ROAD REPAIR AND ACCOUNTABILITY ACT OF 2017
PROJECT BASELINE AGREEMENT

State Route 84 / United States Route 101 Interchange Reimagined Project

Resolution TCEP-P-2526-07B
(to be completed by CTC)

1. FUNDING PROGRAM

- ☐ Active Transportation Program
- ☐ Local Partnership Program (Competitive)
- ☐ Solutions for Congested Corridors Program
- ☐ State Highway Operation and Protection Program
- ☑ Trade Corridor Enhancement Program

2. PARTIES AND DATE

2.1 This Project Baseline Agreement (Agreement) effective on 12/4/2025 (will be completed by CTC), is made by and between the California Transportation Commission (Commission), the California Department of Transportation (Caltrans), the Project Applicant, City of Redwood City, and the Implementing Agency, Caltrans, sometimes collectively referred to as the "Parties".

3. RECITAL

3.1 Whereas at its 6/26/2025 meeting the Commission approved the Trade Corridor Enhancement Program and included in this program of projects the State Route 84 / United States Route 101 Interchange Rei..., the parties are entering into this Project Baseline Agreement to document the project cost, schedule, scope and benefits, as detailed on the Project Programming Request Form attached hereto as ***Exhibit A***, the Project Report attached hereto as ***Exhibit B***, the Performance Metrics Form, if applicable, attached hereto as ***Exhibit C***, as the baseline for project monitoring by the Commission.

3.2 The undersigned Project Applicant certifies that the funding sources cited are committed and expected to be available; the estimated costs represent full project funding; and the scope and description of benefits is the best estimate possible.

4. GENERAL PROVISIONS

The Project Applicant, Implementing Agency, and Caltrans agree to abide by the following provisions:

4.1 To meet the requirements of the Road Repair and Accountability Act of 2017 (Senate Bill [SB] 1, Chapter 5, Statutes of 2017) which provides the first significant, stable, and on-going increase in state transportation funding in more than two decades.

4.2 To adhere, as applicable, to the provisions of the Commission:

- ☐ Resolution _____, "Adoption of Program of Projects for the Active Transportation Program", dated _____
- ☐ Resolution _____, "Adoption of Program of Projects for the Local Partnership Program", dated _____
- ☐ Resolution _____, "Adoption of Program of Projects for the Solutions for Congested Corridors Program", dated _____
- ☐ Resolution _____, "Adoption of Program of Projects for the State Highway Operation and Protection Program", dated _____
- ☑ Resolution G-25-42, "Adoption of Program of Projects for the Trade Corridor Enhancement Program", dated 6/26/2025

4.3 All signatories agree to adhere to the Commission's Guidelines. Any conflict between the programs will be resolved at the discretion of the Commission.

4.4 All signatories agree to adhere to the Commission's SB 1 Accountability and Transparency Guidelines and policies, and program and project amendment processes.

4.5 City of Redwood City agrees to secure funds for any additional costs of the project.

4.6 City of Redwood City agrees to report to Caltrans on a quarterly basis; on the progress made toward the implementation of the project, including scope, cost, schedule, and anticipated benefits/performance metric outcomes.

4.7 Caltrans agrees to prepare program progress reports on a on a semi-annual basis and include information appropriate to assess the current state of the overall program and the current status of each project identified in the program report.

4.8 Caltrans agrees to submit a timely Completion Report and Final Delivery Report as specified in the Commission's SB 1 Accountability and Transparency Guidelines.

4.9 Caltrans agrees to submit a timely Project Performance Analysis as specified in the Commission's SB 1 Accountability and Transparency Guidelines.

4.10 All signatories agree to maintain and make available to the Commission and/or its designated representative, all work related documents, including without limitation engineering, financial and other data, and methodologies and assumptions used in the determination of project benefits and performance metric outcomes during the course of the project, and retain those records for six years from the date of the final closeout of the project. Financial records will be maintained in accordance with Generally Accepted Accounting Principles.

4.11 The Inspector General of the Independent Office of Audits and Investigations has the right to audit the project records, including technical and financial data, of the Department of Transportation, the Project Applicant, the Implementing Agency, and any consultant or sub-consultants at any time during the course of the project and for six years from the date of the final closeout of the project, therefore all project records shall be maintained and made available at the time of request. Audits will be conducted in accordance with Generally Accepted Government Auditing Standards.

5. SPECIFIC PROVISIONS AND CONDITIONS

5.1 Project Schedule and Cost
See Project Programming Request Form, attached as Exhibit A.

5.2 Project Scope
See Project Report or equivalent, attached as Exhibit B. At a minimum, the attachment shall include the cover page, evidence of approval, executive summary, and a link to or electronic copy of the full document.

5.3 Performance Metrics
See Performance Metrics Form, if applicable, attached as Exhibit C.

5.4 Additional Provisions and Conditions *(Please attach an additional page if additional space is needed.)*

In the event of a cost overrun, the Trade Corridor Enhancement Program shall not be responsible for any cost increase.

Attachments:

Exhibit A: Project Programming Request Form
Exhibit B: Project Report
Exhibit C: Performance Metrics Form *(if applicable)*

SIGNATURE PAGE
TO
PROJECT BASELINE AGREEMENT

Project Name State Route 84/United States Route 101 Interchange Reimagined Project

Resolution TCEP-P-2526-07B
(to be completed by CTC)

Rommel Pardo
Digitally signed by Rommel Pardo
Date: 2025.10.13 08:44:51 -07'00'

Regional Project Manager
San Mateo County
California Department of Transportation
Project Applicant

Date

Melissa Stevenson Diaz

11/6/25

City Manager, Redwood City
Implementing Agency

Date

David Ambuehl
David Ambuehl (Oct 13, 2025 20:07:53 PDT)

David Ambuehl
District Director
California Department of Transportation

Date

11/20/2025

Dina El-Tawansy
Director
California Department of Transportation

Date

12/16/2025

Tanisha Taylor
Executive Director
California Transportation Commission

Date

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-5029-2024-0001 v2

Amendment (Existing Project) ☒ YES ☐ NO				Date	11/14/2025 08:53:00
Programs ☐ LPP-C ☐ LPP-F ☐ SCCP ☐ TCEP ☐ STIP ☐ Other					
District	EA	Project ID	PPNO	Nominating Agency	
04	23536	0414000032	0692K	Caltrans HQ	
County	Route	PM Back	PM Ahead	Co-Nominating Agency	
San Mateo County	101	4.600	6.500	City of Redwood City	
San Mateo County	84	25.300	25.700	MPO	Element
				MTC	Capital Outlay
Project Manager/Contact			Phone	Email Address	
Matt Nichols			650-780-7264	mnichols@redwoodcity.org	

Project Title

State Route 84 / United States Route 101 Interchange Reimagined Project

Location (Project Limits), Description (Scope of Work)

Located in City of Redwood City, on US 101 and State Route 84/Seaport Boulevard: Reconstruct the SR 84/US 101 interchange and modify adjacent local intersections. The Project will replace the existing US 101 single-lane loop off-ramps and single-lane on-ramps with multilane ramps and signalized intersections. SR 84/Seaport Boulevard will be improved to three lanes per direction from Bay Road to Blomquist Street and add turn lanes at the intersection. SR 84 will be lowered to increase vertical clearance under US 101. The Project will construct a direct-connect flyover ramps between Veterans Boulevard and US 101, enhance safety at two at-grade crossings, and add 4.2 miles of pedestrian and bicycle facilities.

Component	Implementing Agency
PA&ED	City of Redwood City
PS&E	City of Redwood City
Right of Way	City of Redwood City
Construction	Caltrans HQ

Legislative Districts					
Assembly:	21	Senate:	13	Congressional:	15

Project Milestone	Existing	Proposed
Project Study Report Approved		
Begin Environmental (PA&ED) Phase	10/31/2013	10/31/2013
Circulate Draft Environmental Document Document Type (ND/MND)/FONSI	04/08/2016	04/08/2016
Draft Project Report	04/08/2016	04/08/2016
End Environmental Phase (PA&ED Milestone)	12/16/2016	12/16/2016
Begin Design (PS&E) Phase	08/01/2017	08/01/2017
End Design Phase (Ready to List for Advertisement Milestone)	07/23/2026	07/23/2026
Begin Right of Way Phase	08/01/2017	08/01/2017
End Right of Way Phase (Right of Way Certification Milestone)	11/30/2026	11/30/2026
Begin Construction Phase (Contract Award Milestone)	05/31/2027	05/31/2027
End Construction Phase (Construction Contract Acceptance Milestone)	03/26/2030	03/26/2030
Begin Closeout Phase	03/27/2030	03/27/2030
End Closeout Phase (Closeout Report)	09/30/2031	09/30/2031

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-5029-2024-0001 v2

Date 11/14/2025 08:53:00

Purpose and Need

Traffic and freight movement along the US 101 and Seaport Boulevard corridors will continue to negatively impact the Port's projected growth and the region's goods movement and capacity capabilities. The Port is approximately 28 miles south of San Francisco and has established itself as the only southern deep-water port in the San Francisco Bay that can accommodate large vessels, such as big cargo ships. Because of the Port's strategic location, it has become the fastest growing "small" bulk port in California, as it serves the Silicon Valley region and provides inland transportation access via US 101 and UPRR.

The Project directly serves the Port and neighboring Seaport Industrial Association (SIA) businesses through truck and rail access. Goods travel between the Port and industrial businesses along Seaport Boulevard to the interchange with US 101. The US 101/SR 84 interchange is a bottleneck due to limited capacity to accommodate high truck volumes north of the interchange. As a result, trucks experience significant congestion or need to arrive at the Port in off-peak hours which negatively impacts the quality of life for transportation and industrial workers as well as the residents who live along the UPRR tracks, west of the interchange.

The Project will reduce congestion, freight delays, and safety issues along the corridor and at the intersections near the interchange. The improvements will benefit the freight industry, support the Port in meeting their growth goals, and grow the regional economy. The Project will also address the negative impacts of freight on neighboring underserved communities through the reduction in greenhouse gas (GHG) emissions and construction of low-cost transportation improvements that will reduce housing and transportation cost burdens.

NHS Improvements ☒ YES ☐ NO	Roadway Class 1	Reversible Lane Analysis ☐ YES ☒ NO

Inc. Sustainable Communities Strategy Goals ☒ YES ☐ NO Reduce Greenhouse Gas Emissions ☒ YES ☐ NO

Project Outputs

Category	Outputs	Unit	Total
Rail/ Multi-Modal	Grade separations/ rail crossing improvemnets	EA	2
Bridge / Tunnel	Modified / Improved interchanges	SQFT	70,314
Operational Improvement	Interchange modifications	EA	1
Operational Improvement	Intersection / Signal improvements	EA	6
Active Transportation	Pedestrian/Bicycle facilities miles constructed	Miles	4.2

Date 11/14/2025 08:53:00

Additional Information

The Project is titled as "US 101/Woodside Road Interchange Improvement" in the Metropolitan Transportation Commission Transportation Improvement Program, Caltrans Project Report, and Final Environmental Document.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID

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Performance Indicators and Measures						
Measure	**Required For**	**Indicator/Measure**	**Unit**	**Build**	**Future No Build**	**Change**
Congestion Reduction	TCEP	Change in Daily Vehicle Hours of Delay	Hours	6,034	21,020	-14,986
	TCEP	Change in Daily Truck Hours of Delay	Hours	450	892	-442
Throughput (Freight)	TCEP	Change in Truck Volume	# of Trucks	20,394	14,617	5,777
	TCEP	Change in Rail Volume	# of Trailers	0	0	0
			# of Containers	0	0	0
Velocity (Freight)	TCEP	Travel Time or Total Cargo Transport Time	Hours	4,187,847	59,214,081	-55,026,234
Air Quality & GHG (only 'Change' required)	LPPC, SCCP, TCEP, LPPF	Particulate Matter	PM 2.5 Tons	-2.48	0	-2.48
			PM 10 Tons	0	0	0
	LPPC, SCCP, TCEP, LPPF	Carbon Dioxide (CO2)	Tons	-316,790.92	0	-316,790.92
	LPPC, SCCP, TCEP, LPPF	Volatile Organic Compounds (VOC)	Tons	0	0	0
	LPPC, SCCP, TCEP, LPPF	Sulphur Dioxides (SOx)	Tons	-3.14	0	-3.14
	LPPC, SCCP, TCEP, LPPF	Carbon Monoxide (CO)	Tons	0	0	0
	LPPC, SCCP, TCEP, LPPF	Nitrogen Oxides (NOx)	Tons	-49.19	0	-49.19
Safety	LPPC, SCCP, TCEP, LPPF	Number of Fatalities	Number	0.19	0.2	-0.01
	LPPC, SCCP, TCEP, LPPF	Fatalities per 100 Million VMT	Number	0.33	0.34	-0.01
	LPPC, SCCP, TCEP, LPPF	Number of Serious Injuries	Number	33.5	35.6	-2.1
	LPPC, SCCP, TCEP, LPPF	Number of Serious Injuries per 100 Million VMT	Number	0.3	0.31	-0.01
Economic Development	LPPC, SCCP, TCEP, LPPF	Jobs Created (Only 'Build' Required)	Number	4,304	0	4,304
Cost Effectiveness (only 'Change' required)	LPPC, SCCP, TCEP, LPPF	Cost Benefit Ratio	Ratio	7.7	0	7.7

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PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-5029-2024-0001 v2

District	County	Route	EA	Project ID	PPNO
04	San Mateo County, San Mateo County	101, 84	23536	0414000032	0692K

Project Title

State Route 84 / United States Route 101 Interchange Reimagined Project

Existing Total Project Cost ($1,000s)									
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Implementing Agency
E&P (PA&ED)	4,200							4,200	City of Redwood City
PS&E	17,100							17,100	City of Redwood City
R/W SUP (CT)		2,070						2,070	City of Redwood City
CON SUP (CT)					31,450			31,450	Caltrans HQ
R/W		28,000	8,000					36,000	City of Redwood City
CON					256,576			256,576	Caltrans HQ
TOTAL	21,300	30,070	8,000		288,026			347,396	
Proposed Total Project Cost ($1,000s)									Notes
E&P (PA&ED)	4,200							4,200	
PS&E	17,100							17,100	
R/W SUP (CT)		2,070						2,070	
CON SUP (CT)					31,450			31,450	
R/W		28,000	8,000					36,000	
CON					256,576			256,576	
TOTAL	21,300	30,070	8,000		288,026			347,396	

Fund #1:	Local Funds - City Funds (Committed)								Program Code
Existing Funding ($1,000s)									20.10.400.100
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)	780							780	City of Redwood City
PS&E	2,110							2,110	
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL	2,890							2,890	
Proposed Funding ($1,000s)									Notes
E&P (PA&ED)	780							780	
PS&E	2,110							2,110	
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON									
TOTAL	2,890							2,890	

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-5029-2024-0001 v2

Fund #2:	Local Funds - Developer Fees (Committed)								Program Code
Existing Funding ($1,000s)									20.10.400.100
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									City of Redwood City
PS&E	8,365							8,365	
R/W SUP (CT)		605						605	
CON SUP (CT)									
R/W									
CON									
TOTAL	8,365	605						8,970	
Proposed Funding ($1,000s)									Notes
E&P (PA&ED)									
PS&E	8,365							8,365	
R/W SUP (CT)		605						605	
CON SUP (CT)									
R/W									
CON									
TOTAL	8,365	605						8,970	

Fund #3:	GF RIP - State Cash (Committed)								Program Code
Existing Funding ($1,000s)									20.XX.075.400
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									California Transportation Commissio
PS&E									$8000 RW voted 05/18/22
R/W SUP (CT)									
CON SUP (CT)									
R/W		8,000						8,000	
CON									
TOTAL		8,000						8,000	
Proposed Funding ($1,000s)									Notes
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W		8,000						8,000	
CON									
TOTAL		8,000						8,000	

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

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Fund #4:	Local Funds - Measure A (Committed)								Program Code
	Existing Funding ($1,000s)								20.10.400.100
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)	3,420							3,420	San Mateo County Transportation Au
PS&E	6,625							6,625	Right of Way funds programmed in 24/25
R/W SUP (CT)		1,465						1,465	
CON SUP (CT)					8,650			8,650	
R/W		20,000						20,000	
CON					120,211			120,211	
TOTAL	10,045	21,465			128,861			160,371	
	Proposed Funding ($1,000s)								Notes
E&P (PA&ED)	3,420							3,420	
PS&E	6,625							6,625	
R/W SUP (CT)		1,465						1,465	
CON SUP (CT)					8,650			8,650	
R/W		20,000						20,000	
CON					120,211			120,211	
TOTAL	10,045	21,465			128,861			160,371	

Fund #5:	Local Funds - Bridge Tolls - Regional Measure 3 (Committed)								Program Code
	Existing Funding ($1,000s)								20.10.400.100
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									Metropolitan Transportation Commiss
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON					48,000			48,000	
TOTAL					48,000			48,000	
	Proposed Funding ($1,000s)								Notes
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON					48,000			48,000	
TOTAL					48,000			48,000	

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-5029-2024-0001 v2

Fund #6:	Federal Disc. - Infrastructure For Rebuilding America (INFRA)Grant (Committed)								Program Code
Existing Funding ($1,000s)									20.XX.400.300
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									Federal Highway Administration
PS&E									
R/W SUP (CT)									
CON SUP (CT)					22,800			22,800	
R/W			8,000					8,000	
CON					74,200			74,200	
TOTAL			8,000		97,000			105,000	
Proposed Funding ($1,000s)									Notes
E&P (PA&ED)									
PS&E									
R/W SUP (CT)									
CON SUP (CT)					22,800			22,800	
R/W			8,000					8,000	
CON					74,200			74,200	
TOTAL			8,000		97,000			105,000	

Fund #7:	SB1 TCEP - Trade Corridors Enhancement Account (Committed)								Program Code
Existing Funding ($1,000s)									20.XX.723.100
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									California Transportation Commissio
PS&E									Project was awarded funding at the June 2025 CTC meeting
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON					5,666			5,666	
TOTAL					5,666			5,666	
Proposed Funding ($1,000s)									Notes
E&P (PA&ED)									TCEP State Programming Code 20.XX.723.100
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON					5,666			5,666	
TOTAL					5,666			5,666	

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID

ePPR-5029-2024-0001 v2

Fund #8:	SB1 TCEP - Trade Corridors Enhancement Account (Committed)								Program Code
Existing Funding ($1,000s)									20.XX.723.200
Component	Prior	23-24	24-25	25-26	26-27	27-28	28-29+	Total	Funding Agency
E&P (PA&ED)									California Transportation Commissio
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON					8,499			8,499	
TOTAL					8,499			8,499	
Proposed Funding ($1,000s)									Notes
E&P (PA&ED)									TCEP Regional Programming Code 20.XX.723.200
PS&E									
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON					8,499			8,499	
TOTAL					8,499			8,499	

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST (PPR)

PRG-0010 (REV 08/2020)

PPR ID
ePPR-5029-2024-0001 v2

Complete this page for amendments only Date 11/14/2025 08:53:00

District	County	Route	EA	Project ID	PPNO
04	San Mateo County, San Mateo County	101, 84	23536	0414000032	0692K

SECTION 1 - All Projects

Project Background

The State Route 84 – US 101 Interchange Reimagined Project was awarded Trade Corridor Enhancement Program (TCEP) funds at the June 2025 California Transportation Commission meeting. TCEP will leverage federal Infrastructure for Rebuilding America (INFRA), Regional Measure 3 (RM3), and Measure A funds to reconstruct the existing interchange.

Programming Change Requested

The programming change is requested to create consistency between the TCEP application ePPR and the Baseline Agreement ePPR.

Reason for Proposed Change

The proposed programming change was to separate TCEP from the combined $14.165M into the state share and the regional share. The state share is $5.666M and the regional share is $8.499.

If proposed change will delay one or more components, clearly explain 1) reason for the delay, 2) cost increase related to the delay, and 3) how cost increase will be funded

Other Significant Information

SECTION 2 - For SB1 Project Only

Project Amendment Request (Please follow the individual SB1 program guidelines for specific criteria)

The project amendment is requested to capture the state share and regional share TCEP split to match the application. Additional funds will not be sought from the TCEP.

Approvals

I hereby certify that the above information is complete and accurate and all approvals have been obtained for the processing of this amendment request.

Name (Print or Type)	Signature	Title	Date

SECTION 3 - All Projects

Attachments

1) Concurrence from Implementing Agency and/or Regional Transportation Planning Agency
2) Project Location Map

STATE ROUTE 84 / UNITED STATES 101 INTERCHANGE REIMAGINED PROJECT

The California Department of Transportation, Metropolitan Transportation Commission, San Mateo County Transportation Authority & City of Redwood City

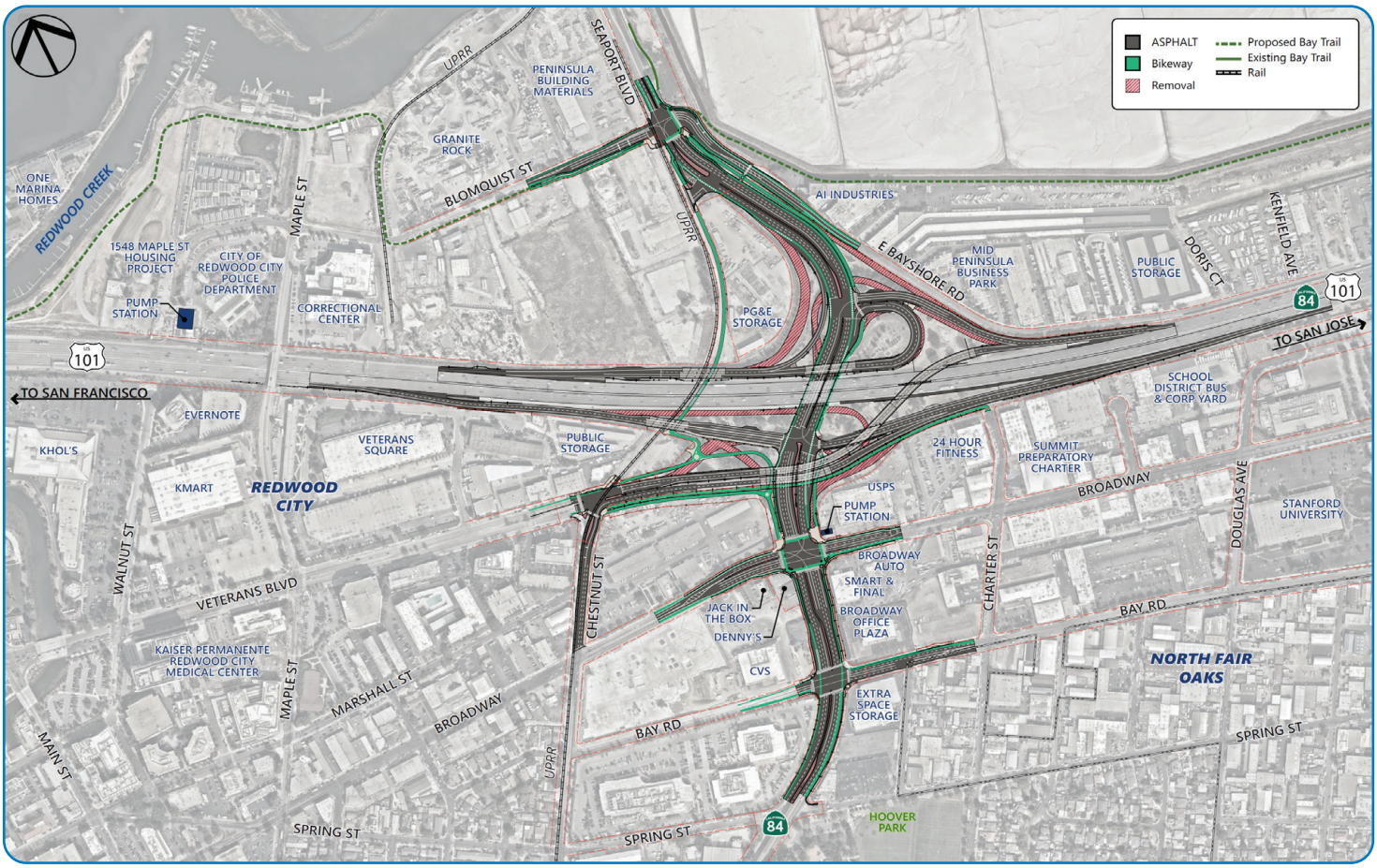


Figure 1. Location and Proposed Project Improvements

PROJECT SCOPE:

The Project will reconstruct the State Route (SR)84 (Woodside Road)/United States (US)101 Interchange to replace all ramps, widen Woodside Road to three lanes per direction between Bay Road and the northbound US 101 off-ramp at Seaport Boulevard, lower Woodside Road to increase the vertical clearance at US 101 for improved freight safety and access to the Port of Redwood City, eliminate the 5-leg intersection at Broadway/Woodside Road, signalize ramp intersections, add turn lanes with longer pocket lengths, construct direct-connect flyover ramps between Veterans Boulevard and US 101, add new sidewalks, add signals and gates at the Union Pacific Railroad at-grade crossing at Veterans Boulevard and Blomquist Street, add two protected intersections, and add multi-use paths, bike lanes, and protected bikeways.

PROJECT SCHEDULE:

The Project right of way and design phases are expected to be complete by November 2026 and July 2026, respectively. Construction is anticipated to begin May 2027 and be completed by March 2030.

PROJECT COST:

Total Project Cost	2024 TCEP Request (Construction)	
$347,396,000	TCEP Regional Request:	$8,499,000
	TCEP State Request:	$5,666,000
	TCEP TOTAL REQUEST:	$14,165,000

PROJECT BENEFITS:

The existing interchange was built in 1959 and is well past its useful life. Single lane off-ramps and traffic conflicts at the ramp terminal intersections create extensive daytime congestion, resulting in queues back onto the freeway. This constrains truck access at the Port of Redwood City (Port) and nearby industrial businesses, and impedes all vehicle and transit movements. Additionally, the Project area lacks pedestrian and bicycle facilities. Safety issues are substantial, with multiple freeway and ramp segments exhibiting collision rates above statewide averages.

The Project will reduce delay and congestion, resulting in enhanced goods movement to and from the Port and surrounding industrial businesses. The Port recently announced that fiscal year 2021-22 closed favorably with $9.4 million in gross revenue. The Port's property rentals, leases and new business contributed to the growth in revenue of 4% ($375,000), compared to the previous fiscal year's $9 million in gross revenue.

Project improvements will also increase safety, reduce greenhouse gas emissions, and enhance mobility for all road users. The at-grade railroad crossing improvements will improve freight rail reliability and protect vulnerable roadway users from conflicts with trains. The bicycle and pedestrian facilities will provide low-carbon transportation options with connections to the City's existing active transportation network. The Project will result in improved air quality and multimodal improvements that will benefit Areas of Persistent Poverty and Historically Disadvantaged Communities, providing transportation equity.

The Project was developed with direct input from the community. The Project will not displace any residents, divide existing communities, or create barriers to movement in the project area. Avoidance and minimization measures have been incorporated to reduce environmental impacts on resources to a less-than-significant level. Resources include traffic and transportation/ pedestrian and bicycle facilities, water quality and stormwater runoff, hazardous waste/materials; air quality; noise, wildlife species, and threatened and endangered species. Abatement measures were included to reduce impacts related to noise.

KEY PROJECT OUTPUTS

Modified Interchange (1 Location)

Bicycle/ Pedestrian Facilities (4.2 Miles)

5 Bridges (70,314 Square Feet)

Intersection Improvements (6 Locations)

At-Grade Crossing Improvements (2 Locations)

KEY PROJECT BENEFITS

Port Access

Freight Efficiency

Safety

Multimodal Access

Equity

State Route 84/United States 101 Interchange Reimagined Project

California Department of Transportation, Metropolitan Transportation Commission, San Mateo County Transportation Authority & City of Redwood City - October 2024

Performance Metrics Form						
	Metric	**Build Conditions**				
Existing Average Annual Vehicle Volume on Project Segment (2022)		53,264,450				
Existing Average Annual Truck Percent on Project Segment (2022) - Daily		10.0%				
Estimated Year 30 Average Annual Vehicle Volume on Project Segment with Project (2059)		70,557,603				
Estimated Year 30 Average Annual Truck Percent on Project Segment with Project (2059) - Daily		10.6%				
Measure	**Metric**	**Project Type**	**No Build**	**Build**	**Change**	**Increase/ Decrease**
Congestion Reduction (Freight)	Change in Daily Vehicle Hours of Delay (2059)	All	21,020	6,034	(14,986)	Decrease
	Change in Daily Truck Hours of Delay (2059)	All (except rail)	892	450	(442)	Decrease
	Person Hours of Travel Time Saved (2059)	All	-	-	(22,179)	Decrease
Throughput (Freight)	Change in Daily Truck Volume (2059 cf 2022)	Highway, road, and port projects only	14,617	20,394	5,777	Increase
System Reliability (Freight)	Truck Travel Time Reliability Index ("No Build" Only) (Optional Metric)	National and State Highway System Only	--	1.54	1.54	N/A
Velocity (Freight)	Travel time or total cargo transport time	All	59,214,081	4,187,847	(55,026,234)	Decrease
Air Quality (tons)	Particulate Matter (PM 10)	All	-	-	-	Equivalent
	Particulate Matter (PM 2.5)		-	-	(2.48)	Decrease
	Carbon Dioxide (CO2)		-	-	(316,790.92)	Decrease
	Volatile Organic Compounds (VOC)		-	-	-	Equivalent
	Sulphur Dioxides (SOx)		-	-	(3.14)	Decrease
	Carbon Monoxide (CO)		-	-	-	Equivalent
	Nitrogen Oxides (NOx)		-	-	(49.19)	Decrease
Safety	Number of Fatalities (2059)	Road and Land Port	0.20	0.19	(0.01)	Decrease
	Rate of Fatalities per 100 Million VMT		0.34	0.33	(0.01)	Decrease
	Number of Serious Injuries (2059)		35.6	33.5	(2.1)	Decrease
	Number of Serious Injuries per 100 Million VMT		0.31	0.30	(0.01)	Decrease
Cost	Cost Benefit Ratio	All	N/A	7.7	7.7	N/A
Economic Development	Jobs Created	All	0	4,304	4,304	Increase

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	Daily Vehicle Hours of Delay
Source Data:	*List source(s) of information used in calculations*

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- 21,020 (2059 No Build Vehicle Travel Time)

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- 6,034 (2059 Build Vehicle Travel Time)

Change

Include the subtraction used to get to the change number here.

6,034 (Build) minus 21,020 (No Build) = -14,986 (reduction in DVHD)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	Daily Truck Hours of Delay
Source Data:	*List source(s) of information used in calculations* Cal B/C Corridor model

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- 892 (2059 No Build Truck Travel Time)

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- 450 (2059 Build Truck Travel Time)

Change

Include the subtraction used to get to the change number here.

450 (Build) minus 892 (No Build) = -442 (reduction in DTHD)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	Person Hours of Travel Time Saved
Source Data:	*List source(s) of information used in calculations* SAGS Traffic Methodology Memo

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- Not Applicable

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- Change in Vehicle Hours of Delay * AVO = Person Hours of Travel Time Saved
- 254 * 1.67 = 424 (per-hours/yr saved)

Change

Include the subtraction used to get to the change number here.

Person Hours of Travel Time Saved = -424 (per-hours/yr saved)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	Change in Truck Volume
Source Data:	*List source(s) of information used in calculations* ADT Calculations

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- Truck ADT Vol 2059 No Build: 14,617 (Truck trips)

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- Truck ADT Vol 2059 Build: 20,394 (Truck trips)

Change

Include the subtraction used to get to the change number here.

20,394 (build) minus 14,617 (no build) = 5,777 (truck trips)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	Travel time or total cargo transport time
Source Data:	*List source(s) of information used in calculations* Performance Measures Table

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- 2059 No-Build Volume*Avg Speed*Project Length = Travel Time
- 428,752*20.4*6.77 = 59,214,081.22 (Travel Time)

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- 2059 Build Volume*Avg Speed*Project Length = Travel Time
- 193,309*32*6077 = 4,187,846.76 (Travel Time)

Change

Include the subtraction used to get to the change number here.

4,184,847 (Build) minus 59,214,081 (No Build) = -55,026,234 (decrease in travel time)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Air Quality; Air Quality Particulate Matter (PM 10)*
Source Data:	*List source(s) of information used in calculations* Emission Calcs

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Change

Include the subtraction used to get to the change number here.

0 (no change in PM 10 Emissions)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Air Quality; Air Quality Particulate Matter (PM 2.5)*
Source Data:	*List source(s) of information used in calculations* Emission Calcs

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Change

Include the subtraction used to get to the change number here.

-2.48 (decrease in PM 2.5 Emissions)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Air Quality; Carbon Dioxide (CO2)*
Source Data:	*List source(s) of information used in calculations*

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Change

Include the subtraction used to get to the change number here.

-316,790.92 (decrease in CO2 Emission)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Air Quality; Air Quality Volatile Organic Compounds (VOC)*
Source Data:	*List source(s) of information used in calculations* Emission Calcs

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Change

Include the subtraction used to get to the change number here.

0 (no change in VOC Emissions)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Air Quality; Air Quality Sulphur Oxides (SOx)*
Source Data:	*List source(s) of information used in calculations* Emission Calcs

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Change

Include the subtraction used to get to the change number here.

-3.14 (decrease in SOx Emissions)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Air Quality; Carbon Dioxide (CO)*
Source Data:	*List source(s) of information used in calculations*

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Change

Include the subtraction used to get to the change number here.

0 (no change in CO Emission)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Air Quality; Air Quality Nitrogen Oxides (NOx))*
Source Data:	*List source(s) of information used in calculations*

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- N/A

Change

Include the subtraction used to get to the change number here.

-49.19 (decrease in NOx Emissions)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Number of Fatalities*
Source Data:	*List source(s) of information used in calculations* BCA Calculations; TIMS Crashes

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

1 fatal collision 2018
- 0 fatal collision 2019
- 0 fatal collision 2020
- 0 fatal collision 2021
- 0 fatal collision 2022

(1 plus 0 plus 0 plus 0 plus 0) divided by 5 = 0.2 fatalities

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- 0 fatal crashes

Change

Include the subtraction used to get to the change number here.

0 (Build) minus 0.2 (No Build) = -0.2 (decrease in fatalities)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Number of Fatalities per 100 Million VMT*
Source Data:	*List source(s) of information used in calculations* Mega Data Plan-CA-SR-84 US-101 Interchange Reimagined

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- No-Build rate of fatalities per 100 Million VMT = 0.34

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- Build rate of fatalities per 100 Million VMT = 0.33

Change

Include the subtraction used to get to the change number here.

0.33 (Build) minus 0.34 (No Build) = -0.01 (decrease in fatalities per 100 Million VMT)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Number of Serious Injuries*
Source Data:	*List source(s) of information used in calculations* Outcome Criteria Narrative

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- No Build Number of Serious Injuries = 35.6

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- Build Number of Serious Injuries = 33.5

Change

Include the subtraction used to get to the change number here.

33.5 (Build) minus 35.6 (No Build) = -2.1 (reduction in serious injuries)

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Number of Serious Injuries per 100 Million VMT*
Source Data:	*List source(s) of information used in calculations* Outcome Criteria Narrative

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

- No Build Number of Serious Injuries per 100 Million VMT = 0.31

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- Build Number of Serious Injuries per 100 Million VMT = 0.30

Change

Include the subtraction used to get to the change number here.

0.30 (Build) minus 0.31 (No Build) = -0.01 (reduction in serious injuries per 100 Million VMT))

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Benefit / Cost Ratio*
Source Data:	*List source(s) of information used in calculations* BCA Model

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- 3) BC Sum tab cell S56: Life-Cycle Costs (mil. $): $331.1
- 3) BC Sum tab cell R56: Life-Cycle Benefits (mil. $): $2,550.3

Change

Include the subtraction used to get to the change number here.

$2,550.3 (Life-Cycle Benefits) divide by $331.1 (Life-Cycle Costs) = *7.7 (Cost Benefit Ratio)*

Required Back-Up Information

Please fill out this information, using this template if desired, for each metric. Even if this template is not used, this back-up information is required for all required metrics.

Metric Name:	*Jobs Created*
Source Data:	*List source(s) of information used in calculations* BCA Calculations

Base Numbers & Calculation for "No Build" Estimate

Include the starting numbers used, and the calculation used to develop the "No Build" number. If "No Build" is not required for metric, put "N/A" for "Not Applicable."

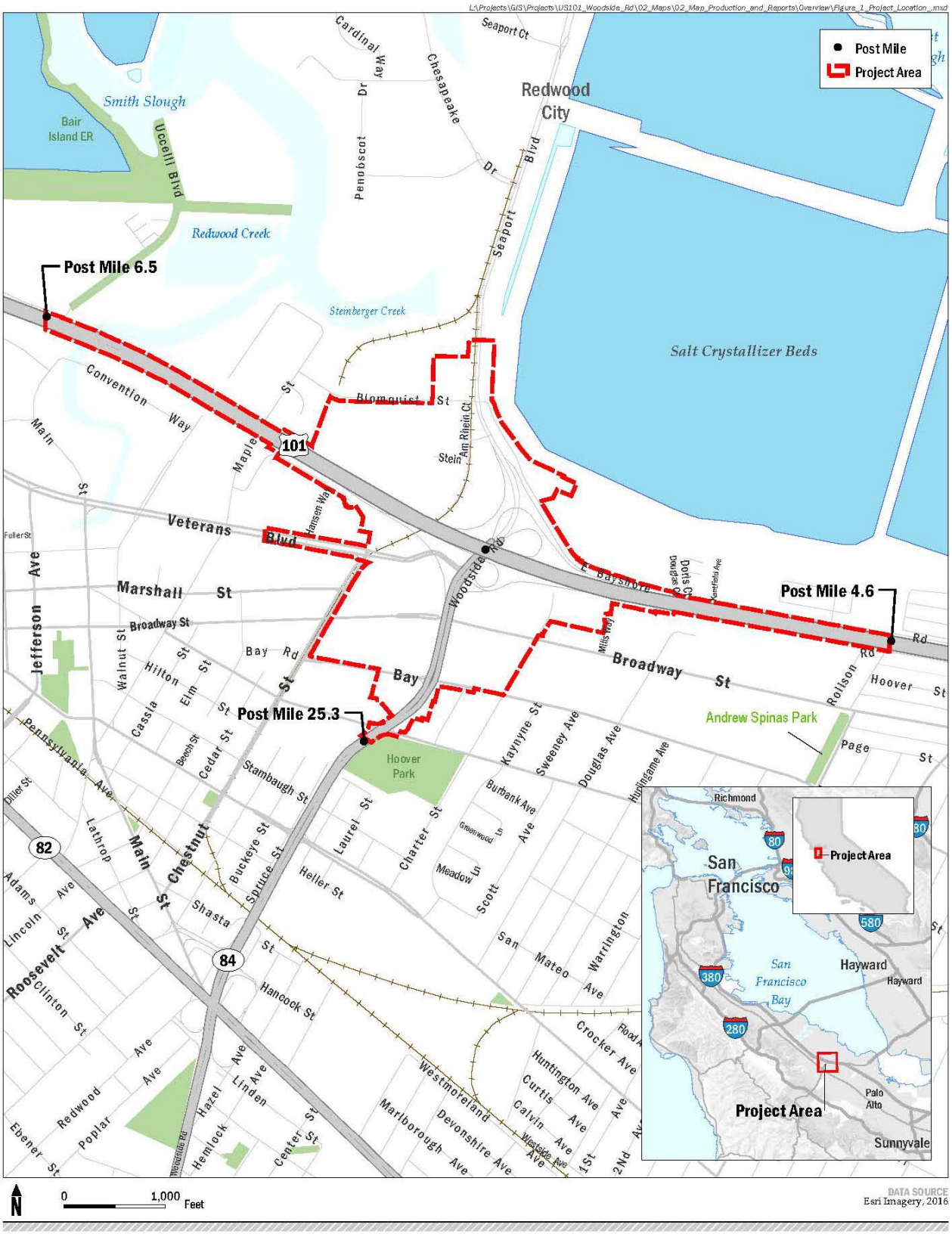
Base Numbers, Trends or Assumptions, and Calculation for "Build" Number

Include the starting numbers used, and the calculation used to develop the "No Build" number. Include any trends or assumptions used. Explain how the impact of the "Build" number was estimated. If "Build" is not required for metric, put "N/A" for "Not Applicable."

- 1) BC Sum tab Cell R58: TOTAL COSTS (in dollars), Present Value: $331,136,507 = Project Cost
- $1 billion dollars = 13,000 jobs (FHWA Employment Impacts of Highway Infrastructure Investment)
- 13,000 (jobs) dived by $1,000,000,000 = 0.000013 (jobs per $1)
- $331,136,507 *(Project Cost) multiply by 0.000013 (jobs per $1) = 4,304 (jobs)*

Change

Include the subtraction used to get to the change number here.
4,304 jobs



Project Location and Regional Setting

04 - SM - 101 - PM 4.6/6.5
04 - SM - 84 - PM 25.3/25.7
EA #04-235360, RU: 0703
Program ID: 0414000032
December 2016

Project Report

To Request for Project Approval

In San Mateo County in Redwood City on Route 101 from 0.8 mile south of Route 101/84 Separation to 0.1 mile south of Whipple Avenue Overcrossing and on Seaport Boulevard and Route 84 from Route 101/84 Separation to Spring Street

I have reviewed the right of way information contained in this Project Report and the R/W Data Sheet attached hereto, and find the data to be complete, current, and accurate:

Mark L. Weaver
Deputy District Director – Right-of-Way &
Land Surveys

APPROVAL RECOMMENDED:

Mohammad Suleiman
Project Manager

APPROVED:

Helena "Lenka" Culik-Caro — Date 12/19/16
Deputy District Director Design

04 - SM - 101 - PM 4.6/6.5
04 - SM - 84 - PM 25.3/25.7
EA #04-235360, RU: 0703
Program ID: 0414000032
December 2016

This project report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

12/14/2016

SCOTT C. KELSEY
REGISTERED CIVIL ENGINEER
URS CORPORATION

DATE

Table of Contents

TABLES

ATTACHMENTS

ACRONYMS

ABAG	Association of Bay Area Governments
ADT	Average Daily Traffic
APE	Area of Potential Effect
AADT	Annual Average Daily Traffic
BART	Bay Area Rapid Transit
BCDC	Bay Conservation and Development Commission
Blvd	Boulevard
BMP	Best Management Practice
BPAC	Bicycle and Pedestrian Advisory Committee
Caltrans	California Department of Transportation
C/CAG	City/County Association of Governments (C/CAG) of San Mateo County
CCTV	Closed Circuit Television
CHP	California Highway Patrol
Department	California Department of Transportation
DED	Draft Environmental Document
DPR	Draft Project Report
ED	Environmental Document
EFH	Essential Fish Habitat
EPS	Expanded Polystyrene
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HOV	High-Occupancy Vehicle
IS/EA	Initial Study with Mitigated Negative Declaration/Environmental Assessment
ITS	Intelligent Transportation System
LHSR	Location Hydraulic Study Report
LOS	Level of Service
M	Millions ($)
MBGR	Metal Beam Guard Rail
mph	mile(s) per hour
MTC	Metropolitan Transportation Commission
MVP	Maintenance Vehicle Pullout
NACTO	National Association of City Transportation Officials
NAC	Noise Abatement Criteria
NADR	Noise Abatement Decision Report
ND/FONSI	Negative Declaration and Finding of No Significant Impact
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

NSR	Noise Study Report
PA&ED	Project Approval & Environmental Document
PDS	Project Development Support
PDT	Project Development Team
PG&E	Pacific Gas and Electric Company
PM	Post Mile
PR	Project Report
Project	US 101/SR 84 (Woodside Road) Interchange Improvement Project
PS&E	Plans, Specifications, and Estimates
PSR	Project Study Report
RTP	Regional Transportation Plan
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMCTA	San Mateo County Transportation Authority
SR 84	State Route 84
STIP	State Transportation Improvement Program
SWDR	Storm Water Data Report
TASAS	Traffic Accident Surveillance and Analysis System
TCCR	Transportation Corridor Concept Report
TIP	Transportation Improvement Program
TMP	Transportation Management Plan
TOS	Traffic Operations System
US 101	United States Highway 101
VA	Value Analysis

1. INTRODUCTION

Project Description:

The California Department of Transportation (Caltrans), in cooperation with the City of Redwood City (City) and the San Mateo County Transportation Authority (SMCTA), proposes the United States Highway 101 (US 101)/State Route (SR) 84 (Woodside Road) Interchange Improvement Project (Project) in the City of Redwood City, County of San Mateo.

The existing US 101/Woodside Road interchange is at the junction of several closely spaced street and ramp intersections where drivers experience peak-period delays. Congestion on the local streets and interchange ramps causes backups for vehicles entering the Project area from US 101. The interchange also lacks sufficient opportunities for bicycle and pedestrian access across US 101 and Woodside Road.

The purpose of the proposed Project is to alleviate peak-period congestion at the US 101/Woodside Road interchange; improve traffic operations within the Project limits at the local street intersections of Woodside Road with Veterans Boulevard, Broadway, Bay Road, and Seaport Boulevard/Blomquist Street/East Bayshore Road; and improve bicycle and pedestrian access across US 101 within the Project limits.

The Project would widen Woodside Road to six lanes (three in each direction) plus the turn pockets. Woodside Road would be graded lower to increase the vertical clearance at US 101 and Woodside Road undercrossing from 14.5 feet to 15.0 feet. The Project would reconstruct all ramp connections between Woodside Road and US 101. Additional turning lanes with longer pocket lengths would be added at ramp intersections as well as at Blomquist Street, East Bayshore Road, Broadway and Bay Road. In addition, the Project would construct direct-connect flyover ramps for Veterans Boulevard that would serve the northbound and southbound movements from northbound US 101 and to southbound US 101. The Project would also eliminate the existing 5 legged intersection at the Broadway and Woodside intersection. Other than the freeway on-ramp and off-ramp modifications, the Project would not change the alignment or operations of US 101.

The Project would also construct additional pedestrian and bicycle facilities throughout the Project area and improve the intersections of Woodside Road with Veterans Boulevard, Broadway, and Bay Road to the south of US 101, and Seaport Boulevard/East Bayshore Road/Blomquist Street to the north of US 101.[1] The Project extends for 1.9 miles along US

[1] US 101 is designated as a north-south freeway, and SR 84 is designated as an east-west highway. However, within the project area, US 101 bears east-west, and SR 84 bears west-south, Overlapping US 101 between Woodside Road in Redwood City and Marsh Road in Menlo Park. For purposes of this report, all descriptions of travel movements on US 101 and SR 84 (Woodside Road) will correspond to north and south for US 101, and east and west for SR 84 (Woodside Road). All other references to east, west, north, and south will generally correspond to actual compass bearings. In other words, except for descriptions of travel movements on US 101 and SR 84 (Woodside Road), all other directions are in relation to the north arrow shown in the report figures.

101 and 0.4 mile along Woodside Road. The total Project length is 2.3 miles. The Project area is shown in Attachment A.

The US 101 and Woodside Road interchange is a major access point to the City and provides primary access for vehicles from the north and south travelling to and from the City. The high volume of commute traffic into and out of the City causes recurring congestion along the Woodside Road corridor. This interchange is a regionally important interchange as it provides one of the only three east-west links within the Peninsula.

Project Limits	04 - SM - 101 - PM 4.6/6.5 04 - SM - 84 - PM 25.3/25.7	
Number of Alternatives	2 (including no-build)	
	Current Cost Estimate:	**Escalated Cost Estimate:**
Capital Outlay Support	$26.9 M	N/A
Capital Outlay Construction	$72.6 M	$78.2 M
Capital Outlay Right-of-Way	$27.9 M	$37.0 M
Funding Source	Local, State (RTIP) and Federal	
Funding Year	2021	
Type of Facility	Interchange Improvement	
Number of Structures	8	
Environmental Determination or Document	Initial Study and Environmental Assessment (IS/EA)	
Legal Description	Construction on State Highway in San Mateo County in Redwood City from 0.8 Mile South of Route 101/84 Separation to 0.1 Mile South of Whipple Avenue Overcrossing	
Project Development Category	3	

2. RECOMMENDATION

The Project Development Team (PDT) formally identified Alternative 3 (partial cloverleaf with diamond alternative) as the Preferred Alternative. This decision was made at the July 6, 2016 PDT meeting after considering the information in the IS/EA, technical studies, comments received from the public and outside agencies during the 45-day review period, and discussion and input from the PDT members. The No Build Alternative would not meet the Project's purpose and need because of the lack of any improvements to traffic circulation or pedestrian/bicycle access, but it served as a baseline for comparison of the build alternatives. It is recommended that this Project Report be approved with Build Alternative 3 and that the Project proceed to the design phase.

The affected local agencies have been invited, participated, and consulted throughout the PDT process with respect to the recommended plan. Their views have been considered, and they are in general accord with the proposed Project.

3. BACKGROUND

3.1 Project History

US 101 was adopted into the State Highway System in 1929. This route was improved to a conventional four-lane highway in 1932. SR 84 was defined by the highway commission in 1961 and is one of only three east-west links between the Peninsula and the East Bay Area.

The SMCTA was formed in 1988 when the voters approved a half-cent sales tax measure known as Measure A. The proceeds from Measure A are used to fund transportation projects within San Mateo County. The SMCTA, in cooperation with local cities and agencies, developed an expenditure plan that establishes the priority for projects using Measure A funding. The proposed Project to improve the US 101/Woodside Road interchange will be covered in part by Measure A.

In 1999, Caltrans approved a PSR (PDS) for the SR 84 Extension, which covers the completion of the Bayfront Expressway from Woodside Road to Marsh Road. This extension Project would have provided a parallel reliever route to US 101 and direct access to the Dumbarton Bridge.

In 2000, Caltrans approved a PSR/PR for the SR 84 (Woodside Road) Widening Project. This Project would have widened Woodside Road to a six-lane facility between El Camino Real and the northbound US 101 loop on-ramp. The same year, Caltrans approved a PSR (PDS) for the Woodside Road interchange (SR 84) Reconstruction Project. This Project proposed to alleviate existing and projected peak-hour traffic congestion at the US 101/Woodside Road interchange and to provide gap closure improvements between the projects previously mentioned. Seven alternatives were studied in the PSR(PDS) for the interchange reconstruction.

In 2006, Caltrans approved a Supplemental PSR (PDS) for the US 101/ Woodside Road Interchange Reconstruction. This Supplemental PSR (PDS) modified the 2000 Caltrans-approved PSR for the Woodside Road interchange (SR 84) Reconstruction Project by eliminating two projects that were assumed to be constructed: the SR 84 Extension of

Bayfront Expressway Project, and the SR 84 (Woodside Road) Widening Project. These projects were not pursued due to funding constraints, environmental issues, and lack of local support.

In 2011, an Alternatives Analysis Study was completed for SMCTA. The study evaluated a variety of potential improvements that would alleviate congestion and developed five feasible alternatives. The PA&ED phase of the proposed Project will build on the 2011 study, further evaluate the previously studied alternatives, and propose additional, or combinations of the previously studied alternatives.

The PA&ED phase of the proposed Project was approved to begin in October 2013, and includes Project initiation and definition of alternatives, traffic forecasting and operational analysis, engineering technical studies, environmental studies, utility impact analysis, right of way services, value analysis, and community outreach.

A Project Development Team (PDT) was formed with members from the City (the Project sponsor), Caltrans, SMCTA, and the design consultants for the PA&ED phase. Agency contacts for information sharing and plan disbursement had been identified within the following organizations: the City of Redwood City, SMCTA, and Caltrans.

3.2 Community Interaction

Formal public involvement for the proposed Project began in 2014 and consisted of stakeholder meetings and City Council Study Sessions, community meetings, and environmental document meetings.

Stakeholder outreach for the Project has included:

- City Council
- Local entities: Sequoia Union High School District, Redwood City School District, PG&E, Kaiser Hospital, Port of Redwood City, and Cargill
- Business associations: Redwood City Downtown Business Association, Redwood City-San Mateo County Chamber of Commerce, and Seaport Industrial Association
- Sequoia and Peninsula Yacht Clubs
- North Fair Oaks Council
- Neighborhood associations: Redwood Village, Stambaugh Heller, Friendly Acres, and Redwood Shores
- Redwood City Working Group of Silicon Valley Bicycle Coalition
- C/CAG Bike and Pedestrian Advisory Committee
- Planned development: Inner Harbor Task Force, and Stanford In Redwood City
- County Supervisors
- State Assembly and Senate Members
- Union Pacific Railroad (UPRR)
- United States Postal Service (USPS)

Two community meetings have been held and are described below.

- March 31, 2014, 6:30 to 8:00 PM, Downtown Library Community Room, 1044 Middlefield Road, Redwood City. The purpose of the meeting was to introduce the

Project, Project area and existing conditions, roles and funding, draft purpose and need statement, and overall Project schedule.

- July 29, 2014, 6:30 to 8:00 PM, Downtown Library Community Room, 1044 Middlefield Road, Redwood City. The purpose of the meeting was to present information and gather specific feedback on the alternatives screening process and the alternatives still under consideration.

Two subsequent meetings provided the public with opportunities to learn about and give feedback on the environmental document: (1) a scoping meeting, held before the draft environmental document (DED) was written; and (2) a DED review meeting, held during the public review period for the document.

The scoping meeting was held on November 20, 2014, from 6:30 to 8:30 PM at the City Hall Council Chamber and Lobby, 1017 Middlefield Road, Redwood City. The purpose of the meeting was to solicit community input on the issues to be addressed in the environmental document. The Project Team provided a presentation, display boards, a handout, and an animation on potential interchange alternatives to help attendees understand the proposed Project, the scope of the environmental document, and the environmental effects to be studied. The meeting was noticed through newspaper advertisements; a bilingual Spanish and English flyer mailed to more than 6,000 addresses, as well as previous meeting attendees, the City's Project e-mail list, and all stakeholders with whom Project team members met; City eNews announcements, and a Caltrans press release. Approximately 30 people attended.

As part of the scoping process, the public was invited to submit written comments on the scope and content of the environmental document for a 30-day period (November 20, 2014, to December 20, 2014). Thirty-five comments were submitted during the scoping period. Most comments pertained to pedestrian and bicycle access, trucks, planned development and transit improvements, elements of the Project design, environmental issues to consider, and the build alternatives. Comments received during the scoping period were reviewed and summarized, and these materials have been made available on the City's website[2].

The DED meeting was held on April 28, 2016, from 6:00 to 8:00 PM at the City Hall Council Chamber and Lobby, 1017 Middlefield Road, Redwood City. The purpose of the meeting was to provide the public with an update on the status of the Project and solicit public comments on the DED. The Project team provided a presentation, display boards, and a handout to help attendees understand the proposed Project, the alternatives evaluated in the DED, and the effects of the Project on the environment. The meeting was noticed through newspaper advertisements (Examiner on April 19, 2016; La Opinion de la Bahia on April 24, 2016); a bilingual Spanish and English flyer mailer, the City's Project e-mail list and all stakeholders with whom Project team members met; the City webpage, and a Department press release on April 18, 2016. Approximately 49 people attended.

The Draft Project Report was approved on April 8, 2016 that supported the release of the DED. The public was invited to submit written comments on the scope and content of the environmental document for a 45-day period that began on April 12, 2016, and ended on

[2] http://www.redwoodcity-docs.org/bit/transportation/101.84.Interchange/101.html

May 24, 2016. Twenty-two written comments were submitted during the scoping period. Most comments pertained to traffic circulation and access, alternative features and preferences, and pedestrian and bicycle access.

3.3 Existing Facility

3.3.1 US 101

US 101 is a major north-south corridor extending from Los Angeles, California to Washington State. Within these Project limits, the route serves local and interregional traffic along the San Francisco Peninsula and the greater Bay Area. It also connects the San Francisco business district and San Francisco International Airport to San Jose and "Silicon Valley" to the south. It is also known as the Bayshore Freeway through San Mateo County. In the Project area, US 101 is an eight-lane divided freeway with three general purpose lanes and one high-occupancy vehicle (HOV) lane in each direction to the south and north of the Woodside Road on- and off-ramps. There is an auxiliary lane in each direction to the south and north of the Woodside Road on- and off-ramps. Just to the north of the US 101/Woodside Road interchange, Maple Street crosses over US 101 but has no ramp connections to the freeway. All ramps at the interchange have ramp meters.

3.3.2 Woodside Road (SR 84)

From US 101 in the Project area, Woodside Road extends to the west and Seaport Boulevard to the east. Woodside Road is designated as SR 84 through Redwood City, with a posted speed limit of 35 miles per hour (mph). It is the only major east-west high-capacity roadway through the city, and one of only three east-west links within the entire San Francisco Peninsula. Woodside Road has two eastbound lanes, three westbound lanes, a divided median, and no sidewalks or designated bicycle lanes. SR 84 is a four- to six-lane east-west roadway and a designated state highway through Redwood City between I-280 and US 101. Woodside Road is the only major high-capacity east-west facility through Redwood City and includes a grade-separated urban interchange at its junction with El Camino Real. East of this interchange, SR 84 continues at Marsh Road interchange, and is classified as an expressway with access only provided at signalized major intersections or via right-in/right-out only connections.

3.3.3 Seaport Boulevard

Seaport Boulevard extends east from US 101 to Pacific Shores Center. It has a posted speed limit of 35 mph. It is a four-lane divided arterial from US 101 to Seaport Court. East of Seaport Court it is a four-lane undivided roadway and becomes a two-lane ring road around Pacific Shores Center.

Seaport Boulevard provides the primary access to US 101 for industrial and commercial traffic generated from land uses including the Pacific Shores Center business park, the Port of Redwood City, Seaport Centre, the Redwood City Municipal and Westpoint Harbor Marinas, and several industrial debris and material reuse facilities. In the Project area, Seaport Boulevard has two lanes in each direction, with a center median. This segment of Seaport Boulevard provides no on-street parking, and very limited pedestrian facilities.

Seaport Boulevard also has a Bay Trail segment on the east side of the roadway, north of Blomquist Street and East Bayshore Road.

3.3.4 East Bayshore Road

East Bayshore Road just north of US 101 parallels the northbound US 101 lanes and off-ramp and is one leg of the intersection with Seaport Boulevard and Blomquist Street. Blomquist Street extends between Seaport Boulevard and Maple Street, which is the only other crossing of US 101 in the Project area.

3.3.5 Veterans Boulevard, Broadway, and Bay Road

Veterans Boulevard, Broadway, and Bay Road connect to Woodside Road south of US 101 in at-grade intersections that are relatively closely spaced. The southbound US 101 off-ramp to westbound Woodside Road forms a multi-lane, five-legged intersection with Broadway.

3.3.6 Union Pacific Railroad (UPRR)

The Union Pacific Railroad (UPRR) maintains a freight spur line that parallels Seaport Boulevard and crosses under US 101 on the northwest side of the interchange, and continues southward on Chestnut Street.

3.3.7 Existing Structures

The existing Route 101/84 Separation (Br. No. 35-0083), formerly named Route 101/114 Separation, was originally built as two separate ±157'-6" long two-span structures consisting of precast, prestressed I-girders. The bents are located in the median of SR 84, separating eastbound and westbound traffic.

The structure was widened in kind in 1970 in four locations:

- Widening of the eastbound Seaport Boulevard to northbound US 101 on-ramp.
- Median widening between the northbound and southbound US 101 structures.
- Median widening between the southbound US 101 structure and the southbound US 101 to eastbound SR 84 off-ramp.
- Sliver widening of the southbound US 101 to eastbound SR 84 off-ramp.

The resulting combined structure was later retrofitted in 1994 with abutment seat bolsters and additional pier wall reinforcing.

The Redwood Harbor Overhead (Br. No. 35-0065 R/L/OL) was originally built in 1958 as three separate structures crossing UPRR tracks:

- 135'-0" long three span cast-in-place reinforced concrete slab bridge (Br. No. 35-0065 R) carrying northbound US 101 traffic.
- 135'-0" long three span cast-in-place reinforced concrete slab bridge (Br. No. 35-0065 L) carrying southbound US 101 traffic.

- 421'-2" long eleven span cast-in-place reinforced concrete slab bridge (Br. No. 35-0065 OL) carrying southbound US 101 traffic to SR 84.

In 1970, the eleven span structure (Br. No. 35-0065 OL) was replaced with a five span cast-in-place concrete box girder (Bridge No. 35-0065 QL).

The three span cast-in-place reinforced concrete slab bridges (Br. No. 35-0065 R and L) were widened in kind in 1970 in three locations:

- Median widening to combine the northbound and southbound US 101 structures into a single bridge (Br. No. 35-0065).
- Widening of the northbound US 101 structure to include a new on-ramp from Seaport Boulevard.
- Widening of the southbound US 101 structure to include a new off-ramp to Woodside Road.

3.3.8 Transit Agencies

Transit in Redwood City includes Caltrain rail service and San Mateo County Transit District (SamTrans) bus service, which serve the downtown and surrounding areas west of US 101. Caltrain has a station in Redwood City on James Avenue near Broadway, northeast of Woodside Road. SamTrans bus route 270 provides service on East Bayshore Road, Blomquist Street, Maple Street, Veterans Boulevard, and Broadway in the Project area.

4. PURPOSE AND NEED

4.1 Problem, Deficiencies, and Justification

4.1.1 Project Purpose

The purpose of the Project is to:

- Alleviate peak-period congestion at the US 101/Woodside Road interchange,
- Improve traffic operations within the Project limits at the local street intersections of Woodside Road with Veterans Boulevard, Broadway, Bay Road, and Seaport Boulevard/Blomquist Street/East Bayshore Road, and
- Improve bicycle and pedestrian access across US 101 within the Project limits.

4.1.2 Project Need

The US 101/Woodside Road interchange is at the junction of several closely spaced street and ramp intersections where drivers experience peak-period delays. Congestion on the local streets and interchange ramps causes backups for vehicles entering the Project area from and to US 101. The interchange also lacks sufficient opportunities for bicycle and pedestrian access across US 101 and Woodside Road. The interchange is near San Francisco Bay, UPRR tracks, a Pacific Gas and Electric Company (PG&E) substation, and established land uses, which have all presented limitations to the development of transportation improvements in the interchange area.

4.1.3 Roadway Deficiencies

The existing configuration of the US 101/Woodside Road interchange and associated intersections limits the flow of traffic, resulting in the ramps that interfere with freeway traffic during peak periods. The five-legged intersection at Woodside Road and Broadway requires additional signal phasing time (the total duration for each sequence of green, yellow, red, and walk light changes). Southbound US 101 traffic exiting at Woodside Road is limited to a single-lane off-ramp. Heavy demand at this exit causes backup onto US 101 because vehicles are delayed at the five-legged intersection at Broadway. Because of the extra signal timing delay to handle a five-legged intersection and its high volume, this intersection operates at LOS E and LOS F in the AM and PM peak periods, respectively. As a result of this backup, vehicles headed toward the Port of Redwood City are delayed exiting the freeway on this ramp until it splits and allows eastbound vehicles (headed toward the Port) to continue to the southbound-to-eastbound loop ramp that connects to Seaport Boulevard.

The close intersection spacing along Woodside Road (Bay Road, Broadway, Veterans Boulevard, and the on- and off-ramps at US 101) results in weaving that contributes to traffic congestion and delays. The Veterans Boulevard intersection with Woodside Road is in close proximity (less than 500 feet) to the Broadway intersection, and the backup and congestion at Broadway also extends to this intersection. These two intersections function at LOS E and LOS F during either the AM or PM peak periods, or both (see Table 4-1). The Seaport Boulevard/Blomquist Street intersection can also be functionally affected when railroad traffic on the UPRR tracks crosses Blomquist Street and effectively closes this leg of the

intersection.

Loop ramps at the interchange serve eastbound Woodside Road to northbound US 101, and southbound US 101 to eastbound Woodside Road/Seaport Boulevard. The off-ramp to Seaport Boulevard has a relatively short radius, which is geometrically undesirable, requires reduced speeds, and is especially difficult for large trucks heading to the Port of Redwood City. The close proximity of the two on and off ramp loop ramps results in a short weaving distance on eastbound Woodside Road/Seaport Boulevard.

More information about Project area traffic conditions is provided in Section 4.3.

4.1.4 Bicycle and Pedestrian Facility Deficiencies

The interchange vicinity lacks bicycle and pedestrian facilities. No designated bicycle facilities provide access across US 101 in the Project area. The closest bicycle facility is on Blomquist Street, which has Class II bikeways.[3] Seaport Boulevard has a Class I bikeway north of Blomquist Street and East Bayshore Road. Veterans Boulevard has buffered Class II bikeways north of Chestnut Street, but no bicycle or pedestrian facilities between Chestnut Street and the interchange. Bay Road and Broadway have sidewalks but no designated bicycle facilities. Within Redwood City, US 101 serves as a barrier to bicycle and pedestrian access between each side of the freeway.

Bicyclists and pedestrians have to use Woodside Road to connect to Seaport Boulevard, or use the overcrossing at Maple Street, which is approximately 0.5 mile to the west of Woodside Road, to travel across the freeway. Woodside Road has no striped bike or pedestrian facilities in the vicinity of the US 101 undercrossing, and the freeway on- and off-connections to Woodside Road are not considered "bike friendly" because of the free-flow merging of exiting and entering traffic typical of interchange ramps. The Redwood City General Plan notes the lack of sidewalks and safe crossings, the high vehicular volumes that discourage pedestrian and bicycle use, and the need to provide better linkages accessible to these modes of travel and use. These connections are specifically needed in this area to complete the pedestrian and bikeway access along Seaport Boulevard to Woodside Road that currently terminates at Blomquist Street.

Other than Seaport Boulevard/Woodside Road, the Maple Street overcrossing is the only means of crossing US 101 in the southern portion of Redwood City. Bicyclists currently use the Maple Street overcrossing of US 101 because it is a relatively less traveled vehicle route, but the existing striped shoulders are relatively narrow and there are no sidewalks except on the bridge structure.

Local pedestrian and bicycle access across Woodside Road to/from downtown Redwood City is also limited due to heavy traffic volumes and the design of the intersections, which provide

[3] A Class I bikeway (bike path) is a completely separate facility designated for the exclusive use of bicycles and pedestrians, with vehicle and pedestrian cross-flow minimized. A Class II bikeway (bike lane) is a striped lane designated for the use of bicycles on a street. A Class III bikeway (bike route) is a route designated by signs or pavement markings for bicyclists within the vehicular travel lane (i.e., shared use) of a roadway (City of Redwood City 2010b). A Class IV bikeway (separated bikeway), has a marked (painted) buffer without flexible posts or inflexible barriers as the separation between the bike lane and the vehicular traffic lane.

only two signalized crossings in the study area south of US 101 (at Bay Road and Broadway). There is one grade-separated pedestrian overcrossing of Woodside Road at Stambaugh Street, which is two intersections to the south of the Project limits.

4.2 Regional and System Planning

The proposed modifications by this Project are consistent with regional and local planning, as discussed below.

4.2.1 Identify Systems

US 101 is a major north-south corridor extending from Los Angeles, California to Washington State. Within the Project area, US 101 is a primary, interregional commute corridor in and through San Mateo County, and has major regional significance in the San Francisco Bay Area. US 101 is a part of the National Highway System and the Strategic Highway Network, which provide defense access, continuity, and emergency capabilities for defense purposes. US 101 is also a truck route and part of the Surface Transportation Assistance Act (STAA) Network.

SR 84 is the only major east-west high-capacity roadway through Redwood City, and one of only three east-west links within the entire San Francisco Peninsula. SR 84 is a four- to six-lane east-west roadway and a designated state highway between I-280 and US 101.

4.2.2 State Planning

US 101 was identified in the Caltrans 2002 Global Gateways Development Plan as one of California's top-priority global gateways and as one of the key international trade corridors in California. The 1998 Interregional Transportation Strategic Plan designated US 101 as a "High-Emphasis Route" with priority for programming and construction to minimum facility standards for freeways or expressways. The inclusion of US 101 in the High-Emphasis Route category highlights its critical importance to interregional travel and to the State.

SR 84 is fragmented near the Project area in sections. The first section is an east–west arterial road running from San Gregorio to Menlo Park, across the Dumbarton Bridge through Fremont and Newark and ending at I-580 in Livermore. The route overlaps the freeway segment of US 101 between Woodside Road in Redwood City and Marsh Road in Menlo Park. The segment between Marsh Road and the Dumbarton Bridge has been upgraded to an expressway and is known as the Bayfront Expressway. The proposed interchange Project does not preclude the construction of the Bayfront Expressway extension at a later date.

4.2.3 Regional Planning

The Project is included in the Metropolitan Transportation Commission's (MTC's) Regional Transportation Plan (RTP), *Plan Bay Area* (ABAG and MTC 2013a, RTP ID No. 21603). The current RTP entry indicates a total cost of $73M, including a committed funding of $36M, and a discretionary funding of $36M. The proposed RTP entry in the Draft 2040 Plan indicates a total cost of $171M, including $7M in pre-2017 funding, $98M in post 2017 local committed funding, and $66M in regional discretionary funding. The Project is also included in the 2015 Transportation Improvement Program (TIP), which was adopted by the MTC on September 24,

2014 (TIP ID No. SM-050027). The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) approved the 2015 TIP on December 15, 2014.

4.2.4 Local Planning

This Project is consistent with the City of Redwood City General Plan as well as the San Mateo Countywide Transportation Plan 2010.

4.3 Traffic

Fehr and Peers conducted the traffic studies for this Project. The traffic studies were detailed in the Traffic Operations Analysis Report (TOAR) approved by Caltrans on December 11, 2015. The traffic study area consisted of two mainline segments of US 101 and 12 local roadway intersections. The mainline segments of US 101 were between the Willow Road and Holly Street interchanges, encompassing a total of six interchanges in the northbound direction; and between the Hillsdale Boulevard and Willow Road interchanges, encompassing a total of eight interchanges in the southbound direction. The number and length of the segments studied in each direction was based on congestion patterns for each direction of travel. The Project area is approximately in the middle of the mainline segments studied.

The following 12 local roadway intersections were analyzed:

1. Blomquist Street/Seaport Boulevard
2. Lyngso Access/Seaport Boulevard
3. Veterans Boulevard/Woodside Road
4. Broadway/Woodside Road
5. Bay Road/Woodside Road
6. Spring Street/Woodside Road
7. Middlefield Road/Woodside Road
8. Blomquist Street/Maple Street
9. Oddstad Drive/Maple Street
10. Veterans Boulevard/Maple Street
11. Veterans Boulevard/Chestnut Street
12. Broadway/Chestnut Street

The operational analysis evaluated existing and future conditions. Existing conditions represent the year 2014, based on the availability of data when the traffic study was conducted. Future conditions are projected for the years 2022 (Opening Year) and 2042 (Design Year). The AM and PM peak hour operational models were calibrated and validated to replicate existing conditions for freeway, ramp, and intersection volumes; bottleneck locations; and observed queues.

The future traffic forecasts for intersections were developed using the Furness Method as stated in the TOAR. Intersection operations were analyzed using Synchro/SimTraffic 8.0 software. Mainline operations on US 101 were analyzed using the FREQ macroscopic traffic model.

All of the intersections in the Project area currently operate at LOS D or better during the

AM and PM peak hours except the Lyngso Access/Seaport Boulevard, Veterans Boulevard/Woodside Road and Broadway/Woodside Road. In general, the build alternative is expected to reduce delays at all of the intersection locations where intersection improvements are proposed. The build alternative would not degrade the traffic level of service at any of the study locations in 2022 or 2042 except the Lyngso/Woodside Road intersection which would degrade to LOS F in the PM peak hour compared to LOS E under the no-build alternative in 2042. However, some locations would continue to operate at unacceptable service levels in the future due to traffic demand growth that is unrelated to the Project, and the build alternative would increase delays at several locations where additional traffic is able to access the US 101/Woodside Road interchange vicinity.

The findings from the TOAR can be summarized as follows:

Under No Project/No-Build conditions most of the study intersections along Woodside Road (Seaport Boulevard) are anticipated to operate at LOS F by year 2042. Congestion at the US 101/SR 84 (Woodside Road) interchange is anticipated to result in vehicle queue spillback onto US 101 on both the northbound and southbound off-ramps during the AM and PM peak hour under No Project/No-Build conditions.

In the year 2042, the Project would provide LOS C or better operations at both ramp terminal intersections and vehicle queue spillback onto US 101 is not anticipated. The Project would reduce the average travel time and increase the average travel speed on Woodside Road when compared to No Project/No-Build conditions. Based on the ramp metering analysis results, vehicle queue spillback from the ramp meters to the local streets is not anticipated under any of the alternatives in year 2022 or year 2042 AM peak hour. Vehicle queue spillback is anticipated in year 2042 during the PM peak hour for the Project. Vehicle queue spillback is not anticipated under No Project/No-Build conditions due to local street congestion substantially constraining the volume arriving at the ramp meters. Although vehicle queue spillback to the local streets is anticipated under the Project during the PM peak hour in year 2042, it would still improve traffic operations at the US 101/SR 84 (Woodside Road) interchange compared to No Project/No-Build conditions.

The Project would eliminate the vehicle queue spillback impacts from Woodside Road to US 101 that are present under No Project/No-Build conditions. In the northbound AM peak hour (year 2022) the Project would reduce the average travel time by about 27% and the mainline vehicle hours of delay by 80%.

4.3.1 Current and Forecasted Traffic Volumes

Peak hour and average daily traffic (ADT) volumes for existing conditions, design year build alternatives and the no-build alternative for both AM and PM within the Project limits are summarized in Table 4-1.

Table 4-1: Existing and Forecasted Peak Hour and ADT Volume

Facility	Existing			2022			2042		
	AM Peak	PM Peak	ADT	AM Peak	PM Peak	ADT	AM Peak	PM Peak	ADT
US 101 North of Woodside (Both Directions)	15527	12084	207000	17150	15800	226700	20370	18710	266900
US 101 South of Woodside (Both Directions)	15671	15004	213000	17490	16090	231000	20580	18960	270000
US 101 Northbound Off-Ramp	1905	1352	23000	2210	1540	26500	2380	1630	28300
US 101 Northbound On-Ramp	1409	1355	19500	1520	1430	20800	1770	1560	23500
US 101 Southbound Off-Ramp	1450	1409	19600	1520	1480	20600	1650	1650	22700
US 101 Southbound On-Ramp	1129	1650	21900	1210	1730	23200	1330	1900	25500
Woodside between Northbound and Southbound Ramps (Both Directions)	3736	3226	29400	4440	3890	35400	5000	4230	38500
Woodside just west of Broadway (Both Directions)	3057	3196	29100	3600	3840	34900	4170	4320	39300
Woodside just west of Blomquist (Both Directions)	1718	1737	15800	2510	2300	20900	2950	2550	23200

Source: Fehr & Peers 2015
Unit of Measurement: Vehicles

4.3.2 Truck Volumes

Trucks also affect traffic operations at the US 101/Woodside Road interchange. US 101 is a major truck route for the Peninsula with an average of 9,765 trucks per day south of the interchange and an average of 9,450 north of the interchange, or 4.5 percent of total freeway traffic volume, in 2014. Seaport Boulevard provides access to the Port of Redwood City, which supports industrial and commercial land uses associated with trucking. The Bay Conservation and Development Commission's *San Francisco Bay Area Seaport Plan* provides for increases in cargo throughput at the Port of Redwood City, and the Port has proceeded with modernizing its wharves and facilities to increase current throughput capacity. These measures are expected to increase truck volumes. A truck classification survey recently measured a total of over 3,000 trucks on a typical weekday on Seaport Boulevard north of Blomquist Street.

Businesses near the interchange that generate truck traffic were surveyed as part of the traffic studies for this Project, and the following trends and issues were identified:

- Truck volumes peak around noon on weekdays, and the majority of truck traffic occurs before 1 PM.

- Predominant truck travel routes on Seaport Boulevard use US 101 to and from areas south of the Project location. Fewer trucks from Seaport Boulevard use Woodside Road, or US 101 to and from the north.
- Issues identified by truck operators include delays from queues on Woodside Road blocking the US 101 southbound off-ramp, congestion causing backups on the northbound US 101 off-ramp, a difficult right-turn movement from Woodside Road to Veterans Boulevard due to congestion, and eastbound traffic on Seaport Boulevard backing up to the US 101 interchange.

4.3.3 Forecasted Traffic Conditions

Traffic conditions are expected to worsen in the future with continued development and redevelopment in the region and in the Project area. Between 2010 and 2040, San Mateo County is predicted to experience a 26 percent increase in population and a 29 percent increase in jobs. In Redwood City, job growth in the designated Priority Development Area[4] of the Broadway/Veterans Boulevard Corridor between 2010 and 2040 is estimated at 40 percent, and housing unit growth is estimated at 199 percent.

Although Redwood City expects to reduce trip generation rates and decrease roadway system congestion by 10 percent through 2035 by focusing on alternative modes of transport and improvements to SR 82 (El Camino Real), SR 84 (Woodside Road), US 101, and I-280, it is reasonable to expect that regional traffic volumes will increase and affect traffic in the Project area.

4.3.4 Accident Analysis

4.3.4.1 Mainline and Ramp Collision

Traffic Accident Surveillance and Analysis System (TASAS) data are summarized in Table 4-2 for US 101 and Woodside Road in the Project area for the period between June 2009 and May 2012. The data are expressed as accidents per million vehicle miles (MVM) traveled and accidents per million vehicles for ramps. The data show that three of the four highway segments and six of the nine ramps had higher collision rates than the state average for similar facilities. The highest number of reported collisions in the Project area were on southbound US 101 (455 reported collisions). During the PM peak period the existing southbound off-ramp vehicle queue extends back onto the mainline so that vehicles getting off the freeway are at a complete stop on the mainline as they wait to exit the freeway. This condition can create a substantial speed differential between stopped vehicles on the freeway waiting to exit and vehicles traveling through. The available collision data does not identify how many of the southbound US 101 collisions are related to the off-ramp queue. Nonetheless, all of the Project build alternatives would eliminate the vehicle queue spillback onto the mainline and potentially reduce collisions associated with the existing southbound off-ramp vehicle queue. For US 101, the majority (60 to 70

[4] As described in *Plan Bay Area,* Priority Development Areas (PDAs) are locally designated areas within existing communities that have been identified and approved by local cities or counties for future growth. These areas are typically accessible to transit, jobs, shopping and other services (MTC and ABAG 2014).

percent) of the accidents recorded were rear-end collisions, which is indicative of a congested corridor. Sideswipe collisions were also prevalent (10 to 15 percent) potentially due to lane changes in congested conditions, and "hit object" collisions were also prevalent (10 to 15 percent) in the corridor, especially for northbound US 101.

For the ramps at the Woodside Road interchange, most collisions were rear-end collisions. Other prevalent collision types included sideswipe and hit object (guardrail) collisions. All of the Project alternatives modify local street circulation and do not provide any mainline improvements. The Project is also projected to prevent spillback onto the freeway mainline from the off-ramps due to improved signal operations. Thus, the Project can potentially reduce congestion related collisions on the local street and the ramps but not significantly on US 101.

Table 4-2: Vehicle Collision History for US 101 and Ramps at Woodside Road: June 2009 – May 2012

Facility	Number of Collisions			Collision Rate (accidents/million vehicle miles)					
				Actual			State Average		
	Total	Fatal	Fatal + Injury	Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total
EB SR 84 (PM 25.3 to PM 25.7)	30	0	14	0.000	1.40	3.01	0.009	0.35	0.84
WB SR 84 (PM 25.3 to PM 25.7)	24	0	7	0.000	0.70	2.41	0.009	0.35	0.84
NB US 101 (PM 3.3 to PM 7.0)	287	0	73	0.000	0.18	0.71	0.004	0.28	0.91
SB US 101 (PM 3.3 to PM 7.0)	455	1	123	0.002	0.30	1.13	0.004	0.28	0.91
NB US 101 Off-Ramp to SR 84/Woodside (PM 5.1)	4	0	2	0.000	0.10	0.20	0.002	0.08	0.25
SB US 101 On-Ramp from SR 84/Woodside (PM 5.2)	13	0	4	0.000	0.20	0.63	0.002	0.22	0.63
US 101 Segment NB Off-Ramp to WB SR 84 (PM 5.2)	3	0	1	0.000	0.05	0.16	0.004	0.16	0.49
US 101 Segment NB Off-Ramp to EB Woodside (PM 5.2)	2	0	2	0.000	0.60	0.60	0.004	0.24	0.75
NB US 101 On-Ramp from EB SR 84/Woodside (PM 5.3)	11	0	4	0.000	0.27	0.27	0.002	0.21	0.73
NB US 101 On-Ramp from WB SR 84/Woodside (PM 5.5)	6	0	3	0.000	0.77	0.77	0.003	0.18	0.57
US 101 Segment SB Off-Ramp to EB Woodside (PM 5.6)	8	0	3	0.000	0.82	2.18	0.003	0.30	1.06
US 101 Segment SB Off-Ramp to WB SR 84 (PM 5.6)	8	0	3	0.000	0.20	0.54	0.004	0.24	0.75
SB US-101 Off-Ramp to SR-84/Woodside (PM 5.7)	10	0	4	0.000	0.22	0.54	0.002	0.08	0.25

Shaded cells denote locations that exceed the statewide average.
EB = eastbound; NB = northbound; SB = southbound; WB = westbound

Source: Caltrans District 4 TASAS data between 06/01/2009 and 5/31/2012.

4.3.4.2 Local Street Collision

Three years of collision data (January 2010 – December 2012) were obtained using the California Highway Patrol Statewide Integrated Traffic Records System (SWITRS). As shown in Table 4-3A, 145 collisions were reported by SWITRS over this period. Of these collisions, one involved a pedestrian, one involved a bicyclist, and three involved trucks. Although trucks represent a large portion of traffic observed in the Project study area, the collision data indicates that only a small percentage (2%) of collisions involved trucks. About 40 percent of all the collisions resulted in injury and no fatalities were reported over the three year period. A larger collision data set was obtained from SWITRS for January 2008 – December 2012. This 5 year data set was evaluated for pedestrian and bicyclist collisions. As shown in Table 4-3B, a total of 16 collisions were reported for bicyclists and 10 involved pedestrians, resulting in 3 severe injuries and 23 minor injuries.

The proposed Project will primarily modify the US 101/SR 84 (Woodside Road) interchange area. Table 4-4 presents the percent of collisions listed by the primary collision factor (PCF) violation categories for the ramp terminal intersections and Woodside Road at the interchange.

The highest number of collisions (28) was reported at the intersection of Woodside Road (SR 84)/Broadway with about 40% of the accidents resulting in injury. This intersection is a complex five-legged intersection with nonstandard design and signal phasing which is reflected in two of the highest reported violations at this location (improper turning and traffic signals/signs). The highest reported violation resulting in a collision at this location is unsafe speed. Although not specifically reported in the collision report it is likely that the high levels of traffic congestion at this location influence unsafe speeds as drivers are required to accelerate and decelerate in short distances and often underestimate the distance required to stop.

For the Seaport Boulevard and Woodside Road roadway segments, many (40-50%) collisions were rear-end collisions, which is indicative of a congested corridor. Sideswipe (15-25%) and broadside (20-30%) collisions were also prevalent in the corridor, potentially due to lane changes in congested conditions and closely spaced intersections. A high number of collisions (12) compared to other roadway segments were reported on Woodside Road at the US 101/Woodside Road interchange between the Lyngso Access Road and Veterans Boulevard. The highest reported violation (59%) resulting in a collision was unsafe speed. This roadway segment experiences substantial weaving of traffic due to the ramp access locations to US 101.

Table 4-3A: Local Street Collision History – January 2010 through December 2012

Location	Total Collisions	Collisions Resulting in Injury	Collisions Involving Bicyclists	Collisions involving Trucks	Collisions Involving Pedestrians	Collisions Resulting in Fatality
Seaport & Blomquist/Bayshore	4	3	0	0	0	0
Seaport & Lyngso	1	1	0	0	0	0
Woodside/SR 84 & Veterans	8	3	0	0	0	0
Woodside/SR 84 & Broadway	28	11	0	0	0	0
Woodside/SR 84 & Bay	10	4	0	0	0	0
Woodside/SR 84 & Spring	1	0	0	0	0	0
Woodside/SR 84 & Middlefield	15	7	0	1	0	0
Maple & Blomquist	0	0	0	0	0	0
Maple & Oddstad	0	0	0	0	0	0
Maple & Veterans	6	3	0	0	0	0
Chestnut & Veterans	2	1	0	0	0	0
Chestnut & Broadway	4	2	0	0	0	0
Seaport from Blomquist/Bayshore to Lyngso	1	1	0	0	0	0
Woodside from Lyngso to Veterans	12	4	0	0	0	0
Woodside from Veterans to Broadway	6	3	0	1	0	0
Woodside from Broadway to Bay	6	3	0	0	0	0
Woodside from Bay to Spring	2	0	0	0	0	0
Woodside from Spring to Middlefield	15	6	0	0	0	0
Blomquist from Seaport to Maple	1	0	0	0	0	0
Maple from Blomquist to Oddstad	1	0	0	0	0	0
Maple from Oddstad to Veterans	2	0	0	0	0	0
Veterans from Maple to Chestnut	5	2	0	1	0	0
Veterans from Chestnut to Woodside	7	0	0	0	0	0
Chestnut from Veterans to Broadway	2	0	0	0	0	0
Broadway from Chestnut to Woodside	6	4	1	0	0	0

Source: California Highway Patrol Statewide Integrated Traffic Records System (SWITRS) data between 01/01/2010 and 12/31/2012.

Table 4-3B: Local Street Pedestrians and Bicyclists Collision History – January 2008 through December 2012

Intersection			Collison Severity		
	Collisions Involving Bicyclists	Collisions Involving Pedestrians	Fatal	Severe	Minor
Maple Street/RT 101	2	0	0	0	2
Veterans Boulevard/ Walnut Street	2	0	0	1	1
Walnut Street/ Marshall Street	1	0	0	0	1
Maple Street/ Veterans Boulevard	1	2	0	0	3
East Bayshore/ Seaport Boulevard	1	0	0	1	0
Broadway/ Chestnut Street	2	2	0	0	4
Chestnut Street/ Spring Street	1	0	0	0	1
Broadway/ Woodside Road	4	0	0	0	4
Woodside Road/ Bay Road	2	0	0	0	2
Walnut Street/ Marshall Street	0	1	0	0	1
Spring Street/ Walnut Street	0	1	0	0	1
Broadway/ Maple Street	0	2	0	0	2
Broadway/ Beech Street	0	1	0	1	0
Charter Street/Bay Street	0	1	0	0	1
TOTAL	**16**	**10**	**0**	**3**	**23**

Source: California Highway Patrol Statewide Integrated Traffic Records System (SWITRS) data between 01/01/2008 and 12/31/2012.

Table 4-4: Percent of Accidents by Primary Collision Factor Violation Category

Location	Un-known	Under the Influence of Alcohol / Drugs	Unsafe Speed	Following Too Closely	Unsafe Lane Change	Improper Turning	Auto Right of Way	Traffic Signals and Signs	Other Hazardous Violation / Unsafe Starting
Intersections									
Woodside/SR 84 & Veterans	12%	13%	25%	25%	0%	0%	0%	25%	0%
Woodside/SR 84 & Broadway	4%	0%	32%	4%	7%	14%	7%	21%	11%
Roadway Segments									
Woodside from Lyngso to Veterans	8%	8%	59%	17%	8%	0%	0%	0%	0%
Woodside from Veterans to Broadway	17%	0%	50%	0%	17%	0%	0%	0%	16%

Source: California Highway Patrol Statewide Integrated Traffic Records System (SWITRS) data between 01/01/2010 and 12/31/2012.

5. ALTERNATIVES

This section describes the proposed action and the preferred alternative that was developed by a multidisciplinary team to achieve the Project's purpose and need, while avoiding or minimizing environmental impacts. Two viable build alternatives (Alternatives 3 and 8B) were presented in the Draft Project Report in addition to the No-Build Alternative. Both alternatives would widen Woodside Road from four lanes (two eastbound and two westbound) to six lanes (three in each direction) plus turn pockets. Woodside Road would be lowered in grade to increase the vertical clearance at the US 101 undercrossing from 14.5 feet to 15.0 feet. All ramp connections between Woodside Road and US 101 would be reconstructed. In addition, they would construct direct-connect flyover ramps between northbound US 101 and westbound Veterans Boulevard and between eastbound Veterans Boulevard and southbound US 101. The two alternatives would also eliminate the existing five-legged intersection at Broadway and Woodside Road. Other than the freeway on-ramp and off-ramp modifications, they would not change the alignment or operations of US 101.

Sidewalks and bicycle facilities would be added on Woodside Road between approximately Bay Road and Seaport Boulevard/East Bayshore Road/Blomquist Street. Both alternatives would include Class I bikeways on both sides of Veterans Boulevard between Chestnut Street and Woodside Road. A Class I bikeway is also proposed adjacent to the UPRR tracks that extend along Chestnut Street and under US 101 to Seaport Boulevard. Sidewalks would range from 6 feet to 10 feet in width, and crosswalks would include standard safety features. Differences between the two alternatives are outlined below:

Features specific to Alternative 3 (Partial Cloverleaf with Diamond Alternative)
North of US 101, this alternative would replace the existing northbound US 101 ramps with a new slip on-ramp, loop on-ramp, and diagonal off-ramp in a single partial cloverleaf ramp configuration. The new ramps would connect with Seaport Boulevard at a new signalized intersection. Alternative 3 would also realign and replace the existing southbound US 101 ramps with a single wider diamond-configuration off-ramp and new on-ramp connecting with a new signalized intersection.

Sidewalks would be added on both sides of Woodside Road between Broadway and Bay Road. A new Class I bikeway would be added on the east side of Woodside Road between Broadway and the Seaport Boulevard/East Bayshore Road/Blomquist Street intersection to the north of US 101. Other Class I bikeways would be added to the west side of Woodside Road. The bikeways would connect with Veterans Boulevard and a new Class I bikeway along the UPRR tracks that would cross under US 101 to Seaport Boulevard.

Alternative 3 would include a high-occupancy vehicle (HOV) preferential lane for the northbound on-ramp. It would also include Class II and IV bikeways on both sides of Woodside Road between Bay Road and the Seaport Boulevard/East Bayshore Road/Blomquist Street intersection and would conform to all Class III facilities at the Project conform points of existing streets.

Features specific to Alternative 8B (Diverging Diamond Alternative)
This alternative would replace all existing US 101 ramp connections with diagonal ramps on both sides of US 101 in a diverging diamond configuration. Woodside Road would be reconfigured to allow eastbound and westbound traffic to cross to the opposite side of the road (on the driver's left) and back again between two new signal intersections, one on each side of US 101. The diverging diamond configuration would allow for two-phase operations (eastbound/westbound Woodside Road through movements and off-ramp left/right-turn movements).

The ramp geometry for Alternative 8B does not allow for inclusion of an HOV preferential lane on the northbound on-ramp. A ramp meter will be added by the Project to this ramp. Bicycle and pedestrian facilities would be the generally same as for Alternative 3 except along the diverging diamond section of Woodside Road under US 101. A Class I bikeway would be constructed in the median of Woodside Road, between the intersections where vehicle traffic would change directions. The path would connect via signalized intersections with crosswalks to the proposed pedestrian and bicycle facilities to the north and south of US 101.

5.1 Identification of the Preferred Alternative

After completion of the Draft Project Report and circulation of the Draft Environmental Document, the Project Development Team (PDT) identified viable Alternative 3 (Partial Cloverleaf with Diamond Alternative) as the preferred alternative. This decision was made at the July 6, 2016 PDT meeting after considering the information in the IS/EA, technical studies, comments received from the public and outside agencies during the 45-day review period, and discussion and input from the PDT members. The PDT discussion found the two alternative designs to be similar, with some important differences.

Alternative 3 would reduce the average travel time on Woodside Road in both directions when compared to No Build conditions. In comparison, Alternative 8B would increase the average travel time in the westbound direction in year 2042 during the PM peak hour. Vehicle queue spillback from the ramp meters to the local streets is anticipated in year 2042 during the PM peak hour for both Project alternatives. However, the impact of the vehicle queue spillback is anticipated to be greater under Project Alternative 8B than Alternative 3 such that the US 101 northbound ramps/Woodside Road intersection would operate at LOS F and LOS B under Alternative 8B and Alternative 3, respectively. This difference in traffic operations was an important deciding factor, as Alternative 8B would have predicted traffic delays at the northbound freeway interchange ramps that could not be resolved by any suitable design change, and would present a risk of substantial future traffic congestion that would not meet the Project purpose and need criteria.

Both alternatives would provide new bicycle and pedestrian facilities and access along Woodside Road, the UPRR railroad, and connections to local roads. Alternative 3 also includes a Class I Bikeway on the Veterans flyover, providing a grade-separated overcrossing of Woodside Road. This would allow bicyclists and pedestrians the option to entirely avoid having to cross Woodside Road. Alternative 8B precludes this bicycle and pedestrian path due to the necessary design of the southbound freeway ramp connections.

Both alternatives can include landscaping in all quadrants of the interchange. Alternative 3 would limit tree planting in the northbound loop on-ramp and quadrant of the interchange because of clear recovery zone requirements. Alternative 8B could provide more tree planting than Alternative 3 in this quadrant, but limits available room for planting along the northbound on-ramp near the existing PG&E substation.

Because Alternative 3 provides superior traffic operations and bicycle/pedestrian facilities, it was identified as the preferred alternative.

5.2 Preferred Alternative

The Partial Cloverleaf with Diamond Alternative (Alternative 3) is identified as the preferred build alternative for the proposed Project.

5.2.1 Proposed Engineering Features

5.2.1.1 Typical Cross Section and Profile

The Project would widen Woodside Road from four lanes (two in each direction) to six lanes (three in each direction). The vertical clearance of the existing Woodside Road undercrossing of US 101 is below current HDM standards. Woodside Road would be graded lower at the 101/84 Undercrossing to increase the vertical clearance from 14'-5" to standard 15'-0". Additional turning lanes would be added at ramp intersections as well as at Broadway and Bay Road. In addition, the Project would construct direct-connect flyover ramps for Veterans Boulevard that would serve the northbound and southbound movements from and to US 101. The Project would reconstruct the ramps to Caltrans standard typical cross sections for lane and shoulder widths and profile standards. Other than the freeway on-ramp and off-ramp modifications, the Project would not change the alignment or operations of US 101. See Attachment B, Preferred Alternative Preliminary Plans (Alternative 3) for Layout, typical cross section and profiles.

5.2.1.2 Drainage

A Location Hydraulic Study Report (LHSR) that identifies existing hydrologic and hydraulic conditions, highway drainage design elements, and hydrologic and hydraulic design standards was prepared for the Project. The existing drainage systems within the Project limits consist of roadside ditches, cross culverts, longitudinal culverts, drains (in freeway median), asphalt concrete (AC) dikes, and concrete curbs with inlets to collect storm water at shoulders. There is an existing storm drainage pump station at the corner of Broadway and Woodside Road.

The build alternative would result in added impervious area due to roadway widening and the addition of sidewalks and bikeways. However, the increase in flow is expected to be insignificant when compared to the overall watershed. The reconfigured on- and off-ramps south of US 101 would result in a decrease of impervious drainage area attributed to the Broadway pump station. Therefore, the Project is not expected to impact the capacity of the existing pump station.

The proposed widening and modifications to the existing freeway and ramps are expected to result in the fill or removal of existing ditches, modification or relocation of existing longitudinal drainage structures, extension or relocation of existing cross culverts and construction of new drainage structures. Existing drainage systems at the edge of shoulders or in the median may need to be relocated. New drainage systems would be required to capture drainage from the Project.

Concentrated flow conveyance systems, such as ditches, berms, swales, overside drains, flared end sections and outlet protection and velocity dissipation devices will be considered for this Project. Storm drain inlet protection would be deployed throughout the Project at all existing, temporary, and permanent drainage inlets. The existing roadway drainage facilities would either be modified to fit with new drainage systems or be removed and replaced by new systems. The proposed drainage systems will be developed during the final design phase.

The Project would lower the elevation of Woodside Road by approximately one foot to increase its vertical clearance under US 101. The depth to groundwater in the Project area is approximately 4 feet, which should not pose a significant problem except for the trenching of any utility relocations. Redwood Creek crosses US 101 approximately 0.8 mile west of Woodside Road. The Project does not include work in or near this creek.

Roadside drainages exist along both sides of US 101 to the west of the US 101/Woodside Road interchange ramps and along the east side of Seaport Boulevard. US 101 ramp modifications and widening of the East Bayshore Road and the Seaport Boulevard/East Bayshore Road/Blomquist Street intersection are anticipated to require minor modifications to the drainages.

Salt crystallizer beds lie northeast of the Project area. A berm separates the beds from a drainage along the east side of Seaport Boulevard and from the roadways of East Bayshore Road and Seaport Boulevard. The berm may require minor modifications to accommodate widening at the Seaport Boulevard/East Bayshore Road/Blomquist Street intersection. Temporary construction access may be needed on the west side of the berm.

5.2.1.3 Proposed Structures

Direct-connect flyover ramps for Veterans Boulevard would be constructed to serve the northbound and southbound movements from and to US 101. The flyovers would extend up to approximately 30 feet above the roadway of US 101. The bridges where the northbound US 101 on-ramp and southbound US 101 off-ramp cross the UPRR tracks would be reconstructed to accommodate wider ramps with additional lanes, and additional vertical clearances. The bridge section of the eastbound Woodside Road to northbound US 101 loop ramp would also be reconstructed to accommodate an additional lane. Table 5-1 lists the details of the proposed structures.

Table 5-1: Proposed Structures

Bridge Name	No. of Spans	Width/Design Height	Length
N101 Off-Ramp/Route 101 & 84 Separation	8 (3 Frames)	44'-10" max and varies	1,240'-0"
S101 On-Ramp/Route 84 Separation	5 (2 Frames)	60'-4" max and varies	702'-0"
Seaport Boulevard Northbound On-Ramp OC	2	52'-7"	158'-0"
Redwood Harbor Northbound On-Ramp OH	3	51'-0"	129'-0"
Woodside Road Southbound Off-Ramp OH	3	51'-0"	117'-0"

The APS Plans are included in Attachment C.

5.2.1.4 Retaining Walls, Concrete Barriers, and Sound Walls

There will be 14 retaining walls for the Preferred Alternative. Retaining walls would be installed along new and reconstructed ramps, including the Veterans Boulevard flyover. A retaining wall would also be constructed along the proposed Class I bikeway adjacent to the UPRR tracks that extend along Chestnut Street and under US 101 to Seaport Boulevard.

Concrete safety barriers would be constructed in several locations in the Project area. Concrete barriers would be constructed along the northbound US 101 on- and off-ramps, both sides of the Veterans Boulevard flyover ramp, at the northbound US 101 on-ramp and southbound US 101 off-ramp separation over UPRR tracks, and both sides of Woodside Road under US 101.

The Project area has existing sound walls along East Bayshore Road to the south of the northbound US 101 off-ramp. The sound walls would not be affected by the Project.

Table 5-2 lists the details of the proposed retaining walls.

Table 5-2: Proposed Retaining Walls

Wall Name	Max Design Height	Length
Ground Anchor Wall "RW-115"	15'-0"	186'-0"
MSE Wall "RW-120"	30'-0"	984'-5"
MSE Wall "RW-126"	12'-6"	327'-9⅛"
MSE Wall "RW-333"	30'-0"	777'-6"
MSE Wall "RW-423"	30'-0"	879'-1"
MSE Wall "RW-434"	30'-0"	202'-0"
Ground Anchor Wall "RW-533"	13'-0"	199'-0"
Ground Anchor Wall "RW-535"	27'-0"	55'-0"
Ground Anchor Wall "RW-536"	6'-0"	15'-0"
MSE Wall "RW-538"	15'-0"	241'-0"
MSE Wall "RW-637"	27'-6"	413'-8"
MSE Wall "RW-732"	25'-0"	347'-5⅝"

See Attachment C, APS plan sheets for locations of retaining walls within the Project area. Consistent with the Project's approved Visual Impact Assessment (June, 2015), the Project design will incorporate architectural treatment to all walls, bridges, and barriers. The City of Redwood City and Caltrans landscape architecture group would be involved in the design process and selection of aesthetic treatment for the Project.

5.2.2 Nonstandard Mandatory and Advisory Design Features

The phrase "mandatory design standards" refers to the mandatory standards outlined in Caltrans Highway Design Manual, Table 82.1A, while the phrase "advisory design standards" refers to the advisory standards outlined in Caltrans Highway Design Manual, Table 82.1B. Caltrans Highway Design Manual Chapter 21 defines Mandatory design standards as those considered most essential to achievement of overall design objectives. Advisory design standards are important also, but allow greater flexibility in application to accommodate design constraints or be compatible with local conditions on resurfacing or rehabilitation projects.

There are several nonstandard horizontal and vertical design elements that do not meet the current design standards. These nonstandard features have been documented in the design exceptions fact sheets that have been prepared for the Project. The Fact Sheet for exceptions to mandatory design standards for the preferred alternative was approved on December 1, 2016, while the Fact Sheet for exceptions to advisory design standards for the preferred alternative was approved on November 29, 2016.

The mandatory design exceptions and advisory design exceptions for the preferred alternative are summarized in Tables 5-3 and 5-4:

Table 5-3: Exceptions to Mandatory Design Standard – Preferred Alternative 3

Exception No.	Design Exception and HDM Index	Location	Standard	Proposed	Condition
M1	Standards for Superelevation Index 202.2	"84" Line (Woodside Road)	Radii -1050' Super 4%	2%	Existing
M2	Standards for Superelevation Index 202.2	"R2" Line (SB US101 On-Ramp from Woodside Road)	Radii -1014' Super 10%	5%	Proposed
M3	Standards for Superelevation Index 202.2	"R3" Line (NB US101 Off-Ramp to Seaport Boulevard)	Radii -300' Super 12% Radii -624' Super 12%	10%	Proposed
M4	Standards for Superelevation Index 202.2	"V1" Line (NB US101 Off-Ramp to Veterans Boulevard)	Radii -600' Super 12% Radii -600' Super 12%	10%	Proposed
M5	Standards for Superelevation Index 202.2	"V2" Line (SB US101 On-Ramp from Veterans Boulevard)	Radii -625' Super 12%	10%	Proposed
M6	Lane Width Index 301.1	84 @ 101/84 Separation and various locations	12 ft.	11 ft.	Proposed
M7	Shoulder Width Index 302.1	US101 SR84	10 ft. 8 ft.	2 ft -7.9 ft. 0 ft – 7.0 ft	Existing/ Proposed
M8	Median Width – Freeways and Expressways Index 305.1(3)(a)	US 101	22 ft.	9.1 ft Min	Existing
M9	Horizontal Clearances Index 309.1(3)(b)	SR 84	10 ft Min lateral clearance from fixed object (abutment wall)	1.10 ft WB Rt ETW 1.60 ft WB Lt ETW 0.90 ft EB Lt ETW	Existing
M10	Left-turn Channelization - Lane Width Index 405.2(2)(a)	WB SR 84/Woodside Road to SB US101 on-ramp WB SR 84/Woodside Road to SB Broadway	The lane width for both single and double left-turn lanes on State highways shall be 12 feet.	11 ft.	Proposed
M11	Right-turn Channelization – Lane and Shoulder Width Index 405.3(2)(a)	EB SR 84/Woodside Road to SB Broadway WB SR 84/Woodside Road to NB Broadway NB Broadway to EB SR 84/Woodside Road	Index 301.1 shall be used for right-turn lane width requirements. Shoulder width shall be a minimum of 4 feet.	2 ft.	Existing/ Proposed

HDM = Highway Design Manual
SB = southbound
EB = Eastbound
NB = northbound
WB = Westbound

Table 5-4: Exceptions to Advisory Design Standard – Preferred Alternative 3

Exception No.	Design Exception and HDM Index	Location	Standard	Proposed	Condition
A1	Superelevation on Class II and III Bikeways Index 202.2(2)	SR 84	Table 202.2 also applies to Class II and III bikeways. See index 1003.1 for class I guidance.	Radii - 1050' Super 2%	Proposed
A2	Superelevation Runoff Index 202.5(2)	"84" Line (Woodside Road)	2/3 of superelevation runoff should be on the tangent and 1/3 within the curve.	Does not conform	Existing
A3	Superelevation Runoff Index 202.5(2)	"V1" Line (NB US101 Off-Ramp to Veterans Boulevard)	2/3 of superelevation runoff should be on the tangent and 1/3 within the curve.	Does not conform	Proposed
A4	Superelevation Runoff Index 202.5(2)	"R5" Line (NB US101 On-Ramp from Seaport Boulevard)	2/3 of superelevation runoff should be on the tangent and 1/3 within the curve.	Does not conform	Proposed
A5	Standard for Grade Index 204.3	"R1" Line (SB US101 Off-Ramp to Woodside Road)	Min grade in snow country is 0.5% and 0.3% in other locations.	0.20%	Existing
A6	Standard for Grade Index 204.3	"R2" Line (SB US101 On-Ramp from Woodside Road)	Min grade in snow country is 0.5% and 0.3% in other locations.	0.12% and 0.19%	Existing
A7	Standard for Grade Index 204.3	"R4" Line (NB US101 On-Ramp from Woodside Road)	Min grade in snow country is 0.5% and 0.3% in other locations.	0.00%	Existing
A8	Standard for Grade Index 204.3	"R5" Line (NB US101 On-Ramp from Seaport Boulevard)	Min grade in snow country is 0.5% and 0.3% in other locations.	0.15%	Existing
A9	Standard for Grade Index 204.3	"V1" Line (NB US101 Off-Ramp to Veterans Boulevard)	Min grade in snow country is 0.5% and 0.3% in other locations.	0.10%	Existing
A10	Median Width Conventional Highways Index 305.1(2)	SR 84	12 ft. min for Urban main street highways.	6 ft Min	Proposed
A11	20.3 – Urban and Mountainous Areas Outer Separation Index 310.2	Between NB US 101 off-ramp and East Bayshore Road	26 ft. from edge of traveled way to edge of travel way.	17 ft Min	Proposed
A12	Distance between Ramp Intersection and Local Road Intersection Index 504.3(3)	SB US 101 on-ramp and EB SR84/Woodside Road and Broadway Intersection SB US 101 off-ramp and WB SR84/Woodside Road and Broadway Intersection	The preferred minimum distance should be 500 feet.	401 ft. 409 ft.	Proposed

Exception No.	Design Exception and HDM Index	Location	Standard	Proposed	Condition
A13	Class I Bikeway Horizontal Clearance Index 1003.1(3)	101/84 undercrossing	3 ft horizontal clearance from the paved edge of a bike path to obstructions shall be provided.	2.5 ft is provided on the right side of the Class I Bikeway	Proposed

HDM = Highway Design Manual
SB = southbound
EB = Eastbound
NB = northbound
WB = Westbound

5.2.3 Project Construction

The following activities and components are anticipated as part of Project construction. Project construction would take approximately 3 years. Vehicle, bicycle, and pedestrian access throughout the interchange area would be maintained throughout Project construction. Any lane or ramp closures would be temporary and limited to nighttime hours.

5.2.3.1 Temporary Right-of-Way Requirements

Acquisition of residential parcels is not required. North of US 101, widening of East Bayshore Road and the Seaport Boulevard/East Bayshore Road/Blomquist Street intersection is anticipated to require acquisition of small sections of parcels along the roadside frontages of industrial and commercial properties.

Throughout the Project area, temporary construction easements (TCEs) would be needed for construction access and staging.

Retaining walls have been used to minimize right-of-way impacts.

5.2.4 Interim Features

Interim features are not proposed at this time.

5.2.5 Maintenance Vehicle Pullouts

Maintenance vehicle pullouts (MVP) would be provided on the US 101 mainline and ramps as needed for access by maintenance and operations workers for their safety and protection; the exact locations will be determined during the final design of the Project.

5.2.6 HOV (Bus and Carpool) Lanes

Within the Project limits, US 101 is an eight-lane divided freeway with two HOV lanes, one in the northbound direction and one in the southbound. Existing HOV lanes require two or more passengers per vehicle to use the lane between the operating hours of 5 AM to 9 AM and 3 PM to 7 PM. For the on-ramps, HOV preferential lanes operate on a full-time basis (24/7). HOV preferential lanes currently exist on both the northbound and southbound metered ramps within the Project limits. The proposed Project will not affect the HOV lanes on the US 101.

Alternative 3 proposes a HOV preferential lane for the northbound and southbound on-ramps. The southbound on-ramp storage length will be increased by pushing the ramp metering limit line southerly.

5.2.7 Ramp Metering

Caltrans District 4 Directive 97-03, dated November 11, 1997, calls for implementation of the Ramp Meter Development Plan on selected on-ramps and freeway-to-freeway connectors. Caltrans District 4 has determined that all local service on-ramps within the Project limits are included in the plan, which therefore requires installation of ramp metering hardware and provision of HOV preferential lanes. Alternative 3 would include a three lane ramp meter with a HOV preferential lane in both northbound and southbound directions.

All existing and operational ramp metering and TOS elements will be kept operational throughout the construction phase of this Project. Any TOS or ramp meter elements that may be affected by this Project will be relocated, modified, or fully replaced as necessary.

5.2.8 Traffic Operations System

The San Mateo Smart Corridor Project has existing ITS equipment at the intersection of Seaport Boulevard and Bayshore Road. There are existing CCTV cameras at the signalized intersection, an informational message sign on the northbound approach of the intersection from Bayshore Road, and fiber optic communication conduits and cables.

These and other existing Traffic Operations System (TOS) field elements within the Project limits, such as closed-circuit television cameras (CCTVs) and loop detectors on US 101, will be preserved or kept operational during Project construction. Any existing TOS element that will be affected by the proposed Project will be relocated, modified, or fully replaced as necessary. This will be determined during the final design phase. Additional TOS elements have been included in the Project, such as ramp metering with HOV preferential lanes, traffic-monitoring loop detectors, and fiber-optic conduits. Other TOS elements that should be considered during the plans, specifications, and estimates (PS&E) phase include, but are not limited to, video traffic detectors, highway advisory radio, and additional CCTVs. An allowance for new TOS elements has been included in the Project cost estimate (see Attachment D).

5.2.9 CHP Enforcement Areas

The proposed Project includes many features to assist the California Highway Patrol (CHP) in law enforcement activities. At on-ramp locations, a standard 15-foot wide CHP enforcement area is proposed.

5.2.10 Park and Ride Facilities

This Project proposes no new park-and-ride facilities. Currently, there is one existing park-and-ride facility located north of the Project area. The SamTrans Park and Ride facility is located on Whipple Avenue approximately 1 mile north of US 101 and provides 54 spaces.

5.2.11 Highway Planting

The Project would remove mature trees and other plants with the construction of the interchange. The design of the new interchange will include a number of large contiguous planting areas that provide opportunities for an attractive landscape setting for the interchange and entrance to the City of Redwood City at Woodside Road and other locations. Tall growing, drought tolerant trees are recommended for the wide planting areas to restore character and scale to the setting and to strongly define the highway corridor as the traveler approaches the City. Drought tolerant shrubs and woody groundcovers are recommended for planting within the landscape areas. The plant selection must provide visual interest for motorists, pedestrians and bicyclists, require minimal water use and maintenance and deter the growth of weeds. Flowering accent trees and shrubs are recommended for seasonal interest and accents.

Medians that are wide and long provide opportunities for planting with drought tolerant shrubs and groundcovers. Where the roadway design speed and tree setbacks permit, flowering accent street trees are recommended to enhance the appearance of the streetscape.

Replacement highway planting will be provided in all unpaved areas within the Project limits. Per Caltrans Highway Design Manual, section 62.5 Landscape Architecture, "Highway planting addresses safety requirements, complies with environmental commitments, and assists in the visual integration of the transportation facility". Highway planting also includes roadside management strategies that improve worker safety. The acres of replacement planting estimated in the Visual Impact Assessment is 10 acres for Alternative 3. Replacement planting, including trees, shrubs and groundcover, would meet Caltrans' current setback and sight distance requirements. Highway planting will be completed as a separate Project from the road Project, and encompass a 3-year plant establishment period. A landscape concept plan will be prepared during the early design phase of the Project and submitted for Project Development Team review.

An automatically controlled irrigation system and irrigation crossovers will be provided. Due to drought management, Caltrans has implemented the use of Smart controllers, a weather-based irrigation controller system that automatically downloads weather data from the internet on a daily basis and updates watering cycles based on daily evapotranspiration rates. Additional water saving features will include a flow sensor and master valve to shut down the system in the event of a leak, use of bubblers instead of overhead spray heads to place water only where it is needed and hydro-zoning the valves so that plants materials with similar watering requirements are irrigated together. Irrigation crossovers (jacked or drilled) will be installed on the road job, across major streets, as well as on- and off-ramps. The crossovers and irrigation equipment will be located in areas that are safe for maintenance personnel to access. The irrigation equipment will be installed outside of clear recovery zones, preferably near maintenance vehicle pullouts.

5.2.12 Water Pollution and Erosion Control

Standard Caltrans erosion control measures will be used to protect the transportation facility and to meet water quality discharge requirements. These measures include seeding, planting, rock slope protection, slope paving, and applicable new technologies such as bonded fiber

matrix and turf reinforcement mat. In addition to temporary erosion control, the following other erosion control measures are proposed during the construction phase:

- Temporary silt fence
- Temporary drainage inlet protection
- Check dams
- Temporary fiber rolls
- Temporary covers
- Temporary hydraulic mulch
- Temporary fence (Type ESA)

A detailed evaluation of erosion control measures will be made at the PS&E stage in conjunction with design of storm water control measures using Caltrans guidelines for best management practices (BMPs). Erosion control measures are further explained in detail in the Storm Water Data Report (for approval signature page, see Attachment F). Erosion control measures will be defined for the Project and included in a Storm Water Pollution Prevention Plan (SWPPP) during final design phase as required by the National Pollutant Discharge Elimination System (NPDES) permit.

The estimated costs for the erosion control measures have been included in the Preliminary Project Cost Estimate Summary (see Attachment D).

5.2.13 Noise Barriers

Based on findings from the preliminary Noise Abatement Decision Report (NADR), no noise barriers or other noise mitigations are required for this Project (see Attachment M).

5.2.14 Non-Motorized and Pedestrian Features

The interchange vicinity lacks bicycle and pedestrian facilities. No designated bicycle facilities provide access across US 101 in the Project area. The closest bicycle facility is on Blomquist Street, which has Class II bikeways. Seaport Boulevard has a Class I bikeway north of Blomquist Street and East Bayshore Road. Veterans Boulevard has buffered Class II bikeways north of Chestnut Street, but no bicycle or pedestrian facilities between Chestnut Street and the interchange. Bay Road and Broadway have sidewalks but no designated bicycle facilities. Within Redwood City, US 101 serves as a barrier to bicycle and pedestrian access between each side of the freeway.

Bicyclists and pedestrians have to use Woodside Road to connect to Seaport Boulevard, or use the overcrossing at Maple Street, which is approximately 0.5 mile to the west of Woodside Road, to travel across the freeway. Woodside Road has no striped bike or pedestrian facilities in the vicinity of the US 101 undercrossing, and the freeway on- and off-connections to Woodside Road are not considered “bike friendly” because of the free-flow merging of exiting and entering traffic typical of interchange ramps. The Redwood City General Plan notes the lack of sidewalks and safe crossings, the high vehicular volumes that discourage pedestrian and bicycle use, and the need to provide better linkages accessible to these modes of travel and use. These connections are specifically needed in this area to complete the pedestrian and bikeway access along Seaport Boulevard to Woodside Road that currently terminates at Blomquist Street.

Table 5-5 summarizes existing bicycle and pedestrian facilities.

Table 5-5: Bicycle and Pedestrian Facilities in the Study Area

Street	From	To
Bicycle Facilities[a]		
Blomquist Street: Class II bikeways	Seaport Boulevard	Maple Street
Seaport Boulevard (1.4-mile Class I bikeway)	Blomquist Street	Seaport Centre
East Bayshore Road (shared lane markings)	Seaport Boulevard	Approximately Haven Avenue
Broadway (shared lane markings and Class II bikeways)	East of Woodside Road (Shared Lane)	West of Woodside Road (Class II)
Veterans Boulevard (Class II bikeways)	Chestnut Street	West of Chestnut Street
Sidewalks with Buffer to Traffic and/or Minimal Barriers		
Veterans Boulevard (north side)	Maple Street	Chestnut Street
Maple Street (east side)	Marshall Street	Veterans Boulevard
Chestnut Street (east side)	Broadway	Veterans Boulevard
Broadway (south side)	Chestnut Street	Woodside Road
Broadway (north side)	Woodside Road	Charter Street
Sidewalks in Poor Condition or with Barriers		
Veterans Boulevard (south side)	Maple Street	Chestnut Street
Maple Street (west side)	Marshall Street	N. of Veterans Boulevard
Chestnut Street (west side)	Broadway	Veterans Boulevard
Broadway (north side)	Maple Street	Woodside Road
Broadway (south side)	Maple Street	Chestnut Street
Broadway (south side)	Woodside Road	Charter Street
Blomquist Street	Maple Street	Seaport Boulevard
No Sidewalk		
Maple Street (both sides)	N. of Veterans Boulevard	Blomquist Street
Blomquist Street (north side)	Maple Street	Seaport Boulevard
Woodside Road (both sides)	Blomquist Street	Bay Road

Source: Fehr & Peers 2015

[a] A Class I bikeway (bike path) is a completely separate facility designated for the exclusive use of bicycles and pedestrians, with vehicle and pedestrian cross-flow minimized. A Class II bikeway (bike lane) is a striped lane designated for the use of bicycles on a street. A Class III bikeway (bike route) is a route designated by signs or pavement markings for bicyclists within the vehicular travel lane (i.e., shared use) of a roadway. A Class IV bikeway (bike lane), has a marked (painted) buffer without flexible posts or inflexible barriers as the separation between the bike lane and the vehicular traffic lane.

Other than Seaport Boulevard/Woodside Road, the Maple Street overcrossing is the other means of crossing the freeway in the Project vicinity. Bicyclists currently use the Maple Street overcrossing of US 101 because it is a relatively less traveled vehicle route, but the existing striped shoulders are relatively narrow and there are no sidewalks except on the bridge structure.

Local pedestrian and bicycle access across Woodside Road to/from downtown Redwood City is also limited due to heavy traffic volumes and the design of the intersections, which provide only two signalized crossings in the study area south of US 101 (at Bay Road and Broadway). There is one grade-separated pedestrian overcrossing of Woodside Road at Stambaugh Street, which is two intersections to the south of the Project limits.

The proposed Project would add Class I, Class II, and Class IV bikeways and sidewalks along the SR 84/ Woodside Road corridor, a Class I bikeway along UPRR, and Class I and Class II bikeways along the Broadway and Veterans Boulevard corridor. Protected intersections are also being provided for bicyclists accessing the intersections along Woodside Road (Broadway and East Bayshore Road/Blomquist Street). Protected

intersections are designed to separate bicyclists and pedestrians from motorists via a refuge area located on the corners of the intersections, which allows for increased reaction time and visibility, and improves safety.

See Attachment B, roadway layouts, for locations of pedestrian and bicycle features.

5.2.14a Complete Streets Policy/Design Considerations

Flexibility in Highway Design, Complete Streets, and NACTO guidelines were reviewed during Project development and components from these guidelines have been considered. The following components will be incorporated into the Project:

- Standard lane, sidewalk, Class I, II, III, and IV Bikeway widths.
- Standard lighting, signing, and striping.
- Corner refuge islands and mountable truck aprons at Woodside Road/Broadway and Woodside Road/East Bayshore Road/Blomquist Street intersections.
- Stormwater management elements such as biofiltration strips, swales, and/or detention basins.
- Landscape Improvements
- Aesthetic features such as architectural treatment along retaining walls and bridge abutments and city gateway features at the intersections of Broadway/Woodside Road and Veterans Boulevard/Chestnut Street.

5.2.15 Needed Roadway Rehabilitation and Upgrading

Life Cycle Cost Analysis (LCCA) was prepared using the guidelines presented in the Caltrans Highway Design Manual, Caltrans LCCA Procedures Manual, and RealCost v2.5CA software. The LCCA was approved on December 19, 2015.

The LCCA accounts for various Project factors including Traffic Index (TI). For a 40 year design life, the TI was determined using the formula presented in the Highway Design Manual 613.3 Traffic Index Calculation. The TI formula includes input for projected equivalent single axle loads (ESALs). For Route 84/Woodside Road, the TI was determined to be 13.0 based on an ESAL of 19,161,743. For Route 101 at the Junction of Route 84, the TI was determined to be 13.5 based on a ESAL of 33,314,873.

The LCCA determined that Continuously Reinforced Concrete Pavement should be used for the Project. Based on engineering judgment, and given the presence of the underground utility corridor in the area which would be more difficult and costly to access under rigid pavement, it is recommended that the Project use 40 year design life Flexible Pavement instead. A summary of the LCCA assumptions, results, general Project information, and traffic data are described in the LCCA Design Assumptions Memo included in Attachment L.

5.2.16 Cost Estimates

A preliminary cost estimate was prepared for the preferred alternative. A detailed breakdown of the quantities and unit prices is provided in Attachment D. Below is a summary of the preliminary cost estimate for the Preferred Alternative.

Table 5-6: Total Project Cost

Roadway	Structures	Right of Way	Total Capital Cost
$ 37,160,421	$40,990,056	$ 36,952,000	$ 115,103,000

The preliminary total cost estimate including the support cost for the preferred alternative is $142.0M.

5.2.17 Aesthetic Treatments

Caltrans uses "Context Sensitive Solutions (DP-22)" as an approach to plan, design, construct, maintain, and operate its transportation system. These solutions use innovative and inclusive approaches that integrate and balance community, aesthetic, historic, and environmental values with transportation safety, maintenance, and performance goals. Context sensitive solutions are reached through a collaborative, interdisciplinary approach involving all stakeholders.

Aesthetic treatments envisioned for the bridge structures include the following:

- Concrete Barrier (Type 742) will be used along the outside edges of the Northbound 101 Off-Ramp/Route 101 & 84 Separation.
- Concrete Barrier (Type 742) will be used along the outside edge and median of the S101 On-Ramp/Route 84 Separation.
- Chain Link Fence will be used along the bikeway on the southbound US 101 On-Ramp/Route 84 Separation.
- Chain Link Fence will be used over the UPRR tracks on the Redwood Harbor Northbound On-Ramp OH and the Woodside Road Southbound Off-Ramp OH.
- Concrete Barrier (Type 736) will be used along the outside edges of the Seaport Boulevard Northbound On-Ramp OC, Redwood Harbor Northbound On-Ramp OH, Woodside Road Southbound Off-Ramp OH, and Retaining Walls.
- The Pier wall at Seaport Boulevard Northbound On-Ramp OC that will match the existing structures pier wall.

Aesthetic features are to be included in the design of interchange structures. The overall design is to be attractive, cohesive and context sensitive as per Caltrans Director's Policy Number 22, Context Sensitive Solutions. Opportunities where aesthetic features can be expressed include abutments, walls, barriers, railings, corbels and lighting. It is the goal of the Project to create concrete formliner-created textures and patterns that reflect community themes and character. Selection of colors, light fixtures and poles and design of metal work are important components of the overall design. All features of the Project including formed concrete, metal work, lighting, colors and textures must be considered as a single cohesive design with multiple components.

Any aesthetic treatments outside of State Right of Way will be maintained by the City. Any requests by the City for special aesthetic treatments within State Right of Way that are deemed Gateway Monumentation or Gateway Identifiers will be maintained by the City.

City Gateways

The City of Redwood City General Plan identifies roadway corridors in the City including El Camino Real, Woodside Road, Middlefield Road, Veterans Boulevard, and Broadway that have very different characters. Each corridor functions as a community and neighborhood connection, as well as a place for shopping, living, and working. Also of note are the Redwood Shores Parkway and Marine Parkway, within the Redwood Shores master planned community.

While these corridors are currently predominantly automobile oriented, with limited provisions for pedestrians and bicyclists, Redwood City envisions the corridors transformed into mixed use and pedestrian oriented environments. Utilizing corridors in this manner contributes to a more compact pattern of development, and helps encourage use of alternative forms of transportation. Inspired by Downtown and the historic neighborhoods, the City looks to encourage urbanism where it has not existed previously, with private buildings lining and oriented to well-designed public streets.

The street corridors also serve as the most visible pathways into the City, with major gateway entrance locations. Gateways provide opportunities for urban design features such as attractive landscape statements and high quality signage to help identify Redwood City and provide directional information to the public. The City's General Plan recommends the creation of plans for and installation of strong, unifying gateways with signage and other public improvements at the following City gateways:

- Edgewood Road at Alameda de las Pulgas
- Farm Hill Boulevard at Woodleaf Avenue
- Woodside Road at Alameda de las Pulgas
- El Camino Real at the San Carlos City limit
- El Camino Real near Oakwood Drive
- Middlefield Road near 7th Avenue
- Woodside Road at US 101
- Seaport Boulevard at US 101 (Port Gateway)
- Whipple Avenue at US 101
- Redwood Shores Parkway and Marine Parkway, at US 101 (at the City boundary)

In the Project limits, Veterans Boulevard, with US 101 access at Whipple Avenue and Woodside Road, serves as a highly visible gateway into Redwood City. With its wide right-of-way and higher traffic speeds, Veterans Boulevard currently has a distinct auto-oriented character, with commercial and industrial businesses representing the dominant uses, although the Kaiser Permanente hospital campus also has a significant presence. The City of Redwood City envisions transforming the Veterans Boulevard Corridor into a true boulevard, with nodes of regional commercial businesses that benefit from high freeway visibility at the

Whipple and Woodside interchanges, and office district and mixed-use neighborhoods in between. To help achieve this vision, Veterans Boulevard has a "Boulevard" street typology classification.

The City's entrances from US 101 onto Veterans Boulevard offer the first impression many visitors have of Redwood City. To convey the City's identity at these points of access, as well as to take better advantage of freeway visibility, the City envisions successful commercial and mixed-use Gateway Centers near the Woodside Road/Veterans Boulevard and Whipple Avenue/Veterans Boulevard intersections. The Gateway Centers will support commercial, mixed-use, and housing. Appropriate commercial uses include hospitality businesses, largescale commercial and retail centers, and quality office space with associated amenities.

Attractive streetscapes and clear directional signage will complement the uses. Efforts will be made to enhance these entrances to the City with urban design features and landscaping that support and define the City of Redwood City's image. The Gateway Monument would be funded and maintained by local funds.

The Project would conform to Caltrans Gateway Monument Policy described in Chapter 29 of Caltrans Project Development Procedures Manual.

5.2.18 Bicycle and Pedestrian Lighting

Bicycle and Pedestrian Lighting would be considered at the following Class 1 bikeway locations.

1. Along US 101 and Woodside Road undercrossing
2. Under Veterans Boulevard Flyover structure overcrossing
3. Along US 101 undercrossing parallel to UPRR
4. Along Veterans Boulevard on-ramp overcrossing

In addition, locations where riding at night is anticipated would be further analyzed during the Project design phase and the need for lighting would be identified.

5.2.19 Americans with Disabilities Act (ADA) Compliance

The Project would comply with ADA Guidelines and Design Information Bulletin (DIB) 82-05 - Pedestrian Accessibility Guidelines for Highway Projects. Existing pedestrian facilities would be upgraded to meet ADA standards. The Project would construct around 6250 linear feet of sidewalk and would construct 32 curb ramps. The estimated capital costs for the ADA improvements is $650,000.

5.3 Project Phasing

The Preferred Alternative was further evaluated for potential Project construction phasing opportunities. The Project presents the opportunity to be constructed in three major phases. A description of these phases are summarized below. If Project phasing is applied, additional

design exceptions will be requested for existing nonstandard features that the construction phase is not remedying. See Attachment B2 for proposed Project Phasing Layouts.

Phase 1:

Phase 1 would construct a major portion of the proposed Project. Construction would be concentrated on the southbound side of US 101. Direct access to and from northbound US 101 to Veterans Boulevard, and from Veteran Boulevard to southbound US 101 would be provided via the flyover structures. The existing 5-legged intersection at Veterans Boulevard and Woodside Road could be eliminated and replaced with a new 4-legged signalized intersection between southbound US 101 on- and off-ramps and Woodside Road. These changes in configuration would improve access to US 101, Veterans Boulevard, and Woodside Road.

Phase 1 would construct 16 of the retaining walls within the Project limits, N101 Off-ramp/Rte 101 & 84 Separation, S101 On-ramp Rte 101 & 84 Separation, Woodside Road Southbound Off-ramp OH, Redwood Harbor OH (Portion), Retaining Wall No. 120, 126, 333, 533, 637, 732, 801, 802, 803, 804, 805, and 806. In order to reduce impacts to Seaport Boulevard and East Bayshore Road, a temporary retaining wall and roadway would be constructed from Retaining Wall No. 333 to existing Seaport Boulevard. The S101-SR 84 Connector OH (Br No. 35-0065F) and a portion of Redwood Harbor OH (Br No. 35-0065) would also need to be removed to accommodate the improvements made during this phase.

Pedestrian and bicycle facilitates would be constructed during Phase 1 and would include construction of Class I Bikeways from Seaport Boulevard to Veterans Boulevard and from Veterans Boulevard to Charter Street (along the S101 On-ramp Rte. 101 & 84 Separation), concrete sidewalks, and curb ramps.

Phase 1 of the Project would take approximately 350 working days for completion at a cost of approximately $79.4M. See Table 5-7 for Phase I cost details.

Phase 2:

Phase 2 would be concentrated on the northbound side of US 101, East Bayshore Road, Blomquist Street, and Seaport Boulevard.

Phase 2 would improve traffic along Seaport Boulevard and Woodside Road by widening Seaport Boulevard and installing signalized intersections at the access locations to the northbound US 101 on- and off-ramps. In addition, it would eliminate the short merge lengths along Seaport Boulevard due to the northbound off-ramp traffic that currently enters westbound Woodside Road.

Phase 2 would include the construction of 10 permanent structures; Route 101/84 Separation Bridge No. 35-0083, Redwood Harbor Northbound On-ramp OH, Seaport Boulevard Northbound On-ramp OC, Redwood Harbor OH (Portion), and Retaining Walls No. 115, 423, 434, 535, 536, and 538. Removal of existing structures would include: N101-SR 84 Connector OC (Bridge No. 35-0081G), S101-SR 84 Connector OH (Br No. 35-0065F), portions of Route 101/84 Separation (Br No. 35-0083), and the temporary retaining wall constructed in Phase 1.

Pedestrian and bicycle improvements would also be constructed during Phase 2 and would include installation of Class I Bikeways along Blomquist Street, Woodside Road, and Seaport Boulevard, concrete sidewalks, and curb ramps. The Class I Bikeways along Woodside Road and Seaport Boulevard would provide access from Broadway to the East Bayshore Road intersection.

Phase 2 of the Project would take approximately 275 working days for completion at a cost of approximately $38.7M. See Table 5-7 for Phase II cost details.

Phase 3:

Phase 3 would construct the remaining portions of roadway for the proposed Project and would include construction of Woodside Road, Broadway, and Bay Road. No structures will be built during Phase 3.

This phase would construct sidewalks and curb ramps along Woodside Road, Broadway, and Bay Road in addition to providing Class I Bikeways which connect Veterans Boulevard to Broadway and Woodside Road. This phase would also include installing the final signs and roadway striping for the Class II bikeways located within the Project area.

Phase 3 of the Project would take approximately 120 working days for completion at a cost of approximately $27.1M. See Table 5-7 for Phase III cost details.

The estimated Capital and Support Costs for the Preferred Alternative for the three phases are summarized in the following table:

Table 5-7. Preferred Alternative Total Estimated Capital and Support Costs Per Phase

DESCRIPTION	PHASE 1	PHASE 2	PHASE 3
Total Roadway Items	$16,547,000	$12,686,000	$8,572,000
Total Structures Items	$33,489,000	$8,212,000	$0
Total Right of Way and Utility Costs	$13,504,000	$9,916,000	$13,534,000
TOTAL CAPITAL COSTS	**$63,539,000**	**$30,813,000**	**$22,106,000**
PA&ED Phase	$1,334,000	$1,334,000	$1,334,000
Engineering Services (PS&E)	$6,354,000	$3,082,000	$2,211,000
R/W Services	$650,000	$360,000	$150,000
Construction Administration	$7,506,000	$3,135,000	$1,286,000
TOTAL SUPPORT COSTS PER PHASE	**$15,843,000**	**$7,910,000**	**$4,980,000**
TOTAL PROJECT COSTS PER PHASE	**$79,381,000**	**$38,722,000**	**$27,085,000**
TOTAL PROJECT COSTS	**$145,188,000***		

* Approximate additional costs due to phasing the Project are assumed to be $3.19M and include construction items related to the temporary detour and retaining wall constructed in Phase 1.

5.4 Rejected Alternatives

Alternatives were identified and considered during the early stages of Project development but were eliminated because they did not meet the Project's purpose and need or would have

unacceptable environmental impacts. The following describes these alternatives and why they were not advanced for further evaluation.

Alternatives considered in 2000 and 2006 interchange reconstruction studies were not advanced because they involved connections to a Bayfront Expressway Extension that was never built.

The 2011 Interchange Alternatives Analysis Study (SMCTA 2011) examined five designs: one (Alternative 3) had design elements that were advanced for further evaluation in the current Project, and four were ultimately determined to have unacceptable traffic operations.

During the preparation of the Draft Project Report (DPR), new concepts and alternatives were analyzed in addition to those discussed in the past. After preliminary designs were developed, focused alternative evaluations were performed on nine designs plus variations. Two alternatives were considered feasible that would meet the overall purpose and need of the Project: Alternatives 3 and 8B, which were evaluated in detail in the approved DPR.

The following is a brief summary of why these alternatives were rejected. For more detailed descriptions of the rejected alternatives, please refer to the IS/EA.

5.4.1 PR Alternatives 1, 2, 4 and 3B - Partial Cloverleaf Interchange

These alternatives are similar (but not identical) to those considered in the 2011 study, with the same identification numbering. For all three, the northbound US 101 ramps would form a partial cloverleaf design. The southbound US 101 ramps would be configured as a compact diamond with partial interchange improvements at Maple Street (Alternative 1), loop off ramp exit aligned with Veterans Boulevard (Alternative 2), or loop off ramp exit aligned with Veterans Boulevard with direct diagonal off ramp to Woodside Road (Alternative 4). These alternatives would not reduce the number of intersections on Woodside Road, and the close spacing of intersections would remain, resulting in traffic queues that overlap with adjacent intersections. These designs would not provide adequate levels of service or meet the Project's purpose and need to improve traffic conditions at local roadway intersections.

Alternative 3B would be similar to Alternative 3 at the northbound ramps, but would have a standard diamond ramp configuration at the southbound ramps. Southbound US 101 off- and on-ramps would form a diamond interchange with Woodside Road. However, the intersection for the southbound ramps would be wider to accommodate a grade separation at Woodside Road and Broadway. The grade separation would allow though traffic on Woodside Road to cross under Broadway, theoretically improving travel times on Woodside Road, but would create additional undesirable 5 legged intersections at the US 101 southbound Ramps/Woodside Road intersection and Bay Road/Woodside Road intersection. Based on preliminary operations analysis, both of these intersections would result in no overall improvement in operations. Therefore, Alternative 3B was determined to not meet the Project's purpose and need.

5.4.2 PR Alternatives 3A, 6, 6A and 6B - Roundabout Interchange

The potential use of one or more roundabouts (also known as traffic circles) was investigated where Woodside Road intersects with the northbound and southbound US 101 on- and off-ramps. A basic issue with roundabouts at this interchange is the need for signals to handle the

high traffic volumes and pedestrian crossings, which eliminate the continuous traffic flow advantage that a roundabout design offers.

5.4.2.1 Alternative 3A

Alternative 3A is similar to Alternative 3. The southbound US 101 off- and on-ramps would form a diamond interchange with Woodside Road, the northbound US 101 off-ramp would lead into a Veterans Boulevard flyover ramp, and the northbound US 101 on-ramp would have a three-lane partial cloverleaf configuration. However, on the north side of US 101, the northbound US 101 off-ramp would terminate at a 250-foot inscribed diameter[5] three-leg roundabout with bypass lanes from the northbound US 101 off-ramp to Seaport Boulevard and Seaport Boulevard to the northbound US 101 on-ramp.

The projected traffic volumes and traffic analysis (Fehr & Peers 2015) indicate that the roundabout would lead to traffic queuing (backing up) onto northbound US 101 from the northbound US 101 off-ramp. The northbound US 101 off-ramp approach is anticipated to operate at LOS F in opening year 2022 and horizon year 2042. Vehicle queuing onto US 101 would occur depending on the level of pedestrian activity and pedestrian control at the roundabout. This was identified as a fatal flaw that would present significant traffic and safety concerns and therefore would not meet the Project's purpose and need.

5.4.2.2 Alternative 6 and Variations

Alternative 6 would have roundabouts on both sides of US 101. With Alternative 6, the southbound US 101 ramps would be part of a six-leg, 400-foot inscribed diameter, two-lane roundabout with Woodside Road, Veterans Boulevard, and Broadway. Bypass lanes would be provided for the southbound US 101 off-ramp to Veterans Boulevard and northbound Broadway to the southbound US 101 on-ramp. The northbound US 101 on-ramp would be part of a two-lane partial cloverleaf interchange and would terminate in a 250-foot inscribed diameter, three-leg, two-lane roundabout with bypass lanes from the northbound US 101 off-ramp to Seaport Boulevard and Seaport Boulevard to the northbound US 101 on-ramp.

Traffic volumes were projected to be too high at the Woodside Road/Broadway intersection to consider a roundabout, even one with three lanes. Under Alternative 6, the existing and estimated 2040 volumes would be well above the two-lane roundabout threshold at both roundabout locations.

With Alternative 6A, the southbound US 101 ramps would be part of a 300-foot inscribed diameter, five-leg, two-lane, roundabout with Woodside Road and Broadway. There would be bypass lanes for the southbound US 101 off-ramp to Broadway and northbound Broadway to the southbound US 101 on-ramp. Veterans Boulevard flyover ramps would connect with the southbound US 101 on-ramp and northbound US 101 off-ramp. The northbound US 101 on-ramp would be part of a two-lane partial cloverleaf interchange and would terminate in a 250-foot inscribed diameter, three leg, two-lane roundabout. Like Alternative 6, Alternative 6A would have bypass lanes from the northbound US 101 off-ramp to Seaport Boulevard and Seaport Boulevard to the northbound US 101 on-ramp.

[5] Inscribed diameter refers to diameter of outside edge of travelled way of the Roundabout.

Under Alternative 6A, the existing and estimated 2040 volumes would be well above the threshold for a two-lane roundabout on the south side of US 101. At the roundabout on the north side of US 101, estimated 2040 volumes are right above the threshold for a two-lane roundabout. A Roundabout at the northern ramps would not be feasible due to similar reasons mentioned under Alternative 3A.

With Alternative 6B, the southbound US 101 ramps would be part of a five-leg, two and partial three-lane, 300-foot inscribed diameter roundabout with Woodside Road and Broadway. The roundabout would have bypass lanes serving the same movements as Alternative 6A, and Veterans Boulevard flyover ramps would be provided as with Alternative 6A. Alternative 6B would also have a roundabout on the north side of US 101; in this case, it would be a 250-foot inscribed diameter, three leg, two-lane roundabout. Like Alternative 6A, it would have bypass lanes from the northbound US 101 off-ramp to Seaport Boulevard and Seaport Boulevard to the northbound US 101 on-ramp.

The roundabouts proposed on the south side of US 101 for Alternatives 6, 6A, and 6B would present additional conflicts as well. The roundabout would be challenging for pedestrians and bicyclists to navigate. There is a higher risk of conflict between vehicles and bicycles on the roadway, and pedestrians would experience substantial out of direction travel and midblock crossings (with possible extended delays for signal/yielding) for sidewalk travel. Inorder to meet intersection level of service standards, a crosswalk would not be installed at the north side of Woodside Road at Broadway. This would reduces trail connectivity along the Class I Bikeways located between Broadway, Veterans Boulevard, Blomquist Street, and Chestnut Street.

Utility relocations would be needed for gas transmission, gas and electric distribution, water, sewer, and communication lines. The existing pump station and PG&E substation could also be affected.

The roundabouts on the south side of US 101 for Alternatives 6, 6A, and 6B would require substantially more right of way acquisitions than the proposed build alternative. Affected businesses along Woodside Road could include community retail, commercial, and restaurants, and could result in loss of business and tax revenue for the city.

5.4.3 PR Alternatives 5 & Variations -Type L-5 Interchange & Maple Street Ramps

A “Type L-5” interchange refers to one of a number of interchange designs that connect with or add roads parallel to the freeway (frontage roads). For this design concept, Alternatives 5 and variations would add on- and off-ramps to the west of the existing Maple Street overcrossing and one-way frontage roads connecting to Woodside Road and Seaport Boulevard. Alternative 5A would add braided (overcrossing) ramps in those locations instead of frontage roads. Alternative 5B would modify Alternative 5 to provide single off ramp and onramp access in both northbound and southbound directions to both Woodside Road and Maple Street. Alternative 5C would provide separate on ramps and off ramps in northbound and southbound directions for both Woodside road and Maple Street. Alternative 5D would modify Alternative 5C to combine northbound loop onramp from Seaport Boulevard connection with the Maple Street northbound diagonal onramp.

These alternatives offered the potential to distribute traffic between Woodside Road and Maple Street, possibly improving traffic on Woodside Road. This design was ultimately rejected because the proposed ramps would be within 0.75 mile of the existing Whipple Avenue interchange, which would not meet a Department mandatory design requirement of at least 1 mile spacing between freeway interchanges. Alternatives 5A and 5C were rejected because they would create additional freeway entrance points. Constructing interchange ramps at the Maple Street overcrossing would also add potential new intersection conflicts for bicyclists who prefer using Maple Street to other busier US 101 crossings.

5.4.4 PR Alternative 7 - Single Point Interchange

A "single point" or "urban" interchange offers the advantage of a more compact design and reduces the number of traffic points of conflict by having all directions of travel pass through a single intersection. This type of interchange would have very high construction and staging costs and was considered infeasible to build because it would require simultaneous reconstruction of the US 101/Woodside Road undercrossing and the mainlines of northbound and southbound US 101. Staging would be impractical considering the traffic volumes on US 101. Traffic operations would be delayed in all directions by a pedestrian or bicyclist activating a signal crossing. This alternative was therefore eliminated from further consideration.

5.4.5 PR Alternatives 8 and 8A - Diverging Diamond

Like Alternative 8B, Alternatives 8 and 8A are "diverging diamond" designs. Alternative 8 was eliminated from further consideration because it would not provide direct freeway access to and from Veterans Boulevard. For this reason, flyover ramps connecting Veterans Boulevard with US 101 were considered for Alternatives 8A and 8B. Alternative 8A was eliminated because the required grades on the flyover ramps would exceed the Department's advisory standard for ramp grades, (8 percent, with the exception of descending on-ramps and ascending off-ramps where a one percent steeper grade is allowed). In addition, the southbound US 101 off-ramp would not meet elevation and curve radius standards for exiting the freeway.

5.4.6 PR Alternative 9 - Diamond and Partial Clover Leaf Interchange

This design concept would offer direct connections between Woodside Road and the US 101 northbound and southbound ramps, possibly improving flow at these ramps. Alternative 9 would require multiple flyover ramps, significantly increasing the height of the interchange and resulting in a visually unappealing structure. This alternative would require the proposed ramps to converge at the Woodside Road/Broadway intersection, and may result in unacceptable intersection geometry. This design was rejected because it did not meet the purpose and need to improve local traffic operations (on Woodside Road), estimated construction costs would be unacceptably high, and it would not provide direct freeway access to and from Veterans Boulevard.

5.4.7 No-Build Alternative

Under the no-build alternative, no construction on either local streets or US 101 within the

Project limits is proposed. The no-build alternative, which offers a basis for comparison with the build alternatives, assumes no major improvements within the Project area other than routine rehabilitation and repair. The No-Build Alternative was rejected because it does not meet the purpose and need of the Project.

5.5 ICE Assessment/Screening of Access Concepts

The following factors were considered in the ICE screening process to consider the access concepts for practicality; Capital Costs, Roadway Geometrics, Constructability (Staging), Maintenance, Hydraulic/Water Quality, Environmental and Right of Way.

The following factors were considered in the ICE screening process to consider the access concepts viable; Safety, Pedestrian and Bicyclist Access, Traffic Operations of State Highway System, Traffic Operations of Local Facilities.

All factors were assessed for each alternative and assigned a numerical value. When the design analysis was complete, the total scores for each alternative were calculated and compared. The design alternatives with the lowest scores were screened from further study.

5.5.1 Intersection Control Evaluation (ICE)

Based on the ICE Process Informational Guide for Traffic Operation Policy Directive #13-02 Version 1.0, a variety of access strategies and configurations were considered. Some types of access strategies and configurations were initially screened from further study because they did not meet Project needs. For example, the All Way Stop Control Interchange was deemed impractical for entering ADT volumes exceeding 25,000 per section C-3.3.1. Therefore it did not meet Project needs and merit further analysis.

As a result of initial screening of alternatives, the Project build alternatives were considered to be viable and feasible for the Project.

6. CONSIDERATIONS REQUIRING DISCUSSION

6.1 Hazardous Waste

Thirty-five potential hazardous materials sites within the Project area, or within 1/8th of a mile upgradient of the Project area, were identified during the regulatory database search and Project site reconnaissance. Soil and/or groundwater sampling is recommended prior to or during soil excavation activities. Soil and/or groundwater found to have environmental contaminants should be properly characterized and disposed of at an appropriate facility per applicable regulations.

The presence of US 101 within the Project limits for several decades indicates that soil in the immediate vicinity is likely contaminated with aerially deposited lead. In addition, thermoplastic paint on the road and freeway overcrossing is likely to contain lead, and buildings in the Project area may have leaded paint and asbestos-bearing construction materials. Asbestos could also be present in concrete, electrical insulation, expansion joint material, sheet packing in girder joints, and textured paint. Existing structures that will be demolished or modified should be investigated in the PS&E phase for potential hazardous

materials or contamination issues, including leaded paint, asbestos, and polychlorinated biphenyls (PCBs).

Contractors working at the Project site, or removing soil materials and/or groundwater from the Project area, should be aware of appropriate handling and disposal methods or options. Higher levels of the potential contaminants could be present at some locations and, therefore, material moved or removed may require individual or specific testing to verify it is at levels below any regulatory action limits.

6.2 Value Analysis

A Value Analysis (VA) study was performed in June 2015. The VA Study analyzed the conceptual plans and ensured their compatibility with the surrounding conditions. The objectives of the VA study were to identify value-improving proposals to the baseline concept in order to improve or maintain operational performance, reduce cost, and reduce design and construction time. The VA team presented 12 proposals. A VA study implementation meeting was conducted on August 12, 2015 to study, validate and accept or reject the presented proposals. The VA team developed twelve alternatives.
The following are the alternatives identified:

- VA Alternative 1 proposed to reduce the width of the inside shoulder on Veterans bridges (#1 and #2) to 4 feet wide from 10 feet on #1 and 8 feet on #2
- VA Alternative 2 proposed to reduce the width of Northbound Veterans flyover (Bridge #1) by eliminating a lane
- VA Alternative 3.1 proposed to reduce the Class 1 bikeway path on Veterans flyover (Bridge #1) from 16 feet wide to 12 feet
- VA Alternative 3.2 proposed to eliminate the bike path on Southbound Veterans bridge over Woodside Road (Bridge #2) and have pedestrians and cyclists use surface streets
- VA Alternative 4 proposed to design and construct Project Report Alternative 8B in lieu of Alternative 3
- VA Alternative 5 proposed to reduce width of Southbound Veterans bridge over Woodside Road (Bridge #2) by eliminating a lane
- VA Alternative 6.1 proposed to modify Northbound loop on-ramp to use existing structures in lieu of a new bridge at #3
- VA Alternative 6.2 proposed to eliminate the HOV lane on Northbound loop on-ramp to US 101 to narrow Bridge #3 to two lanes vs. three lanes
- VA Alternative 7 proposed to add retaining walls and eliminate fill for the west side of Veterans Boulevard (from Woodside to Chestnut) to reduce ROW acquisition
- VA Alternative 8 proposed to eliminate the bike path adjacent to the UPRR tracks to reduce ROW and soil movement
- VA Alternative 9 proposed to construct the two bridges that go over the UPRR at one time in lieu of in series
- VA Alternative 10 proposed to eliminate the Northbound off-ramp flyover to Veterans Boulevard (Bridge #1)

The PDT team and the stakeholders evaluated these VA alternatives. VA Alternative 7 to add retaining walls and eliminate fill for the west side of Veterans Boulevard (from Woodside to

Chestnut) to reduce ROW acquisition was the only proposal accepted by the team to further evaluate and implement during the Design Phase.

This VA alternative will reduce ROW cost, reduce embankment costs and minimize the amount of City land that has to be acquired to construct the Project.

6.3 Resource Conservation

The proposed Project will improve traffic operations and facilitate traffic movements through the Project area. The lessening of congestion and related traffic delay is associated with faster average travel speeds and more efficient vehicle operation compared to no-build conditions. Improved operations are likely to reduce vehicle energy use, whether in the form of petroleum fuels or alternative sources of energy. Measures to conserve energy and nonrenewable resources have been considered. Any existing asphalt concrete pavement that is removed will be recycled if economically and logistically advantageous. Additional features, such as barricades, signs, crash cushions, signals, MBGRs, and lighting, will be salvaged and reused if they are in working condition and if doing so proves economically and logistically advantageous. These features will be further analyzed during the final design phase.

6.4 Right-of-Way

6.4.1 Right-of-Way Required

South of US 101, the widening of Woodside Road, realignment of freeway ramps, and construction of the new Veterans Boulevard flyover would require full acquisition of two commercial parcels, and partial acquisitions from commercial/office and municipal properties along Woodside Road and the section of Veterans Boulevard to the south of US 101.

Throughout the Project area, TCEs would be needed for construction access and staging. Acquisition of residential parcels is not required. North of US 101, the widening of East Bayshore Road and the Seaport Boulevard/East Bayshore Road/Blomquist Street intersection are anticipated to require acquisition of small sections of parcels along the roadside frontages of industrial and commercial properties.

A right of way data sheet has been prepared for the Preferred Alternative based on the right of way needs of the conceptual design developed for the Project which can be found in Attachment G.

Acquisitions required for the right of way for the Preferred Alternative are from approximately 35 different larger parcels. Of these parcels, 7 are commercial with a zoning of CO (Commercial Office), MUC-GB (Mixed Use Corridor – Gateway Broadway), or IR (Industrial Restricted). The two industrial properties estimated as commercial were included based on the Redwood City's Inner Harbor Specific Plan. The properties are planned to be included in a commercial office development. Of the 28 remaining properties, 19 are industrial with a zoning of IR, GI (General Industrial), or LII-S (Light Industrial Incubator) and 9 are portions of public right of way from Redwood City.

Retaining walls have been used to minimize right-of-way impacts.

6.4.2 Utility and Other Owner Involvement

The utility investigations of the Project area included site visits and review of utility locations shown in readily available electronic or hard-copy plans obtained from Caltrans, SMCTA, City of Redwood City, Comcast, Sprint, Verizon, AT&T, Level III Communication, Qwest, Astound Broadband and PG&E. Where feasible, existing utility features were identified during field reconnaissance studies. Utilities verification will be performed and the project's utility plans will be prepared in accordance of Caltrans' Project Development Procedures Manual Chap 17 (PDPM Chap 17). High priority facilities will be positively located during PS&E.

A number of utilities need to be relocated within this Project. Utility investigations have identified the location and extent of existing service lines within the Project area. Suitable areas for utility relocation have been included in Project footprint and Project study areas. A preliminary list of utility relocation information for the Preferred Alternative is included in Attachment G, Right of Way Data Sheet. For Project funding purposes, all relocation costs and liability are estimated and included in the Project cost, but final "Determination of Liability" will be completed during the design phase. The Preferred Alternative is expected to require relocating some underground and above ground utilities to outside of the State right of way. The relocation of utilities would result in localized construction impacts and could result in temporary interruption of service. The affected utilities identified in the preliminary investigations involve gas transmission, gas and electric distribution, water, sewer, and communication lines. All utility relocations performed by the Project contractor or at any Project expense will comply with the provisions of Buy America per State standards.

The Preferred Alternative requires relocation of several high and low risk utilities. Further utility investigation should be performed to verify accuracy and completeness of utility data in accordance with State law, policy, procedure, contracts, and agreements during the final design phase. Table 6-1 summarizes the list of the affected utilities and estimated relocation costs for the Preferred Alternative. Verifications of utilities will be required. The need for positive location (potholing) will be determined once utility facilities have been plotted. Required potholing will be performed unless an exception to policy is secured.

Table 6-1: Existing Utilities To Be Relocated by Preferred Alternative 3

Utility Relocation	Owner	Relocation Quantity	Unit	Estimated Cost
2-22 kV Underground Lines	PG&E	380	LF	$228,180
1-4.16 kV Underground Lines	PG&E	706	LF	$423,360
3-12 kV Underground Lines	PG&E	287	LF	$172,020
12 kV Overhead Pole	PG&E	5	Pole	$425,000
2-4.16kV Overhead Pole	PG&E	1	Pole	$85,000
4-4.16kV Overhead Pole	PG&E	6	Pole	$510,000
4" Gas with 40' of 8" Casing	PG&E	346	LF	$173,146
12" Gas with 323' of 30" Casing	PG&E	323	LF	$467,761
Telecommunication Line	AT&T	364	LF	$90,890
Telecommunication Line	Astound	987	LF	$246,643
10" Water	City of Redwood	253	LF	$63,250
10" Water with 252' of 16" Casing	City of Redwood	1063	LF	$372,066
6" Water with 62' of 12" Casing	City of Redwood	324	LF	$81,000
18" Sanitary Sewer w/ 245' of 24" Casing	Fair Oaks Sewer Maintenance District	312	LF	$124,994
30" Sanitary Sewer w/ 245' of 36" Casing	Fair Oaks Sewer Maintenance District	888	LF	$444,015
30" Sanitary Sewer w/ 36" Casing	Fair Oaks Sewer Maintenance District	426	LF	$212,824
Casing Line Extension				
Extend 30" Casing for 24" Gas	PG&E	86	LF	$256,500
Install 16" Casing for 12" Sanitary Sewer	Fair Oaks Sewer Maintenance District	228	LF	$113,998

An Encroachment Policy Variance Request (EPVR) for the various existing utility facilities to remain in place within the State right of way has been submitted to Caltrans with the preferred build alternative and concurrence was provided on 12/12/2016 for conceptual approval. Table 6-2 summarizes the list of the longitudinal encroachment exceptions for exceeding a permissible skew angle of 30° from the normal for transverse crossing for the Preferred Alternative. Table 6-3 summarizes the list of encroachment exceptions for encasement requirements of underground utilities within the State Right of Way for the Preferred Alternative. Where potholing, protection, relocation, or removal of facilities is required, the work will be performed and liability determined in accordance with State law, policy, procedure, contracts, and agreements, as per Caltrans Right of Way Manual. Each utility facility will be relocated to comply with the State encroachment policy if the policy exception request is denied by Caltrans during the design phase.

Table 6-2: Summary Table of Longitudinal Encroachment Exception

Utility Exception No.	Owner	Facility Description	Sheet No.	Existing Skew Angle	Location of Crossing
A.1	PG&E	12kV 4-6" Conduit	U-5	39°	"US101 LINE" 533+50
A.2	PG&E	15kV 5-6" Conduit	U-5	40°	"US101 LINE" 532+40
A.3	AT&T	Telephone	U-5	33°	"US101 LINE" 532+90
A.4	Verizon	Fiber Optic	U-5	33°	"US101 LINE" 532+80
A.5	City of Redwood	10" Water Line	U-5	36°	"US101 LINE" 532+67
A.6	Fair Oaks Sewer Maintence District	33" Sanitary Sewer	U-2 U-5	35°	"US101 LINE" 532+73
A.7	PG&E	12" Gas Line	U-6	33°	"US101 LINE" 547+95

Table 6-3: Summary Table of Utility Encasement Exception

Utility Exception No.	Owner	Facility Description	Sheet No.	Encased	Location of Crossing
B.1	PG&E	4-6" Conduit 12kV	U-5	Partial	"US101 LINE" 533+50
B.2	PG&E	5-6" Conduit 15kV	U-5	No	"US101 LINE" 532+40
B.3	AT&T	Telecommunications	U-5	No	"US101 LINE" 532+90
B.4	Verizon	Fiber Optic	U-5	No	"US101 LINE" 532+80
B.5	City of Redwood	10" DIP Water Line	U-5	No	"US101 LINE" 532+67
B.6	Fair Oaks Sewer Maintence District	33" RCP Sanitary Sewer	U-5	No	"US101 LINE" 532+73
B.7	Fair Oaks Sewer Maintence District	10" VCP Sanitary Sewer	U-5	No	"US101 LINE" 525+40
B.8	AT&T	Telecommunications	U-6	No	"US101 LINE" 546+70
B.9	Level 3	Fiber Optics	U-1	No	"84 LINE" 107+85
B.10	XO COMM	Telecommunications	U-1	No	"84 LINE" 107+80
B.11	City of Redwood	30" RCP Sanitary Sewer	U-1	No	"84 LINE" 109+15

6.4.3 Railroad Involvement

In the PS&E phase, an agreement will need to be entered into with UPRR to reimburse them for preliminary engineering plan review expenses (Caltrans uses a right of way agreement, formally known as a service contract). Eventually, after UPRR approves the design, they may require an amendment to the existing construction and maintenance (c&m) agreement, or, most likely, a new c&m agreement for the structure work that will take place over their right of way. The c&m agreement will explain UPPR's requirements which include: the plan submittal process, insurance requirements, flagging instructions and the need for a right of entry prior to construction.

The California Public Utilities Commission (CPUC) will need to provide approval for any modifications of structures over railroad tracks or at-grade interchanges. Depending on the type of work, the CPUC will either issue a GO 88-B for at-grade modifications and/or for modifications of an existing structure. A "formal application" is needed for any new structure(s) over UPRR right of way.

Property rights such as temporary construction easements (TCEs), temporary access easements (TAEs), etc. will mostly be required. They should be handled just like any other property right, i.e. an appraisal, offer, settlement or condemnation, if needed.

Sufficient lead time when working with both UPRR and the CPCU is critical for the successful delivery of the Project. A two year lead time should be sufficient as long as ongoing engagement with UPRR and CPUC takes place.

Coordination with UPRR would be required through the PS&E phase of the Project. The existing UPRR rail system will have effects on three sections of the Project. The first will be the intersection of Seaport Boulevard and Blomquist Street, the second will be the vertical clearance of the southbound off-ramp and the northbound on-ramp, and third will be the intersection of the Veterans flyovers and Chestnut Street. The intersection roadway conforms at Seaport Boulevard and Blomquist Street, and at Veterans flyovers and Chestnut Street, may require traffic control and temporary closure of the UPRR line. UPRR will be provided the opportunity to review, comment, and approve the proposed roadway conform plans as well as the Redwood Harbor Northbound On-ramp OH structure and the Woodside Road Southbound Off-Ramp OH structure plans during the design phase.

6.5 Environmental

The Initial Study/Environmental Assessment (IS/EA) has been prepared in accordance with Caltrans' environmental procedures, as well as State and Federal environmental regulations. The attached IS/EA is the appropriate document for the proposal.

The Draft IS/EA was approved by Caltrans on April 5, 2016 and circulated for public review, and one public meeting was held on April 28, 2016, as described in more detail in Section 7.1 Public Hearing Process.

The Final Environmental Document is a Negative Declaration under the California Environmental Quality Act (CEQA) and Finding of No Significant Impact (FONSI) under the National Environmental Policy Act (NEPA). The Final Environmental Document with

Negative Declaration and Finding of No Significant Impact (ND/FONSI) was approved by Caltrans on December 16, 2016.

The following subsections summarize the required environmental findings and issues related to Project design and construction.

6.5.1 Wetlands and Floodplain

The jurisdictional delineation identified 2.18 acres of potentially jurisdictional features: 2.02 acres of wetlands or wetlands within waters, and 0.16 acre of other waters of the United States. No permanent or temporary impacts are anticipated to wetlands or waters of the United States. However, construction activities would permanently affect 0.02 acre of non-jurisdictional wetlands, which are considered waters of the State.

Standard measures such as implementation of best management practices (BMPs) and preparation of a storm water pollution prevention plan (SWPPP) will avoid or minimize any construction-related impacts to potentially jurisdictional features. Project activities will adhere to permit conditions set forth by the San Francisco Bay Regional Water Quality Control Board (RWQCB).

The nearest surface water body in the Project vicinity is Redwood Creek, which is located approximately 0.8 mile west of Woodside Road. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for the Project vicinity indicate that portions of the Project area are located within Flood Hazard Zones AE, X (unshaded), and X (shaded). Zone AE represents areas that are subject to inundation by the 100-year flood event, and where base flood elevations are determined. Zone X (shaded) represents areas that would be affected by the 500-year flood. Zone X (unshaded) represents areas of minimal flood hazard, which are outside of the Special Flood Hazard Area and higher than the elevation of the 500-year flood. Although Redwood Creek is the nearest surface water body within the Project limits, the 100-year flood elevations in the Project area are controlled by San Francisco Bay.

The design goal for the Project is to avoid or minimize impacts to FEMA floodplains to the maximum extent practicable. The change in impervious area is insignificant compared with the total drainage area of the San Francisco Bay. As a result, there will be no significant change in water surface elevation to the identified floodplains. The Project will incorporate standard measures, revegetation, BMPs, and other activities to maintain or restore pre-Project hydrology. During final design, options to address the runoff from the Project will evaluate modification of the existing pump station in the southeast quadrant of the interchange to accommodate increased runoff. Another option is to resize the culverts that drain runoff towards the Bay to have more capacity to temporarily store drainage collected from the Project area. One of both of these options would be effective to address the additional runoff resulting from the Project. These options would be further evaluated during design in consultation with the City, County and other responsible parties. Therefore, the Project will have minimal impacts to the floodplains within the Project limits.

An assessment of sea level rise was performed, which identified an area of risk for future inundation along US 101 within most of San Mateo County. In the Project area, at 2 to 3 feet of predicted sea level rise, portions of Seaport Boulevard and the UPRR corridor would be inundated during high water events. At 5 feet of inundation, US 101 would be impassible to

the south of the Woodside Road interchange. Sea level rise projections based on Ocean Protection Council estimates indicate a 7-inch (in 2030) to 14-inch (in 2050) minimum increase in the expected inundation elevation. The Project design year (2042) would occur during this period. Because of the low elevation of Woodside Road undercrossing at US 101, the US 101 overpass would require reconstruction to accommodate a 7- to 14-inch increase in the inundation elevation. Reconstruction of the US 101 overpass is not considered practicable to include in this Project, and the remainder of US 101 and Seaport Drive would still be subject to inundation, leaving these routes impassible under moderate to high sea level rise conditions.

6.5.2 Cultural Resources

Cultural resources were identified within the APE, although they were determined ineligible for listing in the NRHP. Therefore, the cultural resources finding for this Project is No Historic Properties Affected. The Department submitted the cultural resources studies to the SHPO on August 26, 2015, for concurrence on the eligibility of the resources within the APE. The SHPO provided concurrence on October 8, 2015.

If cultural materials are unearthed during construction, work will be halted in the area until a qualified archaeologist can assess the find. If Human remains are encountered, the procedures described in State and Safety Code Section 7050.5 and CA PRC Section 5097.98 will be implemented.

6.5.3 Water Quality and Storm Water Runoff

The Project would add impervious area and involve grading, which could result in additional storm water runoff, soil erosion, and suspended solids being introduced into waterways. The Project would have a disturbed soil area of 22.99 acres for Preferred Alternative. Disturbed soil area, net added impervious area, and reworked area distribution between Caltrans and City R/W for each alternative is shown in Table 6-4.

Table 6-4. Added Impervious and Reworked Areas

Area (ac)	Preferred Alternative 3	
	Caltrans	City
Disturbed Soil Area	19.07	3.92
*Existing Impervious Area	18.86	7.43
Net Added Impervious Area	3.98	0.24
Reworked Area	10.33	0.70

* Existing Impervious Area is measured within the R/W limits of each alternative

Impacts to water quality, storm water runoff, and groundwater recharge would not be substantial in comparison to the overall watershed and groundwater area.

Temporary and permanent erosion control BMPs will be included in the Project to prevent an adverse change in downstream water quality. Measures will include feasible temporary (short-term) and permanent (long-term) BMPs. Feasible treatment BMPs that will be considered during the final design phase include biofiltration swales or strips, infiltration and detention devices, and media filters. The required Storm Water Pollution Prevention Plan will include storm water BMPs for erosion and sediment control, non-storm water management, post-construction storm water management, and waste management and disposal. The signature page of the approved SWDR for the Project can be found in Attachment F.

6.5.4 Paleontology

The Holocene-epoch Quaternary Alluvium and artificial fill underlie the Project area, which are considered to have no potential to yield fossils. No Project elements or excavations are expected to encounter older, fossil-bearing geologic units beneath the Holocene alluvium.

If fossils are discovered, Construction Resident Engineer will contact the Caltrans Office of Cultural Resources upon discovery of remains. The paleontologist (or paleontological monitor) will be called to recover them. Construction work in these areas may need to be halted or diverted to allow recovery of fossil remains in a timely manner.

6.5.5 Biological Resources

The Project footprint consists of paved freeway surrounded by landscaped and graded roadsides. These areas lack special-status plant species. The areas that support native plants and natural habitat for wildlife are limited to a tidal marsh located near the Seaport Boulevard/East Bayshore Road/Blomquist Street intersection, trees, and under bridges in the Project area. No work will take place in the tidal marsh.

Project construction could permanently impact up to 0.18 acre of marginal habitat for the salt marsh harvest mouse. With implementation of avoidance and minimization measures, take of individual salt marsh harvest mouse is not expected to occur. Construction-related noise may indirectly affect the Ridgway's rail and California least tern. Caltrans has requested technical assistance with the USFWS to identify issues of any concern. A Biological Assessment was prepared and submitted to the USFWS. USFWS issued a concurrence letter for Section 7 consultation on October 17, 2016.

A Project landscaping plan will be developed during final design and will include tree replacement. Tree removal would take place during the nonbreeding season for protected raptors and migratory birds and prior to the rainy season (September 1 through October 15). If any tree removal has to take place during the nesting season (February 1 through August 31), preconstruction surveys would be required to identify that no active nesting is taking place. Vegetation would be preserved in areas of the Project limits where no construction is planned. Preconstruction surveys for nesting migratory birds and raptors and bat roosts will be conducted and ESAs will be established as described in Appendix G of the IS/EA (Environmental Commitment Record).

6.5.6 Environmental Permits

The following environmental permits, reviews, and approvals would be required for Project construction:

Table 6-5: Permits and Approvals Required

Agency	Permit or Approval	Status or Planned Action
U.S. Fish and Wildlife Service (USFWS)	Section 7 consultation for threatened and endangered species.	● A Biological Assessment has been prepared and submitted to the USFWS. USFWS issued a concurrence letter on September 15, 2016
Federal Highway Administration (FHWA)	Concurrence with Project's conformity to Clean Air Act and other requirements.	● FHWA issued their conformity determination on September 12, 2016.
U.S. Army Corps of Engineers (USACE)	Concurrence on delineation of waters of the United States.	● The Jurisdictional Delineation was submitted to USACE on September 2, 2015, for concurrence.
State Historic Preservation Officer (SHPO)	Notification of finding of "No Historic Properties Affected" under the Section 106 Programmatic Agreement.	● The SHPO concurred with findings on October 8, 2015.
San Francisco Bay Regional Water Quality Control Board (RWQCB)	Waste discharge requirements under the Porter-Cologne Water Quality Control Act; National Pollutant Discharge Elimination System (NPDES) approval for work greater than one acre.	● Joint "Application for 401 Water Quality Certification and/or Report of Waste Discharge" will be submitted during the Project design phase. ● NPDES permit application will be submitted during the Project design phase. ● A Notice of Intent and Storm Water Pollution Prevention Plan will be prepared/submitted prior to construction.

6.6 Air Quality Conformity

The Project is listed in the 2013 Plan Bay Area Regional Transportation Plan (ABAG and MTC 2013, RTP ID 21603), which was found to conform by MTC on July 18, 2013, and FHWA and Federal Transit Authority (FTA) made a regional conformity determination on August 12, 2013. The Project is also included in MTC's financially constrained 2015 Transportation Improvement Program (MTC 2014, TIP ID SM-050027). The MTC's 2015 Transportation Improvement Program was found to conform by FHWA and FTA on December 15, 2014.

The design concept and scope of the proposed Project is consistent with the Project description in the 2013 RTP, the 2015 TIP, and the open to traffic assumptions of the MTC's regional emissions analysis. Therefore, the Project is in conformity with the State Implementation Plan (SIP) and will not otherwise interfere with timely implementation of any Transportation Control Measures in the applicable SIP.

The Project team conducted consultation with MTC Air Quality Conformity Task Force for $PM_{2.5}$ conformity analysis on July 23, 2015, and the Project was determined to be not a Project of air quality concern. FHWA issued their conformity determination on September 12, 2016.

6.7 Title VI Considerations

All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in this Project. Caltrans' commitment to upholding the mandates of Title

VI is evidenced by its Title VI Policy Statement, signed by the Director, which can be found in Appendix D of the IS/EA.

The Project has been designed to improve vehicle, bicycle, and pedestrian access throughout the interchange area. The addition of bicycle and pedestrian access would benefit all users equally, including bicyclists or those who rely on public transportation. In addition to benefits, the Project modifications would not disproportionately impact any of the populations in the Project area.

6.8 Noise Abatement Decision Report

This section represents the Noise Abatement Decision Report (NADR) which:

- Is an evaluation of the reasonableness and feasibility of incorporating noise abatement measures into this Project;
- Constitutes the preliminary decision on noise abatement measures to be incorporated into the DED (if applicable); and
- Is required for Caltrans to meet Title 23, Code of Federal Regulation, Part 772 of the Federal Highway Administration standards.

The Noise Study Report (October 2015) for this Project were prepared by Dana M. Lodico, Illingworth & Rodkin, Inc.

Noise levels in 2042 with the Preferred Alternative are predicted to approach or exceed the NAC at the following locations:

- Some ground-level front porches and outdoor use areas of Marina Townhomes;
- Houseboats at the Docktown Marina;
- The Bay Trail;
- Upper-level patios at Casa de Redwood senior apartments on Veterans Boulevard;
- An outdoor use area for Stanford Health Care; and
- Upper-level patios at the Avenue 2 Apartments on Second Avenue;
- Single-family residences on Hoover Street near its intersection with Second Avenue;
- Backyards of first-row homes in the R.C. Mobile Park, La Mar Trailer Park, and Redwood Mobile Estates; and
- The side yard of a home in the Harbor Village Mobile Home Park.

The Marina Townhomes, houseboats at the Docktown Marina, upper-level patios at Casa de Redwood senior apartments, Bay Trail, Stanford Health Care, Avenue 2 Apartments upper-level patios, and residences along Hoover Street are not currently shielded by noise barriers. The mobile home parks are currently shielded by a 12-foot-high noise barrier. Noise abatement in the form of new and replacement sound walls was considered for impacted receptors.

A total of three new barriers (1, 2, and 3A/3B) and one replacement barrier were evaluated:

- Bay Trail (Barrier 1)
- Marina Townhomes and Docktown Marina Houseboats (Barrier 2)

- Stanford Health Care, Upper-Level Patios at Avenue 2 Apartments, and residences along Hoover Street (Barriers 3A and 3B)
- R.C. Mobile Park, La Mar Trailer Park, Redwood Mobile Estates, and Harbor Village Mobile Home Park (Existing Barrier A)

Table 6-6 lists noise levels with and without the Project, the corresponding sound walls that were studied to provide noise abatement for those receptors, the wall heights analyzed, and the predicted noise levels at each receptor if the walls were constructed. For each sound wall that met the Protocol acoustical design goal (at least 7 dB of noise reduction at one or more benefited receptors), Table 6-6 also identifies the total reasonableness allowance for each sound wall and the estimated construction cost, in accordance with the Caltrans' Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction projects, May 2011.

Table 6-6: Noise Levels with and without the Project

Sound Wall ID: Receptor ID and Location	Existing (dBA)	Noise Level (dBA)		Predicted Noise Level (dBA) w/Abatement (by wall height [ft])					Total Reasonable-ness Allowance	Construction Cost	Reasonable and Feasible?
		No-Build Alternative	Alternative 3	8	10	12	14	16			
Proposed Barrier 1 (new wall)											
R-5 – Bay Trail	69	72	70	62	61	60	60	60	$71,000	$282,080 - $564,160	No
Proposed Barrier 2 (new wall)											
R-13 – Marina Townhomes, Front Porch (632 True Wind Way)	67	67	67	62	61	60	60	59	$426,000 - $1,491,000	$1,221,120 - $2,365,920	No
R-13a – Marina Townhomes, Front Porch (630 Bair Island Road)	64	59	59	55	54	52	51	51			
R-13b - Marina Townhomes (One Marina Building 2)	66	65	65	60	59	57	57	56			
R-13c – Marina Townhomes, Grassy Area (636 Fan Trail Way)	68	68	68	63	62	61	61	60			
R-13d – Marina Townhomes, Grassy Area (636 Fan Trail Way)	66	66	66	62	61	60	60	59			
R-14 – Houseboat at Docktown Marina	67	67	67	64	63	62	61	61			
R-14a – Houseboat at Docktown Marina	64	64	64	60	60	59	59	58			
R-14b – Houseboat at Docktown Marina	59	59	59	57	56	56	55	55			
R-15 – Pool at One Marina Hotel (One Marina Way)	67	53	53	53	52	52	52	51			
Proposed Barrier 3a											
ST-8 – Stanford Health Care	69	69	69	64	64	62	61	60	$142,000 - $781,000	$1,069,200 - $2,059,200	No
R-17 – Avenue 2 Apartments pool (1107 Second Ave)	64	64	64	62	61	60	59	58			
R-18 – Avenue 2 Apartments upper level patios (1107 Second Ave)	70	70	70	65	64	64	62	61			
R-19 – Backyard of 3001 Hoover Street	67	67	67	64	62	61	60	59			

Sound Wall ID: Receptor ID and Location	Existing (dBA)	Noise Level (dBA)		Predicted Noise Level (dBA) w/Abatement (by wall height [ft])					Total Reasonable-ness Allowance	Construction Cost	Reasonable and Feasible?
		No-Build Alternative	Alternative 3	8	10	12	14	16			
R-20 – Backyard of 3017 Hoover Street	63	63	63	61	60	59	58	58			
R-21 – Frontyard of 3000 Hoover Street	62	62	62	60	60	58	57	57			
R-22 – Frontyard of 3008 Hoover Street	59	59	59	58	57	56	55	55			
Proposed Barrier 3b											
ST-8 – Stanford Health Care	69	69	69	67	65	64	63	62	$284,000 - $568,000	$1,440,000 - $1,872,000	No
R-17 – Avenue 2 Apartments pool (1107 Second Ave)	64	64	64	64	63	62	60	59			
R-18 – Avenue 2 Apartments upper level patios (1107 Second Ave)	70	70	70	68	66	65	64	63			
R-19 – Backyard of 3001 Hoover Street	67	67	67	65	64	62	61	60			
R-20 – Backyard of 3017 Hoover Street	63	63	63	62	61	60	59	58			
R-21 – Frontyard of 3000 Hoover Street	62	62	62	61	61	60	58	58			
R-22 – Frontyard of 3008 Hoover Street	59	59	59	59	58	57	56	56			
Existing Barrier A (increase height of existing wall)											
LT-3 – Douglas Court and East Bayshore Road	69	70	70	[a]	[a]	[a]	69	69	NA	NA	No
R-11 – Backyard at R. C. Mobile Park (1903 East Bayshore Road)	69	70	70	[a]	[a]	[a]	70	70			
ST-7 – Redwood Mobile Estates #16	57	57	57	[a]	[a]	[a]	56	55			
R-12 – Redwood Mobile Estates #55	69	70	70	[a]	[a]	[a]	70	70			
ST-9 – Redwood Mobile Estates #55	57	58	58	[a]	[a]	[a]	57	56			
R-16 – Harbor Village Mobile Home Park (408 Rose Ave)	70	70	70	[a]	[a]	[a]	70	70			

[a] = already protected.

All four new sound wall segments analyzed had at least one wall height that would meet the noise reduction design goal of a 7 dB noise reduction at a minimum of one receptor location. The total reasonableness allowance[6] for each feasible sound wall ranged from $71,000 to $1,491,000, depending on the wall height and number of benefited receptors. In all cases, the estimated construction costs[7] of the walls well exceeded the combined reasonableness allowance for the benefited receptors.

As none of the barriers evaluated meet the feasibility and reasonableness criteria established by 23 CFR 772, no noise abatements are proposed. However, the final decision on the noise abatement will be made upon completion of the Project design and the public involvement processes.

The preliminary noise abatement decision presented in this report is based on preliminary Project alignments and profiles, which may be subject to change. As such, the physical characteristics of noise abatement described herein also may be subject to change. If pertinent parameters change substantially during the final Project design, the preliminary noise abatement decision may be changed or eliminated from the final Project design. A final decision to construct noise abatement will be made upon completion of the Project design.

The preliminary noise abatement decision presented here was included in the DED, which was circulated for public review.

[6] **Total reasonableness allowance** was calculated based on the allowance of $71,000 per benefited receptor, which is set by the Protocol.

[7] **Estimated construction cost** was calculated based on the square footage of the analyzed wall multiplied by an estimated construction cost of $93-$96 per square foot. The estimated construction cost ranges based on the length and height of the analyzed wall.

7. OTHER CONSIDERATIONS AS APPROPRIATE

7.1 Public Hearing Process

Caltrans and the City of Redwood City circulated the IS/EA for public review and comment from April 12 to May 24, 2016. Each of the agencies and individuals received printed or electronic copies of the document or mailers with information about the public meetings for the Project and a link to the IS/EA on the Caltrans District 4 environmental documents website. In addition, mailers were sent to all addresses within 0.25 mile of the Project corridor. The mailer was translated into five languages (Spanish, Vietnamese, Korean, Chinese and Tagalog). A copy of the IS/EA was made available at the San Jose, Morgan Hill, Mountain View, Palo Alto, Santa Clara and Sunnyvale public library reference shelves for public review. The meeting notice was also posted on the City's website on April 14, 2016. An email was sent on April 22, 2016 to the City's cumulative list of meeting attendees and stakeholders.

The Notice of Availability was placed in the following newspapers on the following days: San Francisco Examiner on April 21, 2016 and De la Bahia on April 24, 2016.

One open house public meeting was held for the proposed Project on April 28, 2016, from 5:30 p.m. to 7:30 at the Redwood City City Hall. 49 members of the public attended.

In total, twenty two (22) public comments were submitted during the comment period by postal mail, e-mail and comment cards collected at the public meetings. The IS/EA presents the public comments and the Project team’s responses.

7.2 Route Matters

This Project proposes to reconfigure the existing Interchange. The existing freeway agreements dated November 25, 1958 for US 101 and May 24, 1963 for SR 84 between Caltrans and the City of Redwood City will need to be superseded by new agreements. No route adoption is required for this Project. California Transportation Committee (CTC) consent will be required for new public road connections. The request to the CTC should be initiated at the start of the Project design phase.

7.3 Permits

The Project will require special approvals, review, and/or permits from UPRR. A detailed description of UPRR special procedures are described in section 6.4.3 Railroad Involvement. No other special significance approvals, review, and/or permits are anticpated for the Project.

7.4 Cooperative Agreements

A Cooperative Agreement addressing the PA&ED has been executed between Caltrans and the City using the Cooperative Agreement Report (CAR) as the authorizing document.

A draft Cooperative Agreement has been prepared for the design and right-of-way procurement activities in the PS&E design phase (see Attachment H). The City of Redwood City will remain as the Project sponsor and will be responsible for all design and right-of-way work with Caltrans providing oversight. The Project Report will be the authorizing document for the PS&E Cooperative Agreement.

A Cooperative Agreement for construction will be negotiated near the end of the PS&E phase and prior to the beginning of construction. The City of Redwood City is the project sponsor. It is assumed that construction will be administered by Caltrans.

7.5 Involvement with a Navigable Waterway

This Project does not involve crossing over any body of water that requires a permit from the U.S. Coast Guard.

7.6 Transportation Management Plan for Use During Construction

A Transportation Management Plan (TMP) will be prepared during the final design phase to minimize delay and inconvenience to the traveling public, in accordance with Caltrans requirements and guidelines. The TMP will address traffic impacts from staged construction, detours, and specific traffic handling concerns during construction of the Project. Also, the TMP will provide a detour plan for the portion of the Bay Trail that would be affected during construction. A TMP data sheet was prepared for the Project to provide a preliminary cost estimate for TMP elements. It was updated on June 26, 2015 and was approved by Caltrans on July 23, 2015. The approved TMP data sheet is provided in Attachment I.

The TMP for the Project will be further developed during the final design phase and may require additional traffic studies to evaluate traffic operations. The need for lane closures during off-peak hours or short-term detour routes for ramp closures will be identified in the TMP. The TMP will also include briefings to local officials and a public information program to inform the public of Project progress and upcoming closures and detours.

Table 7-2 is a list of the TMP strategies and contains a brief description of each item that should be further detailed in the TMP. Additional aspects of a TMP should include ride-sharing agencies, transit operators, and neighborhood and special-interest groups; consideration of construction strategies and contract incentives; and CHP and local law enforcement involvement.

Table 7-2: Transportation Management Plan Strategies

Strategy	Description
Public Information	Community outreach strategies are to inform motorists and businesses affected by construction and detours. Publish daily construction activities in the local newspaper or on a website to advise of changes to the traffic patterns. Provide toll-free number to motorists to provide information or assist in complaints. Hotels may also be provided to public for stay due to increased noise during construction.
Integrated Incident/Emergency Management Program	The use of electronics, computers, and wireless communication systems to coordinate real-time responses to incidents and emergencies by various emergency providers and enforcement agencies, particularly around construction sites.
Freeway Service Patrol	Dedicated patrol trucks along construction site, particularly during peak commute hours.
California Highway Patrol	Additional CHP presence will be required during temporary partial and full freeway and ramp closures.
Construction Zone Enhanced Enforcement Program	Cooperative program between Caltrans and the CHP for proactive police enforcement at construction sites on the State highway system.
Portable Changeable Message Signs	These signs will be used to inform motorists about traffic conditions and future roadwork.
Traffic Control Improvements	Examples include changes in signal timing, use of temporary signals, adding detectors for actuation, and coordinating traffic signals.
Street Improvements, Signing, and Striping	Examples include temporary removal of median islands or on-street parking, changes in turn restrictions and prohibitions, and provision of detour and guidance signage, etc.
Comprehensive GIS/Database/Mapping System	Computer mapping and database system centralizing various information on construction detours, transportation, modes, travel services, major destinations, planned development, etc.
Coordination of Construction Schedules	Continuous ongoing coordination of the schedules of construction projects with all of the stakeholder agencies.
Contingency Plans	Specific actions that will be taken to minimize impacts on traffic when the congestion or delay exceeds original estimates due to unforeseen events such as work-zone accidents, higher-than-predicted traffic demand, or delayed lane closures. Information to be coordinated and disseminated among construction and emergency service providers and public-safety providers.
Workshops	Workshops to be conducted with the general public and specific stakeholders such as Riverside School prior to the construction phases that would affect the stakeholders.

7.7 Stage Construction

The Project site is currently experiencing noticeable traffic congestion on and near US 101 and SR 84 during both the AM and PM peak hours. To ensure that traffic operations are not further affected, detour and construction staging plans will be developed that will preserve or minimize the impact to the existing number of traffic lanes on US 101 and SR 84 in each direction throughout the construction period, except during critical short-term construction activities. Twenty-four-hour traffic counts will be performed to assess the impact of any needed lane closures. Preliminary information concerning lane closures will be used to develop feasible staging plans. Impacts to pedestrian and bicyclist movements, as well as access to local business properties, will all be carefully considered in the staging plans. An alternative route for access under US 101 will be provided for pedestrians and bicyclists near

the UPRR line and will be maintained during all construction stages. If night time closures are required, acceptable detours will need to be put in place.

Some temporary signalized intersections will be required and designed to help manage traffic demand during construction. If necessary, the signal phasing and timings can be adjusted based on field observations to help minimize delays and queues. The details of how traffic will be handled during construction will be presented in the TMP. Lane closures will be required to lower SR 84 six inches under US 101 to meet standard vertical clearances. These lane closures will be done at night to keep traffic effects at a minimum. Public outreach will be performed ahead of time to ensure that closures will be announced in a timely manner. Temporary detours of US 101 existing interchange ramps may be necessary during construction. Most of the construction activity will be done behind temporary railing (type K) to keep lane closures and traffic disruption to a minimum.

Project constructability is based on the five stages identified below. The stage construction concept was discussed in the Constructability meeting with Caltrans on May 6th 2015. Different construction techniques, staging, and sequencing were also discussed. Several construction phases may be associated with each construction stage. A conceptual stage construction plan has been developed (see Attachment J) to confirm Project constructability. Frank Guros and Taher Sarwary from Caltrans District 4 Constructability/Claims unit reviewed the Project for constructability and their comments have been addressed. A construction sequence of the major construction activities of each stage is presented below. Refer to Attachment J for details.

Stage 1:

- Maintain existing Route 101/84 Separation Br No. 35-0083. Grind and lower SR 84 to increase vertical clearance to 15'.
- Construct Ground Anchor Wall "RW-115".

Stage 1A:

- Construct MSE Wall "RW-423" and "RW-434". Construct pavement widening along northbound US 101 on-ramp.
- Remove portion of existing Redwood Harbor OH (Br No. 35-0065) and portion of existing retaining walls.
- Construct temporary pavement widening along northbound US 101 on-ramp.
- Remove existing median and construct Seaport Boulevard segment.
- Construct pavement for temporary signalized intersection at SR 84/Seaport Boulevard.
- Construct temporary pavement widening along northbound US 101 off-ramp.
- Construct pavement widening along southbound US 101 on-ramp.
- Construct temporary widening of southbound US 101 loop off-ramp for temporary signalized intersection at SR 84/Woodside Road.
- Relocate 3 - 12 kV PG&E overhead electric poles and lines (by others).
- Coordinate stage construction and flagging operations with UPRR.

Stage 2:

- Construct sidewalk and pavement widening along East Bayshore Road.
- Construct pavement widening along Seaport Boulevard.
- Remove existing N101-S84 Connector OC (Br No. 35-0081G).
- Construct temporary pavement for stage 3 detour.
- Construct portion of northbound US 101 slip on-ramp and MSE Wall "RW-538".
- Remove portion of existing Route 101/84 Separation (Br No. 35-0083) and construct northbound US 101 loop on-ramp and Seaport Boulevard northbound on-ramp OC.
- Remove existing S101-S84 Connector OH (Br No. 35-0065F) and existing retaining walls.
- Construct southbound US 101 off-ramp, Woodside Road southbound off-ramp OH. Construct MSE Wall "RW-120" and "RW-126".Construct temporary pavement widening along Veterans Boulevard.
- Construct pavement widening along SR 84/Woodside Road.
- Coordinate stage construction and flagging operations with UPRR.

Stage 3:

- Remove temporary northbound US 101 off-ramp pavement.
- Construct portion of northbound US 101 off-ramp and MSE Wall "RW-333".
- Construct widening along Seaport Boulevard.
- Remove existing northbound US 101 slip on-ramp from Seaport Boulevard.
- Construct southbound US 101 on-ramp.
- Remove southbound US 101 loop off-ramp.
- Construct widening along SR 84/Woodside Road median.
- Construct embankment for Veterans Boulevard flyover.
- Relocate 12 kV PG&E overhead electric pole and line.
- Relocate 2 City of Redwood City sanitary sewer gravity lines.
- Relocate PG&E UG 12 kV electric lines (by others).
- Relocate City of Redwood City water line.
- Construct Ground Anchor Wall "RW-535" and "RW-536".
- Coordinate stage construction and flagging operations with UPRR.
- Add Signalized Intersection.

Stage 4:

- Construct widening and overlay of SR 84/Woodside Road.
- Construct Class I bikeways and Ground Anchor Wall "RW-533".
- Remove existing southbound US 101 on–ramp.
- Remove temporary northbound US101 off-ramp to Seaport Boulevard.

- Remove temporary pavement.
- Construct S101 on-ramp/RTE 84 Sep and N101 off-ramp/Rte 101 & 84 Sep Structures for Veterans Boulevard Flyovers.
- Construct MSE Wall "RW-637."
- Construct MSE Wall "RW-732", "RW-801", "RW-802", "RW-803", "RW-804", "RW-805", AND "RW-806".
- Coordinate stage construction and flagging operations with UPRR.

Stage 5:

- Shift traffic onto new Veterans flyover.
- Place final overlay and striping.

Construction staging will be further detailed and refined during the PS&E phase.

7.8 Accommodation of Oversize Loads

The Project will not restrict the movement of oversized loads through the area.

7.9 Graffiti Control

Generally, this Project is located in an urban area and therefore it is considered a graffiti-prone area. The Project proposes new retaining walls, bridges, and a significant number of overhead signs. Graffiti control features such as anti-graffiti coatings on retaining walls, bridge railings, and overhead signs that allow easier clean-up and maintenance will be incorporated into the design.

7.10 Maintenance Considerations

The responsibility for all portions of the proposed pedestrian/bike paths and related overcrossings within Caltrans R/W will be designated in a maintenance agreement between the City and Caltrans. Existing maintenance agreements dated September 1, 1961 for US 101 and February 15, 1965 for SR 84 would be superseded with a revised agreement prior to Project construction. The terms of the revised agreement will be negotiated between the Project sponsor, the City, and Caltrans, during the PS&E phase.

The following maintenance items will be incorporated during the design phase.

- The design would include ditches to remove surface water from the slope and avoid sheet flow down the slope. An "air blown mortar" lined ditch with access for maintenance is one possible type for consideration.
- Maintenance vehicle pullouts are needed near features such as overhead signs, signal boxes, and controllers. During the design phase, maintenance vehicle pullout exact locations will be identified in coordination with appropriate Caltrans maintenance staff.
- The gore and narrow strip areas will be paved.

- There will be no median planting. All roadside planting will be simple to maintain. Highway planting is a separate contract and Caltrans maintenance staff will review the highway planting design.
- There will be vegetation control measures implemented beneath the guardrails and roadside sign structures.
- Removing and relocating cabinets, valves, pull boxes and other hardware located near the pavement edge, and providing safe access for maintenance workers with access roads and access gates, where feasible.

8. FUNDING/PROGRAMMING

8.1 Funding

The Project funding includes $138M in future fiscal year costs, $115M in construction costs and $27M in support costs. The City, as Sponsor, is presently pursuing funding commitments described under Programming below. The current funding plan for future funds is as follows:

(1) $25.0M in City Funds for support and capital costs
(2) $67.6M in SMCTA Highway Funds for support and capital costs
(3) $12.0M in the STIP/RIP for construction and right-of-way capital costs
(4) $33.2M in Federal Funds (2015 FAST Act) for construction and right-of-way capital costs

It has been determined that this Project is eligible for federal-aid funding.

8.2 Programming

The Project will be programmed in the 2020 STIP, pending approval of this Project Report. The Project is listed in the Regional Transportation Plan (RTP) (Plan Bay Area 2040, ID # 21603) and the Transportation Improvement Program (TIP, ID #SM-050027). The TIP database for the Project indicates an RTP Project cost of $72.54M and Total Funding of $49.11M. This information was last updated in 2014 and does not reflect the current Project scope and cost. The RTP entry indicates a total cost of $73M, a committed funding of $36M, and a discretionary funding of $36M.

The proposed Project listing approved by the C/CAG Board for submittal to MTC, for consideration in Plan Bay Area 2040 (the next RTP) indicates a total cost of $171M, as shown in the attached 9/17/2016 C/CAG letter to MTC. MTC has acknowledged this, as is indicated in the attached 8/14/2016 MTC letter to C/CAG. This letter includes a portion of the 8/14/2016 Draft Plan Bay Area 2040 Project List and includes the Project (RTPID #17-06-0010). It indicates a total cost of $171M, including $7M in pre-2017 funding, $98M in post 2017 local committed funding, and $66M in regional discretionary funding. This total cost value exceeds the $142M current total Project cost. See Attachment N for the 8/14/2016 MTC letter and the 9/17/2015 C/CAG letter.

This Project is a high-priority Project in San Mateo County and is named in both San Mateo County Measure A Expenditure Plans (the 1988 Expenditure Plan, under Streets and Highways - Improvements to Approach of Dumbarton Bridge, and the 2004 Expenditure Plan, under Highways - Key Congested Areas - 101 South Improvements). The 2004 Expenditure Plan provides $60M in Measure A funds for improvement in this category.

The City has submitted applications for two Federal funding programs:

- 2016 FASTLANE (2015 FAST Act) ($70M)
- 2017 ATP Cycle 3 ($3.6M)

Table 8-1 presents the fiscal year estimate of capital outlay support costs and capital outlay Project right-of-way and construction costs.

Table 8-1: Funding by Fiscal Year and Project Phase

Fiscal Year Estimate							
	Prior	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**Total**
Component	**In thousands of dollars ($1,000)**						
PA&ED Support	$ 4,200	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 4,200**
PS&E Support	$ 0	$ 8,000	$ 0	$ 0	$ 1,900	$ 0	**$ 9,900**
Right-of-Way Support	$ 0	$ 1,000	$ 0	$ 0	$ 0	$ 0	**$ 1,000**
Construction Support	$ 0	$ 0	$ 0	$ 0	$ 11,700	$ 0	**$ 11,700**
Right-of-Way	$ 0	$ 0	$ 35,000	$ 0	$ 2,000	$ 0	**$ 37,000**
Construction	$ 0	$ 0	$ 0	$ 0	$ 78,200	$ 0	**$ 78,200**
Total	**$ 4,200**	**$ 9,000**	$ 35,000	$ 0	**$ 93,800**	$ 0	**$ 142,000**

The total support cost ratio is 23% ($26.8M/$115.2M).

Table 8-2 summarizes the Project funding by source.

Table 8-2: Funding Source Summary by Project Phase

Fund Sources					
Component	**RWC**	**SMCTA HWY**	**STIP/RIP**	**2015 FAST Act**	**Total**
	In thousands of dollars ($1,000)				
PA&ED Support	$ 800	$ 3,400	$ 0	$ 0	**$ 4,200**
PS&E Support	$ 900	$ 9,000	$ 0	$ 0	**$ 9,900**
Right-of-Way Support	$ 100	$ 900	$ 0	$ 0	**$ 1,000**
Construction Support	$ 0	$ 11,700	$ 0	$ 0	**$ 11,700**
Right-of-Way	$ 9,000	$ 14,000	$ 4,000	$ 10,000	**$ 37,000**
Construction	$ 15,000	$ 32,000	$ 8,000	$ 23,200	**$ 78,200**
Total	**$ 25,800**	**$ 71,000**	**$ 12,000**	**$ 33,200**	**$ 142,000**

Tables 8-3 through 8-6 present the estimated funding by each of the four proposed sources. In Table 8-3, the sources of the City of Redwood City (RWC) funds are indicated in the notes. The RWC contributions in right-of-way include the estimated value of the Project-required Public Works facility.

Table 8-3: Funding by Fiscal Year and Project Phase (RWC)

Fund Source	**Fiscal Year Estimate**						
Local - RWC	**Prior**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**Total**
Component	**In thousands of dollars ($1,000)**						
PA&ED Support	$ 800	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 800**
PS&E Support	$ 0	$ 800	$ 0	$ 0	$ 100	$ 0	**$ 900**
Right-of-Way Support	$ 0	$ 100	$ 0	$ 0	$ 0	$ 0	**$ 100**
Construction Support	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Right-of-Way (Note 1)	$ 0	$ 0	$ 9,000	$ 0	$ 0	$ 0	**$ 9,000**
Construction (Note 2)	$ 0	$ 0	$ 0	$ 0	$ 15,000	$ 0	**$ 15,000**
Total	**$ 800**	**$ 900**	**$ 9,000**	$ 0	**$ 15,200**	$ 0	**$ 25,800**

Notes:
1. Estimated value of City Public Works facility right-of-way required for the Project.
2. Estimated voluntary developer contributions for the Project.

Table 8-4: Funding by Fiscal Year and Project Phase (SMCTA HWY)

Fund Source	**Fiscal Year Estimate**						
Local Discretionary-SMCTA HWY	**Prior**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**Total**
Component	**In thousands of dollars ($1,000)**						
PA&ED Support	$ 3,400	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 3,400**
PS&E Support	$ 0	$ 7,200	$ 0	$ 0	$ 1,800	$ 0	**$ 9,000**
Right-of-Way Support	$ 0	$ 900	$ 0	$ 0	$ 0	$ 0	**$ 900**
Construction Support	$ 0	$ 0	$ 0	$ 0	$ 11,700	$ 0	**$ 11,700**
Right-of-Way	$ 0	$ 0	$ 14,000	$ 0	$ 0	$ 0	**$ 14,000**
Construction	$ 0	$ 0	$ 0	$ 0	$ 32,000	$ 0	**$ 32,000**
Total	**$ 3,400**	**$ 8,100**	**$ 14,000**	$ 0	**$ 45,500**	$ 0	**$ 71,000**

SMCTA HWY = San Mateo County Transportation Authority Highway Fund

Table 8-5: Funding by Fiscal Year and Project Phase (STIP/RIP)

Fund Source	Fiscal Year Estimate						
Regional - STIP/RIP	**Prior**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**Total**
Component	**In thousands of dollars ($1,000)**						
PA&ED Support	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**
PS&E Support	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**
Right-of-Way Support	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**
Construction Support	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**
Right-of-Way (Note 1)	$ 0	$ 0	$ 4,000	$ 0	$ 0	$ 0	**$ 4,000**
Construction (Note 1)	$ 0	$ 0	$ 0	$ 0	$ 8,000	$ 0	**$ 8,000**
Total	**$ 0**	**$ 0**	**$ 4,000**	**$ 0**	**$ 8,000**	**$ 0**	**$ 12,000**

STIP/RIP = State Transportation Improvement Program/Regional Improvement Program Fund
Notes:
1. Estimated grant from prospective US101 San Mateo County congestion relief bill (AB 378)
2. MTC/ABAG's Transportation 2040 Plan (Plan Bay Area) and the TIP (TIP ID # SM-050027) list Project funding that will flow through MTC.

Table 8-6: Funding by Fiscal Year and Project Phase (2015 FAST Act)

Fund Source	Fiscal Year Estimate						
Regional Discretionary- STP (2015 FAST Act)	**Prior**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**Total**
Component	**In thousands of dollars ($1,000)**						
PA&ED Support	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**
PS&E Support	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**
Right-of-Way Support	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**
Construction Support	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	**$ 0**
Right-of-Way (Note 1)	$ 0	$ 0	$ 10,000	$ 0	$ 0	$ 0	**$ 10,000**
Construction (Note 1)	$ 0	$ 0	$ 0	$ 0	$ 23,200	$ 0	**$ 23,200**
Total	**$ 0**	**$ 0**	**$ 10,000**	**$ 0**	**$ 23,200**	**$ 0**	**$ 33,200**

STP = Surface Transportation Program
Notes:
1. Estimated grant from 2015 FAST Act
2. MTC/ABAG's Transportation 2040 Plan (Plan Bay Area) and the TIP (TIP ID # SM-050027) list Project funding that will flow through MTC.

9. SCHEDULE

The following is the current major milestone schedule for the Project:

Table 9-1: Project Schedule - Major Milestones

Project Milestones		Milestone Date (Month/Day/Year)	Milestone Designation (Target/Actual)
PROGRAM PROJECT	M015		Jun/13/2006
BEGIN ENVIRONMENTAL	M020		Dec/12/2013
CIRCULATE DED EXTERNALLY	M120		Apr/11/2016
PA & ED	M200	Dec/22/2016	
PS&E TO DOE	M377	Dec/19/2018	
RIGHT OF WAY CERTIFICATION	M410	Mar/13/2019	
READY TO LIST	M460	Aug/22/2019	
FUND ALLOCATION	M470	Nov/14/2019	
HEADQUARTERS ADVERTISE	M480	Dec/5/2019	
AWARD	M495	Feb/21/2020	
APPROVE CONTRACT	M500	Mar/9/2020	
CONTRACT ACCEPTANCE	M600	Aug/15/2023	
END PROJECT	M800	Oct/10/2023	

10. RISKS

A risk management plan and associated risk register (Attachment K) was prepared for the Project and has continued to be maintained through the entire Project development process. The Project is not fully funded, and the proposed schedule is at risk if funding is not secured. The Project cost estimate is based on the latest available cost information and is escalated to the mid-year of construction. Detailed design plans and documents which include layout, cross section, profile and superelevation, TMP data sheet, right-of-way requirement map and bridge Advance Planning Studies (APS) were used to calculate the Project cost estimates; therefore, the 15% contingency included in the preliminary Project cost estimate is anticipated to cover the total costs of the risks as specified in the risk registry matrix.

Due to the Project requiring a number of full and partial takes, the acquisition process may delay the Project schedule. It is recommended that the right-of-way acquisition process start as early as possible during the design phase of the Project.

11. FHWA COORDINATION

Per the Joint Stewardship and Oversight Agreement dated May 28, 2015 between Caltrans and FHWA, the Project review has been delegated to Caltrans.

This Project has neither been identified as a Project of Division Interest (PoDI), nor as a Project of Corporate Interest (PoCI).

12. PROJECT REVIEWS

12.1 Geometric Reviews

Geometry review meetings were conducted with Lawrence T. Moore, Caltrans HQ Project Delivery Coordinator, Gordon Brown, Geometric design reviewer Caltrans District 4, Caltrans Design, Caltrans Highway Operations, Caltrans Ramp Metering, Caltrans Pedestrian and Bicycle Planning Branch and other functional units between February 2014 to May 2016. Comments were received and have been incorporated into the current Project geometry drawings (GeDs). The Fact Sheet Exceptions to Mandatory and Advisory Design Standards were submitted to Caltrans on August 18, 2015. Comments on the Mandatory Fact Sheets were received on October 19, 2015 and on the Advisory Fact Sheets on November 10, 2015. The Fact Sheet for exceptions to mandatory design standards for the preferred alternative was approved on December 1, 2016, while the Fact Sheet for exceptions to advisory design standards was approved on November 29, 2016.

12.2 Other Reviews

Encroachment Policy Variance Request Review: The Encroachment Policy Variance Request (EPVR) was submitted in August 2016 and comments were received on November 29, 2016 and December 8, 2016. HQ encroachment exceptions division of design concurred with the variance request on December 12, 2016.

Pavement Strategy Review: The proposed pavement structural sections have been developed. Life Cycle Cost Analysis for 40-yr design pavement was prepared and the design assumptions memo is attached as Attachment L for reference. Caltrans has reviewed the analysis and provided comments on June 22, 2015 and July 17, 2015.

13. PROJECT PERSONNEL

Caltrans Project Manager	Mohammad Suleiman	(510) 622-5943
Caltrans Design Office Chief	Keyhan Moghbel	(510) 286-7189
Caltrans Senior Transportation Engineer	Amir H. Sanatkar	(510) 622-8826
Caltrans Design Review	William Gee	(510) 286-4924
Caltrans HQ Project Delivery Coordinator	Robert Effinger	(916) 651-8312
Caltrans Environmental Analysis	Yolanda Rivas	(510) 286-6216
Caltrans Highway Operations	Lance Hall	(510) 286-6311
Caltrans Traffic	Robin Pon	(510) 286-4580
City of Redwood City	Jessica Manzi	(408) 899-5036
City of Redwood City	Paul Krupka	(650) 504-2299
SMCTA	Jim McKim	(650) 508-7944
URS Principal in Charge	Ramsey Hissen	(408) 297-9585
URS Senior Project Manager	Scott Kelsey	(408) 297-9585
URS Design Manager	Abhijeet Bhoi	(408) 297-9585
URS Senior Environmental Manager	Jeff Zimmerman	(510) 874-3005
URS Environmental Manager	Lynn McIntyre	(510) 874-3149

14. ATTACHMENTS

Attachment A **Project Vicinity & Location Map**

Attachment B **Preferred Alternative Preliminary Plans**

B1 **Preferred Alternative (Alternative 3) Preliminary Plans**

Title Sheet
Typical Sections
Key Map
Layout
Profile and Superelevation Diagram
Utility Plan

B2 **Preferred Alternative (Alternative 3) Project Phasing Layouts**

Attachment C **APS Plans**

Attachment D **Preliminary Project Cost Estimate**

Attachment E **Final Environmental Document Signature Page**

Attachment F **Storm Water Data Report Signature Page**

Attachment G **Right-of-Way Data Sheets**

Attachment H **Draft Cooperative Agreement**

Attachment I **Transportation Management Plan Data Sheet**

Attachment J **Proposed Construction Staging Plan**

Attachment K **Risk Management Plan**

Attachment L **Pavement Strategy Checklist & LCCA Design Assumptions Memo**

Attachment M **Noise Abatement Decision Report (NADR) Signature Page**

Attachment N **Updated Funding/Programming Information**