EA 04-1J560K, HB5
Project ID: 0413000206

SUPPLEMENTAL PROJECT STUDY REPORT-PROJECT DEVELOPMENT SUPPORT (SUPPLEMENTAL PSR-PDS) TO ADD EXPRESS LANE ALTERNATIVE

To

Request Approval to Program Capital Support for the Project Approval and Environmental Document (PA&ED) Phase

On Route US 101

Between 0.3 mile north of San Antonio Road Interchange (SCL Post Mile 50.6) in Santa Clara County

And 0.3 mile south of Grand Avenue Interchange (SM Post Mile 21.8) in San Mateo County

APPROVAL RECOMMENDED:

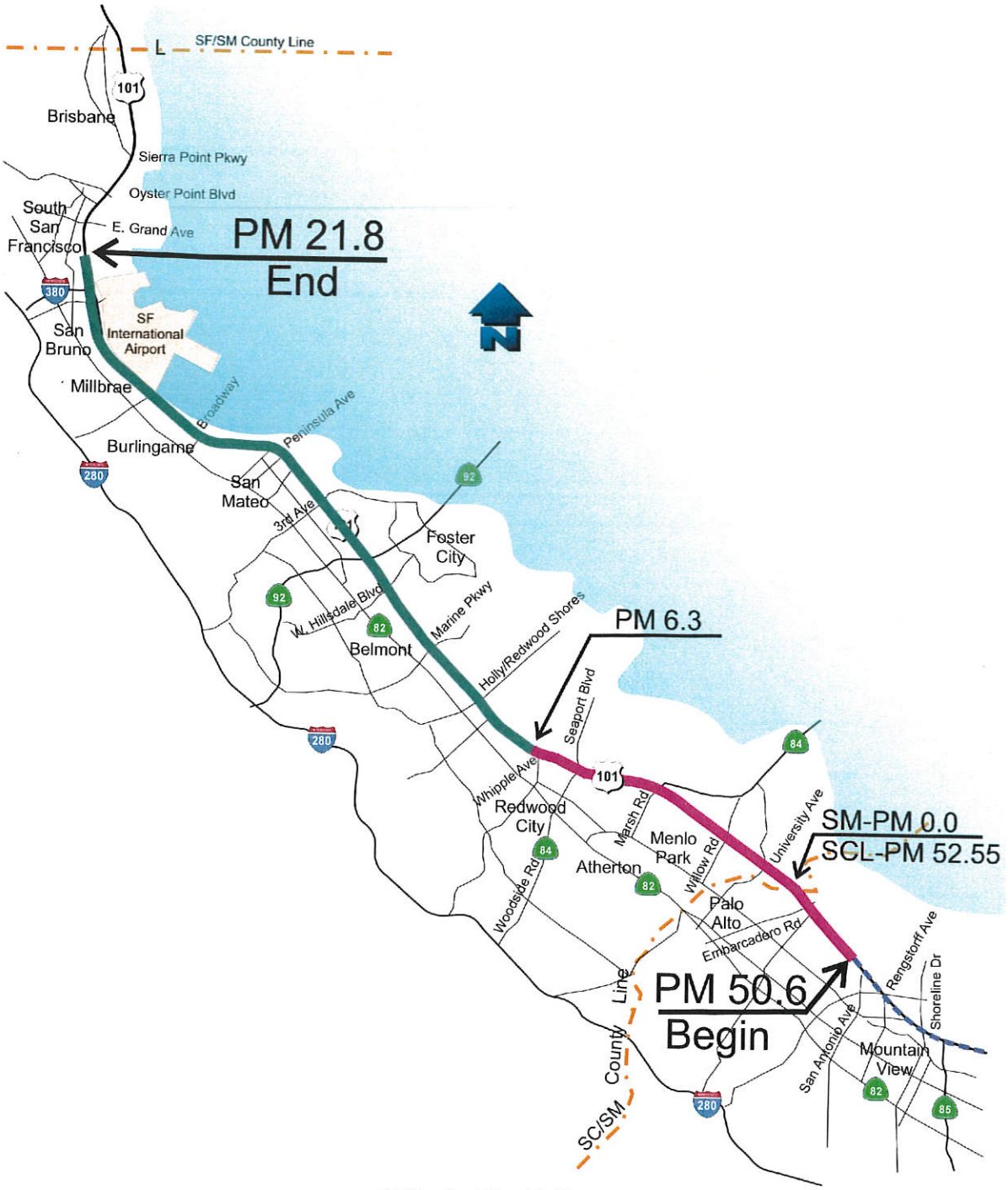
JOSEPH M. HURLEY, *SAN MATEO COUNTY TRANSPORTATION AUTHORITY*
PROJECT SPONSOR

SANDY WONG, *C/CAG OF SAN MATEO COUNTY*
PROJECT SPONSOR

NIDAL TUQAN, *PROJECT MANAGER*

APPROVED:

BIJAN SARTIPI, *DISTRICT DIRECTOR* — *DATE* 6-3-16



Vicinity Map

On Route US 101

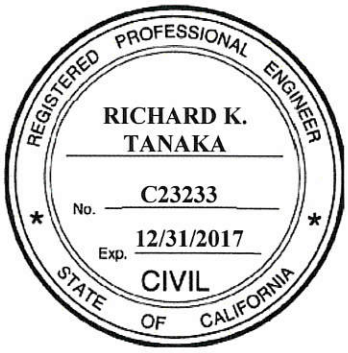
Between 0.3 mile north of San Antonio Road Interchange (SCL Post Mile 50.6) in Santa Clara County

And 0.3 mile south of Grand Avenue Interchange (SM Post Mile 21.8) in San Mateo County

This Supplemental Project Study Report (Project Development Support) has been prepared under the direction of the following Registered Engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

May 31, 2016

RICHARD K. TANAKA - REGISTERED CIVIL ENGINEER *DATE*



Reviewed by:

CELIA MCCUAIG
Office Chief
Office of Advance Planning

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1. INTRODUCTION

The San Mateo County Transportation Authority (SMCTA) and the City/County Association of Governments of San Mateo County (C/CAG), in cooperation with the California Department of Transportation (Caltrans) completed the PSR-PDS for the high occupancy vehicle (HOV) Extension from Whipple Avenue (PM 6.3) to north of I-380 (PM 20.8). This PSR-PDS was approved on May 4, 2015.

Project proposes to add express lane alternatives from the terminus of Santa Clara County Express Lane at Matadero Creek (PM 51.4) to north of I-380 (PM 20.8) which is approximately twenty two (22) miles of Express Lane in each direction. Project limits extend an additional one mile beyond the actual terminus of the express lane for incorporating express lane infrastructure such as signs, electrical and communication systems. These express lane alternatives in conjunction with the Santa Clara County Express Lane would ultimately provide a continuous US 101 express lane in both Santa Clara County (from Dunne Avenue in Morgan Hill) and San Mateo County (to I-380), totaling approximately 57.5 miles in length. These express lane alternatives in combination with the HOV alternatives from the approved PSR-PDS comprise the U.S. 101 Managed Lane Project.

One of the express lane alternatives is the conversion of the existing general purpose lane to an express lane. Currently, AB No. 798, Chapter 474, Section 64112 (b) of Division 3, Title 6.7 of the Government Code prohibits conversion of a general purpose lane to an express lane. In addition, Title 23 of US Code, Section 129 (a) (1) (G) states that federal participation is not permitted if the number of general purpose lanes (excluding auxiliary lanes) after project construction is less than the number of general purpose lanes before project construction. For this express lane alternative to be viable, changes in State and Federal legislation would be required.

US 101 on the San Francisco Peninsula is the main access route to San Francisco International Airport (SFO) from the North and South Bay. It also serves as a major gateway route between San Francisco and the Silicon Valley, as well as providing access to San Jose International Airport (SJC) at the southern end of the corridor. US 101 also links to the East Bay via the Dumbarton Bridge (SR 84), the San Mateo Bridge (SR 92), and the San Francisco - Oakland Bay Bridge (I-80), and provides access to the Port of Redwood City.

See Attachment B for the capital outlay cost estimate for this project.

Description	**Original PSR-PDS (HOV Alternatives only)**	**Supplemental PSR-PDS (Express Lane Alternatives)**
Project Limits (Dist., Co., Rte., PM)	District 04; San Mateo; US 101; PM 6.3/20.8	04, SCL US 101 PM 50.6/52.55 and SM US 101 PM 0.0/21.8
Number of Alternatives:	2 HOV Build Alternatives, 1 No-Build Alternative	2 Express Lane Alternatives Alt. 3 – HOV & GP Conversion Alt. 4 – HOV Conversion
Capital Construction Cost Range, including R/W & System Integration	$85 to $158 M	Alternative 3 - $87 M Alternative 4 - $244 M

Description	Original PSR-PDS (HOV Alternatives only)	Supplemental PSR-PDS (Express Lane Alternatives)
PA&ED Support Cost Range	$6.8 to $7.4 M	Up to $13.0 M
PS&E, R/W & System Support Cost Range	$15.3 to $28.2 M	$8.5 to $36.5 M
Construction Support Range	$12.7 to $21.3 M	$7.6 to $28.9 M
Funding Source:	Federal, State and Local Funds	Federal*, State and Local Funds
Type of Facility (conventional, expressway, freeway):	Freeway: HOV lanes widening	Express Lane
Number of Structures:	Widen five bridges, seven new retaining walls and five new soundwalls.	No Change
Anticipated Environmental Determination or Document:	IS with MND for CEQA EA with FONSI for NEPA	If separately cleared: South Segment (SCL PM 50.6/52.55 and SM PM 0.0/6.3) - CE/CE North Segment (PM 6.3/21.8) – IS/EA with MND and FONSI
Legal Description	In San Mateo County from 0.2 miles south of Whipple Avenue Overcrossing to 0.9 miles north of I-380	US 101 Managed Lane Project from 0.3 mile north of San Antonia Road Interchange in Santa Clara County to 0.3 mile south of Grand Avenue Interchange in San Mateo County
Approximate Schedule	Complete PA&ED Phase – April 2018 Start Construction – November 2020	Complete PA&ED Phase – South Segment – December 2017 North Segment – August 2018 Start Construction – November 2020
Project Category	3	No Change

* Current Federal regulations do not allow Alternative 3 to receive federal funds.

Support cost for the PA&ED phase for the HOV Project (Whipple to I-380) is in the range of $6.8 to $7.4 million from the approved PSR/PDS. In addition, the support cost for the PA&ED phase to add express lanes is in the range of $3.3 to $5.6 million, making the total PA&ED phase cost range from $10.1 to $13.0 million. The remaining support, right of way, and construction components of the project are preliminary estimates and are not suitable for programming purposes. A Project Report will serve as approval of the "preferred" alternative and the programming document for the remaining support costs, right of way and capital costs of the project.

2. BACKGROUND

A. Existing Facility

US 101 between Santa Clara County and I-380 is currently an 8-lane facility (4 through-lanes in each direction) with auxiliary lanes between most interchanges. The southern segment from Matadero Creek in Santa Clara County to Whipple Avenue in Redwood City consists of 1 HOV lane and 3 general purpose lanes in each direction. The northbound HOV lane ends at the Whipple Avenue interchange while the southbound HOV lane begins at the Whipple Avenue interchange. From Whipple Avenue to the San Francisco County line, US 101 consists of 4 general purpose lanes in each direction.

There are no changes for the existing facility for PM 6.3 to 20.8 from the approved PSR-PDS, except the extension of the limits one mile north to include signage and equipment installation. From Matadero Creek (PM 51.4) in Santa Clara County to Whipple Avenue Interchange (PM 6.3) in San Mateo County, there is an existing HOV lane. This project will convert this existing HOV lane to an express lane, tying into the proposed Santa Clara County express lane at PM 51.4. Within the project limits, new signs and equipment will be installed for express lane operation.

B. Project Development History

An Express Lane Feasibility Study on US 101 in San Mateo County was completed by the Metropolitan Transportation Commission in October 2014. Since the approval of the original PSR-PDS in May 2015, both SMCTA and C/CAG have determined a need to evaluate an express lane as an additional alternative. In June of 2015, SMCTA, C/CAG and Caltrans met to discuss the addition of an express lane alternative from San Mateo/Santa Clara County line to I-380 for the PA&ED phase. As an outcome of these meetings and in January 2016, all parties agreed to prepare this Supplemental PSR-PDS.

The project elements do have independent utility and logical termini. There are existing HOV lanes from the Santa Clara County to Whipple Avenue. There are no HOV lanes between Whipple Avenue and San Francisco along this heavily traveled corridor. Constructing the HOV lanes beginning at Whipple Avenue and extending to I-380 would utilize existing auxiliary lanes and avoid reconstruction of structures to effectively extend the HOV lanes 14 miles towards San Francisco while minimizing cost. The southern limit of the HOV lanes therefore ties in with existing HOV lanes extending south, and the northern limit provides an end point at the I-380 interchange ramps and avoids reconstruction of this interchange. This extension of the HOV lanes from Whipple Avenue to I-380 requires no other improvements to provide time saving benefits to HOV drivers between San Mateo and Santa Clara Counties. Converting the HOV lanes to express lanes also appears to have independent utility because the express lanes would benefit a separate set of vehicles, single occupant drivers willing to pay a toll. The use of the express lanes can be restricted to HOV use at any time by the managed facility to maintain preference for HOV users. Even though the two projects may have independent utility and logical termini, Caltrans is studying them together to capture efficiencies in programming, public review and comment, and to identify operational benefits or issues. Project approval of these proposed segments and uses may occur

together or may be separated in the future depending upon circumstances identified during project development.

3. PURPOSE AND NEED

Section 3, Purpose and Need, in the approved PSR-PDS dated May 2015 is superseded in its entirety and replaced as follows:

Purpose:

The purpose of the proposed project is to provide a continuous managed lane in each direction on US 101 from the terminus of the Santa Clara County Express Lanes to I-380 to:

- Reduce congestion in the corridor;
- Encourage carpooling and transit use;
- Provide managed lanes for travel time reliability;
- Minimize operational degradation of general purpose lanes;
- Increase person throughput; and
- Apply technology and/or design features to help manage traffic.

Need:

North of the existing HOV lanes during peak hours (north of Whipple Avenue), all lanes on US 101 are congested resulting in an overall degradation of operations throughout the corridor. All users, whether they are in single or multiple occupant vehicles or in buses, traveling on US 101 north of Whipple Avenue experience delays in both the northbound and southbound directions in the AM and PM peak hours, and at other periods during the week. The managed lanes would provide all users with increased travel reliability.

4. TRAFFIC ENGINEERING PERFORMANCE ASSESSMENT

In a report titled, "San Mateo County US 101 Express Lane Feasibility Study," dated October 7, 2014, MTC evaluated two alternatives for the implementation of the express lane in San Mateo County.The first alternative implemented an express lane by converting the proposed Hybrid HOV lane to Express Lane from PM 6.3 to PM 20.8 (approved PSR-PDS minimum alternative) and converting the existing HOV lane from PM 0.0 to PM 6.3 and the second alternative converted the existing number 1 general purpose lane to an express lane from PM 6.3 to PM 20.8. This report assumed continuous express lane from Santa Clara County to north of I-380 with an occupancy of 2+ persons. The second alternative concluded that the overall freeway productivity would be degraded with a 6% decrease in VMT and 5% decrease in PMT. The feasibility study did not evaluate with HOV 3+ option.

In May 2015 and after the approval of the PSR-PDS for an HOV Lane Project, SMCTA

initiated further traffic analyses to evaluate other potential viable transportation solutions for the US 101 corridor. In this effort, field observation of existing conditions was conducted and travel time data was collected from San Mateo County line to north of the I-380 interchange on Tuesday, June 9, 2015.

There is no change for existing conditions from the previously approved PSR-PDS for PM 6.3 to PM 20.8. For PM 0.0 to PM 6.3, field observation from June 9, 2015 showed the following:

Bottlenecks were observed at the following locations:

AM PEAK Period

- Northbound bottleneck was found at the segment between Embarcadero Rd and University Ave from 7:00 AM to 10:00 AM.
- Southbound bottleneck was found at the segment between University on-ramp and Embarcadero Rd. off-ramp from 6:30 AM to 10:00 AM.

PM Peak Period

- Northbound bottleneck was found at the segment between Embarcadero Rd and University Ave from 3:30 PM to 7:00 PM.
- Southbound first bottleneck was found at the off-ramp to Marsh Rd from 4:00 PM to 7:00 PM.
- Southbound second bottleneck was found at the segment between University on-ramp and Embarcadero Rd off-ramp from 3:00 PM to 7:00 PM.

A. Recommended Scope of the Traffic Studies for PA&ED

Traffic Forecasting – No change from the approved PSR-PDS except:

- Express Lane Project limit is from SCL PM 50.6/52.55 and SM PM 0.0/21.8 (Original PSR-PDS – SM PM 6.3/20.8)
- Forecast for HOV and Express Lane Alternatives is needed for both HOT 2+ and HOV/HOT 3+ options.
- As part of the PA&ED Phase, new data will be collected to reflect the most current conditions, if needed.

Operations Analysis – No change from the approved PSR-PDS, except:

- Express Lane Project limit is from SCL PM 50.6/52.55 and SM PM 0.0/21.8 (Original PSR-PDS – SM PM 6.3/20.8)
- The existing and future freeway mainline and ramp operation will be analyzed using the Microscopic Simulation software VISSIM for;
  - Existing condition
  - Express Lane Alternatives
    - Alternative 3: Implement express lanes by converting existing HOV lane from Matadero Creek (SCL PM 51.4) to Whipple Avenue Interchange (SM PM 6.3) and converting one general purpose lane from SM PM 6.3 to PM 20.8.
    - Alternative 4: Implement express lanes by converting existing HOV lane from Matadero Creek (SCL PM 51.4) to Whipple Avenue

Interchange (SM PM 6.3) and constructing new lane from PM 6.3 to PM 20.8.

- Ramp terminal intersections will be analyzed using Synchro software & Highway Capacity Manual 2010 procedure
- HOV 3+ will be analyzed from the terminus of Santa Clara Express Lane to I-380.

Traffic Safety Analysis – No change from the previously approved PSR-PDS except increased project limit and the need to prepare crash/safety analysis, which may include new mitigation measures, such a providing additional lighting or changing access type.

5. DEFICIENCIES

Based on previous traffic analysis, the traffic demands on the US 101 corridor within the project limits would far exceed the available capacity during peak periods, adversely affecting travel speeds, increase vehicular delays, and create additional bottlenecks if no improvements are made to the corridor. The forecasted conditions indicate a level of congestion that is also expected to cause substantial diversion of through traffic onto local streets, degrade air quality, reduce transit service reliability, and worsen the collision rate in the corridor.

The existing HOV lane system extends 7.4 miles from Matadero Creek in Santa Clara County into San Mateo County and ends at Whipple Avenue in Redwood City. North of Whipple Avenue, the northbound HOV drivers experience the same traffic congestion as single occupancy vehicle (SOV) drivers beginning at the Whipple Avenue interchange. Similarly, the southbound HOVs do not get the HOV benefit until after Whipple Avenue. The HOV lane discontinuity diminishes the incentive for drivers to carpool and to use public transit.

Accident Data

There are no changes for Table 3, "Collison Data" and Table 4, "Collision Types and Factors" for PM 6.3 to PM 20.8. Collision data for the PM 0.0 and PM 6.3 was provided by Caltrans via their Traffic Accident Surveillance and Analysis System (TASAS). Table 3 summarizes the TASAS data for PM 0.0 and PM 6.3 and Table 4 summarizes the collision types and factors.

Table 3: Collision Data January 1, 2011 to December 31, 2013

Location	Post Mile	Number of Accidents			Actual Accident Rate (acc/million veh miles)			Average Accident Rate (acc/million veh miles)		
		Total	Fatal	F + I	Total	Fatal	F + I	Total	Fatal	F + I
NB/SB US 101 Between Projects Limits	0.0 to 6.3	1,996	6	579	0.84	0.003	0.24	0.94	0.004	0.29

Notes: Limits are from San Mateo/Santa Clara County Line (PM 0.0) to Whipple Ave (PM 6.3) Source: Caltrans TASAS data, 2011-2013

As indicated in Table 3, there were a total of 1996 accidents along the US 101 corridor between Whipple Avenue and the county line the three-year period between 2011 and 2013. Actual accident rates averaged for the entire segment are less than the average statewide rate for comparable facilities.

Table 4: Collision Types and Factors

Type and Number of Collisions		Percent (%)	Primary Collision factors (Other Associated factors)	Percent (%)
Rear End	1,381	69.2	Speeding and following close	67.0
Hit Object	186	9.3	Improper turn	9.6
Sideswipe	341	17.1	Other violation	22.7
Others	88	4.4	Unknown	0.7
Total	1,996	100		100

Two-thirds of the accidents are rear end accidents, with the primary collision factors of speeding and following too closely. The primary reason for these rear-end accidents can be attributed to congestion. Thus, if the proposed improvements are implemented, then the number of accidents would be expected to decrease.

6. CORRIDOR AND SYSTEM COORDINATION

A. Identify Systems

No change from previously approved PSR-PDS.

B. State Planning

No change from previously approved PSR-PDS.

C. Regional Planning

The project is listed in the Metropolitan Transportation Commission's (MTC's) Plan Bay Area - Regional Transportation Plan (RTP) 2040 as adding HOV lanes on U.S. 101 from Whipple Avenue to San Francisco County line. US 101 in San Mateo County is part of the MTC HOV Master Plan and the Bay Area Express Lanes network as published in the Bay Area High-Occupancy/Toll (HOT) Network Study Final Report. MTC completed a feasibility study to make this portion of the US 101 an express lane in October 2014, which concluded this segment to be a feasible and good candidate for an express lane. If an Express Lane Alternative is selected as the preferred project, the RTP will be updated.

D. Transit Operator Planning

An enhanced express bus service will need to be evaluated as part of Alternative 3 to gauge impacts on remaining general purpose lanes. SamTrans will undertake this

study separate from the Caltrans process and will provide a report and input for incorporation into PA&ED documents.

E. Local Planning

No change from previously approved PSR-PDS, except both the C/CAG and SMCTA desire to analyze an express lane in San Mateo County, to understand the benefit that would be reallized by the travelling public and its economic viability.

F. Express Lane Operations

If an express lane alternative is selected as the preferred alternative, the following additional agreements would be required:

- Express Lane Operations and Maintenance Agreement
- Encroachment Variance Request/Approval

7. ALTERNATIVES

The originally approved PSR-PDS included no-build, minimum design geometric and maximum design geometric alternatives from PM 6.3 to PM 20.8 for an HOV Lane Project. The project limit is now extended from Santa Clara County at PM 50.6 (south of Matadero Creek) to San Mateo County at PM 21.8 (north of I-380).

A. No-Build Alternative

Under the No-Build Alternative (Alternative 1), the existing HOV lanes from Matadero Creek in Santa Clara County (PM 51.4) to Whipple Avenue (PM 6.3) in San Mateo County will remain and no HOV lanes would be constructed along US 101 from the Whipple Avenue Interchange (PM 6.3) to the I-380 Interchange (PM 20.8). This alternative would include all currently planned and programmed projects on US 101 within the project limits through the year 2040 as identified in the US 101 CSMP, which includes the following projects:

Table 9: CSMP Baseline Improvement projects

Project Name	Description
US 101 Express Lane – Santa Clara County	US 101 from Matadero Creek southerly to Morgan Hill will include express lane.
SR 84/101 - Interchange	Upgrade existing interchange to improve traffic operations in the interchange area.
US 101/Willow Avenue Interchange	Upgrade existing interchange to improve traffic operations in the interchange area.
US 101 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/Broadway Interchange	Reconstruct the interchange to improve traffic operations in the interchange area. (To be completed in 2017)

B. HOV Lane Alternative

The originally approved PSR-PDS included two (2) HOV Build Alternatives. The first alternative reflects the "Staged" HOV Hybrid Alternative (restoring critical auxiliary lanes) and the second alternative restores all auxiliary lanes. In this Supplemental PSR-PDS, there will be only one HOV build alternative with design variations, designated as Alternative 2.

C. Express Lane Alternatives

There are two Build Alternatives for the implementation of express lanes from Matadero Creek in Santa Clara County to north of I-380 in San Mateo County as follows:

Alternative 3: Implement express lanes by converting the existing HOV lanes from Matadero Creek (SCL PM 51.4) to Whipple Avenue Interchange (SM PM 6.3) and converting one general purpose lane from PM 6.3 to PM 20.8.

Alternative 4: Implement express lanes by converting the existing HOV lanes from Matadero Creek to Whipple Avenue Interchange and constructing a new lane from PM 6.3 to PM 20.8

For Alternative 3 to be viable, State legislation AB No. 798, Chapter 474, Section 64112 (b) of Division 3, Title 6.7 of the Government Code, would need to be changed to allow conversion of a general purpose lane to an express lane. In addition, Title 23 of US Code, Section 129 (a) (1) (G) states that Federal participation shall be permitted on the same basis and in the same manner as construction of toll-free highways if the number of toll-free non-HOV lanes, excluding auxiliary lanes, after reconstruction, restoration, or rehabilitation is not less than the number of toll-free non-HOV lanes, excluding auxiliary lanes, before reconstruction, restoration, or rehabilitation

Both alternatives will need to conform to the planned Santa Clara County Express Lanes Project. Just south of Matadero Creek, Santa Clara County will have two express lanes with HOV 2+ configuration. It is anticipated that the San Mateo County portion of the express lane would need to be 3+. This difference in HOV occupancy will be resolved through agreement on a single occupancy requirement prior to environmental document approval by the counties of San Mateo and Santa Clara, Caltrans, the California Highway Patrol (CHP) and MTC. For purposes of this PSR-PDS, it is assumed that all parties will agree to HOV 3+ and that there would be no need for HOV 2+ to 3+ transition zone for the northbound direction.

Both alternatives will utilize a continuous access design, which means that the express lanes will be contiguous/non-barrier separated from the general purpose lanes and there will be no intermediate ingress and egress locations unless further traffic analysis concludes that a separated ingress/egress location must be provided to improve operations or address safety concerns. The express lanes will be 12 feet wide where feasible and designated using a dashed-stripe pavement marking.

Elements of the express lane features common to both alternatives are:

- The operator of the Express Lanes must be determined in order to settle on the selection of the Toll System Integrator;

- Installation of static and dynamic signs, electronic tolling equipment, and toll collection system;

- California Highway Patrol (CHP) Observation and Median Enforcement Areas will be provided, where feasible, and if required and dictated by the traffic operational analysis (TOAR) conclusions of the need for them; and

- Installation of ancillary components such as electrical power and communication conduits and any Caltrans required traffic control devices.

If Alternative 3 is chosen as the preferred implementation project (build alternative), this project will be implemented as one construction contract followed by the Toll System Integrator contract work. Whereas, if Alternative 4 were selected as the preferred build alternative, it could be implemented as one or more construction contracts followed by the Toll System Integrator contract work as follows:

The first phase can be the South Segment. The South Segment begins at the end of Santa Clara County Express Lane at Matadero Creek (PM 51.4) to Whipple Avenue Interchange (PM 6.3) in San Mateo County. In this segment, existing HOV lanes in both the NB and SB directions will be restriped and converted into express lanes with tolling infrastructure. With the conversion of this portion of the HOV lane to express lane, a continuous Express Lane will be provided between Santa Clara and San Mateo Counties. There will be no pavement widening in this segment, except if in the PA&ED Phase, it is determined that CHP observation areas are need to be included as part of the project. The improvements are proposed to be constructed within existing right of way. Power and communication service points will need to be provided to the express lane tolling equipment from existing service points. These extensions of services are assumed to be in public city or in privately held utility easements and not anticipated that a new easements would be required. There will also be no impacts to bridge structures and creek crossings.

This South Segment could be implemented earlier and would create 6.3 miles of express lanes in each direction that would connect to the Santa Clara County Express Lanes Project.

The second phase would be the balance of the project, labelled as the North Segment. The North Segment (PM 6.3 to PM 20.8) will construct new express lanes in both the NB and SB directions of US 101 from Whipple Avenue Interchange to north of I-380. To provide width for the new express lanes, the freeway will require inside and outside widening at specific locations as indicated in the approved PSR-PDS. There would be no impacts to the express lane components with the HOV design variations. An Express Lane component for this segment is similar to the South Segment. The North Segment would take longer to complete in both the design and construction phases and could therefore be constructed as a separate contract.

This phased implementation approach would create an operational express lane as soon as practical, commencing express lane operation first in the South Segment. The total

project cost, in 2016 dollars, is estimated to range from $107 to $323 million (See Section 11 – Preliminary Cost Estimate and Funding for details).

Analysis of Alternatives

Section 7, Analysis of Alternatives, in the approved PSR-PDS dated May 2015 is superseded in its entirety and replaced as follows:

With addition of the express lane alternatives, there are now four alternatives to be further analyzed as potentially viable alternatives as part of the traffic operational analysis during the PA&ED Phase as follows:

Alternative 1: No-Build for the entire project limits

Alternative 2: Add HOV lanes with design variations from PM 6.3 to PM 20.8

Alternative 3: Convert existing HOV Lanes (SCL PM 51.4 to SM PM 6.3) and General Purpose Lanes (PM 6.3 to PM 20.8) to express lanes

Alternative 4: Convert existing HOV lanes (SCL PM 51.4 to SM PM 6.3) and the Alternative 2 proposed HOV Lanes (PM 6.3 to PM 20.8) to express lanes

The alternatives analysis will identify Build Alternative(s) that would meet Need and Purpose, require the least right of way, and minimize(s) environmental impacts. Analysis of the following is necessary to evaluate the Build Alternative(s):

- Right of Way Impacts: Minimize right of way impacts.

- Environmental Impacts: There is a range of potential environmental impacts for the project as identified in the PEAR (Attachment C), including potential wetlands, biological sensitive habitat areas, historical and archeological sites, and Section 4(f) property. Avoidance and minimization measures will be based upon establishing locations of potential environmental impacts in the PA&ED phase and will serve to define the scope of the Build Alternative(s).

- Sea Level Rise Consideration: Caltrans developed the *Guidance on Incorporating Sea-Level Rise (May 2011)* to address sea level rise impacts on existing infrastructure and future projects. The Guidance provides screening criteria for construction projects within vulnerable areas to determine whether a range of sea level rise scenarios need to be considered.

  Since the project area along the US 101 corridor is vulnerable to sea level rise and the design life of the project is beyond 2030, the project is obligated to do an analysis of sea level rise and adaptation for years 2050 and 2100 to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. This study will be performed during the PA&ED phase. However, for this PSR-PDS phase, because a large portion of US 101 within the project limit would either require relocation, raising or other large

scale improvements to reduce or avoid the effects of sea level rise, such alternatives would likely involve substantial residential and business relocations and impacts to environmentally sensitive areas. This mitigation is not included in any of the assumptions or cost analysis at this stage and will be determined later in the PA&ED phase.

- Design Standards: All nonstandard design features will require evaluation and justification in the PA&ED phase. These standards include lane widths, median width, inside and outside shoulder widths, vertical clearance, deceleration lane lengths, stopping sight distance, decision sight distance, ramp entrance and exit, distance between successive on-ramps, auxiliary lane length, interchange spacing, partial interchanges, weaving length, radius of curvature and superelevation.

The following table lists design standard risk assessment for this project.

Design Standards Risk Assessment

#	Proposed or Existing Feature	Design Standard from HDM Tables 82.1A & 82.1B	Description	Probability of Approval (None, Low, Medium, High)	Justification for Probability Rating
1	Existing	Index 201.1 Stopping Sight Distance (Mandatory)	4 horizontal curves along mainline #1 lane	High	Some soundwall & right-of-way impacts
2	Proposed	Index 202.2 Standards for Superelevation (Mandatory)	5 ramps	High	Impact to frontage road and right-of-way
3	Existing	Index 203.2 Curvature-Minimum Radius (Mandatory)	4 ramps	Medium	Frontage road and right-of-way impacts
4	Existing & Proposed	Index 301.1 Lane Width (Mandatory)	Mainline generally #2,#3 & #4 lanes 11' wide	High	High impact to frontage roads & right-of-way
5	Existing & Proposed	Index 302.1 Inside Shoulder Width (Mandatory)	Mainline generally 2' to 8'	High	High impact to frontage roads & right-of-way
6	Proposed	Index 302.1 Inside Shoulder Width (Mandatory)	Spot locations due to express lane signs and CHP, generally 1' to 7'	High	High impact to either frontage road or right of way
7	Proposed	Index 302.1 Outside	Mainline at overcrossings	Medium to High	High impact to overcrossing

#	Proposed or Existing Feature	Design Standard from HDM Tables 82.1A & 82.1B	Description	Probability of Approval (None, Low, Medium, High)	Justification for Probability Rating
		Shoulder Width (Mandatory)	and some ramps	depending on location	structures (replace)
8	Existing & Proposed	Index 305.1 Median Width (Mandatory)	Mainline generally 6' to 10'	High	High impact to frontage roads & Right-of-way
9	Existing & Proposed	Index 309.1 Horizontal Clearance (Mandatory)	Mainline generally 2' to 8'	High	High impact to frontage roads & right-of-way
10	Existing	Index 309.2 Vertical Clearance (Mandatory)	At 6 Overcrossings	Medium to High depending on location	High impact to overcrossing structures (replace)
11	Existing	Index 501.3 Interchange Spacing (Mandatory)	10 interchanges	High	High impact to Right-of-way if rebuilding & to traffic if removing interchange
12	Existing	Index 502.2 Partial Interchange/ Isolated ramps (Mandatory)	7 interchanges	High	High impact to Right-of-way if rebuilding & to traffic if removing interchange
13	Proposed	Index 504.2 Deceleration Length (Mandatory)	8 ramps	High	Impact to frontage roads and Right-of-way
14	Existing	Index 504.7 Minimum Weave Length (Mandatory)	5 interchanges	Medium to High depending on locations	High impact to right-of-way if moving interchange ramps
15	Existing	Index 201.7 Decision Sight Distance (Advisory)	5 ramps	Medium	Some soundwall & right-of-way impacts
16	Existing	Index 504.2 Ramp Entrance & Exit Standards (Advisory)	9 ramps	Medium	Some soundwall & Right-of-way impacts
17	Existing	Index 504.3 Successive On-ramp Distance	2 ramps	Medium	Right-of-way impacts

#	Proposed or Existing Feature	Design Standard from HDM Tables 82.1A & 82.1B	Description	Probability of Approval (None, Low, Medium, High)	Justification for Probability Rating
		(Advisory)			

#	Proposed or Existing Feature	Design Standard from HDM Tables 82.1A & 82.1B	Description	Probability of Approval (None, Low, Medium, High)	Justification for Probability Rating
18	Proposed	Index 309.1 CRZ (Advisory)	Placement of MVP and tolling equipment	High	Attempt will be made to minimize impacts

8. RIGHT OF WAY

A. Right of Way

No change to Right of Way discussion from the approved PSR-PDS.

B. Railroad

Two Bay Area Rapid Transit (BART) rail line structures cross over 101 at the San Francisco International Airport and one UP rail line in Menlo Park. All build alternatives will not require modification to any of the rail facilities within the project corridor. A clause will be added to the project plans reminding the contractor that rail facilities are within the project limits.

C. Utilities

There are no changes to utility discussion from the approved PSR-PDS. It is anticipated that there would be no impact to existing utilities. However, during the preliminary engineering and PA&ED phase of the project, if the design team determines that utilities cannot be avoided, the design team will confirm any right of way/utility impacts with the utility agency owners.

9. STAKEHOLDER INVOLVEMENT

C/CAG and SMCTA authorized the initiation of the PID phase in December 2012 and completed the PSR-PDS for an HOV Project from PM 6.3 to PM 20.8 in May 2015. This Supplemental PSR-PDS is to add express lane components from Matadero Creek in Santa Clara County (PM 50.6) to north of I-380 (PM 21.8). Community involvement and public outreach will be conducted as part of the PA&ED Phase.

10. ENVIRONMENTAL DETERMINATION AND DOCUMENTATION

Past experience with similar actions and the information gathered to date indicate that environmental clearance could be obtained with an Initial Study (IS) leading to a Mitigated Negative Declaration (MND) under CEQA and an Environmental Assessment (EA) leading to Finding of No Significant Impacts (FONSI) under NEPA for the entire project. If PA&ED studies indicate that the Southern Segment involves minor impacts that could be approved under a CE/CE, Caltrans would consider approving the Southern Segment under a separate environmental approval.

Key environmental issues include visual impacts, related to the need to place new overhead signs to identify and provide information for the express lanes. A cultural resources records search has been performed, and there are recorded sites near the project alignment that would require avoidance and may need further investigation to determine any sensitivity for encountering unknown resources. The project is not exempt from air quality requirements and an air quality study is needed, including assessment of particulate matter impacts. Consultation with the MTC Air Quality Conformity Task Force will be needed, and the project must be listed in a current RTP and TIP. Although most of the route where there is housing or other community resources has existing soundwalls, a noise study will be required because of the change in lane use.

Assembly Bill 52 requires Caltrans to begin consultation with Native Americans within 14 days of "Begin Environmental." Therefore, coordination with Caltrans Office of Cultural Resource Studies on the "Begin Environmental" date is critical to ensure meeting this timing requirement.

A public outreach and information effort is recommended to keep residents and local businesses informed of the project, its status, opportunities for review and comment, and overall project schedule.

Completion of the IS/EA leading to MND and FONSI, including technical studies, is anticipated to take approximately 28 months. This timeline includes time for review by the environmental division staff within Caltrans, but does not include time for permitting by federal or state resource agencies. If the project is separated into two phases, a CE/CE may be obtained six to eight months earlier for the southern segment of the project.

The majority of construction work will take place within the State right-of-way, and within the already developed areas of the existing freeway. There may be some utility connections that are beyond the existing freeway area, but these are anticipated to follow existing roads or existing utility corridors. The following is a list of anticipated permits and approvals:

- RQWCB Water Quality Certification (under section 401 of the Federal Clean Water Act). If there is no Section 404 Nationwide permit required for this project, the RWQCB permit may fall under a Waste Discharge Authorization or waiver;
- Section 7 Federal Endangered Species Act Consultation with USFWS (for terrestrial species). This would be completed during the PA&ED phase. Impacts to anadromous fish are unlikely and therefore coordination is not anticipated with the NMFS; and
- SHPO Consultation for Section 106 of the National Historic Preservation Act. This would be completed during the PA&ED phase.

The following are potentially needed permits and approvals, but only if work could affect a regulated resource. These resources are expected to be avoidable, but if not the following permits and approvals may be needed and would be determined during the PA&ED phase:

- USACE Clean Water Act Section 404 permit, if work or fill is required with a jurisdictional waters or resource (if required, this would probably fall under a Nationwide authorization if impacts are under 0.5 acre);
- BCDC-jurisdiction is nearby the US 101 corridor. BCDC permit may be required; and
- CDFW 2081 incidental take permit, if certain species habitat is present and would be affected.

Typical construction compliance with the Caltrans Construction General Permit will be required, and storm water treatment and hydromodification management measures should be anticipated in the project design. The location of the project near the Bay indicates a potentially high groundwater table, which should be investigated and considered in the project design and construction methods.

The project corridor crosses areas that are mapped as vulnerable to existing Bay inundation (e.g., during a 100-year flood event) and subject to future sea level rise. Adaptive measures such as local road reconstruction or flood protection barrier installations are not considered practicable for reasons of additional project cost, additional area of environmental impact, and the fact that these would have to be carried out along most of the Peninsula to be effective. The proposed project also involves limited changes necessary only to convert lanes from HOV use to express use, and the project expenditure for sea level rise adaptation would not likely be justifiable for this project. Therefore, no measures related to sea level rise were specifically identified during the preparation of the PEAR.

11. PRELIMINARY COST ESTIMATE AND FUNDING

The cost estimate for the Alternative 2 (HOV) remains the same as the previously approved PSR/PDS estimate. Preliminary cost estimates are provided in Attachment B for the express lane component for Alternative 3 and 4. The total cost for Alternative 3 is simply the express lane component, because no widening is required for new lanes. The total cost for Alternative 4 is the combination of Alternative 2 and the express lane component. The slight difference in the express lanes costs between Alternative 3 and 4 is due to efficiencies gained in performing the Alternative 4 work along with the lane widening work of Alternative 2.

It is anticipated that this project will be funded from federal, state and local sources.

A summary of costs for the project alternatives is provided on the following page.

ITEM	Costs (Millions)		
	Alternative 2 New Lanes added For HOV	Alternative 3* Existing HOV and GP to EL	Alternative 4** Existing HOV & new lanes to EL
Capital Outlay Costs			
Roadway Items (HOV)	$75.8 to $132.9		$75.8 to $132.9
Structure Items (HOV)	$4.1		$4.1
Environmental Mitigation Items	$4.6 to $4.8	$0.0	$4.6 to $4.8
Right of Way Costs	$0.3 to $15.7	$0.3	$0.5 to $15.9
Civil Cost to Add Express Lane		$52.3	$51.3
System Integration (Tolling Equipment & Soft Costs)		$34.5	$34.5
Subtotal	$84.8 to $157.5	$87.1	$170.8 to $243.5
Capital Outlay Support Costs			
a) PA&ED Phase	$6.8 to $7.4	$3.3 to $5.6	$10.1 to $13.0
b) PS&E (Civil)	$15.3 to $28.2	$8.5	$16.1 to 36.5
c) System Integration Management		$0.5	$0.5
d) Construction Phase	$12.7 to $21.3	$7.6	$20.3 to $28.9
Subtotal	$34.8 to $56.9	$20.1 to $22.1	$47.0 to $78.4
TOTAL PROJECT COSTS (Rounded)	$120 to $215	$107 to $109	$218 to $323

*If Alternative 3 is selected as the preferred alternative, it is anticipated that it would require an increased use of buses, vans and carpools (mode shift from single occupant vehicles). A separate study would be undertaken to determine the feasibility of enhancing bus service to achieve this mode shift.

**As noted above, Alternative 4 cost is a combination of the costs of Alternative 2 and 3 less some amount for efficiencies.

A. Capital Outlay Project Estimate

Capital Outlay Estimate (2016 dollars)

	Range of Cost	STIP Funds	Fund Source "Local"
Build Express Lane Alternatives	$107M TO $321M	TBD	Local Sales Tax, State and Federal sources

The capital outlay costs should not be used to program or commit capital funds. The Project Report in the PA&ED phase will serve as the appropriate document from which the capital outlay and remaining capital outlay support costs of the project will be programmed.

B. Capital Outlay Support Estimate for PA&ED Phase

The capital outlay support cost needed to complete the PA&ED phase with an express lane alternative is estimated to range from $10.1 million to $13.0 million.

A cooperative agreement will be executed between Caltrans and the implementing agency prior to the start of the PA&ED phase. Separate future Cooperative Agreements for the PS&E, Right of Way and Construction phases of the project will be prepared before those phases begin.

12. SCHEDULE

Project Milestones	Delivery Date (Month, Year)
Begin Environmental	June 2016
Circulate DED	April 2018
Complete PA&ED	September 2018
Begin PS&E at Risk if one construction package	May 2018
Begin Construction	November 2020
End Construction	February 2023

The following assumptions were made to develop project schedule as outlined above:

- Funding will be in place for each phase of the project (PA&ED, PS&E and Construction).
- Schedule is based on the maximum alternative, which includes partial right of way acquisitions, but no buildings impact.
- Communities along the corridor will support the locally preferred alternative without litigation or delaying the project.
- The majority of design exceptions listed as medium to high probability of approval will be approved by Caltrans, including existing longitudinal utility encroachments.

As the project moves forward, there may be opportunities to expedite the delivery schedule. One proposal under consideration is concurrent design (PS&E) with the PA&ED phase. A second proposal would initiate advance Right of Way (R/W) acquisitions upon the consensus selection of the locally preferred alternative. A third proposal would bring the Contractor on board through a "Construction Management and General Contractor – CMGC" procurement. A fourth proposal would be to prepare a separate procurement contract for all signs in advance of the civil construction contract. These proposals implemented together could reduce the normal schedule delivery and opening of the express lanes to the public by as much as 40% to 50%. As the opportunities arise, the Project Development Team will explore implementation of one or more of these and other accelerated delivery proposals.

13. RISKS

There are additional risks related to the implementation of the express lane (See Attachment F – Risk Register for detail), but in summary:

1) Conflict with current State Statute, AB No. 798, use of general purpose lane as an express lane, must be changed in a timely manner to allow the use of a general purpose lane as an express lane (alternative 3). State legislation to change this prohibition must be in place prior to Project Report approval.

2) Use of federal funding for Alternative 3 is not possible per Title 23, US Code, Section 129 unless this section is amended to allow usage of federal funds for this type of project.

3) Decision on the Tolling Authority needs to be made early in the PA&ED Phase in order to not delay project delivery.

4) A System Integrator needs to be selected for the project in the PA&ED Phase to provide design inputs, such as finalization of the tolling zones and equipment.

5) Right of Way risks include potential delay in longitudinal encroachment approval of tolling equipment.

6) Coordination of implementation between Santa Clara County Express Lane and this project.

14. FHWA COORDINATION

The project is considered an assigned project under the current Stewardship and Oversight Agreement between FHWA and Caltrans signed on May 28, 2015. US 101 is not part of the Interstate System and therefore does not need FHWA approval for access modifications or exceptions to Mandatory Design Standards. However, the north end of the project does propose some modifications near the connectors to I-380. During the PA&ED if it is determined the viable alternatives do propose access modifications to the I-380 connectors, FHWA will be consulted for approval.

15. DISTRICT CONTACTS

Caltrans Project Manager	Nidal Tuqan	(510) 286-5073
Caltrans Project Development Team Leader	Mimy Hew	(510) 286-5578
Caltrans Environmental Analysis	Kathy Boltz	(510) 622-8706
Caltrans Right of Way	Kristen Schober	(510) 286-5327
Caltrans Traffic Operations	Lance Hall	(510) 286-6311
Caltrans Project Delivery Coordinator	Robert Effinger	(916) 653-4384

16. PROJECT REVIEWS

The project was reviewed by Larry Moore, Project Delivery Coordinator on August 27, September 18, and October 28, 2014.

17. ATTACHMENTS

A. Conceptual Express Lane Layout Plan
B. Capital Outlay Project Estimate for Express Lane
C. Preliminary Environmental Analysis Report (PEAR)
D. Traffic Engineering Performance Assessment (TEPA)
E. Transportation Planning Scoping Information Sheet
F. Risk Register
G. MTC Express Lane Feasibility Report (October 2104)

- Note: The Right of Way Conceptual Cost Attachment from the original PSR-PDS approved in May 2015 is not included in this Supplemental PSR-PDS because there is no change. There is also no change to the Storm Water supplemental documentation for project files from the original PSR-PDS.