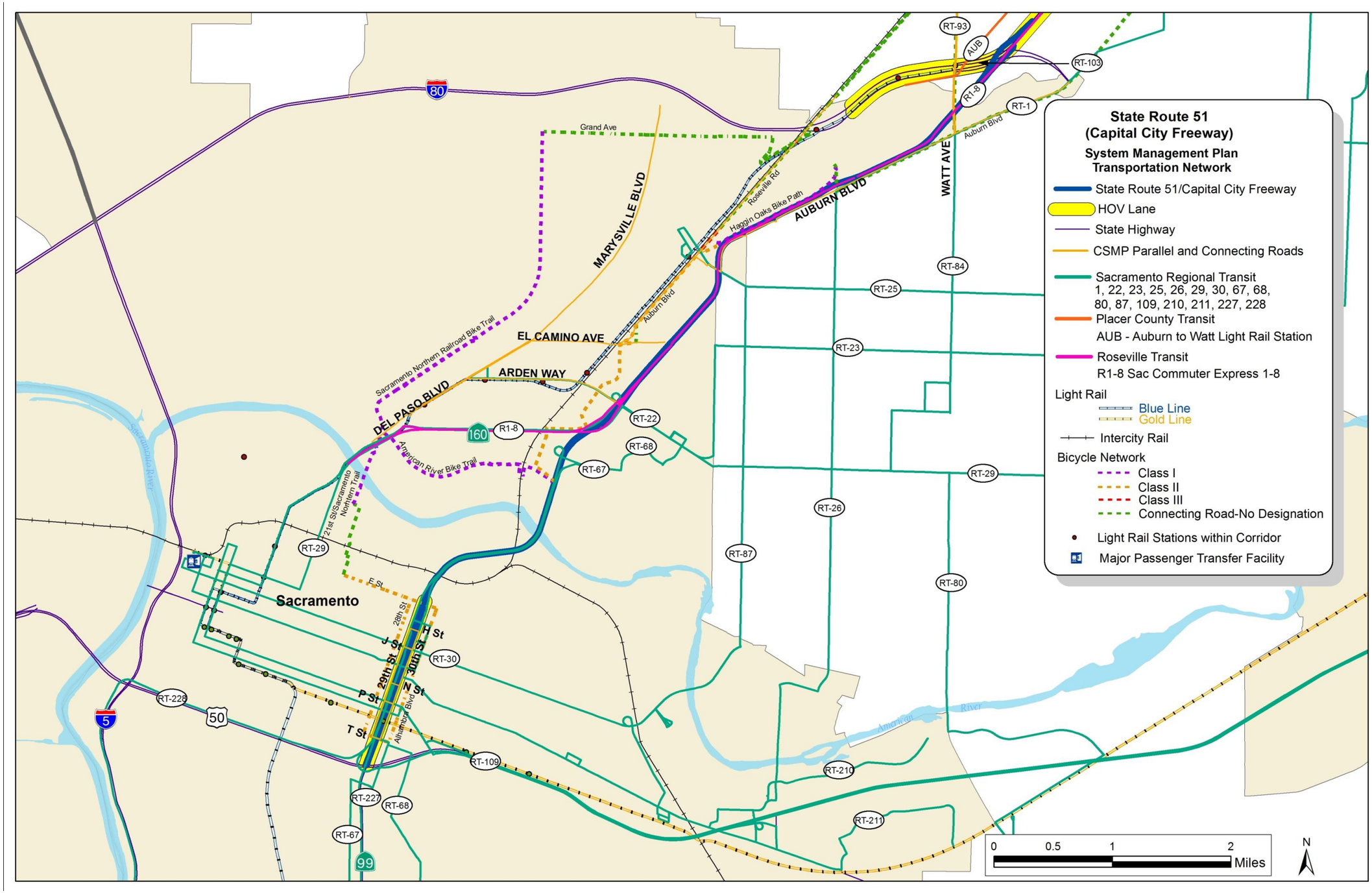

Figure 5: SR 51 Corridor Transit Services

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BICYCLE FACILITIES

Bicycles are prohibited on SR 51, but alternate parallel bicycle facilities are identified within the corridor. Bicycling constitutes an active transportation alternative to automobile use that can help reduce congestion and improve corridor performance. Bicycle facilities, particularly on parallel roads, are important in improving the attractiveness and use of bicycling. These bicycle facilities are located on both local parallel roads and on dedicated pathways, such as the American River Parkway (Pkwy.) Trail. Table 9 below gives details about the bicycle facilities in the corridor. Figure 8 shows the bicycle routes included in the CSMP segments of this plan.

Bicycle facilities in the corridor are not actively managed in the same manner as motor vehicle facilities. However, there are traffic operation systems that serve bicyclists such as dedicated bicycle lanes, some bicycle detection loops at signalized intersections, video detection, other non-loop type detection, and bicyclist activated signal change buttons. The City of Sacramento is in the process of implementing video bicycle signal detection. With video detection at a given intersection, connected traffic lights change for bicyclists, with additional time added to the green light so bicyclists can clear the intersection. Many transit providers also have bicycle racks on their buses and bicycle storage areas on their trains. For example, SacRT buses and the new light rail trains are equipped with bicycle racks. There are over 150 weatherproof bicycle lockers at 19 light rail stations.

Caltrans District 3 recently completed the *State Highway Bicycle Facility Plan* (SHBFP). This plan establishes a framework for bicycle planning across a variety of areas, such as maintenance, operations, planning, and project management. Further, the plan includes a table and maps with recommended improvements to the bicycle transportation system, such as Class II bike lanes and Class III bike routes where appropriate. These improvements are to be incorporated as funds allow or the highway segment is improved.

Several policy recommendations were made as to what types of bicycle facilities would be constructed on the SHS. Priority is to be given to ensuring consistency with local bicycle plans to the extent possible, unless the local proposal is inconsistent with allowable use of the SHS due to safety, ROW, environmental, financial, maintenance, or other factors. Bicycle facilities are generally not appropriate in areas with limited access and high vehicular speeds. In particular, urban freeways are not appropriate for bicycle facilities. In these cases, Caltrans consults with local governments to identify alternative routes to segments closed to bicycles.

The SHBFP established several District actions that help achieve the plan's vision. These actions by various District 3 divisions provide further coordination between divisions and maintenance agreements with local governments regarding bicycle facility planning.

The SHBFP can be viewed at: http://www.dot.ca.gov/dist3/departments/planning/bike/D3SHBFP_June2013.pdf.

The Sacramento Area Bicycle Advocates maintains an on-line hazard reporting system that allows bicyclists to report hazards such as potholes, inadequate signal timing, debris, insufficient shoulder, and inadequate bikeway markings. SACOG has created an on-line route planning system for bicyclists, which can be found at http://www.sacregion511.org/bicycling/trips/. In addition, SACOG maintains bicycle maps on their website, which they frequently update.

Numerous web sites containing bicycle facilities and trip planning information including bicycle route maps can be found at http://www.sacregion511.org/bicycling/.

TABLE 9: SR 51 CORRIDOR BICYCLE TRANSPORTATION NETWORK							
Seg. #	County & City Location	Bicycle Access Prohibited	Bicycle Facility Type[1]	Parallel Bike Routes			
				Route	From	To	Facility Type
1	Sacramento	Yes	Alt. Route	28th St.	T St.	E St.	C. II
				Alhambra Blvd.	T St.	E St.	C. II
				T St.	28th St.	Alhambra Blvd.	C. II
				E St.	Alhambra Blvd.	21st St.	C. II
				21st St.	E St.	Sacramento Northern Trail	None
				Sacramento Northern Trail	2st St.	American River Bike Trail/Sacramento Northern Railroad Bikeway	C. I
				Sacramento Northern Railroad Bikeway	Sacramento Northern Trail/American River Bike Trail	SR 160	C. I
				American River Bike Trail	Tribute Rd.	Sacramento Northern Trail/Sacramento Northern Railroad Bikeway	C. I
				Tribute Rd.	SR 160	American River Bike Trail	C. II
2	Sacramento	Yes	Alt. Route	Tribute Rd.	SR 160	Fee Rd.	C. II
				Fee Rd.	Tribute Rd.	Blumenfeld Rd.	C. II
				Blumenfeld Rd.	Fee Rd.	Harvard Rd.	C. II
				Harvard Rd.	Blumenfeld Rd.	Auburn Blvd.	C. II
				Auburn Blvd.	Harvard Rd.	Roseville Rd./Haggin Oaks Path	C. II
				Haggin Oaks Path	Auburn Blvd./ Roseville Rd.	Auburn Blvd.	C. I
				Auburn Blvd.	Haggin Oaks Path	SR 244	None
				Roseville Rd	Auburn Blvd./Haggin Oaks Path	Watt Ave.	None
				Sacramento Northern Railroad Bikeway	SR 160	Grand Ave.	C. I
				Grand Ave.	Sacramento Northern Railroad Bikeway	Roseville Rd.	None
				Watt Ave.	Auburn Blvd.	Roseville Rd.	None

[1] Bicycle Facility Type indicates the type of bicycle facility on that segment. Class I Bike paths are separate ROWs for bicycles and pedestrians. Class II bike lanes are separate lanes for bicyclists. Class III Bike routes are roadways with signs designating the roadway for shared bicycle use. Alternate route indicates that a designated local road is to be used when the facility is closed to bicyclists. Finally, non-designated means that while the facility is not prohibited to bicyclists, there is no designated bicycle facility on the corridor.

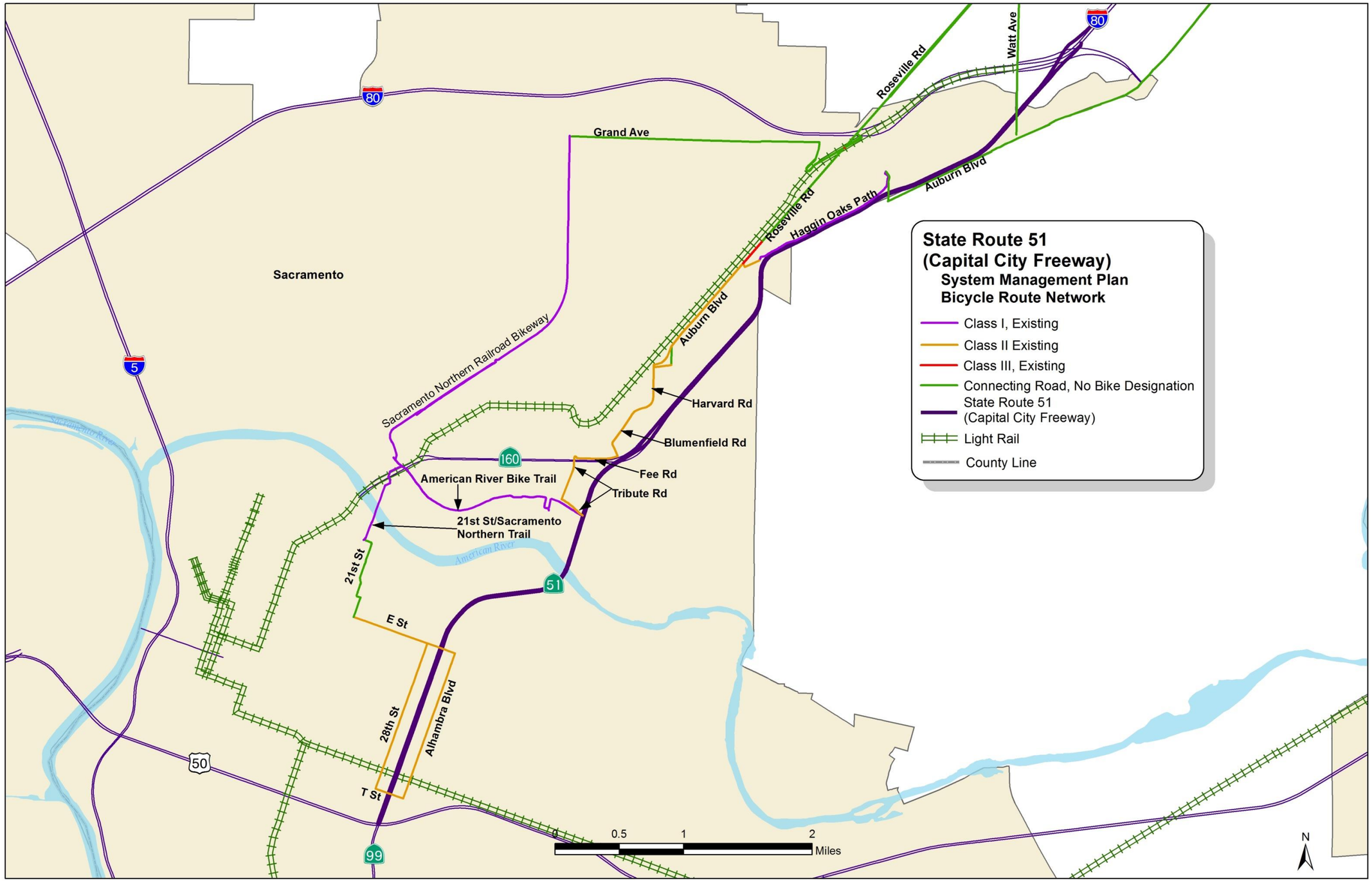

Figure 6: SR 51 Corridor Bicycle Facilities Map

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PEDESTRIAN FACILITIES

Pedestrian access is prohibited along the entire length of SR 51, as pedestrian use is generally inappropriate on freeway facilities.

Parallel 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 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.

Caltrans District 3 is currently preparing the *Caltrans District 3 Complete Streets Plan* that will address the specific implementation of complete streets elements into the SHS within the District. A complete street is a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit riders, and motorists appropriate to the function and context of the facility. Information regarding the addition of complete streets elements in the specific route or corridor will be included in each applicable CSMP. Caltrans will develop and implement the Plan in coordination with local and regional agencies.

FREIGHT

The entire length of the facility is on the National Network, meaning trucks of STAA dimensions can use the facility. Its interregional use is for trucks using SR 51 as a connector between I-5, US 50, SR 99, SR 160 and I-80. Most long distance haulers travel on I-5 and I-80.

In addition to interregional truck traffic, SR 51 is used for terminal access, wherein freight is transported to its destinations. These destinations are characterized as large, regional industrial and commercial distribution centers.

AIRPORTS

There is one airport, McClellan Airfield, in close proximity to SR 51. McClellan Airfield is a former military installation repurposed as a large manufacturing and business park, and large air museum. Its functional class is Metropolitan-Business/Corporate. It offers the following services: aircraft fuel sales, oxygen, aircraft detailing and maintenance, fire, law enforcement, and disaster/emergency services, search and rescue, aircraft sales, an on airport restaurant, catering, air charter, flight training, and rental car services. There are 97 based aircraft, and 18,000 operations for the twelve month period ending April 30, 2013. A Coast Guard rescue unit comprised of both aircraft and helicopters is one of its larger tenants.

CORRIDOR PERFORMANCE MANAGEMENT

There are two major components of corridor performance management, which are performance measurement and performance monitoring.

PERFORMANCE MEASUREMENT

The use of performance measures with threshold standards is used to evaluate the degree of congestion along a highway segment or local parallel/connecting roadway, transit facility, and bicycle and pedestrian facility to determine the scope and schedule of system improvements needed to correct a performance deficiency. The performance measures used for the highway facility in this CSMP include Level of Service (LOS), Vehicle and Person Hours of Delay (VHD) at 60 MPH, Vehicle Miles Traveled (VMT), Peak Hour VMT, Peak Hour Volume over Capacity (V/C), and Peak Hour Average Speed. The tools used to determine the performance measures include Average Annual Daily Traffic (AADT), Truck AADT, Percent of Trucks, 5+ Axle Truck AADT, and 5 Axle Truck Percentage of AADT. The definitions, applicability, and sources of the baseline performance measures data used in this TCR/CSMP corridor are identified in Appendix C. This data is given for both the base (2012) and horizon (2035) years for all of SR 51 where available. Basic system operation, truck traffic, and peak hour traffic performance data is summarized in Tables 10, 11, and 12, below.

LOS is a term used to describe operational conditions within a traffic stream and perception of condition by users. Operational conditions are defined in terms of speed, travel time, freedom to maneuver, traffic interruption, comfort, and convenience. LOS is defined into six levels with letter designations from A to F. LOS A represents the best operating conditions wherein there is ample maneuverability, no speed restrictions and no delays, while LOS F represents the worst operating conditions with traffic congestions, significant delays and little maneuverability (please see Appendix A for more information including data sources). LOS is accepted as a performance measure by the Federal Highway Administration as well as almost all 49 other states.

The "*Concept LOS"* is based on District 3 standards, which are from the Caltrans District 3 District System Management and Development Plan (DSMDP). Typical Concept LOS standards in District 3 are LOS "D" in rural areas and LOS "E" in urban areas. Performance variations and interchange deficiencies within a corridor segment may inadvertently increase or decrease the LOS calculations, which may warrant additional detailed operational analysis. A local agency may set a higher LOS threshold standard consistent with community wishes and other local concerns. Caltrans as the owner and operator of the facility establishes the Concept Level of Service as the **minimum acceptable level of service**. Any threshold standard LOS established by a local agency for the SHS should not be lower than the Caltrans Concept LOS. For those parts of the SHS where LOS may not be an appropriate measure to describe performance such as in locations designated as a "Transit Priority" area where the Caltrans Performance Management System (PeMS) is available, the Caltrans District 3 DSMDP (page 34) suggests using other performance measures including, but not limited to, Vehicle Travel Time (minutes) and Vehicle Hours of Delay (VHD).

LOS is one performance measures utilized by Caltrans in the review of proposed projects during the Intergovernmental Review/CEQA development review process to determine if proposed projects might cause significant impacts to the operation of the SHS. In segments of the SHS main line where the existing LOS is at or below the Concept LOS, any land use development should not directly or cumulatively lower the existing LOS. Any impacts exceeding this threshold will be viewed by Caltrans as significant and warrant appropriate mitigation. Any CEQA lead agency should coordinate with Caltrans as early in the development review process as feasible to jointly determine the most appropriate threshold standards of significance.

Data collection for non-auto modes is not as robust as what is needed for active system management. AADT and LOS were used in the 2009 CSMPs as performance measures for the local parallel/connecting roadways. However, the availability and year date consistency of this data varied between local city and county jurisdictions, which resulted in the data not being valuable to measuring roadway performance across the corridor. Consequently, this CSMP update does not include performance measures for the roadways.

Available Average Daily and Peak Hour Capacity were used in the 2009 CSMPs as performance measures for transit. No performance measures were identified for bicycle and pedestrian facilities. Following consultation with key external stakeholders for both bicycling and transit after adoption of the 2009 CSMPs, the progress in implementing the infrastructure improvements to close system gaps by improving and facilitating bicycling, pedestrian, and mass transit, as included in the applicable regional transportation plans, was determined to replace the performance measures reported in the 2009 CSMPs for bicycling, pedestrian, and transit facilities, and to be reported in subsequent CSMPs for bicycling, pedestrian, and transit modes. It is realized that the bicycle and pedestrian transportation networks need to be completed prior to developing meaningful performance measures that quantify deficiencies.

PERFORMANCE MONITORING

The goal of performance monitoring is to continuously and dynamically examine corridor performance to identify operational problems caused by traffic congestion and implement immediate, efficient, and effective system operations and improvement actions and strategies along the corridor, including capital improvements to generate the desired results. Where available, PeMS is utilized to monitor highway performance. In other corridor segments where PeMS is not available, HCS 2010 analysis is performed using traffic counts or tachometer (tach) runs to assess performance.

TABLE 10: SR 51 BASIC SYSTEM OPERATIONS DATA																
Seg. #	County	Post Miles	Distance (Miles)	Average Annual Daily Traffic			Level of Service (LOS)				Vehicle Miles Traveled (VMT)			Delay (No Build)	
				Base Year (BY)*	No Build (Horizon Year (HY))*	Build (HY)	BY	No Build (HY)	Build (HY)	Concept LOS	BY	No Build (HY)	Build (HY)	Daily Vehicle Hours of Delay	Daily Person Hours of Delay
1	SAC	0.00 – 4.35	4.35	159,000	178,000	199,000	F	F	E	E	654,532	734,000	820,000	2,022	2,750
2	SAC	4.35 – 8.86	4.51	142,000	165,000	169,000	F	F	E	E	571,346	662,000	680,000	1,148	1,561

TABLE 11: SR 51 TRUCK TRAFFIC DATA							
Seg. #	County	Post Miles	Distance (Miles)	Average Annual Daily Truck Traffic (AADTT)	Total Trucks (% of AADT) (BY)	5+ Axle AADTT (BY)	5+ Axle Total Truck (% of AADT) (BY)
1	SAC	0.00 – 4.35	4.35	5,422	3.41%	2,269	1.43%
2	SAC	4.35 – 8.86	4.51	7,524	5.30%	2,182	1.54%

TABLE 12: SR 51 PEAK HOUR TRAFFIC DATA														
Seg. #	County	Post Miles	Volume			Directional Split			Volume/Capacity (V/C)			VMT		
			BY	No Build (HY)	Build (HY)	BY	No Build (HY)	Build (HY)	BY	No Build (HY)	Build (HY)	BY	No Build (HY)	Build (HY)
1	SAC	0.00 – 4.35	11,700	13,100	14,700	62%	60%	62%	N/A	1.11	0.97	654,532	734,000	820,000
2	SAC	4.35 – 8.86	11,400	13,200	13,600	65%	64%	65%	N/A	1.22	0.88	571,346	662,000	680,000

BOTTLENECK AND CONGESTION ANALYSIS

The 2010 Highway Capacity Manual defines a bottleneck as "a road element on which demand exceeds capacity."

The bottleneck analysis evaluates specific causes of existing recurrent traffic congestion in the corridor. Freeway bottleneck locations that create mobility constraints are identified and documented, and their relative contribution to corridor-wide congestion is reported. The bottleneck locations were determined based on a combination of the use of 2012 PeMS data, probe vehicle tach runs, and field observations.

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 as lane merges, inadequate number of transit vehicles to handle passenger loads, or other persistent physical conditions of the transportation facility.

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.

Prior to analyzing the congestion and bottlenecks located within the corridor, a review of the District 3 *2012 Mobility Performance Report* (MPR) was conducted. The MPR is prepared by each Caltrans District where PeMS is utilized and Headquarters Traffic Operations Division annually and updated quarterly. The freeway congestion data is identified by freeway route and County, but does not contain specific CSMP segment data. This data, which lists Vehicle Hours of Delay at 60 MPH, provides an overall perspective of the level of congestion for each route, which can be compared to prior year data so that performance can be monitored. The data presented in the MPR also identifies the top ten bottlenecks during the AM Peak Period and PM Peak Period by freeway route and County, and identifies Total and Average Vehicle Hours of Delay and the Average Duration, which again can be compared to prior year data for performance monitoring purposes. The MPR data is useful in providing an overall perspective of the performance of the freeway at the County level that can be compared to the CSMP corridor segment specific performance data. SR 51 is included in the District 3 MPR's top ten congested freeways and bottleneck locations. The ranking of the SR 51 corridor is as follows:

Traffic Congestion:

- **Vehicle Hours of Delay (VHD):** Total VHD at 60 miles per hour in both directions decreased in 2012 over 2011 within the CSMP corridor. The results are as follows:

Route	County	2011	2012
SR 51	SAC	959,693	881,426

- **Top 10 Congested Freeways:** Based on the VHD of all District 3 Freeway urban corridors in the Sacramento area, the congestion comparison of SR 51 for 2011 and 2012 was ranked with the other corridors. As identified below, the SR 51 Corridor is becoming even more congested.

Route	County	2011 Rank	2012Rank
SR 51	SAC	5	4

- **Top Bottleneck Locations:** The bottleneck comparison of SR 51 for 2011 when available and 2012 by locations and rankings listed below can change from year to year, and may be indicative of temporary bottlenecks (i.e. short-term construction activities or special events) rather than major geometric constraints that require major operational strategies or capital expansion. Rankings are in comparison to all state highways in the greater Sacramento area of District 3 during both the AM peak and PM peak time periods and by direction. As identified below, SR 51 captures the top four (1-4) of all Sacramento area freeways in having the highest average daily vehicle hours of delay during the PM peak period.

County	Route	Location	Time of Day	2011 Av. Daily VHD	2012 Ave. Daily VHD	2011Av. Duration (min)	2012 Av. Duration (min)	2011 Rank	2012 Rank
Northbound									
SAC	51	A St., N. of A	PM	241	295	73	84	4	1
SAC	51	Glenrose Ave.	PM	280	260	80	108	3	2
SAC	51	EB Exposition	PM	---	377	--	78	--	3
SAC	51	30th & E	PM	134	139	50	54	9	7
Southbound									
SAC	51	EB Exposition	PM	131	205	85	126	11	4

Along with the MPR information, additional PeMS data from 2012 was compiled and analyzed so that congestion and bottleneck locations on the individual route segments within the CSMP corridor could be further refined and causality defined. The location and extent of the bottlenecks on SR 51 found in the AM and PM peak periods are summarized on Table 13, below. Northbound and southbound bottlenecks are shown on this table, while the illustrations that follow discuss each bottleneck, including location and possible causality. Criteria to be considered a bottleneck for Table 13 are that the bottleneck needed to: 1) occur at least 20% of the time on Tuesdays, Wednesdays, and Thursdays, 2) have an average duration of 15 minutes, and 3) have at least 50 vehicle hours of delay. Minor or hidden bottlenecks are those that are not as defined (or severe) as the major bottlenecks. Please note that the graphics accompanying the bottlenecks are not to scale. These depictions should be considered a snapshot view and not a comprehensive analysis of all bottlenecks in the corridor.

It should be noted that while both the MPR data and the data collected by District 3 Travel Forecasting and Modeling utilized PeMS, the data was collected for different time periods, and duration and delay thresholds between the two data sets vary. As such, while both data sets are generally consistent with each other, there may be some variation. Further work is being conducted to refine the identification and causality of bottlenecks within the corridor.

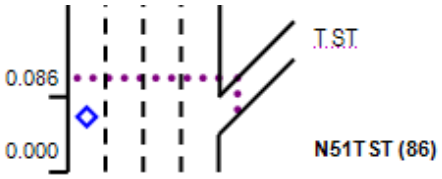
Causes for these bottlenecks range from high-traffic demand (congestion), heavy weaving/merging areas, or physical constraints such as lane drops, lack of ramp meters, incomplete Bus/Carpool lane network, incomplete Auxiliary Lane network, poorly coordinated traffic signals and an off-ramp queue.

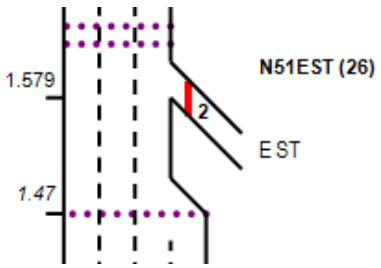
TABLE 13: SR 51 BOTTLENECK ANALYSIS DATA[1,2]								
Seg. #	**Location**	**County**	**Time of Day**	**Post Miles**	**Probability of Bottleneck Forming**	**Avg Queue Length (Miles)**	**Avg Delay (Veh Hrs)**	**Avg Duration (Minutes)**
Northbound								
1	T St.	SAC	PM	0.1	21%	2.60	140	78
1	30 & E St.		PM	1.5	92%	0.98	123	51
1	North of A St.		PM	2.0	96%	1.50	287	81
1	Elvas UP		PM	2.4	57%	2.04	125	25
1	Tribute Rd.		PM	3.0	21%	2.02	174	34
1	Arden Wy.		PM	3.5	79%	2.35	412	84
2	Glenrose Ave.		PM	5.1	96%	1.43	306	118
Southbound								
2	N of Watt Ave.	SAC	AM	8.3	79%	0.69	69	89
2	WB El Camino Ave.		AM	4.7	22%	0.73	51	55
1	EB Exposition Blvd.		PM	3.3	87%	1.06	179	112
1	Elvas UP		PM	2.4	33%	1.54	119	55
1	T St.		PM	0.1	22%	0.80	84	50

[1]: Bottlenecks identified occur at least 20% of the time (on Tuesdays, Wednesdays, and Thursdays), have an average duration of 15 minutes, and have at least 50 Vehicle hours of delay.
[2]: Bottleneck data extracted from 2012 PeMS.

Northbound Bottleneck Analysis

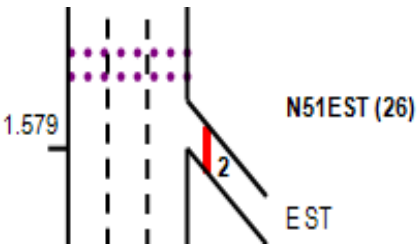
A. T St. (PM)
High demand and volumes of weaving and merging as traffic try to cross lanes and get into the HOV lane, because of vehicles merging from the US 50 eastbound and westbound connector. Diverging SR 51 traffic with merging traffic from US 50 creates a spill back effect, which contributes to the sections bottleneck.

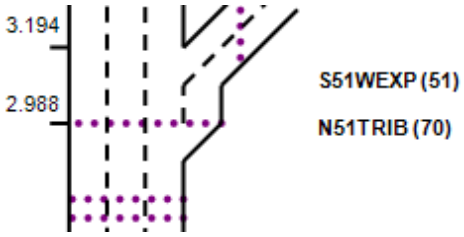




B. E St. Bottleneck (PM)
The upstream lane drop combined with the merging traffic from the E St. on-ramp causes a bottleneck at E St.

C. North of A St. Bottleneck (PM)
The bottleneck north of A St. is caused by a slight horizontal curve from E St. to the Exposition off ramp, along with two low underpasses limits the sight distance of oncoming traffic contributes to the congestion as well.



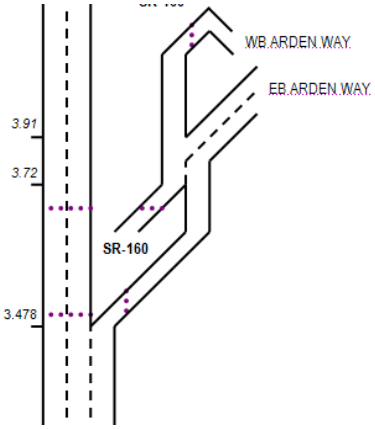


D. Elvas Underpass (PM)

The bottleneck at Elvas Underpass is caused by a high volume of weaving and merging from approaching and merging vehicles. SR 51 traffic tries to move left as a high number of vehicles merge on SR 51 from the E St. on-ramp. A short acceleration lane for merging vehicles, a slight horizontal curve and restricted sight distance, due to the height of the Elvas Underpass, contributes to the bottleneck, which is exacerbated during peak periods.

E. Tribute Rd. (Exposition Blvd Bottleneck) (PM)

Exiting vehicles at Exposition Blvd, as well as the lane drop at the Arden off-ramp, cause the bottleneck at this location.

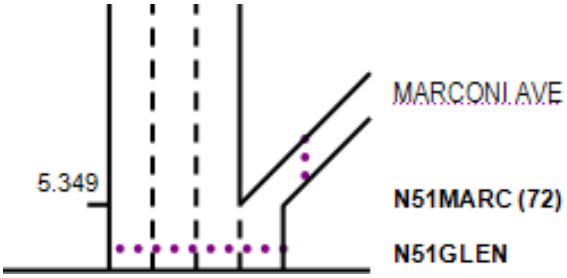


F. Arden Wy. Bottleneck (PM)

The bottleneck at Arden Wy. is caused by a lane drop. After the eastbound Arden Wy. off ramp, the travel lanes are reduced from three to two. High volume of weaving and merging from vehicles have a spill back effect for approaching traffic and contributes to the segments bottleneck.

G. Glenrose Ave. (PM)

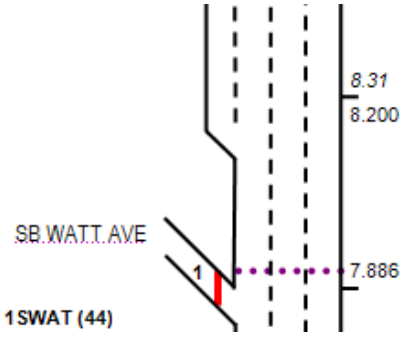
The Marconi Ave bottleneck at Glenrose Ave is caused by the termination of the auxiliary lane at Marconi Ave and a horizontal curve on SR 51 just past the Marconi Ave interchange.



Southbound Bottleneck Analysis

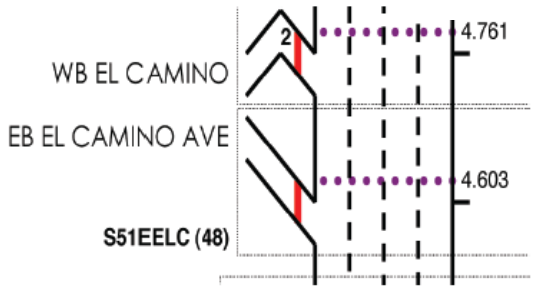
A. N of Watt Ave. Bottleneck (AM)

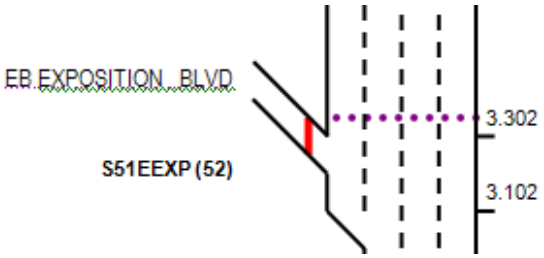
The Watt Ave bottleneck is caused by the increase in traffic entering from Watt Ave and is perpetuated by the upstream lane drop and heavy volumes from I-80.



B. WB El Camino Ave. Bottleneck (AM)

Weaving vehicles headed to Arden or SR 160, along with vehicles entering from El Camino and the lane drop at SR 160, cause the bottleneck at this location. Volumes using the El Camino onramps are high, causing the weave to worsen.



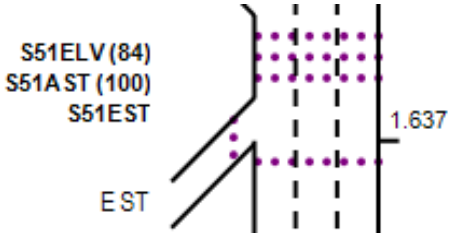


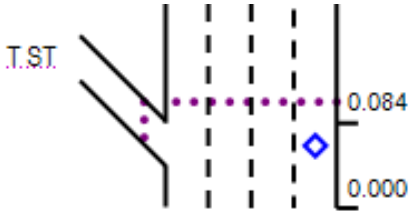
C. Exposition Blvd. Bottleneck (PM)

The bottleneck at Exposition Blvd is caused by the increase in traffic entering from Exposition Blvd, the heavy volume exiting at Exposition, heavy demand from Arden and the downstream lane drop.

D. Elvas Underpass (PM)

A slight horizontal curve approaching Elvas Underpass, along with the low height of the underpass, restricts driver's sight distance and creates a spill back effect that contributes to bottleneck.





E. T St. (PM)

The T St. bottleneck is affect by congestion on southbound SR 99, which spills back on SR 51.

KEY CORRIDOR ISSUES

High travel demand, especially during peak commute periods, is creating significant traffic congestion and impairing mobility in the corridor. Heavy congestion and stop-and-go traffic contributes to increased vehicle emissions and added travel costs. Many transit services are operating at maximum passenger carrying capacity, and buses often must contend with the same congestion as autos. In many locations, bicyclists have to compete for space on these same facilities.

Much of the congestion can be attributed to population growth, residential and commercial development, job/housing imbalances, work schedules that require commute trips during peak travel times, recreational trip generators, and truck traffic.

The overall amount of travel in the corridor increased rapidly in the late 1990s and early 2000s until the beginning of the recession in 2008. Since the original drop in traffic, congestion is beginning to return to the Sacramento region. According to the SACOG MTP/SCS, the population in the Sacramento region is projected to increase by 871,000 residents by 2035, which is expected to place greater demand on the region's transportation infrastructure. Current and forecasted data are depicted in Tables 10 through 12.

The sections of SR 51 with particularly severe traffic congestion are depicted in Figure 9. The congestion and bottlenecks are summarized in greater detail in Table 13.

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 these 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 planning for operations. To this end, and especially where moving forward into ICM strategies, District 3 is committed to increased stakeholder engagement and collaboration in the corridor planning process.

Figure 7: SR 51 Bottlenecks

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CORRIDOR CONCEPT

CONCEPT RATIONALE

"Concept LOS" and *"Concept Facility"* have traditionally been used in Caltrans TCRs and CSMPs to reflect the minimum level or quality of operations acceptable for each route segment and the highway facility needed in the next 20 years and beyond. The "*Base Year," "No Build," "Build,"* and *"Concept"* LOS for SR 51 are identified in Table 12, above, by segment. The *Concept* LOS is LOS D in rural areas and LOS E in urban areas. The *"20-Year Build Facility"* and *"Ultimate Facility Concept"* for SR 51 are shown above in Table 5, above. The *20-Year Build Facility* includes all projects expected to be completed within the 20-year horizon (2031), while the *Ultimate Facility Concept* includes all projects with an expected completion year beyond the 20-year horizon. Projects have been identified below as *Projects and Strategies*.

The *No-Build* scenario is the current facility with future traffic volumes. The *Build* scenario is the current facility plus planned and programmed SHS projects with future traffic volumes, and assumes their completion in the performance forecasts provided in this CSMP. The *Ultimate Facility Concept* is the facility needed to meet District performance standards for a particular segment. Some portions of SR 51 may not be improved to perform at the District standard of E for urban areas due to financial, environmental and ROW constraints. Where this occurs, targeted operational improvements, Intelligent Transportation Systems (ITS), and ICM including Transportation Demand Management (TDM) and active multimodal corridor management strategies will be needed to assist in achieving the Concept LOS, which are reflected in the programmed, planned, and conceptual project lists located in Tables 14 through 18. Planning and deployment of ITS and operational improvements within District 3 are articulated in the *District 3 ITS/Operational Improvement Plan* and the *District 3 Concept of Operations Plan*, both in development.

Additionally, measures to reduce travel demand on the highway such as increased use of transit and development of parallel local road facilities may be explored as a means to prevent further LOS threshold degradation on the SHS and will be considered in the CEQA development process, provided that the reduction is quantified to the satisfaction of Caltrans. Moreover, the District *3 Complete Streets Plan* as described previously in this document, and the *District 3 State Highway Bicycle Facility Plan* identify locations for construction of pedestrian and bicycle facilities that will further reduce local vehicular trips on state highway facilities.

CONCEPT FACILITY

The Concept LOS for SR 51 are shown in Table 12. Both segments are forecasted to operate under LOS "F" conditions in 20 years under the *"No-Build" scenario, and under LOS "E" under the "Build"* scenario. The No-Build scenario is the current facility with future traffic volumes. The Build scenario is the current facility plus planned and programmed SHS projects with future traffic volumes. The Ultimate Facility is the facility needed to meet District performance standards for a particular segment. Improvements to SR 51 are limited due to financial, environmental and ROW constraints. For this reason, targeted operational improvements, ITS, ICM, TDM and active multimodal corridor management strategies will be needed to assist in maintaining the Concept LOS. These improvements are identified in the programmed, planned, and conceptual project lists located in Tables 14 through 18. Further information on the planning and deployment of ITS and Operational improvements within District 3 can be reviewed in the District 3 ITS/Ops Plan and the District 3 Con-Ops plan, both located at: http://www.dot.ca.gov/dist3/departments/planning/.

Additionally, measures to reduce travel demand on the highway such as increased use of transit and development of parallel local road facilities may be explored as a means to prevent further LOS threshold degradation on the SHS and will be considered in the CEQA development process, provided that the reduction is quantified to the satisfaction of Caltrans.

PLANNED AND PROGRAMMED PROJECTS AND STRATEGIES

Planned and programmed projects along the SR 51 corridor are listed in Table 14 on the next page. These projects are included in a fiscally-constrained planning or programming document, such as a Regional Transportation Plan (RTP), Metropolitan Transportation Plan (MTP), Regional Transportation Improvement Program (RTIP), or Metropolitan Transportation Improvement Plan (MTIP). These projects are the most likely to be constructed during the document's twenty year horizon and have been identified with partner transportation agencies. Projects from the State Highway Operations and Protection Program (SHOPP) are also included in the list as they affect the capital assets of the facility.

In 2013, a Preliminary Investigation (PI) was conducted to identify and prioritize projects that would alleviate congestion and enhance performance management on SR 51. Some of these projects were incorporated into the SACOG MTP 2035 and appear in Table 14, below, and include ITS/Operations projects, interchange improvements, and transition lanes.

TABLE 14: HIGHWAY PLANNED AND PROGRAMMED PROJECTS							
SR 51 Northbound							
Seg. #	**Description**	**Programmed or Planned[1]**	**Location, County, Lead Agency, Post Mile**	**Purpose**	**Source[2]**	**Total Cost Estimate (x $1,000)[3]**	**Estimate of Completion Year[3]**
1	Construct transition lane NB from E St. to the American River Bridge	Planned	E St. to American River Bridge, Sac County, Caltrans PM 1.4/2.6	Operational Improvements	2035 SACOG MTP, 2013 SR 51 PI	$3,900	2020
1	SR 51 Transition Lane: NB, American River Bridge to Exposition Blvd.	Planned	American River Bridge to Exposition Blvd, Sac County, Caltrans, PM 2.20/3.36	Operational Improvements	2035 SACOG MTP, 2013 SR 51 PI	$7,500	2035
1	SR 51 Transition Lane: NB, from Exposition Blvd. to SR 160; widen SR 160 separation to 4 lanes	Planned	Exposition to SR 160, Sac County, Caltrans, PM 3.1/3.7	Operational Improvements	2035 SACOG MTP, 2013 SR 51 PI	$45,000	2035
2	Add NB Transition lane. Lengthen Marconi, Fulton & Watt Avs. OC. Reconstruct Howe & Bell Avs. Ramps. Lengthen SB on-ramp from Auburn/ Watt Av. ramp flyover ramp. Widen Arcade Creek Bridge to 4-lanes each direction.	Planned	Sac 51 – Marconi Ave to Watt Ave, Sac County, Caltrans PM 5.5/7.6	Operational Improvements	2035 SACOG MTP, 2013 SR 51 PI	$57,700	2035
SR 51 Southbound							
Seg. #	**Description**	**Programmed or Planned[1]**	**Location, County, Lead Agency, Post Mile**	**Purpose**	**Source[2]**	**Total Cost Estimate (x $1,000)[3]**	**Estimate of Completion Year[3]**
2	Add SB Transition lane. Lengthen Marconi, Fulton & Watt Avs. OC. Lengthen SB on-ramp from Auburn/Watt Av. ramp flyover ramp.	Planned	Sac 51 – Watt Ave to Marconi Ave, Sac County, Caltrans PM 5.5/8.7	Operational Improvements	2035 SACOG MTP, 2013 SR 51 PI	$27,000	2035
1	Auxiliary Lane: SB, from Exposition Blvd. slip off-ramp to Exposition Blvd. loop on-ramp.	Planned	Exposition Blvd. slip off-ramp to Exposition Blvd. loop on-ramp, Sac County, Caltrans, PM 3.36	Operational Improvements	2035 SACOG MTP, 2013 SR 51 PI	$12,500	2025
1	SR 51 Transition Lane: SB, from Exposition Blvd. to E St., includes lengthening B St. underpass, A St overcrossing and extending Bus/Carpool lanes	Planned	Exposition Blvd. to E St., Sac County, Caltrans, PM 3.16/1.44	System Expansion	2035 SACOG MTP, 2013 SR 51 PI	$72,000	2035

TABLE 14: HIGHWAY PLANNED AND PROGRAMMED PROJECTS (Cont.)							
SR 51 Northbound and Southbound							
Seg. #	**Description**	**Programmed or Planned[1]**	**Location, County, Lead Agency, Post Mile**	**Purpose**	**Source[2]**	**Total Cost Estimate (x $1,000)[3]**	**Estimate of Completion Year[3]**
1	U.S. 50 / SR 99 / SR 51 Oak Park Interchange (IC): IC Reconstruction: includes: including bus/carpool lane connectors.	Planned	Various Routes, Sac County, PM L2.137	Interchange Improvements	2035 SACOG MTP	$300,000	2035
1	Sutter's Landing Pkwy.: Construct New Road: 1.6 mile 4-lane arterial on new alignment between SR 160 and SR 51. Includes: sidewalks and bike lanes in both directions, a grade separation with the railroad, and a full interchange at the connection with SR 51.	Planned	Between Hwy. 160 and SR 51, Sac County, City of Sacramento, PM 3.69	New Interchange	2035 SACOG MTP	$167,616	2035
1-2	Ramp Meters: Install ramp meters at 14 locations on Sac-5, 51, 99 and Pla-65	Planned	Various Routes, Sac County, PM vary	Transportation Management Systems	SHOPP	$5,280	2020
1-2	CCTV Camera System Upgrade: 80 locations in 11 counties in District 3 on Routes 5, 50, 51, 65, 80, 89, and 99	Planned	Various Routes, All, Caltrans, PM vary	Transportation Management Systems	Caltrans	$1,850	2020
1-2	CMS Panel Upgrade: 40 locations in 11 counties in District 3 on Routes 5, 50, 51, 65, 80, 89, and 99	Planned	Various Routes, All, Caltrans, PM vary	Transportation Management Systems	Caltrans	$2,600	2020
1-2	HAR Upgrades: 25 locations in 11 counties in District 3 on Routes 5, 50, 51, 65, 80, 89, and 99	Planned	Various Routes, All, Caltrans, PM vary	Transportation Management Systems	Caltrans	$1,450	2020
1-2	Detection Repair and Upgrade Communications: 178 locations in 11 counties in District 3 on Routes 5, 50, 51, 65, 80, 89, and 99	Planned	Various Routes, All, Caltrans, PM vary	Transportation Management Systems	Caltrans	$2,700	2020
1-2	TMS Upgrades: In Sacramento and Placer counties on routes 5, 50, 51, 80, and 99, install ramp and TMS upgrades	Planned	Various Routes, Sac/Pla County, Caltrans, PM vary	Transportation Management Systems	Caltrans	$1,700	2020

1) Programmed include those projects that are partially and fully funded. Definitions of Programmed, Planned, and Conceptual projects can be found in Appendix A.

2) Note, only SHOPP projects that improve Mobility and are Mandated for furthering Complete Streets are included. A complete listing of SHOPP projects can be viewed at http://ctips.dot.ca.gov/citrix/metaframexp/default/reports.asp.

3) Total Cost and Completion Year Estimates are from listed Source. Additional project details and programming information can be found in the District 3 DSMDP at http://www.dot.ca.gov/dist3/departments/planning/systemplanningDSMDP.htm, 2012 SACOG MTP project list at http://www.sacog.org/2035/files/MTP-SCS/appendices/A-1%20Project%20List.pdf, 2012 SACOG MTIP Appendix 3 project list at http://www.sacog.org/mtip/2013-2016/adoption/pdf/2013%20MTIP%20Transmittal%209-26-12.pdf, and CT Programming at http://ctips.dot.ca.gov/citrix/metaframexp/default/reports.asp .

CONCEPTUAL PROJECTS AND STRATEGIES

The projects from the PI that are not planned or programmed are considered conceptual projects contributing to the ultimate facility concept, and are identified in Table 15, below for construction on SR 51 in the long term, beyond the 20-year build horizon. These projects consist of HOV lanes, ITS/Operations projects, interchange improvements, and bicycle/pedestrian projects and ICM. Because these projects are of an undefined time frame, they are subject to revision.

TABLE 15: HIGHWAY CONCEPTUAL PROJECTS AND STRATEGIES

Seg. #	Description	Location, County, Lead Agency, Post Mile	Purpose	Source[1)]
1-2	SR 51 Bus/Carpool Lanes: SR 99 / US 50 Interchange to I-80	SR 99/US 50 Interchange to I-80, Sac County, Caltrans, PM 0.00/8.86	Bus/Carpool Lane	2035 SACOG MTP
1-2	Install Fiber Optic Communication Lines Along Corridor, Add Blue Tooth Reader, Connect All ITS Elements	US 50/SR 99 Junction to I-80 Junction	Improve facility performance through ITS enhancements	2013 SR 51 PI
1-2	Incorporate ICM	US 50/SR 99 Junction to I-80 Junction	Improve facility performance through multimodal and ITS enhancements	FHWA ICM Analysis, Modeling and Simulation Guide 2012
1	Capital City Freeway (SR 51) widening: Widen American River Bridge to 4 lanes in each direction, add NB and SB transition/ aux lanes between American River Bridge and Arden Wy. and accommodate bicycles and pedestrians	Sac 51 – American River Bridge to Arden Wy., Sac County, Caltrans	Bridge Expansion	2035 SACOG MTP, 2013 SR 51 PI

1) Note, only SHOPP projects that improve Mobility and are Mandated for furthering Complete Streets are included. A complete listing of SHOPP projects can be viewed at http://ctips.dot.ca.gov/citrix/metaframexp/default/reports.asp.

2) Total Cost and Completion Year Estimates are from listed Source. Additional project details and programming information can be found in the District 3 DSMDP at http://www.dot.ca.gov/dist3/departments/planning/systemplanningDSMDP.htm, 2012 SACOG MTP project list at http://www.sacog.org/2035/files/MTP-SCS/appendices/A-1%20Project%20List.pdf, 2012 SACOG MTIP Appendix 3 project list at http://www.sacog.org/mtip/2013-2016/adoption/pdf/2013%20MTIP%20Transmittal%209-26-12.pdf, and CT Programming at http://ctips.dot.ca.gov/citrix/metaframexp/default/reports.asp .

OFF-HIGHWAY SR 51 CORRIDOR PROJECTS

The original SR 51 CSMP from 2009 contained off-highway projects on parallel roads, bicycle routes, and transit systems. These projects, while not under Caltrans' direct purveyance, have an impact on freeway operations of SR 51 by offering alternatives to travel on the highway. These alternatives reduce traffic on the freeway and improve overall functioning of the corridor. These off-highway projects as identified in Tables 16 through 18 below are either on parallel roads, cross SR 51 ROW, are transit projects, or are bicycle and pedestrian projects.

TABLE 16: SR 51 PARALLEL AND CONNECTING ROADS PROJECTS				
Seg. #	**Description**	**Planned or Programmed**	**Location, County, Lead Agency**	**Source**
2	Arden Wy. underpass improvements. Remove columns and widen to six lanes.	Planned	Arden Wy., Caltrans	Caltrans
2	Arterial new parallel. Improve Roseville Rd. and extend it to Exposition Blvd interchange	Planned	Roseville Rd. to Exposition Blvd, Caltrans	Caltrans

TABLE 17: SR 51 CORRIDOR TRANSIT PROJECTS				
Seg. #	**Description**	**Planned or Programmed**	**Location, County, Lead Agency**	**Source**
1-2	Significant increase in local bus services, plus community circulators and vanpools	Planned	City of Sacramento, Sacramento County, Sacramento Regional Transit	SacRT Transit Action Plan
1-2	Hi-Bus on key corridors plus direct, premium commuter express routes	Planned	City of Sacramento, Sacramento County, Regional Transit	SacRT Transit Action Plan
1	29th Street light rail station enhancements: add two shelters, a surveillance camera, flashing pedestrian crossing signs, two visible message signs and other transit amenities	Programmed	29th Street Light Rail Station, City of Sacramento, Sacramento Regional Transit	SACOG MTP/SCS 2035
2	Design and install bus shelters along Fulton Ave. from Arden Wy. to Auburn Blvd	Programmed	County of Sacramento, Sacramento Regional Transit	SACOG MTP/SCS 2035

TABLE 18: SR 51 CORRIDOR BICYCLE AND PEDESTRIAN PROJECTS				
Seg. #	**Description**	**Planned or Programmed**	**Location, County, Lead Agency**	**Source**
1-2	Two Rivers Trail Phase II: study and design of bike/pedestrian connection between Northern Bicycle Trail and Sutter's Landing Park, including bike connections across American River, SR-51, to California State University Sacramento	Programmed	City of Sacramento Department of Transportation	SACOG MTP/SCS 2035
1	Sutter's Landing Bridge: Construct bike/pedestrian bridge over American River	Programmed	Sutter's Landing, City of Sacramento	SACOG MTP/SCS 2035
1	Sutter's Landing Pkwy.: construct new road with sidewalks and bike lanes in both directions, grade separation with railroad, and full interchange with SR-51	Programmed	Sutter's Landing, City of Sacramento	SACOG MTP/SCS 2035
2	Haggin Oaks Golf Course: Multi-use path (class I) from Fulton Ave. to Longview Dr.	Planned	Haggin Oaks Golf Course, City of Sacramento	SACOG MTP/SCS 2035
2	Auburn Blvd., Class II bike lane from Howe Ave. to Citrus Heights city limit	Planned	Auburn Blvd., Sacramento County	2011 Sacramento County Bicycle Master Plan
2	Haggin Oaks Golf Course West: Multi-use path (class I) from Connie Dr. to Arcade Creek	Planned	Haggin Oaks Golf Course, City of Sacramento	SACOG MTP/SCS 2035

APPENDIX A: GLOSSARY OF TERMS AND ACRONYMS

Acronyms and Important Abbreviations

AADT - Annual Average Daily Traffic
ADT - Average Daily Traffic
BY - Base Year
CALTRANS - California Department of Transportation
CEQA – California Environmental Quality Act
CLA – California Legal Advisory
CLN – California Legal Network
CHP – California Highway Patrol
CSMP - Corridor System Management Plan
DSMP - District System Management Plan
DU - Density Unit
EIP - Environmental Improvement Program
FHWA - Federal Highway Administration
HCM - Highway Capacity Manual
HOV – High Occupancy Vehicle
HY - Horizon Year
I – Interstate
ICM – Integrated Corridor Management
ITS - Intelligent Transportation System
ITSP - Interregional Transportation System Plan
KPRA – Kingpin-to-rear-axle
LOS - Level of Service
MAP-21 – Moving Ahead for Progress in the 21st Century Act
MPO - Metropolitan Planning Organization
MPR – Mobility Performance Report
MTIP - Metropolitan Transportation Improvement Program
MTP - Metropolitan Transportation Plan
NB – Northbound
PeMS – Performance Measurement System
PM - Post Mile
ROW – Right of Way
RTIP – Regional Transportation Improvement Program
RTP – Regional Transportation Plan
RTPA - Regional Transportation Planning Agencies
SACOG - Sacramento Area Council of Governments
SB – Southbound
SHBFP – State Highway Bicycle Facilities Plan
SHOPP - State Highway Operation and Protection Program
SHS - State Highway System
SR - State Route
STAA - Surface Transportation Assistance Act
TA – Terminal Access
TCR - Transportation Concept Report
TDM – Transportation Demand Management

TOC – Traffic Operations Center
TOS – Traffic Operations Systems
V/C – Volume-to-Capacity Ratio
VHD – Vehicle Hours of Delay
VMT - Vehicle Miles Traveled

Definitions

AADT – Annual Average Daily Traffic is the total volume for the year divided by 365 days. The traffic count year is from October 1st through September 30th. Traffic Counting is generally performed by electronic counting instruments moved from locations throughout the State in a program of continuous traffic count sampling. The resulting counts are adjusted to an estimate of annual average daily traffic by compensating for seasonal influence, weekly variation and other variables which may be present. Annual ADT is necessary for presenting a statewide picture of traffic flow, evaluating traffic trends, computing accident rates, planning and designing highways and other purposes.

Auxiliary Lanes – Utilized between interchange on- and off-ramps for weaving, truck climbing, speed change, or for other purposes supplementary to through movement. These non-capacity increasing lanes give drivers more room to speed up and slow down when getting on or off a freeway. An auxiliary lane makes it easier for drivers to merge into freeway traffic, and reduces ramp congestion.

Transition Lanes – Similar to auxiliary lanes in function, but facilitate merging transitions for traffic over the distance of two or more interchanges, and may include acceleration lanes. Transition lanes provide broader service for merging traffic and therefore alleviate bottleneck conditions and enhance travel lane throughput along freeway segments spread out over two or more interchanges

Base Year- The year that the most current data is available to the Districts.

Bikeway Class I (Bike Path) – Provides a completely separated ROW for the exclusive use of bicycles and pedestrians with cross flow by motorists minimized.

Bikeway Class II (Bike Lane) – Provides a striped lane for one-way bike travel on a street or highway.

Bikeway Class III (Bike Route) – Provides for shared use with pedestrians or motor vehicle traffic.

Bottlenecks – A bottleneck is a location where traffic demand exceeds the effective carrying capacity of the roadway. In most cases, the cause of a bottleneck relates to a sudden reduction in capacity, such as a lane drop, merging and weaving, driver distractions, a surge in demand, or a combination of factors.

California Legal Truck – A truck tractor-semitrailer (or double) that can travel on virtually any route in California, as described below:

California Legal Truck Tractor – Semitrailer
Semitrailer length: no limit
KPRA : 40 feet maximum for two or more axles,
38 feet maximum for single-axle trailers
Overall length : 65 feet maximum

California Legal Truck Tractor - Semitrailer - Trailer (Doubles)
Option A
Trailer length : 28 feet 6 inches maximum (each trailer)
Overall length : 75 feet maximum
Option B
Trailer length : 28 feet 6 inches maximum (each trailer)

Overall length : 75 feet maximum

Capacity – The maximum sustainable hourly flow rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, environmental, traffic, and control conditions.

Capital Facility Concept – The 20-25 year vision of future development on the route to the capital facility. The capital facility can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility (Intercity Passenger rail, Mass Transit Guideway, etc.), grade separation, and new managed lanes.

Concept LOS – The minimum acceptable LOS over the next 20-25 years.

Conceptual Project – A conceptual improvement or action is a project that is needed to maintain mobility or serve roadway users, but is not currently included in a financially constrained plan and is not currently programmed. It could be included in a General Plan or in the unconstrained section of a long-term plan.

Corridor – A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways, bicycle, pedestrian, and transit route alignments. Off system facilities are included as information purposes and not analyzed in the TCR.

Facility Concept – Describes the facility and strategies that may be needed within 20-25 years. This can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility, non-capacity increasing operational improvements, new managed lanes, conversion of existing managed lanes to another managed lane type or characteristic, TMS field elements, transportation demand management and incident management.

Facility Type – The facility type describes the state highway facility type. The facility could be freeway, expressway, conventional, or one-way city street.

Freight Generator – Any facility, business, manufacturing plant, distribution center, industrial development, or other location (convergence of commodity and transportation system) that produces significant commodity flow, measured in tonnage, weight, carload, or truck volume.

Headway – The time between two successive vehicles as they pass a point on the roadway, measured from the same common feature of both vehicles.

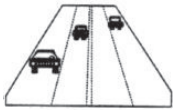
Horizon Year – The year that the future (20-25 years) data is based on.

Intelligent Transportation Systems – Improve transportation safety and mobility and enhance productivity through the integration of advanced communications technologies into the transportation infrastructure and in vehicles. Intelligent transportation systems encompass a broad range of wireless and wire line communications-based information and electronics technologies to collect information, process it, and take appropriate actions.

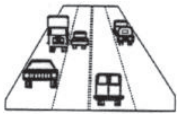
Integrated Corridor Management – A multimodal, multi-jurisdictional approach to managing recurring and non-recurring bottlenecks along a transportation corridor, by treating a transportation corridor as a single asset, including the movement of freight.

Intermodal Freight Facility – Intermodal transport requires more than one mode of transportation. An intermodal freight facility is a location where different transportation modes and networks connect and freight is transferred (or “transloaded”) from one mode, such as rail, to another, such as truck.

LOS – Level of Services is a qualitative measure describing operational conditions within a traffic stream and their perception by motorists. A LOS definition generally describes these conditions in terms of speed, travel time, freedom to maneuver, traffic interruption, comfort, and convenience. Six levels of LOS can generally be categorized as follows:



LOS A describes free flowing conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway.



LOS B is also indicative of free-flow conditions. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.

LOS C represents a range in which the influence of traffic density on operations becomes marked. The ability to maneuver with the traffic stream is now clearly affected by the presence of other vehicles.

LOS D demonstrates a range in which the ability to maneuver is severely restricted because of the traffic congestion. Travel speed begins to be reduced as traffic volume increases.

LOS E reflects operations at or near capacity and is quite unstable. Because the limits of the level of service are approached, service disruptions cannot be damped or readily dissipated.

LOS F a stop and go, low speed conditions with little or poor maneuverability. Speed and traffic flow may drop to zero and considerable delays occur. For intersections, LOS F describes operations with delay in excess of 60 seconds per vehicle. This level, considered by most drivers unacceptable often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection.

Multimodal – The availability of transportation options using different modes within a system or corridor, such as automobile, subway, bus, rail, or air.

System Operations and Management Concept – Describes the system operations and management elements that may be needed within 20-25 years. This can include non-capacity increasing operational improvements (auxiliary Lanes, channelizations, turnouts, etc.), conversion of existing managed lanes to another managed lane type or characteristics (e.g., High Occupancy Vehicle lane to High Occupancy Toll lane), TMS Field Elements, Transportation Demand Management, and Incident Management.

Peak Hour – The hour of the day in which the maximum volume occurs across a point on the highway.

Peak Hour Volume – The hourly volume during the highest hour traffic volume of the day traversing a point on a highway segment. It is generally between 6 percent and 10 percent of the ADT. The lower values are generally found on roadways with low volumes.

Peak Period – Is a part of the day during which traffic congestion on the road is at its highest. Normally, this happens twice a day, once in the morning and once in the evening; the time periods when the most people commute. Peak Period is defined for individual routes, not a District or statewide standard.

Planned Project – A planned improvement or action is a project in a financially constrained section of a long-term plan, such as an approved Regional or Metropolitan Transportation Plan (RTP or MTP), Capital Improvement Plan, or measure.

Post Mile – A post mile is an identified point on the SHS. The milepost values increase from the beginning of a route within a count to the next county line. The milepost values start over again at each county line. Milepost values usually increase from south to north or west to east depending upon the general direction the route follows within the state. The milepost at a given location will remain the same year after year. When a section of road is relocated, new milepost (usually noted by an alphabetical prefix such as "R" or "M") are established for it. If relocation results in a change in length, "milepost equations" are introduced at the end of each relocated portion so that mileposts on the remainder of the route within the county will remain unchanged.

Post-20 Year Concept – This dataset may be defined and re-titled at the District's discretion. In general, the Post-20 Year concept could provide the maximum reasonable and foreseeable roadway needed beyond a 20-25 year horizon. The post-20 year concept can be used to identify potential widening, realignments, future facilities, and rights-of-way required to complete the development of each corridor.

Programmed Project – A programmed improvement or action is a project in a near-term programming document identifying funding amounts by year, such as the State Transportation Improvement Program or the State Highways Operations and Protection Program.

Route Designation – A route's designation is adopted through legislation and identifies what system the route is associated with on the SHS. A designation denotes what design standards should apply during project development and design. Typical designations include but not limited to National Highway System (NHS), Interregional Route System (IRRS), and Scenic Highway System.

Rural – Fewer than 2,500 in population designates a rural area. Limits are based upon population density as determined by the U.S. Census Bureau.

Segment – A portion of a facility between two points.

(Interstate) STAA Truck – A truck tractor-semitrailer (or double) that conforms to the requirements of the Surface Transportation Assistance Act (STAA) of 1982, as described below:

Interstate "STAA" Truck Tractor – Semitrailer
Semitrailer length: 48 feet maximum
KPRA : no limit
Overall length : no limit

Semitrailer length: over 48 feet up to 53 feet maximum
KPRA : 40 feet maximum for two or more axles,
: 38 feet maximum for single-axle trailers
Overall length : no limit

<u>Interstate "STAA" Truck Tractor–Semitrailer–Trailer (Doubles)</u>
Trailer length : 28 feet 6 inches maximum (each trailer)
Overall length : no limit

Traffic Operations Systems – TOS elements are operational elements to enhance system performance rather than focus on capacity increase alone. TOS elements may include, but not be limited to HOV lanes, auxiliary and transition lanes, TMS and ITS elements.

Transportation Demand Management – Programs designed to reduce or shift demand for transportation through various means, such as the use of public transportation, carpooling, telework, and alternative work hours. Transportation Demand Management strategies can be used to manage congestion during peak periods and mitigate environmental impacts.

Transportation Management System – The business processes and associated tools, field elements and communications systems that help maximize the productivity of the transportation system. TMS includes, but is not limited to, advanced operational hardware, software, communications systems and infrastructure, for integrated Advanced Transportation Management Systems and Information Systems, and for Electronic Toll Collection System.

Ultimate Concept - In general, this is also called the Post 20-Year concept that could provide the maximum reasonable and foreseeable roadway needed beyond a 20-year horizon. The ultimate concept can be used to identify potential widening, realignments, future facilities, and rights-of-way required to complete the development of each corridor.

Urban Cluster – 2,500 to 49,999 in population designates an urban cluster. Limits are based upon population density as determined by the U.S. Census Bureau.

Urbanized Area – Over 50,000 in population designates an urbanized area. Limits are based upon population density as determined by the U.S. Census Bureau.

VMT – Is the total number of miles traveled by motor vehicles on a road or highway segments.

APPENDIX B: RESOURCES

10-Year SHOPP Plan:
http://www.dot.ca.gov/hq/transprog/SHOPP/prior_shopp_documents/10yr_SHOPP_Plan/2013_Ten_Year_SHOPP_Plan.pdf
California Road System (CRS) Maps: http://www.dot.ca.gov/hq/tsip/hseb/crs_map/
Interregional Transportation Strategic Plan (ITSP): http://www.dot.ca.gov/hq/transprog/ocip/te/itsp.pdf
ITS/Operations Plan: http://www.dot.ca.gov/dist3/departments/planning/systemplanningITS_OPS.htm
Sacramento Area Council of Governments: http://www.sacog.org/
Sacramento Regional Transit: http://sacrt.com/
Truck Networks on California State Highways: District 3.
http://www.dot.ca.gov/hq/traffops/trucks/truckmap/truckmap-d03.pdf
Zoning Maps. http://portal.cityofsacramento.org/Community-Development/Resources/Maps/Zoning%20Maps
US Census Bureau: http://quickfacts.census.gov/qfd/states/06/0664000.html

APPENDIX C: DATA RESOURCES

Base Year ADT: 2011 Caltrans Traffic Volumes on California State Highways Book

LOS: Used HCS in conjunction with data from this table

Base Year VMT: 2011 Caltrans Traffic Volumes on California State Highways Book (Link Based)

Horizon Year Volumes and VMT based on SACSIM model growth and SHI growth factors

Truck Data: 2011 Annual Average Daily Traffic on California State Highways Book

Base Year Peak Hour Volumes and Directional Split: 2011 Caltrans Traffic Volumes on California State Highways Book

Peak Hour VMT: 2011 Caltrans Traffic Volumes on California State Highways Book (Link Based)

Horizon Year Directional Splits based on SACSIM model projections in conjunction with 2011 Caltrans Traffic Volumes on California State Highways Book

V/C: HCS used in conjunction with data from this table