

# US 101

## US 101 South

### Corridor System Management Plan December 2010

#### executive summary



**CALTRANS DISTRICT 4**

corridor system management plans





# us 101 south corridor system management plan

## APPROVED BY:

  
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*I accept this Corridor System Management Plan for the US 101 South Corridor  
as a document informing the regional transportation planning process.*

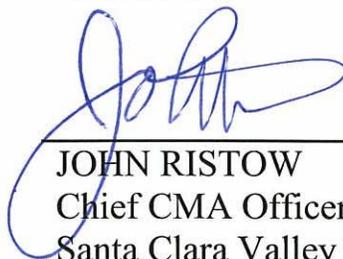
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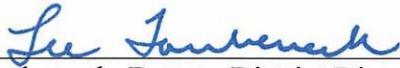
  
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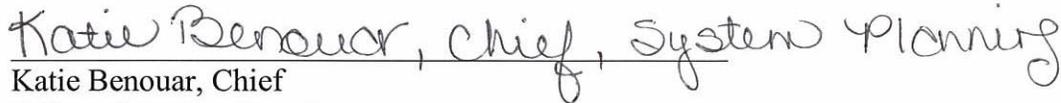
  
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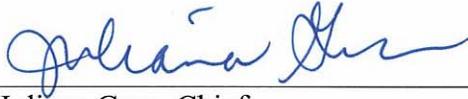
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Cesar Pujol, Senior Transportation Engineer  
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Paul Svedersky, Associate Transportation Planner  
Fredrick Schermer, Transportation Planner

# stakeholder acknowledgment

District 4 wishes to acknowledge the time and contributions of stakeholder groups and partner agencies. Current and continuing Corridor System Management Plan (CSMP) development is dependent upon the close participation and cooperation of all major stakeholders. This CSMP represents a cooperative commitment to develop a corridor management vision for the US 101 South Corridor. The strategies evaluated have the potential to impact the local arterial system and the regional and local planning agencies that have the corridor within their jurisdiction. These representatives participated in the Working Group and provided essential information, advice and feedback for the preparation of this CSMP. The stakeholders/partners include:

- Metropolitan Transportation Commission
- City/County Association of Governments of San Mateo
- San Mateo County Transportation Authority
- Santa Clara Valley Transportation Authority
- San Francisco County Transportation Authority

A website—[www.corridormobility.org](http://www.corridormobility.org)—has been created to support the development of the CSMPs and to provide stakeholders and the public with more information and an opportunity to provide input and review documents.

Disclaimer: The information, opinions, commitments, policies and strategies detailed in this document are those of Caltrans District 4 and do not necessarily represent the information, opinions, commitments, policies and strategies of partner agencies or other organizations identified in this document.

# dedication

## **To Patricia “Pat” Weston (1951-2009)**

Caltrans District 4 Planners dedicate this Corridor System Management Plan (CSMP) to the memory of Pat Weston, Chief, Caltrans Office of Advance System Planning, whose seemingly limitless energy and passion for transportation system planning in California has been an inspiration to countless transportation planners and engineers within Caltrans and its partner agencies. Pat's efforts elevated the importance of corridor-based system planning, performance measurement for system monitoring, and the blending of long-range planning with near-term operational strategies. This has resulted in stronger planning partnerships with Traffic Operations in Caltrans and led directly to the requirement to conduct comprehensive corridor planning through CSMP documents. This is but one of a long list of major achievements in Pat's lengthy Caltrans career. She generously shared her knowledge, wisdom and guidance with us over the years. She will be sorely missed as a planner, mentor and friend.



## introduction

A Corridor System Management Plan (CSMP) is a transportation planning document that examines the mobility of an urban freeway facility in a comprehensive manner based on performance assessments. A CSMP addresses the following questions:

- How is the freeway corridor performing?
- Why is it performing that way?
- What strategies and improvements can best address any problems?

CSMPs are based on the need to efficiently and effectively use all transportation modes and facilities in congested corridors so as to maximize mobility, improve safety, and reduce delay costs. While CSMPs primarily address freeways, there are important ties to local parallel roadways, transit services, and other modes of transportation pertinent to corridor mobility. These alternate modes will be more fully studied in future updates to the CSMPs.

Strategies for improvement to a transportation facility can include both operational and long-range capital improvements. Strategies are typically phased, and take into account transit usage, the arterial network, and connections to State Highways. Each CSMP presents an analysis of existing and future traffic conditions and proposes

traffic management strategies and capital improvements to maintain and enhance mobility within the corridor. The corridor strategy is based on the integration of system planning and system management.

On March 15, 2007, the California Transportation Commission (CTC) adopted Resolution CMIA-P-0607-02 on Corridor System Management Plans. In this Resolution the CTC directed Caltrans and regional agencies to develop system strategies to “preserve the mobility gains of urban corridor capacity improvements over time that will be described in CSMPs, which may include the installation of traffic detection equipment, the use of ramp metering, operational improvements, and other traffic management elements as appropriate.”

CSMPs are required for all Corridor Mobility Improvement Account (CMIA) and Highway 99 Bond projects. Both of these programs were established following the passage of Proposition 1B (The Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act) in the November 2006 election. The CTC has since adopted guidelines and a program of projects for funding. The CMIA projects present a unique opportunity for the State’s transportation system in providing congestion relief, enhanced mobility, improved safety, and stronger connectivity to benefit the traveling public.



# US 101 South

## executive summary

- Corridor Study Limits
- Corridor Management Strategies/Recommended Corridor Improvement Projects
- 2030 Low Level Improvement Scenario
- VTP 2035 Recommended Strategies
- Areas for Further Study

This Corridor System Management Plan (CSMP) represents a cooperative commitment to develop a corridor management vision for the US 101 South Corridor. The CSMP development process was a joint effort of the California Department of Transportation (Caltrans), the Metropolitan Transportation Commission (MTC), City/County Association of Governments of San Mateo County (C/CAG), San Mateo County Transportation Authority (SMCTA), and the Santa Clara Valley Transportation Authority (VTA). Although not within the defined boundaries of this CSMP, the San Francisco County Transportation Authority (SFCTA) was invited to participate. The goal is to propose strategies to achieve the highest mobility benefits to travelers along the US 101 South CSMP Corridor.

#### Corridor Study Limits

The study limits of the US 101 South CSMP extend for approximately 58 miles from the San Mateo/San Francisco county border near US 101/Candlestick Park to the US 101/SR 85 interchange junction in north Santa Clara County. These limits were set based on the geographic locations of the projects that received funding from the Corridor Mobility Improvement Account. The projects that received CMIA funds along the US 101 South corridor are:

- Widen Highway—Yerba Buena to I-280/I-680 Interchange
- Auxiliary Lanes—SR 85 to Embarcadero Road
- Auxiliary Lanes—Marsh Road to Embarcadero Road

#### Corridor Management Strategies/Recommended Corridor Improvement Projects

Though this first generation CSMP has a strong focus on the freeway facility, addressing congestion requires not one strategy, but a multi-pronged approach that includes retaining and where possible recapturing freeway capacity, maintaining the freeway infrastructure, and investing in and encouraging the use of alternate modes, such as transit. ITS is becoming more and more important in managing the freeway in specific and transportation needs in general, and due to its cost-effectiveness ITS receives a top position among the strategies. Further recommended strategies range from advancing ramp-

metering throughout the corridor, with adding auxiliary lanes where feasible, to creating HOV lanes that can be converted to express lanes. The combination of strategies promises to increase freeway efficiency and throughput and may avoid shifting congestion from one location to another that may be the case when just a single strategy is followed. Implementing a Smart Corridor Plan for having surface streets carry traffic away from the freeway during emergencies would benefit freeway operations. The variety of strategies available for addressing localized problems include land use decisions, specific transit mode improvements, demand management, freeway and surface street management, freeway and street improvements, and freeway/street operations.

ITS improvements have been the subject of several extensive studies for the 101 corridor and many of those recommendations are currently being implemented. It is recommended to continue implementation of the Caltrans District 4 ITS deployment approach.

Within this CSMP, a wide range of projects is also included of proposed improvements to specific parts of the freeway. Yet financial restrictions will most certainly guide the process; not all projects can be implemented. The lists of projects are provided to show both the intent for future improvements and make the wider range of options clear that are available within this corridor. The recommendation is to pick those projects that will provide a reasonable return on investment, along with delay reductions; in particular, the various auxiliary lanes additions plus the highway widening funded through the Corridor Mobility Improvement Account (CMIA) program will then generate a good return on investment.

The San Mateo US 101 FPI Technical Corridor Analysis and the Santa Clara County VTP 2035 are the main sources for the recommended strategies of this CSMP, although several other reports, General Plans, and sources such as Go California and SMART Corridor were used to shape the recommended strategies.

Whereas the recommendations for the Santa Clara County portion of the US 101 South CSMP follow VTP 2035, the FPI report provides both a short-term and long-term scenario for San Mateo County.

The full benefit of the CMIA funded projects and the CSMP recommended projects will not be realized without ongoing cooperative system management in the US 101 South corridor. The CSMP development process has brought the major transportation planning agencies in the corridor (Caltrans, MTC, VTA, C/CAG, SMCTA and SFCTA) together to develop this set of recommendations. The next step should be a continuous improve-

ment process to work together on corridor management, further incorporation of other modes, and enhanced collaboration to develop the Sustainable Community Strategy (SCS) and Priority Development Areas (PDA) in the corridor. This will provide the foundation for the next generation CSMP and future Regional Transportation Plan (RTP) and FPI updates.



Figure ES1. US 101 South Congestion.

The FPI report assumes a baseline list of improvements shown in Table ES1.

Table ES1. Baseline Improvement Projects 2015.

<b>San Mateo County<sup>1</sup></b>	
Project Name	Description
Auxiliary Lanes–Marsh to Embarcadero	Widen NB and SB auxiliary lane segments from 4 lanes to 5
Auxiliary Lanes and Ramp Metering 3rd to Millbrae	Widen NB and SB auxiliary lane segments from 4 lanes to 5 and install ramp metering equipment. Ramp meters will be turned on as widening construction is completed.
Smart Corridor	Emergency re-route of traffic on US 101 via ITS and static signs on freeway, intersections, and parallel arterial streets. Includes emergency traffic signal timing plans and emergency response coordination via Caltrans freeway management center in Oakland.
US 101 Ramp Metering	Caltrans' SHOPP project for Ramp Metering (Rte 92 to SF County line)
SR 92 Widening–US 101 to I-280	Widen from 2 lanes to 3 lanes in each direction (To be implemented by 2030)
<b>Santa Clara County</b>	
US 101 HOV to HOT Conversion	Convert HOV lanes on US 101 in Santa Clara County to HOT lanes.
HOV Lane Extension–SR 85 to Oregon	Extend existing dual NB HOV lanes near the US 101/SR 85 interchange to a point south of the US 101/Oregon Expressway interchange.
Northbound Aux Lane–Rengstorff to San Antonio	Widen NB from 4 lanes to 5 (auxiliary lane)
Auxiliary Lane–San Antonio to Oregon	Widen NB and SB auxiliary from 4 lanes to 5
Extend NB Lane–Shoreline to Rengstorff	Remove lane drop on NB US 101 near Shoreline interchange by carrying lane through to Rengstorff interchange loop off-ramp.
US 101/Rengstorff Interchange Improvements	Modify Rengstorff on-ramp to NB US 101 to become 2 mixed flow lanes from its existing single lane configuration.
US 101/San Antonio Interchange Improvements	Modify San Antonio NB loop and diagonal on-ramps into one on-ramp to US 101.
US 101/Old Middlefield Interchange Improvements	Modify Old Middlefield on-ramp to SB US 101 from 1 HOV plus 1 mixed flow lane to 2 mixed flow lanes.
US 101/Oregon Interchange Improvements	Modify Oregon on-ramp to SB US 101 to become 2 mixed flow lanes and 1 HOV lane from its existing configuration of 1 mixed flow lane and 1 HOV lane.
US 101 Ramp Metering	Implement ramp meters for all US 101 on-ramps in Santa Clara County.

Source: San Mateo US 101 Freeway Corridor Technical Analysis–Exhibit 63.

<sup>1</sup>It is not certain when ramp metering will be activated between 3rd Avenue and Millbrae Avenue. Construction of US 101 Aux lanes between San Bruno Avenue and San Francisco County line is still under consideration. The US 101/Broadway I/C reconstruction with ramp metering is a likely project by 2015.

Next, the FPI Technical Analysis for San Mateo US 101 identified the following capacity improvements, grouped around specific locations:

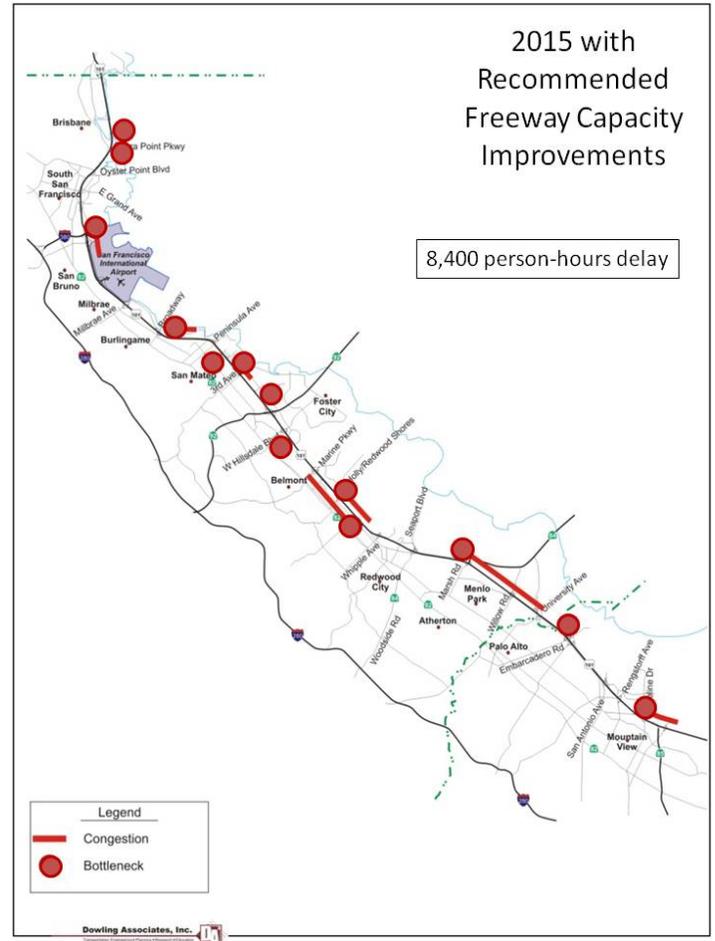
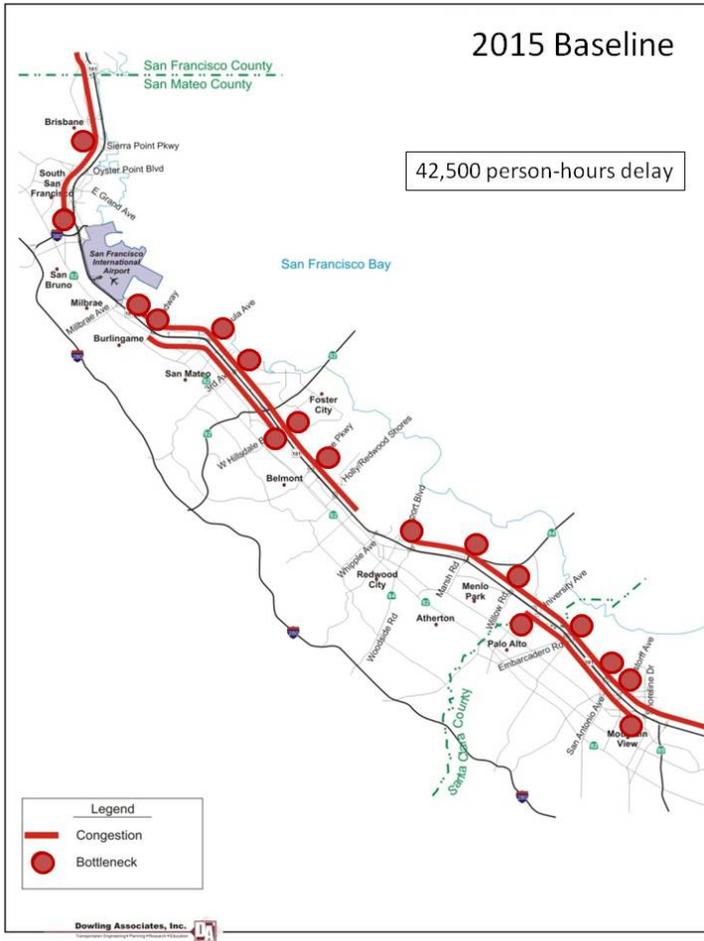
Table ES2. Possible Project Groupings of Short-term Capacity Improvements.

ID	Location	Dir	Improvement	Limits	Cost
1	Willow Road	NB	Widen from 3 to 4 lanes	Off to Loop On	\$ 1,400,000*
		NB	Widen aux from 4 to 5 lanes	Loop On to Loop Off	\$ 16,100,000
		NB	Widen from 3 to 4 lanes	Loop Off to On	\$ 1,300,000
		SB	Widen from 3 to 4 lanes	Loop Off to Diagonal On	\$ 2,700,000
<b>Subtotal</b>					<b>\$ 21,500,000</b>
2	Third Avenue	NB	Widen from 4 to 5 lanes	Off to On	\$ 14,500,000*
		SB	Widen from 4 to 5 lanes	Off to On	\$ 16,500,000*
<b>Subtotal</b>					<b>\$ 31,000,000</b>
3	University Avenue	NB	Widen from 4 to 5 lanes	Lane Add to Off	\$ 2,900,000
		NB	Widen from 3 to 4 lanes	Off to On	\$ 15,900,000
		SB	Widen from 4 to 5 lanes	Lane Add to Univ. Off	\$ 2,100,000
		SB	Widen from 3 to 4 lanes	Univ. Off to Univ. On	\$ 18,500,000*
<b>Subtotal</b>					<b>\$ 39,400,000</b>
4	Hillsdale Boulevard**	NB	Widen from 4 to 5 lanes	Loop On to Diag. On	\$ 2,800,000*
		NB	Widen aux from 5 to 6 lanes	Diagonal On to SR 92 Off	\$ 900,000*
		NB	Widen aux from 5 to 6 lanes	Mar Diag. On to Hills Off	\$ 17,800,000
		NB	Widen from 4 to 5 lanes	Hills Off to Hills Loop On	\$ 6,600,000*
		SB	Widen from 4 to 5 lanes	Loop On to Diag. On	\$ 2,200,000*
		SB	Widen from 4 to 5 lanes	Off to Loop On	\$ 9,600,000*
		SB	Widen aux from 5 to 6 lanes	Hills On to Marine Off	\$ 13,800,000*
SB	Widen from 4 to 5 lanes	Marine Off to Marine On	\$ 3,000,000*		
<b>Subtotal</b>					<b>\$ 56,700,000</b>
5	Dore/Peninsula Avenue	NB	Widen from 4 to 5 lanes	Pen Off to Pen On	\$ 7,500,000
6	Broadway/Anza Boulevard	NB	Widen from 4 to 5 lanes	Broadway Off to Broadway On	\$ 11,000,000
7	Marsh Road	NB	Widen from 3 to 4 lanes	Off to Loop On	\$ 3,200,000
		NB	Widen 3 to 4 lanes/extend downstream aux lane	Loop On to Diag. On	\$ 3,200,000*
<b>Subtotal</b>					<b>\$ 6,400,000</b>
8	Aux Lanes—San Bruno to San Mateo/SF County Line	SB	Widen from 4 to 5 lanes	Mainline to Beatty Off	\$ 6,700,000
		SB	Widen from 4 to 5 lanes	Beatty on to Sierra Point Off	\$ 11,900,000
		SB	Widen from 4 to 5 lanes	Sierra On/Bayshore Off	\$ 21,500,000
<b>Subtotal</b>					<b>\$ 40,100,000</b>
9	Miller Ave/S Airport Blvd.	SB	Widen from 4 to 5 lanes	Miller Off to S Airport Off	\$ 15,300,000
		SB	Widen from 4 to 5 lanes	S Airport Off to S Airport On	\$ 8,800,000
<b>Subtotal</b>					<b>\$ 24,100,000</b>
10	Bayshore/Oyster Point	SB	Widen from 4 to 5 lanes	Bayshore On to Oyster Pt On	\$ 5,700,000*
11	SFO/Millbrae Avenue	NB	Widen from 4 to 5 lanes	Millbrae Off to Lane Add	\$ 32,200,000
		NB	Widen from 5 to 6 lanes	Lane Add to SFO (2) Off	\$ 2,300,000
		NB	Widen from 4 to 5 lanes	SFO (2) Off to Millbrae On	\$ 3,300,000
<b>Subtotal</b>					<b>\$ 37,800,000</b>
12	Ralston/Marine Parkway	NB	Widen from 4 to 5 lanes	Loop On to Diagonal On	\$ 1,600,000
13	Woodside	NB	Widen 3 to 4 mixed flow lanes	Off to On	\$ 12,400,000*
14	SR 92	NB	Widen from 4 to 5 lanes	EB Loop On to WB On	\$ 6,700,000*
15	Peninsula Avenue/Anza	NB	Widen from 5 to 6 lanes	Peninsula On to Anza Off	\$ 24,000,000
16	Broadway/Millbrae	NB	Widen from 5 to 6 lanes	Broadway On to Millbrae Off	\$ 8,000,000
17	Whipple Avenue	SB	Widen from 3 to 4 lanes	Lane Drop to Loop On	\$ 3,400,000*
<b>Total</b>					<b>\$337,300,000</b>

Source: San Mateo US 101 Freeway Corridor Technical Analysis—Exhibit 113.

\* indicates at least one design exception is assumed to be required.

\*\*Auxiliary lane widening in northbound US 101 between Hillsdale Blvd on-ramp and SR 92 off-ramp would cause a difficult weave across two lanes of traffic for the Hillsdale diagonal on-ramp vehicles heading to NB US 101. Two lanes would drop at the SR 92 off-ramp, a distance of only 1200 feet from the Hillsdale diagonal on-ramp.



Figures ES2a and b. 2015 Baseline and 2015 Improved Congestion Locations.  
 Source: San Mateo US 101 Freeway Corridor Technical Analysis—Exhibit 111.

Figure ES2a and ES2b above provide a graphic comparison of freeway bottleneck locations and queues for 2015 baseline versus 2015 with recommended improvements to demonstrate the benefits of the proposed improvements.

Table ES3 shows a summary of US 101 freeway mobility performance measures for both the 2015 and the 2030 improvement scenarios.

For the 2015 scenarios:

- The peak period demand as measured in terms of vehicle-miles traveled (VMT) is forecasted to increase by 39 percent in 2015 over current 2009 levels.
- The peak period vehicle-hours traveled (VHT) is forecasted to increase by 44 percent in 2015 over existing 2009 conditions.
- The peak period vehicle-hours of delay (VHD) is forecasted to increase by 57 percent in 2015 over existing 2009 conditions.
- The peak period mean speed would drop by 4 percent from current conditions to around 44 mph.

Table ES3. Summary of US 101 Freeway Performance.

Freeway Mobility Performance Measures	2009 (Existing)	2015 (Base)	2015 Recommendations		2030 (Base)	2030 Low Level Recommendations	
			MOE	(Diff)		MOE	(Diff)
Vehicle Miles of Travel (VMT)	3,502,424	4,870,341	5,035,396	3%	4,947,243	5,349,363	8%
Vehicle Hours of Travel (VHT)	75,990	109,637	84,336	-23%	137,029	92,578	-32%
Vehicle Hours of Delay (VHD)	22,107	34,709	6,868	-80%	60,917	10,280	-83%
Mean Vehicle Speed (mph)	46	44	60	34%	36	58	60%
Person Miles of Travel (PMT)	4,284,762	5,967,535	6,168,686	3%	6,062,655	6,552,775	8%
Person Hours of Travel (PHT)	92,897	134,276	103,321	-23%	167,703	113,374	-32%
Person Hours of Delay (PHD)	26,978	42,468	8,418	-80%	74,431	12,562	-83%
Unreliability - Buffer Index	205%	206%	199%	-4%	212%	199%	-6%
Safety - Annual Collisions	690	831	552	-34%	1,022	645	-37%
Productivity - Lost Lane-Miles	428	591	350	-41%	847	494	-42%

Source: San Mateo US 101 Freeway Corridor Technical Analysis—Exhibit 118 (FREQ Model Results).

#### 2030 Low Level Improvement Scenario

The baseline analysis for the 2030 scenario for San Mateo was completed assuming no additional projects are built beyond the baseline improvements in 2015. The 2030 with no further improvements scenario is not considered a realistic future scenario. It was created solely for the purpose of providing a neutral benchmark for comparing long-term improvement strategies, and both future years are presented in the following table. The impacts of these improvements on mobility were assessed using the FREQ software.

For the 2030 scenarios:

- The peak period demand as measured in terms of vehicle-miles traveled (VMT) is forecasted to increase by 41 percent over existing 2009 levels.
- The peak period vehicle-hours traveled (VHT) is forecasted to increase by 80 percent over existing 2009 conditions.
- The peak period vehicle-hours of delay (VHD) is forecasted to increase by 176 percent over existing 2009 conditions.
- The average speed of peak period travel would drop by 22 percent from current conditions to approximately 36 mph.

In addition to the baseline improvements, ramp metering was assumed to be implemented and operational for all ramps except freeway-to-freeway ramps in 2030 (such as I-380 to US 101, and SR 92 to US 101).

Approximately \$145 million of freeway capacity improvements (over and above the short-term improvements) are recommended for implementation in the long term (2030). These recommended low level long-term improvements would add approximately 23.4 lane miles of mainline capacity to US 101, which is 7.0 lane-miles of mainline capacity to US 101; over and above the 16.4 lane miles of added mainline capacity improvements included in the short-term improvement recommendations.

The recommended 2030 low level freeway capacity improvements are designed to maintain all congestion within the current four-hour AM peak and the current five-hour PM peak. These improvements would ensure that the peak period capacity of US 101 is sufficient to serve the forecasted 2030 demand (assuming no shifts in demand from other congested streets and freeways occur to take advantage of the improved conditions on US 101).

A scenario of high level improvements for 2030 was investigated, but did not receive recommendation because of high cost and right-of-way requirements.

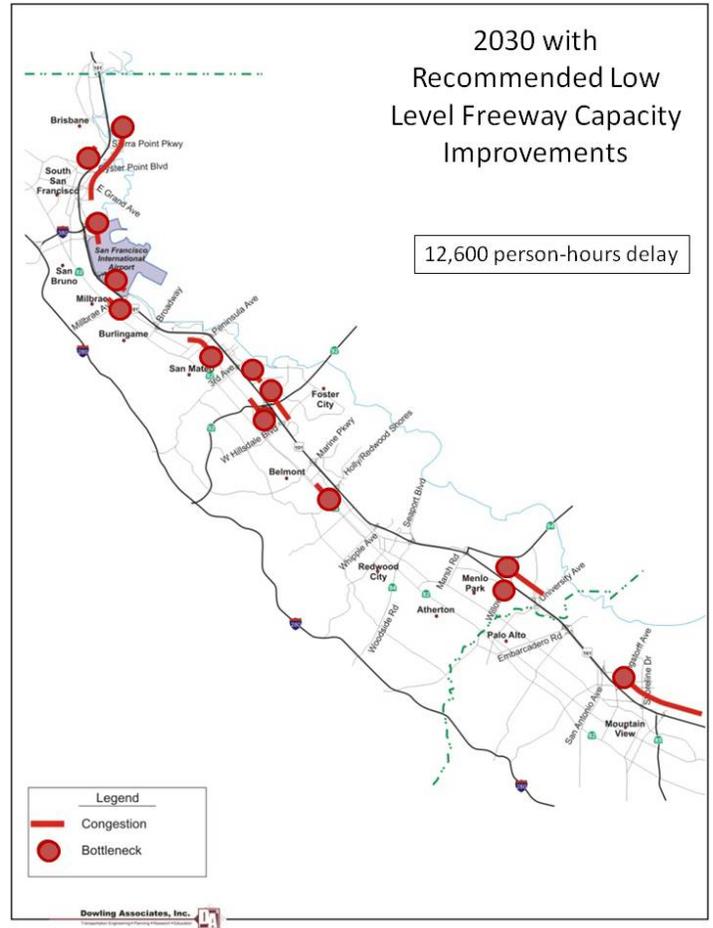


Figure ES3a & b. US 101 Freeway Bottleneck and Queues Comparison for 2030.

Source: San Mateo US 101 Freeway Corridor Technical Analysis—Exhibit 116

Figures ES3a and ES3b provide a graphic comparison of freeway bottleneck locations and queues for the 2030 baseline versus 2030 with recommended low level improvements, to demonstrate the benefits of the proposed

improvements. Table ES4 shows the specific long-term low level improvements for 2030; the included 2015 baseline improvement projects are highlighted with a mark in the table to the right.

Table ES4.a. Long-Term Low Level Improvements.

Subsection		Long-Term Low Level Improvement	Length (ft)	In 2015 Short Term
NB	Northbound			
3	Shoreline off-ramp to SR 85 on-ramp	Widen from 3 to 4 mixed flow lanes	1380	
4	SR 85 on-ramp to SR 85 HOV on-ramp	Widen from 4 to 5 mixed flow lanes	2085	
5	SR 85 HOV on-ramp to Middlefield off	Widen from 4 to 5 mixed flow lanes	995	
8	Shoreline on-ramp to Rengstorff off	Widen to provide auxiliary lane (4 to 5 mixed flow lanes)	2150	
10	Rengstorff loop off-ramp to on-ramp	Widen from 3 to 4 mixed flow lanes	654	
11	Rengstorff on-ramp to San Antonio off	Widen to provide auxiliary lane (4 to 5 mixed flow lanes)	1706	
12	San Antonio off-ramp to loop on-ramp	Widen from 3 to 4 mixed flow lanes	1412	
13	San Antonio loop on to diag. on-ramp	Widen from 3 to 4 mixed flow lanes	280	
14	San Antonio on-ramp	Widen on-ramp to provide additional storage for metering	N/A	
14	San Antonio on-ramp to Oregon off	Widen to provide auxiliary lane (4 to 5 mixed flow lanes)	6787	
15	Oregon off-ramp to Embarcadero on	Widen from 3 to 4 mixed flow lanes	3496	
16	Embarcadero on-ramp to Lane Add	Widen from 4 to 5 mixed flow lanes	3337	
17	Lane add to University off-ramp	Widen from 4 to 5 mixed flow lanes	1491	√
18	University off-ramp to on-ramp	Widen from 3 to 4 mixed flow lanes	2265	√
19	University on-ramp to Willow off-ramp	Widen to provide auxiliary lane (4 to 5 mixed flow lanes)	3099	
20	Willow off-ramp to loop on-ramp	Widen from 3 to 4 mixed flow lanes	545	√
21	Willow loop on-ramp to loop off-ramp	Widen to provide auxiliary lane (4 to 5 mixed flow lanes)	381	√
22	Willow loop off-ramp to on-ramp	Widen from 3 to 4 mixed flow lanes	499	√
24	Marsh off-ramp to loop on-ramp	Widen from 3 to 4 mixed flow lanes	966	
25	Marsh loop on-ramp to diagonal on	Extend existing downstream auxiliary lane between Marsh and Woodside (3 to 4 lanes)	981	√
26	Marsh on-ramp to Woodside off-ramp	Widen to provide auxiliary lane (4 to 5 mixed flow lanes)	6954	√
27	Woodside off-ramp to on-ramp	Widen from 3 to 4 mixed flow lanes	2981	√
28	Woodside on-ramp to Whipple off-ramp	Widen to provide auxiliary lane (4 to 5 mixed flow lanes)	4092	
31	Whipple on-ramp to Holly off-ramp	Widen to extend HOV lane to Holly	3634	
33	Holly off-ramp to on-ramp	Widen from 4 to 5 lanes	3123	
34	Holly on-ramp to Marine off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	3254	
35	Marine off-ramp to loop on-ramp	Widen from 4 to 5 lanes	1453	
36	Marine loop on-ramp to diagonal on-ramp	Extend existing downstream auxiliary lane between Marine and Hillsdale (4 to 5 lanes)	755	√
37	Marine diagonal on-ramp to Hillsdale off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	6200	√
38	Hillsdale off-ramp to loop on-ramp	Widen from 4 to 5 lanes	1631	√
39	Hillsdale loop on-ramp to diagonal on	Extend existing downstream auxiliary lane between Hillsdale and SR 92 (4 to 5 lanes)	1740	√
40	Hillsdale diagonal on-ramp to SR 92 off	Widen to provide auxiliary lane (5 to 6 lanes)	877	√
42	SR 92 loop on-ramp to diagonal on	Widen from 4 to 5 lanes	1002	√
47	3rd off-ramp to on-ramp	Widen from 4 to 5 lanes	1909	√
48	3rd on-ramp to Dore off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	2013	
50	Peninsula off-ramp to on-ramp	Widen from 4 to 5 lanes	1214	√

Source: San Mateo US 101 Freeway Corridor Technical Analysis—Exhibit 94.

Note: Check marks indicate improvements also recommended in short-term 2015 scenario.

Table ES4.b. Long-Term Low Level Improvements (continued)

Subsection		Long-Term Low Level Improvement	Length (ft)	In 2015 Short Term
<b>NB</b>	<b>Northbound</b>			
51	Peninsula on-ramp to Anza off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	4617	√
53	Anza on-ramp to Broadway off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	1165	
54	Broadway off-ramp to on-ramp	Widen from 4 to 5 lanes	2591	√
55	Broadway on-ramp to Millbrae off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	4450	√
56	Millbrae off-ramp to SFO lane add	Widen from 4 to 5 lanes	2158	√
57	Lane add to SFO off-ramp	Widen from 5 to 6 lanes	1399	√
58	SFO off-ramp to Millbrae on-ramp	Widen from 4 to 5 lanes	2206	
61	San Bruno off-ramp to I-380 off-ramp	Extend existing upstream auxiliary lane between SFO and San Bruno (5 to 6 lanes)	1055	
62	I-380 off-ramp to North Access off-ramp	Widen from 4 to 5 lanes	1948	
72	Bayshore off-ramp to Sierra off-ramp	Extend existing upstream auxiliary lane between Oyster and Bayshore (4 to 5 lanes)	973	
77	Harney on-ramp to study limit	Widen between Harney on-ramp to suitable termination point north of the San Mateo/San Francisco County Line (4 to 5 lanes)	2333	
<b>SB</b>	<b>Southbound</b>			
2	Study limit to Beatty off-ramp	Widen to provide auxiliary lane (4 to 5 lanes)	2400	√
4	Beatty on-ramp to Sierra Point off-ramp	Widen to provide auxiliary lane (4 to 5 lanes)	4243	√
6	Sierra Point on-ramp to Bayshore off	Widen to provide auxiliary lane (4 to 5 lanes)	7671	√
6	Sierra Point on-ramp	Widen on-ramp to provide additional storage and higher metering rate	N/A	
9	Bayshore on-ramp to Oyster Point on-ramp	Extend existing downstream auxiliary lane between Oyster and Miller (4 to 5 lanes)	1802	√
11	Miller off-ramp to S. Airport off-ramp	Extend existing upstream auxiliary lane between Oyster and Miller (4 to 5 lanes)	2580	√
12	S. Airport off-ramp to on-ramp	Widen from 4 to 5 lanes	2085	√
13	S. Airport on-ramp	Widen on-ramp to provide additional storage	N/A	
30	3rd off-ramp to on-ramp	Widen from 4 to 5 lanes	1795	√
35	Fashion Is. on-ramp to SR 92 EB on	Widen from 4 to 5 lanes	731	
36	SR 92 EB on-ramp to Hillsdale off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	947	
37	Hillsdale off-ramp to on-ramp	Widen from 4 to 5 lanes	2115	√
38	Hillsdale loop on-ramp to diagonal on-ramp	Extend existing downstream auxiliary lane between Hillsdale and Marine (4 to 5 lanes)	1155	√
39	Hillsdale on-ramp to Marine off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	5302	√
40	Marine off-ramp to on-ramp	Widen from 4 to 5 lanes	4270	√
41	Marine on-ramp to Holly off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	1676	
44	Brittan on-ramp to Whipple off-ramp	Widen to provide auxiliary lane (5 to 6 lanes)	2414	
46	Lane drop to Whipple on-ramp	Widen from 3 to 4 lanes	1429	√
56	Willow loop off-ramp to loop on-ramp	Widen from 3 to 4 lanes	431	√
58	Lane add to University off-ramp	Widen from 4 to 5 lanes	421	√
59	University off-ramp to on-ramp	Widen from 3 to 4 lanes	2083	√
67	Rengstorff on-ramp to Middlefield on	Extend existing downstream auxiliary lane between Middlefield and Shoreline (3 to 4 lanes)	3169	
68	Middlefield on-ramp	Widen on-ramp to provide additional storage for metering	N/A	
68	Middlefield to Shoreline	Widen to provide auxiliary lane (4 to 5 lanes)	688	

Source: San Mateo US 101 Freeway Corridor Technical Analysis—Exhibit 94.

### VTP 2035 Recommended Strategies

The Santa Clara Valley Transportation Plan 2035 builds on recommendations already found in the 2005 VTP 2030, and include the need to study county gateways and vital highway corridors, obtain greater utility from existing highway infrastructure, and develop an express lane network. As a result, part of the work in developing VTP 2035 Highway Projects involved an evaluation of the county gateways and key corridors within the county to increase efficiency, identify, define and prioritize improvements that relieve congestion, alleviate bottlenecks and enhance safety.

The VTP 2035 Highways project list includes 16 projects designed to improve the efficiency of the existing highway system, including auxiliary lane and ramp metering projects. VTA has promoted ramp metering in the Bay Area, and Santa Clara County is currently home to close to half of all ramp meters in the nine-county Bay Area region.

On US 101 the VTP Highways list includes:

- US 101 auxiliary lanes: SR 85 to Embarcadero Road.
- US 101 Southbound improvements: San Antonio Road to Charleston Road/Rengstorff Avenue
- US 101 Southbound auxiliary lane improvement: Ellis Street to SR 237
- SR 237/Mathilda Avenue and US 101/Mathilda Avenue interchange improvements
- SR 237 Westbound to Northbound US 101 ramp improvements
- US 101 Southbound Auxiliary Lane: Great America Parkway to Lawrence Expressway
- US 101/Montague Expressway/San Tomas Expressway/Mission College Boulevard interchange improvements
- US 101/Trimble Road/De La Cruz Boulevard/Central Expressway interchange improvements
- US 101/Zanker Road/Skyport Drive/Fourth Street interchange improvements
- US 101/Old Oakland Road interchange improvements

- US 101 Southbound auxiliary lane widening: I-880 to McKee
- US 101/Mabury Road/Taylor Street interchange improvements
- US 101 Southbound widening: Story Road to Yerba Buena Road
- US 101/Capitol Expressway interchange improvements (includes new NB on-ramp from Yerba Buena Road)
- US 101/Hellyer Avenue Interchange improvements
- US 101/Blossom Hill Road interchange improvements

### Areas for Further Study

The US 101 South CSMP Working Group has identified several areas for future study:

- Developing an ITS plan for the corridor
- Additional focusing on transit and non-highway improvements
- Identifying proactive Demand Management Strategies and related performance measurements
- Accident Response Improvement
- SR 92/US 101 interchange area study
- Peninsula Avenue interchange
- Candlestick/Harney Way interchange
- Functioning of Santa Clara expressways in relation to US 101
- Supporting statewide and regional programs such as GO California and the Sustainable Communities Strategy
- Supporting the Smart Corridor implementation
- Encouraging increased utilization of I-280
- Including the US 101 freeway in San Francisco County and Santa Clara County south of SR 85

The stakeholders of the US 101 South CSMP corridor are committed to continue working together on these mutual goals for corridor system management.

