Modernization Program
Peninsula Corridor Electrification Project (PCEP)

February 2019
Monthly Progress Report

February 28, 2019

Funding Partners

Federal Transit Administration (FTA) Core Capacity

FTA Section 5307 (Environmental / Pre Development only)

FTA Section 5307 (Electric Multiple Unit (EMU) only)

Prop 1B (Public Transportation Modernization & Improvement Account)

Caltrain Low Carbon Transit Operations Cap and Trade

Proposition 1A

California High Speed Rail Authority (CHSRA) Cap and Trade

Carl Moyer Fund

Bridge Tolls (Funds Regional Measure (RM) 1/RM2)

San Francisco County Transportation Authority (SFCTA)/San Francisco Municipal Transportation Agency (SFMTA)

San Mateo County Transportation Authority (SMCTA) Contribution

SMCTA Measure A

Santa Clara Valley Transportation Authority (VTA) Measure A

VTA Contribution

City and County of San Francisco (CCSF) Contribution

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1.0 BACKGROUND

Over the last decade, Caltrain has experienced a substantial increase in ridership and anticipates further increases in ridership demand as the San Francisco Bay Area's population grows. The Caltrain Modernization (CalMod) Program, scheduled to be implemented by 2021, will electrify and upgrade the performance, operating efficiency, capacity, safety, and reliability of Caltrain's commuter rail service.

The PCEP is a key component of the CalMod Program and consists of converting Caltrain from diesel-hauled to Electric Multiple Unit (EMU) trains for service between the San Francisco Station (at the intersection of Fourth and King Streets in San Francisco) and the Tamien Station in San Jose. Caltrain will continue Gilroy service and support existing tenants.

An electrified Caltrain will better address Peninsula commuters' vision of environmentally friendly, fast and reliable service. Electrification will modernize Caltrain and make it possible to increase service while offering several advantages in comparison with existing diesel power use, including:

- **Improved Train Performance, Increased Ridership Capacity and Increased Service:** Electrified trains can accelerate and decelerate more quickly than diesel-powered trains, allowing Caltrain to run more efficiently. In addition, because of their performance advantages, electrified trains will enable more frequent and/or faster train service to more riders.
- **Increased Revenue and Reduced Fuel Cost:** An electrified Caltrain will increase ridership and fare revenues while decreasing fuel costs.
- **Reduced Engine Noise Emanating from Trains:** Noise from electrified train engines is measurably less than noise from diesel train engines. Train horns will continue to be required at grade crossings, adhering to current safety regulations.
- **Improved Regional Air Quality and Reduced Greenhouse Gas Emissions:** Electrified trains will produce substantially less corridor air pollution compared with diesel trains even when the indirect emissions from electrical power generation are included. Increased ridership will reduce automobile usage, resulting in additional air quality benefits. In addition, the reduction of greenhouse gas emissions will improve our regional air quality, and will also help meet the state's emission reduction goals.

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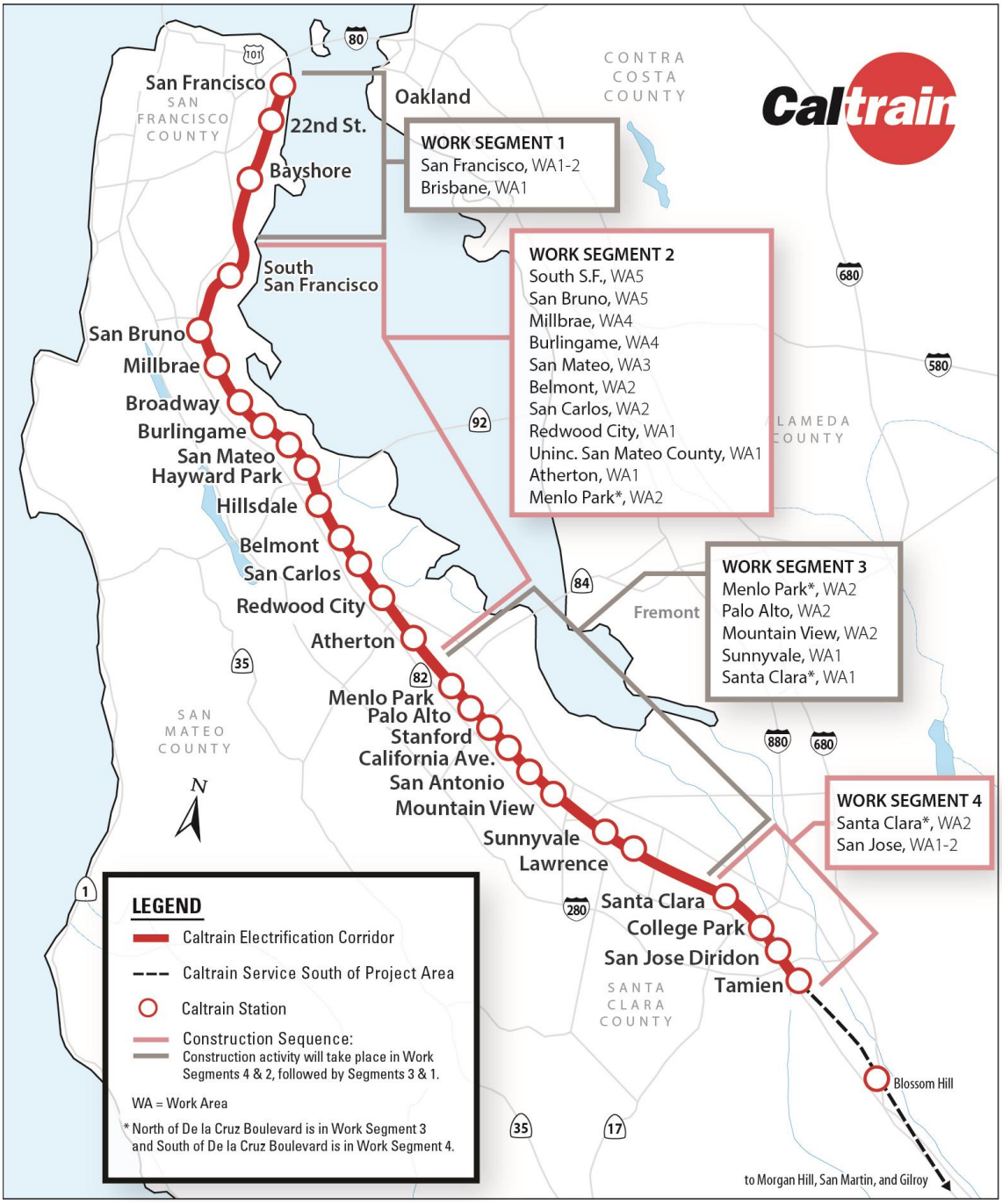
2.0 EXECUTIVE SUMMARY

The Monthly Progress Report is intended to provide an overview of the PCEP and provide funding partners, stakeholders, and the public an overall update on the progress of the project. This document provides information on the scope, cost, funding, schedule, and project implementation. Work along the Caltrain Electrification Corridor has been divided into four work segments and respective work areas (WA) as shown in Figure 2-1. PCEP activities are described and summarized by segments and work areas.

Figure 2-1 PCEP Work Segments



Electrification construction continued in February with installation of foundations, poles, cantilever arms, and insulators. Additional potholes were dug, utility work was performed at TPS-2 and TPS-1, foundations were installed at SWS-1 and PS-4, and wayside power cubicle foundations were installed in Segment 4.

EMU First Article Inspections are well underway with 38 of 69 conducted. All seven carshells for trainset 1 are in Salt Lake City undergoing final assembly.

Four tunnel Overhead Contact System (OCS) termination structure foundations were installed in February for a total of 28 of 34 completed to date. PCEP work in Tunnel 3 is complete, and notching work was completed in Tunnel 4.

2.1. Funding Partners Participation in PCEP

The PCEP has a series of weekly, biweekly, monthly and quarterly meetings to coordinate all aspects of the program. The meetings are attended by project staff with participation by our funding partners in accordance with the Funding Partners Oversight Protocol. A summary of funding partner meetings and invitees can be found in Appendix B.

This section of the report provides a summary of the discussions and decisions made at the meetings and a list of funding partners who attended the meetings.

Electrification – Engineering Meeting – Weekly

Purpose: To discuss status, resolution and tracking of Balfour Beatty Infrastructure, Inc. (BBII) and electrification design-related issues, to discuss Supervisory Control and Data Acquisition (SCADA), the Tunnel Modification Project, and monitor the progress of utility relocation compared to schedule, and to discuss third-party coordination activities with Pacific Gas and Electric (PG&E), CHSRA, Union Pacific Rail Road (UPRR), Bay Area Rapid Transit, California State Department of Transportation (Caltrans), Positive Train Control (PTC) and others.

Activity this Month

Funding Partners: CHSRA: Ian Ferrier

Continued discussions on resolution of outstanding issues for the Design-Build (DB) contract such as grade crossing designs, including preparation for meeting with key stakeholders such as the Federal Railroad Administration (FRA), potholing status, and foundation installation sequencing, review of key actions from weekly Balfour Beatty progress meetings, the progression of the PG&E interconnections design and substations improvement status, including interface with VTA on the design of TPS-2 interconnection into PG&E's FMC Substation, key interface points (foundation installation, signal design, etc.) between the PCEP and other major Peninsula Corridor Joint Powers Board (JPB) projects such as South San Francisco Station Project and 25th Avenue Grade Separation, the utility relocation status, status of the Tunnel Modification construction and key project issues, updates of the SCADA project, updates on DB and program schedule, including key foundation and traction power facility milestones, updates on PG&E Infrastructure buildout and power quality study, upcoming changes to the contract in preparation for the Change Management Board (CMB), specific contract

change orders that require technical review and input, and coordination with key third parties on design review and permitting for the project.

PCEP Delivery Coordination Meeting – Bi-Weekly

Purpose: To facilitate high-level coordination and information sharing between cross-functional groups regarding the status of the work for which they are responsible.

Activity this Month

Funding Partners: CHSRA: Ian Ferrier and Wai-on Siu; SFCTA: Luis Zurinaga

The CHSRA/Funding Partners Quarterly meeting was held on February 27. The Project Management Oversight Consultant (PMOC) met with staff on February 27 – March 1 and observed the tunnel progress. The Safety Campaign launched the week of February 25. Second round of interviews for the On-Call Construction Management Services occurred early February and staff is currently in the process of drafting the staff report and resolution. The CEMOF Facility Modifications Project contract was approved at the February Board. AEM-7 test locomotive units were received in Wilmington on February 12 and are expected to be delivered to a Caltrain/Union Pacific Railroad (UPRR) transfer point in late March. Thirteen train carshells have been shipped and 10 are in Salt Lake City. In Segment 4, foundation installation started on February 26. The transformers are scheduled to arrive in March with one out of three going into PS-7 and the remaining two will be going into Switching Station 1. At the Tunnels Project, 20 weekend shutdowns have occurred through February 25, work was successfully brought trains back into service without impact to revenue service trains. Twenty-eight out of 34 total OCS foundations have been installed as of the end of Weekend #20, and the drop tubes and OCS termination structures are currently planned to be installed during the weekend shutdowns in April and May.

Systems Integration Meeting – Bi-Weekly

Purpose: To discuss and resolve issues with inter-system interfaces and to identify and assign Action Item Owners for interface points that have yet to be addressed.

Activity this Month

Funding Partners: CHSRA: Ian Ferrier and Wai-On Su

Bi-weekly PCEP interface meetings are held to monitor and determine appropriate resolution for systems integration issues. The systems integration database is updated as issues are resolved or new items arise. A spreadsheet for keeping track of Action Items and the individual(s) assigned to these items is also being used. Meetings are also held bi-weekly with the electrification contractor to discuss design and construction integration issues. The Systems Integration Lead also maintains contact with the EMU procurement team. The Traction Power SCADA team also holds bi-weekly status meetings. Coordination with the EMU procurement, PTC and Caltrain Capital Project managers responsible for delivery of the 25th Avenue Grade Separation Project, Marin Napoleon Bridge Rehabilitation Project, and the South San Francisco Station Project is ongoing. There is coordination with the Tunnel Modification Project as well. Progress on activities including systems integration testing activities, FRA, FTA and safety

certification are being tracked. The Systems Integration test plan has been resubmitted as Revision 2 and review of this submittal is in progress.

Master Program Schedule (MPS) Meeting – Monthly

Purpose: To review the status of the MPS and discuss the status of major milestones, critical and near critical paths, upcoming Board review items, and progress with the contracts, among others.

Activity this Month

Funding Partners: CHSRA: Ian Ferrier; SFCTA: Luis Zurinaga; VTA: Manola Gonzalez-Estay

The overall schedule remains unchanged from last month. The forecasted Revenue Service Date (RSD) remains May 2022. The addition of approximately three and a half months of contingency yields an RSD of August 2022. The program critical path runs through the manufacturing and testing of EMU trainsets.

Risk Assessment Meeting – Monthly

Purpose: To identify risks and corresponding mitigation measures. For each risk on the risk register, mitigation measures have been identified and are being implemented. Progress in mitigating these risks is confirmed at the ongoing risk monitoring and monthly risk assessment meetings.

Activity this Month

Funding Partners: CHSRA: Ian Ferrier

One risk was identified and one retired. One risk was regraded. Three risks were added to the Watch List.

Change Management Board (CMB) – Monthly

Purpose: To review, evaluate and authorize proposed changes to PCEP over $200,000.

Activity this Month

Funding Partners: CHSRA: Bruce Armistead and Boris Lipkin; Metropolitan Transportation Commission (MTC): Trish Stoops and Kenneth Folan; SFCTA: Luis Zurinaga; VTA: Carol Lawson; SMCTA: Joe Hurley

The CMB discusses major topics including potential changes to PCEP contracts, contingency usage, track access delays and Differing Site Conditions (DSC) field order updates.

Potential contract changes will follow the PCEP Change Order Procedure. Once approved changes are executed, they will be reported in the Change Management section (Section 9) of this report.

BBII Contract

No changes were identified for consideration.

Stadler Contract

No changes were identified for consideration.

SCADA Contract

No changes were identified for consideration.

Tunnel Modification Contract

No changes were identified for consideration.

2.2. Schedule

The overall schedule remains unchanged from last month. The forecasted Revenue Service Date (RSD) remains May 2022. The program critical path runs through the manufacturing and testing of EMU trainsets.

Table 2-1 indicates major milestone dates for the MPS.

Table 2-1 Schedule Status

Milestones	Program Plan	Progress Schedule (February 2019)[1]
Segment 4 Completion to Begin Vehicle Testing	11/21/2019	03/14/2020[2]
Arrival of First Vehicle in Pueblo, CO	N/A	Fall 2019[3]
Arrival of First Vehicle at JPB	07/29/2019	Spring 2020[3]
Electrification Substantial Completion	08/10/2020	09/02/2021[2]
PG&E Provides Permanent Power	09/09/2021	09/09/2021
Start Phased Revenue Service	N/A	09/10/2021
RSD (w/o Risk Contingency)	12/09/2021	05/06/2022[3]
FFGA RSD (w/ Risk Contingency)	08/22/2022	08/22/2022[3]

Note:

1. Dates may shift slightly as the update of this month's Progress Schedule is still in process.
2. See "Notable Variances" in Section 7 for explanation on date shift.
3. Changes caused by the purchase of additional 37 traincars and proposed offsite testing have necessitated a reevaluation of the program schedule. This effort is currently in process.

2.3. Budget

A summary of the overall budget and expenditure status for the PCEP is provided in Table 2-2 below.

Table 2-2 Budget and Expenditure Status

Description of Work	Budget (A)	Current Budget (B)[1]	Cost This Month (C)[2]	Cost To Date (D)[3]	Estimate To Complete (E)	Estimate At Completion (F) = (D) + (E)
Electrification Subtotal	$1,316,125,208	$1,316,125,208	$12,727,448	$500,483,129	$815,642,079	$1,316,125,208
EMU Subtotal	$664,127,325	$664,127,325	$15,971,988	$148,677,936	$515,449,388	$664,127,325
PCEP TOTAL	$1,980,252,533	$1,980,252,533	$28,699,436	$649,161,065	$1,331,091,467	$1,980,252,533

Notes regarding tables above:

1. Column B “Current Budget” includes executed change orders and awarded contracts.
2. Column C "Cost This Month" represents the cost of work performed this month.
3. Column D "Cost To Date" includes actuals (amount paid) and accruals (amount of work performed) to date.

2.4. Board Actions

- February
  - Award of CEMOF Facility Modifications Project contract

Future anticipated board actions include:

- March
  - Apply for and receive $1.75 million in California Low Carbon Transportation Operations Program funding
- April
  - Award of Construction Management Support Services
- May
  - PG&E interconnect construction

2.5. Government and Community Affairs

There were four outreach events this month.

3.0 ELECTRIFICATION – INFRASTRUCTURE

This section reports on the progress of the Electrification, SCADA, and Tunnel Modification components. A brief description on each of the components is provided below.

3.1. Electrification

The Electrification component of the PCEP includes installation of 138 miles of wire and OCS for the distribution of electrical power to the EMUs. The OCS will be powered from a 25 kilovolt (kV), 60-Hertz, single phase, alternating current supply system consisting of two traction power substations (TPS), one switching station (SS), and seven paralleling stations (PS). Electrification infrastructure will be constructed using a DB delivery method.

Activity This Month

- Continue to install OCS foundations in Segment 2.
- Mobilized foundation work train to prepare for start of OCS foundation installation in Segment 4.
- Began foundation installation in Segment 4.
- Continued fabrication of OCS cantilevers and brackets in the Contractor's South San Francisco warehouse.
- Installed OCS poles, cantilever arms, insulators, brackets, down guys, and Tensorex in Segment (S) 2 Work Area (WA) 5 and S2WA4.
- Potholed at proposed OCS locations and utility locations in Segments 1, 2, 3, and 4 in advance of foundation installation. BBII and PCEP also continued to resolve conflicts found during the potholing process, such as loose concrete, asphalt, and other debris, and continued designing solutions for those conflicts that cannot be avoided. The conflicts must be resolved before the installation of foundations at those locations.
- Relocated signal cables found in conflict with planned OCS foundations as conflicts were identified.
- Installed ground grid and continued utility work at TPS-2.
- Continued to remove and relocate utilities and install ductbanks at TPS-1.
- Continued to install ductbank and gantry foundations at PS-7.
- Continued to install ductbank and foundations at SWS-1.
- Began installation of foundations and ductbank at PS-4.
- Installed signal ductbank and wayside power cubicle foundations in Segment 4.
- Installed impedance bonds in Segment 3 and 4.
- Continued tree pruning and removals in Segment 3.
- Progressed the OCS design with BBII in all segments, which included submittal and review of Design Change Notices for revised foundation locations.

- Coordinated design review with local jurisdictions for the OCS, Traction Power Facilities, and Bridge Attachments design, including responses to comments from jurisdictions.
- Continued to review and coordinate signal and communication design submittals with BBII.
- Scheduled follow up meeting with FRA Headquarters to continue discussion on grade crossing design concept. Also reached out to the CPUC to present the same design concept.
- Received and reviewed 60% TPS Interconnection Plans for TPS-1 and TPS-2. The interconnection is between the PG&E substations and future Caltrain main substations.
- Received and reviewed Issued for Construction (IFC) Bridge Screening and OCS Attachments Segment 1 and 3.
- Received and reviewed Communications System-wide Design 95%.
- Received 95% Stations and Structure Bonding S1 and S3 for review.
- Worked with BBII through Site Specific Work Plans (SSWP) for upcoming field work.
- Continued to work with PG&E for the finalization of protection scheme studies.

A summary of the work progress by segment is provided in Table 3-1 below.

Table 3-1 Work Progress by Segment

Segment	Work Area	Foundations			Poles		
		Required[ab]	Completed this Month	Completed to Date	Required[b]	Completed this Month	Completed to Date
1	Tunnels	34	4	28	31	0	0
2	5	242	0	184	186	0	160
	4	315	0	238[c]	259	10	170
	3	182	1	60[c]	147	0	0
	2	248	7	74	218	0	0
	1	206	7	78	155	0	0
4	A	251	5	5	-	0	0
	B	141	12	12	-	0	0
Total		**1,225**	**36**	**679**	**997**	**10**	**330**

Note:

a. Foundations required does not match poles required as guy foundations are needed in some locations for extra support.

b. The number of required poles and foundations fluctuate due to design changes.

c. In January's report, the number of foundations installed in Segment 2 Work Area 4 was understated by 3, and the number in Segment 2 Work Area 3 was overstated by 3. This has been corrected.

Activity Next Month

- Continue resolution of DSCs.
- Continue to install protective steel plates for protection of utilities during foundation installation.
- Continue to install poles, cantilevers, insulators and brackets in S2WA5 and S2WA4.

- Continue work with BBII on field investigation activities and designs, which will include the progression of the OCS, traction power, bonding and grounding, signal systems, and other civil infrastructure such as overhead bridge protections.
- Pothole and clear obstructions at proposed OCS locations. Potholing will continue in Segments 1, 2, 3 and 4.
- Continue construction at TPS-1 and TPS-2.
- Continue construction at PS-7, PS-4 and Switching Station. Transformer delivery for PS-7 and Switching Station has been pushed back to April.
- Continue to install conduit and foundations for signal and Wayside Power Cabinet units in Segment 2 and 4.
- Continue to install impedance bonds.
- Continue to coordinate with stakeholders on the Consistent Warning Time solution and advance location specific design.
- Progress locations specific design for grade crossing system.
- Review BBII work plans for upcoming construction activities.
- Progress design for PG&E interconnection towards 95%.
- Coordinate with PG&E on final design for PG&E infrastructure.
- Coordinate with local jurisdictions to review designs.
- Continue tree pruning and removals.

3.2. Supervisory Control and Data Acquisition

SCADA is a system that monitors and controls field devices for electrification, including substations, TPSs, Wayside Power Cubicles, and the OCS. SCADA will be integrated with the base operating system for Caltrain Operations and Control, which is the Rail Operations Center System. A separate control console will be established for the Power Director.

Activity This Month

- Submitted formal schedule for review and Monthly Progress Report.
- Continued the implementation of clearance, remote power terminal, and other feature development.
- Began to modify the database based on the Points List.
- Completed development and testing of the communications interface
- Completed development of Sequence of Events.
- Began development of Field Power Director.

Activity Next Month

- Prepare and deliver the Monthly Report and the Monthly Schedule Update.
- Attend project status meetings.
- Support ongoing discussions concerning Requests for Information.
- Continue to modify the database reflecting design drawings from the Points List.

- Continue the implementation of Clearance and Remote Power Terminal.
- Continue unit tests as feature development is completed. Tests planned include:
  - Power Director Shift Change
  - Sequence of Events
  - San Jose lab point-to-point test
- Delivery of test procedures as these unit tests are completed.

3.3. Tunnel Modification

Tunnel modifications will be required on the four tunnels located in San Francisco. This effort is needed to accommodate the required clearance for the OCS to support electrification of the corridor. Outside of the PCEP scope, Caltrain Engineering has requested the PCEP team to manage completion of design and construction for the Tunnel 1 and Tunnel 4 Drainage and Track Rehabilitation Project. The Tunnel Drainage and Track Rehabilitation Project is funded separately from PCEP.

Activity This Month

- Successfully returned Caltrain to revenue service after 20 total weekend shutdowns through December.
- Tunnel 1: Track replacement work continued.
- Tunnel 2: OCS Expansion Anchors that failed testing were replaced.
- Tunnel 3: Work completed except for cleanup of any debris within tunnel.
- Tunnel 4: Tunnel Notching completed and track replacement work began.
- Historic Tunnel 4 South Portal work continued with disassembly of steel set that was utilized in support of South Tunnel 4 notching.
- Four micropile foundations were installed at Tunnel 2 South Portal (Main Track 2 Side). Twenty-eight of 34 total foundations installed to date. Tunnel 1 North Portal and Tunnel 2 South Portals (Main Track 1 Side) remain.
- Continued coordination of weekly plans for track and drainage work activities.

Activity Next Month

- Continue track demolition, construction work, and drainage activities near and within Tunnels 1 and 4.
- Begin Historic Tunnel 4 South Portal reconstruction pending FTA/State Historic Preservation Officer approval of revised plan due to poor condition of existing archstones.
- Continue installation of OCS termination structure foundations at Tunnel 1 North Portal and Tunnel 2 South Portal Areas.
- Begin fabrication of OCS Termination Structures from Steel Shop Drawings based on as-built survey of foundations.
- Review submittals and SSWPs.
- Continue weekly coordination for track and drainage work activities.

4.0 ELECTRIC MULTIPLE UNITS

This section reports on the progress of the Electric Multiple Units (EMU) procurement and the Centralized Equipment Maintenance and Operations Facility (CEMOF) modifications.

4.1. Electric Multiple Units

The procurement of EMUs, or trainsets, from Stadler consists of a Base Order of 96 railcars, plus an Option Order of an additional 37 railcars, for a total of 133 railcars. These two orders will be combined and delivered as 19 seven-car Trainsets. The Base Order is funded from PCEP, and Option Cars funded by a Transit and Intercity Rail Capital Program (TIRCP) grant.

Activity This Month

- Final Design Reviews complete for 13 of the 17 major systems. Remaining four are conditionally approved.
- First Article Inspections (FAIs) continue; 69 total, 38 conducted, 14 closed.
- Four-passenger work table undergoing redesign to meet crashworthiness requirements.
- Trainset 1: all seven shells in Stadler's Salt Lake City facility undergoing final assembly.
- Trainset 2: 3 carshells in SLC, others in transit from Europe.
- Trainset 3: shells being fabricated in Altenrhein for shipment in March 2019.

A summary of the EMU Status by trainset is provided in Table 4-1 below.

Table 4-1 EMU Status by Train Car

Trainset #		Shells Shipped	Salt Lake City In	Salt Lake City Out	Cars at Caltrain
Trainset	1	7	7	0	0
Trainset	2	7	3	0	0
Trainset	3	0	0	0	0
Trainset	4	0	0	0	0
Trainset	5	0	0	0	0
Trainset	19	0	0	0	0
TOTAL		**14/133**	**10/133**	**0/133**	**0/133**

- Truck (bogie) frames: First motor truck and trailer truck frame arrived in SLC.
- Caltrain and FRA representatives discussed several aspects of the EMUs and FRA compliance. Caltrain is currently evaluating options and possible impacts.

Activity Next Month

- Evaluate possibility of performing Trainset Level Design Conformance Testing at Pueblo, Colorado test facility rather than Caltrain.

- Continue truck (bogie) structural and lifecycle testing.
- Commence passenger-side door system lifecycle test.
- Retest EMU engineer's seat pedestal stand for crashworthiness.
- Continue work with FRA on EMU compliance issues.

4.2. Centralized Equipment Maintenance and Operations Facility Modifications

The CEMOF Modifications Project will provide work areas to perform maintenance on new EMUs.

Activity This Month

- Negotiations with sole bidder concluded.
- Board awarded contract to ProVen Management, Inc.

Activity Next Month

- Issue Limited Notice to Proceed to ProVen.
- Progress ancillary procurements for pantograph CCTV-based monitoring system and scissor platform lifts.

5.0 SAFETY

Safety and Security requirements and plans are necessary to comply with applicable laws and regulations related to safety, security, and emergency response activities. Safety staff coordinates with contractors to review and plan the implementation of contract program safety requirements. Safety project coordination meetings continue to be conducted on a monthly basis to promote a clear understanding of project safety requirements as defined in contract provisions and program safety documents.

Activity This Month

- Provided OCS safety awareness presentations to the San Mateo County Fire Department Chiefs at their "All Officers Meeting" and to JPB management staff at JPB Operations All Hands Quarterly Meeting.
- Project staff provided input and continued its participation in the BBII contractor workforce safety meetings. Project incidents continue to be reviewed with project staff to reinforce the application of recommended safety mitigation measures.
- Continued to provide input and oversight of the contractor SSWP safety provisions and ongoing safety construction oversight and inspections.
- Conducted the monthly project Safety and Security Certification and Fire / Life Safety Meetings.
- Conducted ongoing safety inspections of contractor field activities.
- Participated in weekly project coordination meetings with the contractor to review open issues and recommended action items.
- Performed contractor equipment inspections of the new work equipment being deployed for the project.
- Continued to provide safety oversight of the tunnel project contract work. Attended weekly project coordination meetings to discuss ongoing safety concerns and recommended improvements.

Activity Next Month

- Monthly safety communication meetings continue to be scheduled for the Project Safety and Security Certification Committee, Fire/Life Safety Committee, and other project-related contractor and JPB safety meetings to discuss safety priorities.
- Provide an OCS project overview and safety presentation for the San Jose Fire Department Chiefs and training staff.
- Continue focus on performing site safety inspections on the OCS foundation, pole installations, potholing, and tree trimming field work to assess safety work practices and identify additional opportunities for improvement. Conduct contractor equipment inspections.
- Continue to meet with the PCEP contractors, JPB safety, and TransitAmerica Services, Inc (TASI) to identify opportunities to further improve project safety performance and continue to reinforce lessons learned safety mitigation recommendations resulting from prior project incidents.
- Continue to provide safety and security oversight of the weekend shutdowns for Tunnel Project contract activities and continue to document the Tunnel Project safety and security certification requirements.

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6.0 QUALITY ASSURANCE

The Quality Assurance (QA) staff performs technical reviews for planning, implementing, evaluating, and maintaining an effective program to verify that all equipment, structures, components, systems, and facilities are designed, procured, constructed, installed, and maintained in accordance with established criteria and applicable codes and standards throughout the design, construction, startup and commissioning of the PCEP.

Activity This Month

- Staff meetings with BBII QA/Quality Control (QC) management representatives continue weekly.
- Continued review of BBII-generated Nonconformance Reports (NCR) and Construction Discrepancy Reports for proper discrepancy condition, cause, disposition, corrective and preventive action and verification of closure.
- Continued review and approval of Design Variance Requests for BBII and PGH Wong for QA/QC and inspection issues/concerns.
- Continued review of BBII QC Inspectors Daily Reports, Construction QC Reports and Surveillance Reports for work scope, performance of required duties, adequacy, non-conformances, test/inspection results, follow-up on unresolved issues, and preciseness.
- Continued review of BBII Material Receipt Reports, Certificates of Conformance, Certified Tests Reports, and Certificates of Analysis to ensure delivered project materials conform to specifications, and that contractually required quality and test support documents are adequate and reflect concise conditions per the purchase order requirements.
- Continued regularly scheduled design reviews and surveillances on project design packages.
- Continued review of Stadler QA activities including: NCR review, Inspection Exception Reports, Car History Reports, and Weekly Status Reports.
- Conducted audits of BBII/PGH Wong Design Packages: OCS Foundations and Pole Layouts Design Change Notice #072, OCS Layouts and Material Allocation Issued for Construction.

Table 6-1 below provides details on the status of audits performed through the reporting period.

Table 6-1 Quality Assurance Audit Summary

Quality Assurance Activity	This Reporting Period	Total to Date
Audits Conducted	2	85
Audit Findings		
Audit Findings Issued	0	58
Audit Findings Open	0	0
Audit Findings Closed	1	58
Non-Conformances		
Non-Conformances Issued	0	8
Non-Conformances Open	0	0
Non-Conformances Closed	0	8

Activity Next Month

- Three design package audits of PGH Wong are planned, one field activity, and one supplier audit of Alstom (train control manufacturer).

7.0 SCHEDULE

The overall schedule remains unchanged from last month. The forecasted Revenue Service Date (RSD) remains May 2022. The program critical path runs through the manufacturing and testing of EMU trainsets.

Shown below, Table 7-1 indicates major milestone dates for the MPS. Items listed in Table 7-2 reflect the critical path activities/milestones for the PCEP.

Notable Variances

During this monthly progress reporting period, BBII is currently reporting an overall delay to substantial completion, including the intermediate milestone of Segment 4/Test Track completion. The projected dates for BBII's overall substantial completion remain the same as the previous month. The delay is primarily due to the time it has taken to finalize the modifications required for the grade crossings as well the effect that differing site conditions (DSCs) are having on OCS foundation installation. JPB continues to work with and is urging BBII to accelerate the crossing design completion and issues relating to DSCs.

Table 7-1 Schedule Status

Milestones	Program Plan	Progress Schedule (February 2019)[1]
Segment 4 Completion to Begin Vehicle Testing	11/21/2019	03/14/2020[2]
Arrival of First Vehicle in Pueblo, CO (proposed)	N/A	Fall 2019[3]
Arrival of First Vehicle at JPB	07/29/2019	Spring 2020[3]
Electrification Substantial Completion	08/10/2020	09/02/2021[2]
PG&E Final Design and Construction to provide Permanent Power Complete	09/09/2021	09/09/2021
Start Phased Revenue Service	N/A	09/10/2021
RSD (w/o Risk Contingency)	12/09/2021	05/06/2022[3]
FFGA RSD (w/ Risk Contingency)	08/22/2022	08/22/2022[3]

Note:

1. Dates may shift slightly as the update of this month's Progress Schedule is still in process.
2. See "Notable Variances" above for explanation on date shift.
3. Changes caused by the purchase of additional 37 traincars and proposed offsite testing have necessitated a reevaluation of the program schedule. This effort is currently in process.

Table 7-2 Critical Path Summary

Activity	Start	Finish
Manufacturing, Testing & Acceptance of Trainsets 1 - 14	08/13/2018	05/06/2022
RSD w/out Risk Contingency[1]	05/06/2022	05/06/2022[2]
FFGA RSD w/ Risk Contingency[1]	08/22/2022	08/22/2022[2]

Note:

1. Milestone activity.
2. Changes caused by the purchase of additional 37 traincars and proposed offsite testing have necessitated a reevaluation of the program schedule. This effort is currently in process.

8.0 BUDGET AND EXPENDITURES

The summary of overall budget and expenditure status for the PCEP and Third Party Improvements is shown in the following tables. Table 8-1 reflects the Electrification budget, Table 8-2 the EMU budget, Table 8-3 the overall PCEP budget, and Table 8-4 Third Party Improvements budget.

Table 8-1 Electrification Budget & Expenditure Status

Description of Work	Budget (A)	Current Budget (B)[1]	Cost This Month (C)[2]	Cost To Date (D)[3]	Estimate To Complete (E)	Estimate At Completion (F) = (D) + (E)
ELECTRIFICATION						
Electrification [4]	$696,610,558	$716,642,817	$5,956,452	$288,286,062	$428,356,755	$716,642,817
SCADA	$0	$3,446,917	$0	$1,934,371	$1,512,546	$3,446,917
Tunnel Modifications	$11,029,649	$41,881,170	$1,836,271	$20,915,210	$20,965,960	$41,881,170
Real Estate	$28,503,369	$28,503,369	$83,221	$17,222,040	$11,281,329	$28,503,369
Private Utilities	$63,515,298	$94,051,380	$690,085	$35,494,165	$58,557,215	$94,051,380
Management Oversight [5]	$141,506,257	$140,822,289	$2,568,807	$107,449,412	$33,372,877	$140,822,289
Executive Management	$7,452,866	$6,214,226	$136,534	$6,065,827	$148,400	$6,214,226
Planning	$7,281,997	$7,281,997	$4,078	$5,539,211	$1,742,786	$7,281,997
Community Relations	$2,789,663	$2,789,663	$19,175	$1,355,108	$1,434,555	$2,789,663
Safety & Security	$2,421,783	$2,421,783	$83,105	$2,084,275	$337,508	$2,421,783
Project Management Services	$19,807,994	$19,807,994	$175,010	$10,621,152	$9,186,842	$19,807,994
Engineering & Construction	$11,805,793	$11,805,793	$240,736	$6,349,152	$5,456,641	$11,805,793
Electrification Eng & Mgmt	$50,461,707	$50,461,707	$1,413,423	$36,679,280	$13,782,427	$50,461,707
IT Support	$312,080	$331,987	$8,682	$391,368	($59,380)	$331,987
Operations Support	$1,445,867	$1,980,632	$202,290	$1,878,553	$102,079	$1,980,632
General Support	$4,166,577	$4,166,577	$139,689	$3,959,097	$207,480	$4,166,577
Budget / Grants / Finance	$1,229,345	$1,229,345	$30,835	$1,128,700	$100,645	$1,229,345
Legal	$2,445,646	$2,445,646	$53,033	$3,409,788	($964,141)	$2,445,646
Other Direct Costs	$5,177,060	$5,177,060	$62,217	$3,280,025	$1,897,035	$5,177,060
Prior Costs 2002 - 2013	$24,707,878	$24,707,878	$0	$24,707,878	$0	$24,707,878
TASI Support	$55,275,084	$55,275,084	$1,530,923	$21,034,335	$34,240,748	$55,275,084
Insurance	$3,500,000	$4,305,769	$0	$3,558,530	$747,238	$4,305,769
Environmental Mitigations	$15,798,320	$14,972,644	$0	$715,411	$14,257,234	$14,972,644
Required Projects	$17,337,378	$15,302,378	$7,860	$727,999	$14,574,379	$15,302,378
Maintenance Training	$1,021,808	$1,021,808	$0	$0	$1,021,808	$1,021,808
Finance Charges	$5,056,838	$5,056,838	$53,829	$3,145,593	$1,911,245	$5,056,838
Contingency	$276,970,649	$194,842,745	$0	$0	$160,265,031	$160,265,031
Forecasted Costs and Changes	$0	$0	$0	$0	$34,577,714	$34,577,714
ELECTRIFICATION SUBTOTAL	**$1,316,125,208**	**$1,316,125,208**	**$12,727,448**	**$500,483,129**	**$815,642,079**	**$1,316,125,208**

Notes regarding tables above:

1. "Current Budget" includes executed change orders and awarded contracts.
2. Column C "Cost This Month" represents the cost of work performed this month.
3. Column D "Cost To Date" includes actuals (amount paid) and accruals (amount of work performed) to date.
4. Cost To Date for "Electrification" includes 5% for Contractor's retention until authorization of retention release.
5. The agency labor is actual through January 2019 and accrued for February 2019.

Table 8-2 EMU Budget & Expenditure Status

Description of Work	Budget (A)	Current Budget (B)[1]	Cost This Month (C)[2]	Cost To Date (D)[3]	Estimate To Complete (E)	Estimate At Completion (F) = (D) + (E)
EMU	$550,899,459	$550,792,469	$15,316,640	$112,698,145	$438,094,324	$550,792,469
CEMOF Modifications	$1,344,000	$6,550,777	$0	$0	$6,550,777	$6,550,777
Management Oversight [4]	$64,139,103	$63,379,937	$622,356	$33,781,848	$29,598,090	$63,379,937
Executive Management	$5,022,302	$4,263,136	$82,164	$3,806,046	$457,090	$4,263,136
Community Relations	$1,685,614	$1,685,614	$11,752	$516,721	$1,168,893	$1,685,614
Safety & Security	$556,067	$556,067	$7,937	$411,002	$145,065	$556,067
Project Mgmt Services	$13,275,280	$13,275,280	$93,673	$6,948,557	$6,326,723	$13,275,280
Eng & Construction	$89,113	$89,113	$0	$23,817	$65,296	$89,113
EMU Eng & Mgmt	$32,082,556	$32,082,556	$267,750	$15,720,789	$16,361,767	$32,082,556
IT Support	$1,027,272	$1,027,272	$5,081	$459,972	$567,300	$1,027,272
Operations Support	$1,878,589	$1,878,589	$0	$277,200	$1,601,388	$1,878,589
General Support	$2,599,547	$2,599,547	$62,473	$1,734,541	$865,006	$2,599,547
Budget / Grants / Finance	$712,123	$712,123	$33,301	$682,981	$29,142	$712,123
Legal	$1,207,500	$1,207,500	$21,521	$1,211,578	($4,078)	$1,207,500
Other Direct Costs	$4,003,139	$4,003,139	$36,703	$1,988,643	$2,014,496	$4,003,139
TASI Support	$2,740,000	$2,740,000	$0	$0	$2,740,000	$2,740,000
Required Projects	$4,500,000	$4,500,000	$0	$270,000	$4,230,000	$4,500,000
Finance Charges	$1,941,800	$1,941,800	$32,992	$1,927,944	$13,856	$1,941,800
Contingency	$38,562,962	$34,222,341	$0	$0	$33,286,341	$33,286,341
Forecasted Costs and Changes	$0	$0	$0	$0	$936,000	$936,000
EMU SUBTOTAL	**$664,127,325**	**$664,127,325**	**$15,971,988**	**$148,677,936**	**$515,449,388**	**$664,127,325**

Notes regarding tables above:

1. "Current Budget" includes executed change orders and awarded contracts.
2. Column C "Cost This Month" represents the cost of work performed this month.
3. Column D "Cost To Date" includes actuals (amount paid) and accruals (amount of work performed) to date.
4. The agency labor is actual through January 2019 and accrued for February 2019.

Table 8-3 PCEP Budget & Expenditure Status

Description of Work	Budget (A)	Current Budget (B)[1]	Cost This Month (C)[2]	Cost To Date (D)[3]	Estimate To Complete (E)	Estimate At Completion (F) = (D) + (E)
Electrification Subtotal	**$1,316,125,208**	**$1,316,125,208**	**$12,727,448**	**$500,483,129**	**$815,642,079**	**$1,316,125,208**
EMU Subtotal	**$664,127,325**	**$664,127,325**	**$15,971,988**	**$148,677,936**	**$515,449,388**	**$664,127,325**
PCEP TOTAL	**$1,980,252,533**	**$1,980,252,533**	**$28,699,436**	**$649,161,065**	**$1,331,091,467**	**$1,980,252,533**

Notes regarding tables above:

1. Column B "Current Budget" includes executed change orders and awarded contracts.
2. Column C "Cost This Month" represents the cost of work performed this month.
3. Column D "Cost To Date" includes actuals (amount paid) and accruals (amount of work performed) to date.

Table 8-4 Third Party Improvements/CNPA Budget & Expenditure Status

Description of Work	Budget (A)	Current Budget (B)[1]	Cost This Month (C)[2]	Cost To Date (D)[3]	Estimate To Complete (E)	Estimate At Completion (F) = (D) + (E)
CHSRA Early Pole Relocation	$1,000,000	$1,000,000	$0	$106,527	$893,473	$1,000,000
PS-3 Relocation (Design)	TBD	TBD	$0	$0	TBD	TBD
EMU Option Cars	$172,800,047	$172,800,047	$0	$0	$172,800,047	$172,800,047
CNPA TOTAL	**$173,800,047**	**$173,800,047**	**$0**	**$106,527**	**$173,693,520**	**$173,800,047**

Notes regarding tables above:

1. Column B "Current Budget" includes executed change orders and awarded contracts.
2. Column C "Cost This Month" represents the cost of work paid this month.
3. Column D "Cost To Date" includes actuals (amount paid) to date.

Table 8-4 shows improvements outside of the scope of PCEP that are funded with non-PCEP funds. These improvements are implemented through the PCEP contracts. In FTA terminology, these efforts are categorized as Concurrent Non-Project Activities (CNPA).

- CHSRA Early Pole Relocation: Relocation of 196 OCS poles as part of PCEP. Implementing these pole relocations minimizes future cost and construction impacts. This scope is funded by the CHSRA.
- PS-3 Relocation (Design): Relocate PS-3 (Burlingame) as part of PCEP to avoid a future conflict with the Broadway Grade Separation Project (BGSP). This scope is funded by the BGSP.
- EMU Option Cars: Exercise Stadler Contract Option for 37 additional EMUs. This scope is funded with a combination of TIRCP and matching local funds.

Appendix D includes costs broken down by Standard Cost Code (SCC) format. This format is required for reporting of costs to the FTA. The overall project total in the SCC format is lower than the project costs in table 8-3. This is due to the exclusion of costs incurred prior to the project entering the Project Development phase.

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9.0 CHANGE MANAGEMENT

The change management process establishes a formal administrative work process associated with the initiation, documentation, coordination, review, approval and implementation of changes that occur during the design, construction or manufacturing of the PCEP. The change management process accounts for impacts of the changes and ensures prudent use of contingency.

Currently the four PCEP contracts are BBII, Stadler, Tunnel Modification and SCADA. Future PCEP contracts such as CEMOF Modifications will also follow the change management process.

A log of all executed change orders can be found in Appendix E.

Executed Contract Change Orders (CCO) This Month

Electrification Contract

Change Order Authority (5% of BBII Contract) — **5% x $696,610,558 = $34,830,528**

Date	Change Number	Description	CCO Amount	Change Order Authority Usage
2/5/2019	BBI-053-CCO-040A	Increase Quantity for Utilities Potholing (Bid Item #9)	$1,662,500	$1,662,500
		Total	**$1,662,500**	**$1,662,500**

[1] (When indicated) Change approved by the Board of Directors – not counted against the Executive Director's Change Order Authority.

EMU Contract

Change Order Authority (5% of Stadler Contract) — **5% x $550,899,459 = $27,544,973**

Date	Change Number	Description	CCO Amount	Change Order Authority Usage
	None			
		Total	**$**0	**$0**

[1] (When indicated) Change approved by the Board of Directors – not counted against the Executive Director's Change Order Authority.

SCADA Contract

Change Order Authority (15% of ARINC Contract) — **15% x $3,446,917 = $517,038**

Date	Change Number	Description	CCO Amount	Change Order Authority Usage
	None		$0	$0
		Total	**$0**	**$0**

[1] (When indicated) Change approved by the Board of Directors – not counted against the Executive Director's Change Order Authority.

Tunnel Modification Contract

Change Order Authority (10% of ProVen Contract)[2] — **10% x $38,477,777 = $3,847,778**

Date	Change Number	Description	CCO Amount	Change Order Authority Usage
	None		$0	$0
		Total	**$0**	**$0**

[1] (When indicated) Change approved by the Board of Directors – not counted against the Executive Director's Change Order Authority.
[2] Tunnel modification contract ($38,477,777) includes: Notching ($25,281,170) and Drainage ($13,196,607).

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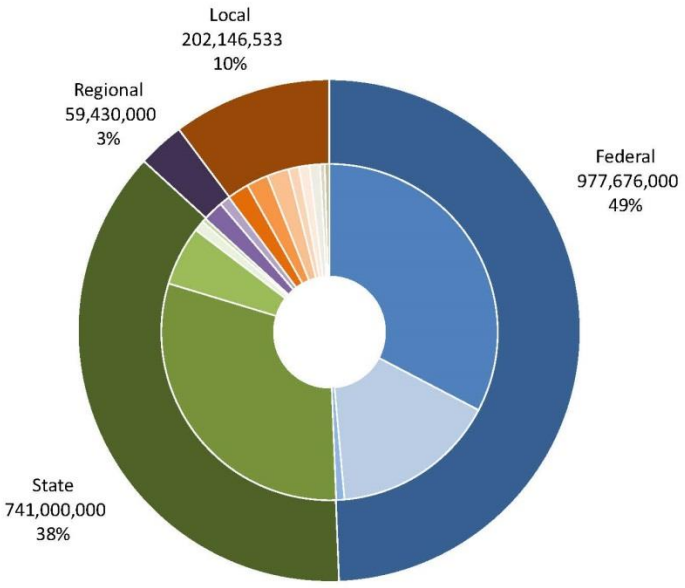
10.0 FUNDING

Figure 10-1 depicts a summary of the funding plan for the PCEP. It provides a breakdown of the funding partners as well as the allocated funds. As previously reported, the JPB was awaiting the award of over $70 million in FTA Section 5307 formula funds, which was previously delayed due to the government shut down. Those funds have since been awarded with the re-opening of the Federal government.

Figure 10-1 Funding Plan



Fund Source	Amount	%
FTA Core Capacity	$647,000,000	32.67%
FTA Section 5307 (EMU only)*	$315,000,000	15.91%
FTA Section 5307 (Environmental / Pre Development only)	$15,676,000	0.79%
Prop 1A	$600,000,000	30.30%
High Speed Rail Cap and Trade	$113,000,000	5.71%
Transit & Intercity Rail Capital Program	$20,000,000	1.01%
Prop 1B (Public Transportation Modernization & Improvement Account)	$8,000,000	0.40%
Bridge Toll Funds (RM1/RM2)	$39,430,000	1.99%
Carl Moyer	$20,000,000	1.01%
SFCTA/SFMTA**	$41,382,178	2.09%
SMCTA Measure A	$41,382,178	2.09%
VTA Measure A	$41,382,177	2.09%
Santa Clara (VTA) 7-Party MOU Contribution	$20,000,000	1.01%
San Francisco 7-Party MOU Contribution	$20,000,000	1.01%
San Mateo (SMCTA) 7-Party MOU Contribution	$20,000,000	1.01%
Caltrain Low Carbon Transit Operations Cap and Trade	$9,000,000	0.45%
Prior Local Contribution	$9,000,000	0.45%
Total	**$1,980,252,533**	

Notes:

*Includes necessary fund transfer with SMCTA

**Includes $4M CMAQ Transfer considered part of SF local contribution

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11.0 RISK MANAGEMENT

The risk management process is conducted in an iterative fashion throughout the life of the project. During this process, new risks are identified, other risks are resolved or managed, and potential impacts and severity modified based on the current situation. The Risk Management team's progress report includes a summary on the effectiveness of the Risk Management Plan, any unanticipated effects, and any correction needed to handle the risk appropriately.

The Risk Management team meets monthly to identify risks and corresponding mitigation measures. Each risk is graded based on the potential cost and schedule impacts they could have on the project. This collection of risks has the greatest potential to affect the outcome of the project and consequently is monitored most closely. For each of the noted risks, as well as for all risks on the risk register, mitigation measures have been identified and are being implemented. Progress in mitigating these risks is confirmed at monthly risk assessment meetings attended by project team management and through continuous monitoring of the Risk Management Lead.

The team has identified the following items as top risks for the project (see Appendix F for the complete Risk Table):

1. Extent of differing site conditions (DSC) and delays in resolving them may delay completion of electrification.
2. Track access may not meet expectations contributing to a prolonged construction schedule.
3. BBII may be unable to develop grade crossing modifications that meet stakeholder and regulatory requirements.
4. There is a potential that modifications to the PTC database and signal software are not completed in time for cutover and testing.
5. Major program elements may not be successfully integrated with existing operations and infrastructure in advance of revenue service.
6. Additional property acquisition may be necessitated.
7. Rejection of Design Variance Request for autotransformer feeder and static wires may result in cost and schedule impacts to PCEP.
8. Inadequate TASI resources may delay construction activities.
9. Decisions to stakeholder requested changes to the vehicles may delay RSD.
10. Changes to PTC implementation schedule could delay completion of electrification work.

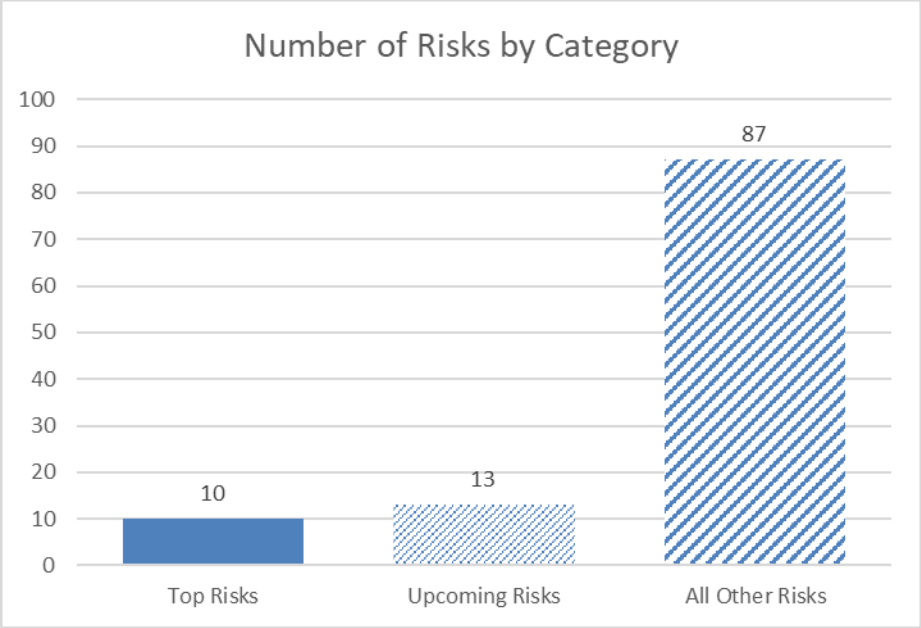
Activity This Month

- Updated risk descriptions, effects, and mitigations based upon weekly input from risk owners. Monthly cycle of risk updating was completed based on schedules established in the Risk Identification and Mitigation Plan.
- Updated risk retirement dates based upon revisions to the project schedule and input from risk owners.

- Continued weekly monitoring of risk mitigation actions and publishing of the risk register.
- The Risk Management team attended Project Delivery, Electrification, and Systems Integration meetings to monitor developments associated with risks and to identify new risks.
- Conducted monthly Risk Assessment Committee meeting.
- Conducted Monte Carlo analysis on current risk register to establish cost of risk.
- Supplied input to contingency update.

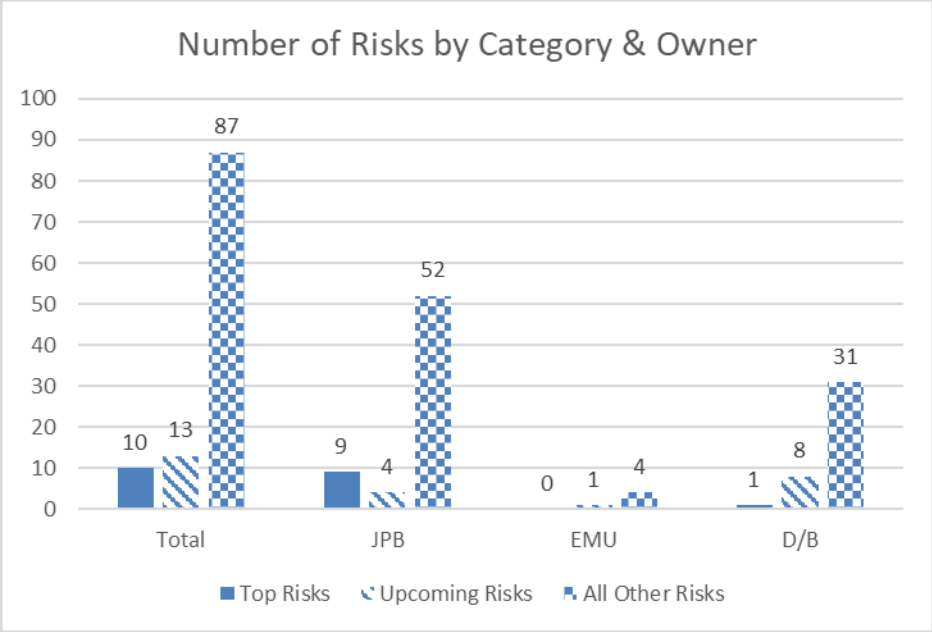
Figures 11-1 and 11-2 show the risks identified for the program. Risks are categorized as top risk, upcoming risk, and all other risks. The categories are based on a rating scale composed of schedule and cost factors. Top risks are considered to have a significantly higher than average risk grade. Upcoming risks are risks for which mitigating action must be taken within 60 days. All other risks are risks not falling into other categories.

Figure 11-1 Monthly Status of Risks



Total Number of Active Risks = 110

Figure 11-2 Risk Classification



Total Number of Active Risks = 110

Activity Next Month

- Conduct weekly monitoring of risk mitigation actions and continue publishing risk register.
- Update risk descriptions, effects, mitigations and retirement dates based on weekly monitoring and attendance at key project meetings.
- Coordinate with contractor on Contractor Risk Management Program.
- Conduct Risk Assessment Committee meeting.
- Complete risk analysis for cost and schedule based on updated risk register and finalize Risk Register Refresh Technical Memorandum.

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12.0 ENVIRONMENTAL

12.1. Permits

The PCEP has obtained the required environmental permits from the following agencies/federal regulations: Section 106 of the National Historic Preservation Act of 1966 (NHPA), Section 7 of the Endangered Species Act (ESA), United States Army Corps of Engineers, San Francisco Bay Regional Water Quality Control Board (SFWQCB), the California Department of Fish and Wildlife, and the San Francisco Bay Conservation Development Commission.

Activity This Month

- None

Activity Next Month

- None

12.2. Mitigation Monitoring and Reporting Program (MMRP)

The California Environmental Quality Act (CEQA) requires that a Lead Agency establish a program to monitor and report on mitigation measures that it has adopted as part of the environmental review process. The PCEP team has prepared a MMRP to ensure that mitigation measures identified in the PCEP Environmental Impact Report are fully implemented during project implementation. PCEP will implement the mitigation measures through its own actions, those of the DB contractor and actions taken in cooperation with other agencies and entities. The status of each mitigation measure in the MMRP is included in Appendix G.

Activity This Month

- Environmental compliance monitors were present during project activities (OCS pole foundation installation, potholing for utility location, utility removal, ductbank installation, tree trimming/removal, staging area development, conduit installation, concrete and asphalt demolition, clearing and grubbing, grading, French drain relocation, etc.) occurring in areas that required environmental compliance monitoring. The monitoring was conducted in accordance with measures in the MMRP in an effort to minimize potential impacts on sensitive environmental resources.
- Tree trimming and removal in Segments 2, 3, and 4.
- Noise and vibration monitoring also occurred during project activities, and non-hazardous soil was removed from the right of way (ROW).
- Environmentally Sensitive Area (ESA) staking and/or fencing occurred to delineate jurisdictional waterways and other potentially sensitive areas that should be avoided during upcoming construction activities, and wildlife exclusion fencing installation and monitoring occurred adjacent to portions of the alignment designated for wildlife exclusion fencing.
- Protocol-level surveys for a sensitive avian species were initiated at previously identified potential habitat locations.

- Best management practices (BMP) installation (e.g., silt fencing, straw wattles, soil covers) occurred at equipment staging areas and other work areas throughout the alignment in accordance with the project-specific Stormwater Pollution Prevention Plan (SWPPP).

Activity Next Month

- Environmental compliance monitors will continue to monitor project activities (OCS pole foundation installation, pot holing for utility location, duct bank and manhole installation, tree trimming/removal, staging area development, conduit installation, concrete and asphalt demolition, clearing and grubbing, grading, excavations, etc.) occurring in areas that require environmental compliance monitoring in an effort to minimize potential impacts on sensitive environmental resources in accordance with the MMRP.
- Noise and vibration monitoring of project activities will continue to occur and non-hazardous soil will continue to be removed.
- Tree trimming and removal will continue in Segments 2, 3, and 4.
- Biological surveyors will continue to conduct pre-construction surveys for sensitive wildlife species ahead of project activities.
- Pre-construction nesting bird surveys during the nesting bird season will commence (nesting bird season is defined as February 1 through September 15), and protocol-level surveys for a sensitive avian species will continue for the 2019 breeding season at previously identified potential habitat locations.
- BMPs installation will continue in accordance with the project-specific SWPPP.
- ESA staking will continue to occur to delineate jurisdictional waterways and other potentially sensitive areas that should be avoided during upcoming project activities.
- Wildlife exclusion fencing will continue to be installed prior to upcoming construction activities adjacent to potentially suitable habitat for sensitive wildlife species.
- Preparation of the Sea Level Rise Vulnerability Assessment and Sea Level Rise Adaptation Plan is pending site access and is anticipated to begin in early 2019.

13.0 UTILITY RELOCATION

Implementation of the PCEP requires relocation or rerouting of both public and private utility lines and/or facilities. Utility relocation will require coordination with many entities, including regulatory agencies, public safety agencies, federal, state, and local government agencies, private and public utilities, and other transportation agencies and companies. This section describes the progress specific to the utility relocation process.

Activity This Month

- Worked with all utilities on review of overhead utility line relocations based on the current design.
- Coordinated with individual utility companies on relocation plans and schedule for incorporation with Master Program Schedule.
- Coordinated work with communications utilities on review of relocation design.
- Completed relocation of Verizon's parallel aerial facilities.
- Worked on relocation design review for PG&E and coordinated with PG&E on permitting and work planning.
- Continued to plan relocation work for Silicon Valley Power (SVP) and Palo Alto Power facilities.
- Coordinated relocation by communication cable owners such as AT&T and Comcast.
- Continued PG&E relocations in Segments 2 and 4.
- Began relocation of SVP facilities in Segment 3.
- Performed verifications for relocated PG&E facilities.
- Conducted weekly utility coordination meeting to discuss overall status and areas of potential concern from the utilities.

Activity Next Month

- Coordinate with utility owners on the next steps of relocations, including support of any required design information.
- Update the relocation schedule as information becomes available from the utility owners.
- Continue to review relocation design from PG&E, SVP, Palo Alto Power, and communications companies and coordinate relocation field work.
- Continue PG&E and communication relocations in Segments 2 and 4.
- Continue SVP and Palo Alto Power relocations in Segment 3.
- Conduct monthly and weekly utility meeting with utility owners.

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14.0 REAL ESTATE

The PCEP requires the acquisition of a limited amount of real estate. In general, Caltrain uses existing ROW for the PCEP, but in certain locations, will need to acquire small portions of additional real estate to expand the Right of Way (ROW) to accommodate installation of OCS supports (fee acquisitions or railroad easements) and associated Electrical Safety Zones (easements). There are two larger full acquisition areas required for wayside facilitates. The PCEP Real Estate team manages the acquisition of all property rights. Caltrain does not need to acquire real estate to complete the EMU procurement portion of the PCEP.

Of the parcels identified at the beginning of the project, there remain only seven owners from whom the agency requires possession:

- One for which the appraisal has been completed and the offer is pending.
    - BBII need date is October 2019.
- One in Segment 3 for which offer was recently made.
- One parcel in Segment 2 needed as soon as possible.
    - The site is owned by UPRR, which has agreed to issue an early entry permit.
- Four that are in redesign.
    - SS-1, needed in February 2019.
        - Owned by SamTrans, which has agreed to issue a permit upon approval of design.
    - One parcel in Segment 3, needed in June 2019.
    - Two parcels in Segment 4, needed in February 2019.

The Real Estate team's current focus is working to identify new parcels and acquire them in conjunction with the project schedule.

- Staff has defined a process to ensure that BBII conveys new needs as soon as possible.
    - BBII must justify and JPB must approve all new parcels.
- Design needs to progress to enable BBII to identify exact acquisition areas.
- Staff is conducting pre-acquisition activities as appropriate.
- JPB has approved four new parcels to date.

Activity This Month

- Actively negotiating with Willowbend Apartments.
- Staff reviewing potential new pole locations and providing feedback to the design team.
- Worked with accounting staff to expedite payment for stipulated judgment.
- Actively working with San Francisco Public Utilities Commission to gain early access on their property.

- Working with UPRR on encroachment permit and/or easement.
- Worked with relocation to review claims for Loop Transportation.

Activity Next Month

- Continue to negotiate for all open parcels.
- New appraisal underway.
- Finalize payment for stipulated settlements and contracts.
- Meet with property owner to sign contract and deeds.
- Continue to negotiate a settlement with Willowbend Apartments.
- Make offers on the parcel for which appraisals have been completed.
- Actively participate in Foundation/Pothole weekly meeting.
- Continue to work with project team to identify and analyze new potential parcels.
- Map newly identified parcels.

15.0 THIRD PARTY AGREEMENTS

Third-party coordination is necessary for work impacting public infrastructure, utilities, ROW acquisitions, and others. Table 15-1 below outlines the status of necessary agreements for the PCEP.

Table 15-1 Third-Party Agreement Status

Type	Agreement	Third-Party	Status
Governmental Jurisdictions	Construction & Maintenance[1]	City & County of San Francisco	Executed
		City of Brisbane	Executed
		City of South San Francisco	Executed
		City of San Bruno	Executed
		City of Millbrae	Executed
		City of Burlingame	Executed
		City of San Mateo	Executed
		City of Belmont	Executed
		City of San Carlos	Executed
		City of Redwood City	Executed
		City of Atherton	In Process
		County of San Mateo	Executed
		City of Menlo Park	Executed
		City of Palo Alto	Executed
		City of Mountain View	Executed
		City of Sunnyvale	Executed
		City of Santa Clara	Executed
		County of Santa Clara	Executed
		City of San Jose	Executed
	Condemnation Authority	San Francisco	In Process
		San Mateo	Executed
		Santa Clara	Executed
Utilities	Infrastructure	PG&E	Executed
	Operating Rules	CPUC	Executed
Transportation & Railroad	Construction & Maintenance	Bay Area Rapid Transit	Executed[2]
	Construction & Maintenance	California Dept. of Transportation (Caltrans)	Not needed[3]
	Trackage Rights	UPRR	Executed[2]

Notes regarding table above:

1. Agreements memorialize the parties' consultation and cooperation, designate respective rights and obligations and ensure cooperation between the JPB and the 17 cities and three counties along the Caltrain ROW and within the PCEP limits in connection with the design and construction of the PCEP.
2. Utilizing existing agreements.
3. Caltrans Peer Process utilized. Formal agreement not needed.

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16.0 GOVERNMENT AND COMMUNITY AFFAIRS

The Community Relations and Outreach team coordinates all issues with all jurisdictions, partner agencies, government organizations, businesses, labor organizations, local agencies, residents, community members, other interested parties, and the media. In addition, the team oversees the BBII's effectiveness in implementing its Public Involvement Program. The following PCEP-related external affairs meetings took place this month:

Presentations/Meetings

- VTA Santa Clara Community Working Group
- VTA San Jose Community Working Group
- Harbor Industrial Association
- San Mateo County Economic Development Association

Third Party/Stakeholder Actions

- 65% OCS Foundation and Pole Layouts – Santa Clara (Segment 3)
- 95% Bridge Attachments – Sunnyvale
- Design Change Notice OCS Foundation and Pole Layouts – San Jose

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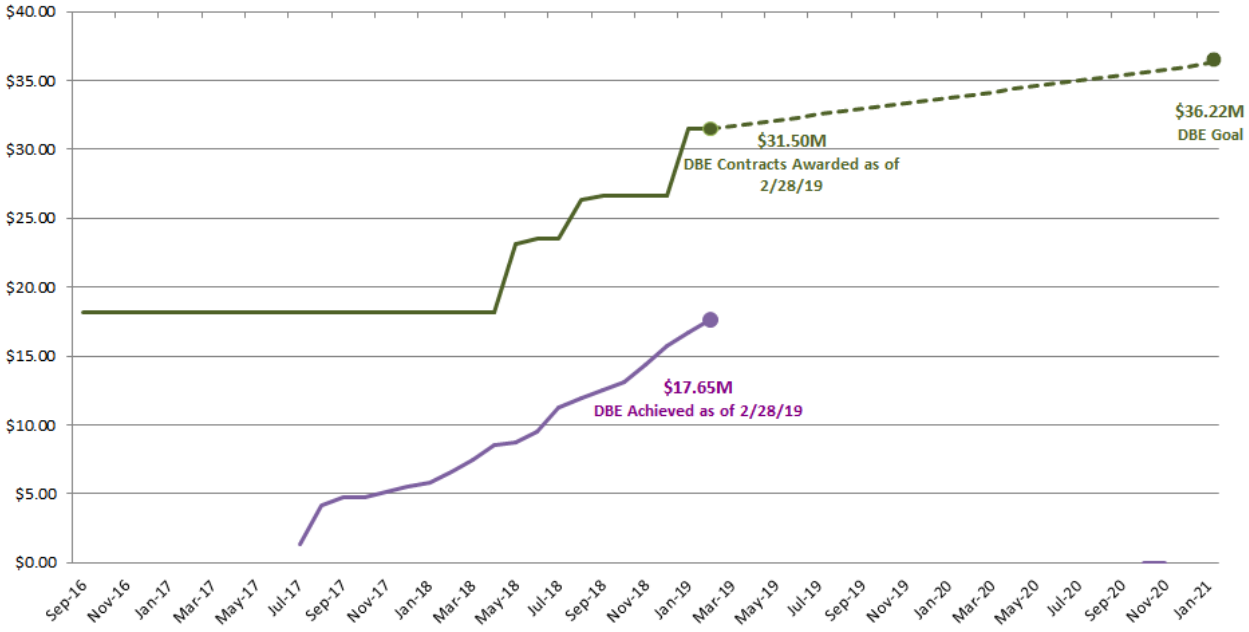
17.0 DISADVANTAGED BUSINESS ENTERPRISE (DBE) PARTICIPATION AND LABOR STATISTICS

BBII proposed that 5.2% of the total DB contract value (**$36,223,749**) would be subcontracted to DBEs. As expressed in Figure 17-1 below, to date:

- **$17,651,741** has been paid to DBE subcontractors.

Figure 17-1 DBE Participation



*Note: The January DBE graph showed contract award of $33.61 million. BBII revised their numbers in February due to recognition that a previously awarded contract was to a DBE regular dealer. DBE regulations require that only 60% of that contract may be counted towards the goal.

In order to reach the 5.2% DBE participation goal, BBII has proposed the following key actions:

"In the month of March, 2019, we continue to anticipate increasing our DBE commitments to firms who we are currently negotiating pricing on proposed work or Professional Services Agreements. We also anticipate that the existing project work will increase resulting in expanded work for current DBE subcontractors."

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18.0 PROCUREMENT

Invitation for Bids (IFB)/Request for Quotes (RFQ)/ Request for Proposals (RFP) Issued this Month:

- None

Bids, Quotes, Proposals in Response to IFB/RFQ/RFP Received this Month:

- None

Contract Awards this Month:

- IFB – 18-J-C-071 – CEMOF Facility Modifications for PCEP

Work Directive (WD)/Purchase Order (PO) Awards & Amendments this Month:

- Multiple WDs & POs issued to support the program needs

In Process IFB/RFQ/RFP/Contract Amendments:

- None

Upcoming Contract Awards:

- RFP – 18-J-P-115 – On-Call Construction Management Services for PCEP

Upcoming IFB/RFQ/RFP to be Issued:

- RFQ – Manlifts
- RFQ – Pantograph Inspection Camera and System

Existing Contracts Amendments Issued:

- None

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19.0 TIMELINE OF MAJOR PROJECT ACCOMPLISHMENTS

Below is a timeline showing major project accomplishments from 2001 to 2017:

Date	Milestone
2001	Began federal National Environmental Policy Act (NEPA) Environmental Assessment (EA) / state EIR clearance process
2002	Conceptual Design completed
2004	Draft NEPA EA/EIR
2008	35% design complete
2009	Final NEPA EA/EIR and Finding of No Significant Impact (FONSI)
2014	RFQ for electrification RFI for EMU
2015	JPB approves final CEQA EIR JPB approves issuance of RFP for electrification JPB approves issuance of RFP for EMU Receipt of proposal for electrification FTA approval of Core Capacity Project Development
2016	JPB approves EIR Addendum #1: PS-7 FTA re-evaluation of 2009 FONSI Receipt of electrification best and final offers Receipt of EMU proposal Application for entry to engineering to FTA Completed the EMU Buy America Pre-Award Audit and Certification Negotiations completed with Stadler for EMU vehicles Negotiations completed with BBII, the apparent best-value electrification firm JPB approves contract award (LNTP) to BBII JPB approves contract award (LNTP) to Stadler FTA approval of entry into engineering for the Core Capacity Program Application for FFGA
2017	FTA finalized the FFGA for $647 million in Core Capacity funding, met all regulatory requirements including end of Congressional Review Period (February) FTA FFGA executed, committing $647 million to the project (May) JPB approves $1.98 billion budget for PCEP (June) Issued NTP for EMUs to Stadler (June 1) Issued NTP for electrification contract to BBII (June 19) Construction began (August) EMU manufacturing began (October) Issued NTP for SCADA to Rockwell Collins (ARINC) (October) Issued NTP for CEMOF Facility Upgrades to HNTB (November)

Date	Milestone
2018	Completed all PG&E agreements
	JPB approves contract award to Mitsui for the purchase of electric locomotives and Amtrak for overhaul services, storage, acceptance testing, training, and shipment of locomotive to CEMOF
	JPB approves authorization for the Executive Director to negotiate final contract award to ProVen for tunnel modifications and track rehabilitation project
	JPB approves contract award (LNTP) to ProVen for tunnel modifications
	Issued NTP to ProVen for tunnel modifications (October)
	Amended contract with ProVen to include OCS in the tunnels (November)
2019	JPB approves contract award to ProVen for CEMOF modifications (February)

APPENDICES

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Appendix A – Acronyms

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AIM	**Advanced Information Management**
ARINC	**Aeronautical Radio, Inc.**
BAAQMD	**Bay Area Air Quality Management District**
BBII	**Balfour Beatty Infrastructure, Inc.**
CAISO	**California Independent System Operator**
CalMod	**Caltrain Modernization Program**
Caltrans	**California Department of Transportation**
CDFW	**California Department of Fish and Wildlife**
CEMOF	**Centralized Equipment Maintenance and Operations Facility**
CEQA	**California Environmental Quality Act (State)**
CHSRA	**California High-Speed Rail Authority**
CIP	**Capital Improvement Plan**
CNPA	**Concurrent Non-Project Activity**
CPUC	**California Public Utilities Commission**
CTC	**Centralized Traffic Control**
DB	**Design-Build**
DBB	**Design-Bid-Build**
DBE	**Disadvantaged Business Enterprise**
DEMP	**Design, Engineering, and Management Planning**
EA	**Environmental Assessment**
EAC	**Estimate at Completion**
EIR	**Environmental Impact Report**
EOR	**Engineer of Record**
EMU	**Electric Multiple Unit**
ESA	**Endangered Species Act**
ESA	**Environmental Site Assessments**
FAI	**First Article Inspection**
FEIR	**Final Environmental Impact Report**
FNTP	**Full Notice to Proceed**
FFGA	**Full Funding Grant Agreement**
FONSI	**Finding of No Significant Impact**
FRA	**Federal Railroad Administration**
FTA	**Federal Transit Administration**
GO	**General Order**
HSR	**High Speed Rail**
ICD	**Interface Control Document**
IFC	**Issued for Construction**
ITS	**Intelligent Transportation System**
JPB	**Peninsula Corridor Joint Powers Board**
LNTP	**Limited Notice to Proceed**

MMRP	Mitigation, Monitoring, and Reporting Program
MOU	Memorandum of Understanding
MPS	Master Program Schedule
NCR	Non Conformance Report
NEPA	National Environmental Policy Act (Federal)
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NTP	Notice to Proceed
OCS	Overhead Contact System
PCEP	Peninsula Corridor Electrification Project
PCJPB	Peninsula Corridor Joint Powers Board
PG&E	Pacific Gas and Electric
PHA	Preliminary Hazard Analysis
PMOC	Project Management Oversight Contractor
PS	Paralleling Station
PTC	Positive Train Control
QA	Quality Assurance
QC	Quality Control
QMP	Quality Management Plan
QMS	Quality Management System
RAMP	Real Estate Acquisition Management Plan
RE	Real Estate
RFI	Request for Information
RFP	Request for Proposals
RFQ	Request for Qualifications
ROCS	Rail Operations Center System
ROW	Right of Way
RRP	Railroad Protective Liability
RSD	Revenue Service Date
RWP	Roadway Worker Protection
SamTrans	San Mateo County Transit District
SCADA	Supervisory Control and Data Acquisition
SCC	Standard Cost Code
SPUR	San Francisco Bay Area Planning and Urban Research Association
SFBCDC	San Francisco Bay Conservation Development Commission
SFCTA	San Francisco County Transportation Authority
SFMTA	San Francisco Municipal Transportation Authority
SFRWQCB	San Francisco Regional Water Quality Control Board
SOGR	State of Good Repair
SS	Switching Station
SSCP	Safety and Security Certification Plan
SSMP	Safety and Security Management Plan

SSWP	**Site Specific Work Plan**
TASI	**Transit America Services Inc.**
TBD	**To Be Determined**
TPS	**Traction Power Substation**
TVA	**Threat and Vulnerability Assessment**
UPRR	**Union Pacific Railroad**
USACE	**United States Army Corp of Engineers**
USFWS	**U.S. Fish and Wildlife Service**
VTA	**Santa Clara Valley Transportation Authority**

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Appendix B – Funding Partner Meetings

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Funding Partner Meeting Representatives

Updated August 1, 2018

Agency	CHSRA	MTC	SFCTA/SFMTA/CCSF	SMCTA	VTA
FTA Quarterly Meeting	• Bruce Armistead • Boris Lipkin • Ian Ferrier (info only) • Wai Siu (info only)	• Anne Richman • Glen Tepke	• Luis Zurinaga	• April Chan • Peter Skinner	• Jim Lawson
Funding Partners Quarterly Meeting	• Bruce Armistead • Boris Lipkin • John Popoff	• Trish Stoops	• Luis Zurinaga	• April Chan • Peter Skinner	• Krishna Davey
Funding Oversight (monthly)	• Kelly Doyle	• Anne Richman • Glen Tepke • Kenneth Folan	• Anna LaForte • Maria Lombardo • Luis Zurinaga • Monique Webster • Ariel Espiritu Santo	• April Chan • Peter Skinner	• Jim Lawson • Marcella Rensi • Michael Smith
Change Management Board (monthly)	• Bruce Armistead • Boris Lipkin	• Trish Stoops • Kenneth Folan	• Luis Zurinaga • Tilly Chang (info only)	• Joe Hurley	• Krishna Davey • Jim Lawson • Carol Lawson • Nuria Fernandez (info only)
Master Program Schedule Update (monthly)	• Ian Ferrier • Wai Siu	• Trish Stoops	• Luis Zurinaga	• Joe Hurley	• Jim Lawson
Risk Assessment Committee (monthly)	• Ian Ferrier • Wai Siu	• Trish Stoops	• Luis Zurinaga	• Joe Hurley	• Krishna Davey
PCEP Delivery Coordination Meeting (bi-weekly	• Ian Ferrier	• Trish Stoops	• Luis Zurinaga	• Joe Hurley	• Krishna Davey
Systems Integration Meeting (bi-weekly	• Ian Ferrier • Wai Siu	• Trish Stoops	• Luis Zurinaga	• Joe Hurley	• Krishna Davey

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Appendix C – Schedule

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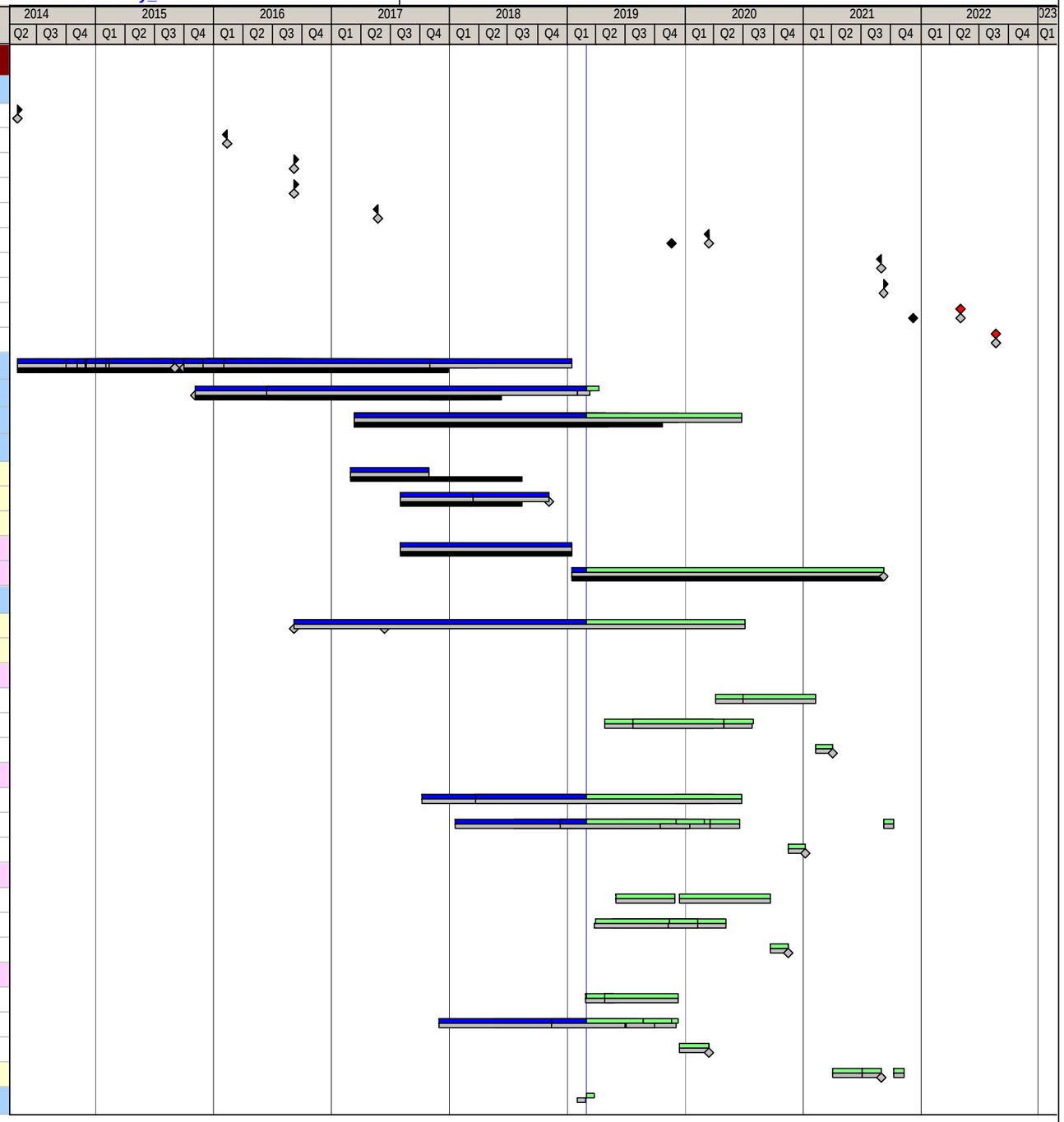
#	Activity Name	Duration	Start	Finish
1	**MASTER PROGRAM SCHEDULE C18.01**	2168d	05-01-14 A	08-22-22
2	**MILESTONES**	2168d	05-01-14 A	08-22-22
3	Start	0d	05-01-14 A	
4	NEPA Reevaluation Complete	0d		02-11-16 A
5	LNTP to Electrification Contractor	0d	09-06-16 A	
6	LNTP to Vehicle Manufacturer	0d	09-06-16 A	
7	FTA Issues FFGA	0d		05-23-17 A
8	Segment 4 (incl. Test Track) Complete	0d		03-14-20
9	Electrification Substantial Completion	0d		09-02-21
10	Start Phased Revenue Service	0d	09-10-21	
11	Revenue Service Date (RSD) w/out Risk Contingency	0d		05-06-22
12	Revenue Service Date (RSD) w/ Risk Contingency (FFGA RSD)	0d		08-22-22
13	**PLANNING / APPROVALS**	1230d	05-01-14 A	01-16-19 A
14	**REAL ESTATE ACQUISITION**	871d	11-05-15 A	04-11-19
15	**OVERHEAD UTILITY RELOCATION (Various)**	838d	03-10-17 A	06-26-20
16	**PG&E INFRASTRUCTURE**	1151d	03-01-17 A	09-09-21
17	**INTERCONNECT (Feasibility Study)**	171d	03-01-17 A	10-31-17 A
18	**INTERIM POWER**	322d	08-01-17 A	11-05-18 A
19	**PERMANENT POWER**	1044d	08-01-17 A	09-09-21
20	***DESIGN & PERMITTING***	369d	08-01-17 A	01-15-19 A
21	***CONSTRUCTION***	675d	01-16-19 A	09-09-21
22	**ELECTRIFICATION (BBII)**	1351d	09-06-16 A	11-09-21
23	**DESIGN**	999d	09-06-16 A	07-05-20
24	**CONSTRUCTION**	1463d	10-09-17 A	10-10-21
25	***Segment 1***	709d	04-27-19	04-04-21
26	**OCS**	310d	04-06-20	02-09-21
27	**Traction Power**	460d	04-27-19	07-29-20
28	**Segment Testing**	54d	02-10-21	04-04-21
29	***Segment 2***	1463d	10-09-17 A	10-10-21
30	**OCS**	993d	10-09-17 A	06-27-20
31	**Traction Power**	1361d	01-19-18 A	10-10-21
32	**Segment Testing**	54d	11-15-20	01-08-21
33	***Segment 3***	598d	03-29-19	11-15-20
34	**OCS**	478d	06-03-19	09-22-20
35	**Traction Power**	406d	03-29-19	05-07-20
36	**Segment Testing**	54d	09-23-20	11-15-20
37	***Segment 4***	835d	12-01-17 A	03-14-20
38	**OCS**	292d	02-25-19 A	12-13-19
39	**Traction Power**	743d	12-01-17 A	12-13-19
40	**Segment Testing**	92d	12-14-19	03-14-20
41	**TESTING**	219d	04-04-21	11-09-21
42	**DRILL TRACK (TASI)**	20d	03-01-19	03-28-19

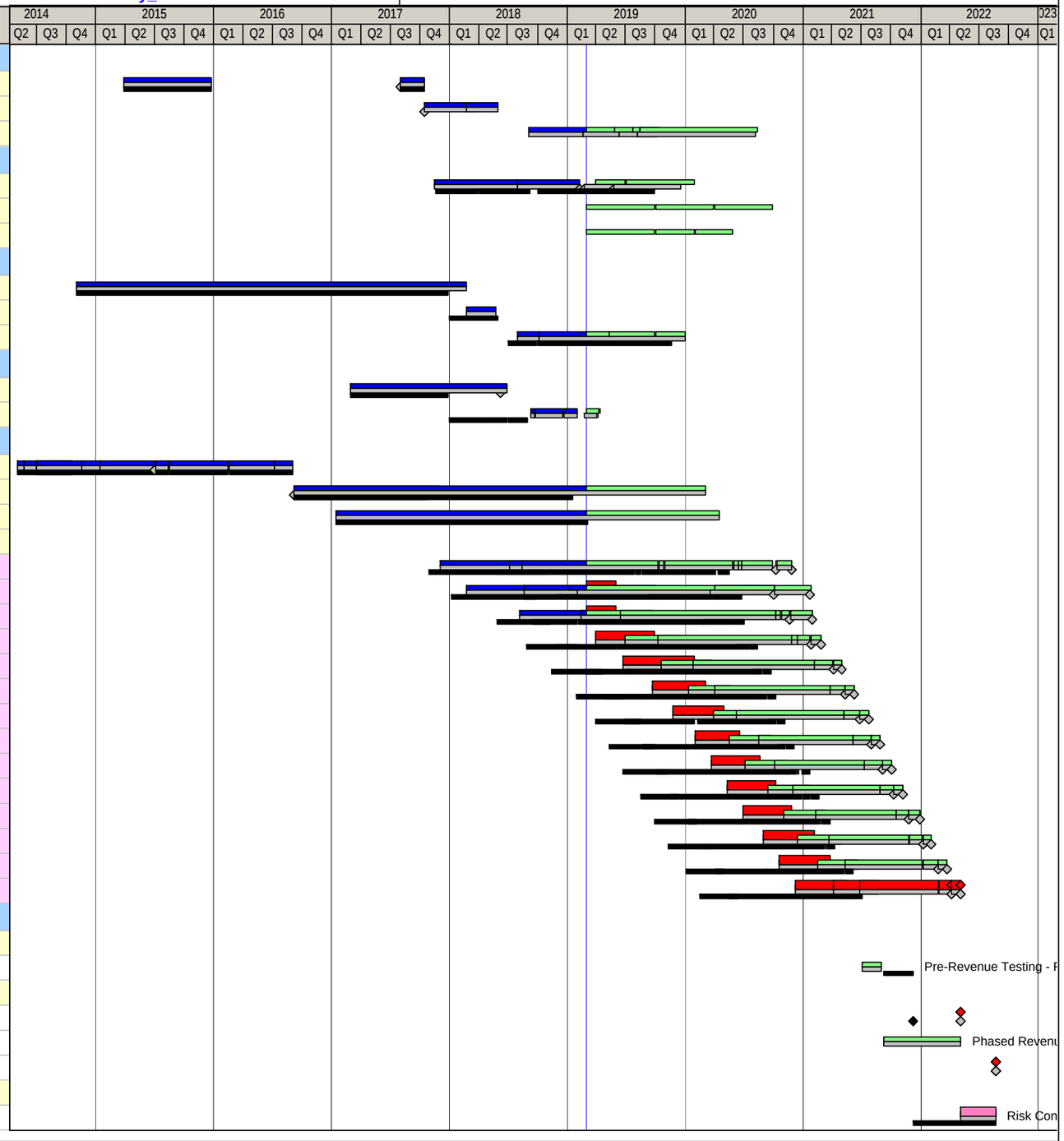


Actual Level of Effort | Progress | Critical | Prog Plan (C16.00) | Risk Contingency
Prog Plan (C16.00) | Remaining | Start Milestone | Last Months Update
Last Months Update | Near Critical | Finish Milestone | Critical Milestone

Filename: _C18.01 032519

FEBRUARY 2019 SCHEDULE UPDATE IS DRAFT UNTIL FINALIZED AT MARCH 2019 MONTH END

#	Activity Name	Duration	Start	Finish
43	**SCADA (Arinc)**	1367d	03-30-15 A	08-13-20
44	**PREPARE SOLE SOURCE & AWARD**	649d	03-30-15 A	10-16-17 A
45	**DESIGN**	157d	10-16-17 A	05-31-18 A
46	**IMPLEMENTATION, TEST, INSTALL & CUTOVER**	495d	09-04-18 A	08-13-20
47	**CEMOF (Various)**	729d	11-16-17 A	09-30-20
48	**CEMOF MODIFICATIONS (ProVen)**	557d	11-16-17 A	01-29-20
49	**PANTORGRAPH INSPECTION & MONITORING SYSTEM (Ctr TBD)**	404d	03-01-19	09-30-20
50	**SCISSOR LIFT WORK PLATFORM (Ctr TBD)**	318d	03-01-19	05-29-20
51	**TUNNEL MODIFICATION (ProVen)**	1348d	10-31-14 A	12-31-19
52	**DESIGN**	840d	10-31-14 A	02-22-18 A
53	**BID & AWARD**	66d	02-23-18 A	05-25-18 A
54	**CONSTRUCTION**	370d	08-01-18 A	12-31-19
55	**ELECTRIC LOCOMOTIVE (Amtrak / Mitsui)**	552d	03-01-17 A	04-12-19
56	**BID & AWARD**	348d	03-01-17 A	06-29-18 A
57	**REHAB / TEST/ TRAIN / SHIP**	150d	09-10-18 A	04-12-19
58	**EMU (Stadler)**	2092d	05-01-14 A	05-06-22
59	**DEVELOP RFP, BID & AWARD**	612d	05-01-14 A	09-02-16 A
60	**DESIGN**	913d	09-06-16 A	03-05-20
61	**PROCUREMENT (Material)**	849d	01-16-17 A	04-16-20
62	**MANUFACTURING & TESTING**	1155d	12-04-17 A	05-06-22
63	***TRAINSET 1***	780d	12-04-17 A	11-27-20
64	***TRAINSET 2***	764d	02-22-18 A	01-26-21
65	***TRAINSET 3***	650d	08-06-18 A	01-29-21
66	***TRAINSET 4***	500d	04-01-19	02-26-21
67	***TRAINSET 5***	485d	06-24-19	04-30-21
68	***TRAINSET 6***	449d	09-23-19	06-10-21
69	***TRAINSET 7***	435d	11-25-19	07-23-21
70	***TRAINSET 8***	410d	02-03-20	08-27-21
71	***TRAINSET 9***	400d	03-23-20	10-01-21
72	***TRAINSET 10***	390d	05-11-20	11-05-21
73	***TRAINSET 11***	395d	06-29-20	12-31-21
74	***TRAINSET 12***	375d	08-31-20	02-04-22
75	***TRAINSET 13***	375d	10-19-20	03-25-22
76	***TRAINSET 14***	370d	12-07-20	05-06-22
77	**TESTING & STARTUP (JPB)**	296d	07-04-21	08-22-22
78	**PRE-REVENUE TESTING**	61d	07-04-21	09-02-21
79	Pre-Revenue Testing - Revenue Service	61d	07-04-21	09-02-21
80	**REVENUE OPERATIONS**	243d	09-10-21	08-22-22
81	Revenue Service Date (RSD) w/out Risk Contingency	0d		05-06-22
82	Phased Revenue Service	167d	09-10-21	05-06-22
83	Revenue Service Date (RSD) w/ Risk Contingency (FFGA RSD)	0d		08-22-22
84	**RISK CONTINGENCY**	108d	05-07-22	08-22-22
85	Risk Contingency (FTA)	108d	05-07-22	08-22-22



Actual Level of Effort | Progress | Critical | Prog Plan (C16.00) | Risk Contingency
Prog Plan (C16.00) | Remaining | Start Milestone | Last Months Update
Last Months Update | Near Critical | Finish Milestone | Critical Milestone

Filename: _C18.01 032519

FEBRUARY 2019 SCHEDULE UPDATE IS DRAFT UNTIL FINALIZED AT MARCH 2019 MONTH END

Appendix D – Standard Cost Codes

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Description of Work	Approved Budget (A)	Cost This Month (B)	Cost To Date (C)	Estimate To Complete (D)	Estimate At Completion (E) = (C) + (D)
10 - GUIDEWAY & TRACK ELEMENTS	**$27,781,170**	**$1,836,271**	**$20,915,210**	**$6,965,960**	**$27,881,170**
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)	$2,500,000	$0	$0	$2,600,000	$2,600,000
10.07 Guideway: Underground tunnel	$25,281,170	$1,836,271	$20,915,210	$4,365,960	$25,281,170
10.07 Allocated Contingency	$0	$0	$0	$0	$0
30 - SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	**$7,050,777**	**$0**	**$0**	**$7,050,777**	**$7,050,777**
30.03 Heavy Maintenance Facility	$6,550,777	$0	$0	$6,550,777	$6,550,777
30.03 Allocated Contingency	$0	$0	$0	$0	$0
30.05 Yard and Yard Track	$500,000	$0	$0	$500,000	$500,000
40 - SITEWORK & SPECIAL CONDITIONS	**$267,064,916**	**$2,800,878**	**$98,098,216**	**$183,625,718**	**$281,723,934**
40.01 Demolition, Clearing, Earthwork	$3,077,685	$160,000	$2,371,000	$706,685	$3,077,685
40.02 Site Utilities, Utility Relocation	$92,728,599	$600,661	$32,981,797	$74,445,820	$107,427,617
40.02 Allocated Contingency	($0)	$0	$0	($0)	($0)
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	$2,200,000	$344,185	$1,914,545	$285,455	$2,200,000
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks	$32,679,208	$66,375	$1,138,295	$31,540,913	$32,679,208
40.05 Site structures including retaining walls, sound walls	$568,188	$0	$0	$568,188	$568,188
40.06 Pedestrian / bike access and accommodation, landscaping	$804,933	$0	$0	$764,933	$764,933
40.07 Automobile, bus, van accessways including roads, parking lots	$284,094	$0	$0	$284,094	$284,094
40.08 Temporary Facilities and other indirect costs during construction	$114,237,209	$1,629,657	$59,692,580	$54,744,628	$114,437,209
40.08 Allocated Contingency	$20,485,000	$0	$0	$20,285,000	$20,285,000
50 - SYSTEMS	**$519,533,064**	**$3,139,992**	**$62,275,442**	**$451,059,071**	**$513,334,513**
50.01 Train control and signals	$99,483,668	$1,621,554	$8,318,275	$91,165,392	$99,483,668
50.01 Allocated Contingency	$0	$0	$0	$0	$0
50.02 Traffic signals and crossing protection	$23,879,905	$0	$0	$24,814,147	$24,814,147
50.02 Allocated Contingency	$1,140,000	$0	$0	$205,758	$205,758
50.03 Traction power supply: substations	$70,984,821	$1,500,950	$15,691,272	$55,401,151	$71,092,422
50.03 Allocated Contingency	$28,150,860	$0	$0	$28,043,259	$28,043,259
50.04 Traction power distribution: catenary and third rail	$271,974,429	$17,488	$38,265,895	$239,816,234	$278,082,129
50.04 Allocated Contingency	$16,356,081	$0	$0	$4,049,830	$4,049,830
50.05 Communications	$5,455,000	$0	$0	$5,455,000	$5,455,000
50.07 Central Control	$2,090,298	$0	$0	$2,090,298	$2,090,298
50.07 Allocated Contingency	$18,000	$0	$0	$18,000	$18,000
60 - ROW, LAND, EXISTING IMPROVEMENTS	**$35,675,084**	**$83,221**	**$15,103,812**	**$20,571,273**	**$35,675,084**
60.01 Purchase or lease of real estate	$25,927,074	$83,360	$15,025,376	$10,901,698	$25,927,074
60.01 Allocated Contingency	$8,748,010	$0	$0	$8,748,010	$8,748,010
60.02 Relocation of existing households and businesses	$1,000,000	($139)	$78,435	$921,565	$1,000,000
70 - VEHICLES (96)	**$625,755,807**	**$15,927,376**	**$140,549,285**	**$485,206,521**	**$625,755,807**
70.03 Commuter Rail	$588,301,135	$15,927,376	$140,279,285	$448,957,850	$589,237,135
70.03 Allocated Contingency	$10,550,740	$0	$0	$9,614,740	$9,614,740
70.06 Non-revenue vehicles	$8,140,000	$0	$270,000	$7,870,000	$8,140,000
70.07 Spare parts	$18,763,931	$0	$0	$18,763,931	$18,763,931
80 - PROFESSIONAL SERVICES (applies to Cats. 10-50)	**$328,742,890**	**$4,824,878**	**$257,563,965**	**$76,085,721**	**$333,649,686**
80.01 Project Development	$130,350	$0	$280,180	($149,830)	$130,350
80.02 Engineering (not applicable to Small Starts)	$185,787,122	$2,314,123	$185,550,534	$5,007,269	$190,557,804
80.02 Allocated Contingency	$435,919	$0	$0	$572,034	$572,034
80.03 Project Management for Design and Construction	$72,987,401	$1,711,381	$55,037,623	$17,949,778	$72,987,401
80.03 Allocated Contingency	$9,270,000	$0	$0	$9,270,000	$9,270,000
80.04 Construction Administration & Management	$22,557,063	$744,826	$9,186,829	$21,068,705	$30,255,534
80.04 Allocated Contingency	$20,657,886	$0	$0	$12,959,415	$12,959,415
80.05 Professional Liability and other Non-Construction Insurance	$4,305,769	$0	$3,558,530	$747,238	$4,305,769
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.	$6,341,599	$54,547	$3,929,310	$2,412,289	$6,341,599
80.06 Allocated Contingency	$556,000	$0	$0	$556,000	$556,000
80.07 Surveys, Testing, Investigation, Inspection	$3,287,824	$0	$20,957	$3,266,866	$3,287,824
80.08 Start up	$1,797,957	$0	$0	$1,797,957	$1,797,957
80.08 Allocated Contingency	$628,000	$0	$0	$628,000	$628,000
Subtotal (10 - 80)	**$1,811,603,707**	**$28,612,616**	**$594,505,930**	**$1,230,565,040**	**$1,825,070,970**
90 - UNALLOCATED CONTINGENCY	**$112,068,589**	**$0**	**$0**	**$98,601,326**	**$98,601,326**
Subtotal (10 - 90)	**$1,923,672,296**	**$28,612,616**	**$594,505,930**	**$1,329,166,366**	**$1,923,672,296**
100 - FINANCE CHARGES	**$6,998,638**	**$86,821**	**$5,073,537**	**$1,925,101**	**$6,998,638**
Total Project Cost (10 - 100)	**$1,930,670,934**	**$28,699,436**	**$599,579,466**	**$1,331,091,468**	**$1,930,670,934**

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Appendix E – Change Order Logs

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Change Order Logs

Electrification Contract

Change Order Authority (5% of BBII Contract) **5% x $696,610,558 = $34,830,528**

Date	Change Number	Description	CCO Amount	Change Order Authority Usage[1]	Remaining Authority
08/31/17	BBI-053-CCO-001	Track Access Delays Q4 2016	$85,472	0.25%	$34,745,056
02/28/18	BBI-053-CCO-003	Deletion of Signal Cable Meggering (Testing)	($800,000)	(2.30%)	$35,545,056
02/21/18	BBI-053-CCO-004	Field Order for Differing Site Condition Work Performed on 6/19/17	$59,965	0.17%	$35,485,091
03/12/18	BBI-053-CCO-006	Track Access Delays for Calendar Quarter 1 2017	$288,741	0.83%	$35,196,350
04/24/18	BBI-053-CCO-002	Time Impact 01 Associated with Delayed NTP	$9,702,667	0.00%[2]	-
04/24/18	BBI-053-CCO-008	2016 Incentives (Safety, Quality, and Public Outreach)	$750,000	0.00%[2]	-
05/31/18	BBI-053-CCO-009	16th St. Grade Crossing Work Removal from BBII Contract	($685,198)	(1.97%)	$35,881,548
05/31/18	BBI-053-CCO-012	2017 Incentives (Safety, Quality, and Public Outreach)	$1,025,000	0.00%[2]	-
06/25/18	BBI-053-CCO-010	Pothole Change Of Shift	$300,000	0.86%	$35,581,548
06/25/18	BBI-053-CCO-013	Field Order for Signal Cable Relocation (FO# 31)	$95,892	0.28%	$35,485,656
06/25/18	BBI-053-CCO-015	TASI Pilot Transportation 2017	$67,345	0.19%	$35,418,311
06/26/18	BBI-053-CCO-005	Field Orders for Signal Cable Relocation (FO#s 26, 30)	$191,836	0.55%	$35,226,475
06/28/18	BBI-053-CCO-014	Field Orders for Signal Cable Relocation (FO-36 & FO-38)	$145,694	0.42%	$35,080,781
06/29/18	BBI-053-CCO-007	Track Access Delays for Calendar Quarter 2 2017	$297,512	0.85%	$34,783,269
06/29/18	BBI-053-CCO-011	Field Orders for Differing Site Condition (FO#s Partial 07A , 08-14)	$181,013	0.52%	$34,602,256
06/29/18	BBI-053-CCO-017	Field Order for NorCal Utility Potholing (FO# 27)	$93,073	0.27%	$34,509,183
06/29/18	BBI-053-CCO-018	Field Order for NorCal Utility Potholing (FO# 29)	$76,197	0.22%	$34,432,986
06/29/18	BBI-053-CCO-020	Field Orders for Differing Site Condition (FO#s 15-19)	$118,364	0.34%	$34,314,622
7/19/2018	BBI-053-CCO-019	Field Order for NorCal Utility Potholing (FO-032)	$88,956	0.26 %	$34,225,666
7/19/2018	BBI-053-CCO-021	As In-Service (AIS) Drawings for Segment 2 and 4 Signal Design (CN-009)	$105,000	0.30 %	$34,120,666
7/25/2018	BBI-053-CCO-022	CEMOF Yard Traction Power Feed (CN-008)	$332,700	0.96 %	$33,787,966
7/31/2018	BBI-053-CCO-028	Sonic Echo Impulse Testing	$4,541	0.01 %	$33,783,425
7/31/2018	BBI-053-CCO-026	TASI Pilot Transportation 2018 (CNC-0022)	$50,409	0.14%	$33,733,016
7/31/2018	BBI-053-CCO-027	Signal Cable Relocation (FOs-040 & 051)	$196,114	0.56%	$33,536,902
9/27/2018	BBI-053-CCO-030	Delete Spare 115k Disconnect Switches	($19,000)	(0.05)%	$33,555,902
9/28/2018	BBI-053-CCO-031	Bldg A HVAC and FOB Card Reader Systems	$76,500	0.22 %	$33,479,402
9/28/2018	BBI-053-CCO-025A	Addition of Shunt Wire at Transverse Utility Crossing Locations - Design	$925,000	2.66 %	$32,554,402
9/28/2018	BBI-053-CCO-016A	UPRR MT-1 Pole Relocation - Design Changes	$903,000	0.00%[2]	-
9/28/2018	BBI-053-CCO-024A	PG&E Utility Feed Connection to TPS#1 and TPS#2 (Design Only)	$727,000	0.00%[2]	-
12/17/2018	BBI-053-CCO-032	PS-2 Site Relocation (Design Only)	$291,446	0.84%	$32,262,956
1/17/2019	BBI-053-CCO-023	Insulated Rail Joints	$2,694,519	0.00%[2]	-

Change Order Authority (5% of BBII Contract)				**5% x $696,610,558 = $34,830,528**	
Date	**Change Number**	**Description**	**CCO Amount**	**Change Order Authority Usage[1]**	**Remaining Authority**
1/17/2019	BBI-053-CCO-029	CHSRA Early Pole Relocation (Design Only)	$625,000	0.00%[2]	-
2/5/2019	BBI-053-CCO-040A	Increase in Potholing Quantity (unit price contract bid item by 25%)	$1,662,500	4.77 %	$30,600,456
		Total	**$20,657,285**	**12.14%**	**$30,600,456**

Notes:

1. When the threshold of 75% is reached, staff may return to the Board to request additional authority.
2. Change approved by the Board of Directors – not counted against the Executive Director's Change Order Authority.
3. Third party improvements/CNPA projects that are funded with non-PCEP funds.

EMU Contract

Change Order Authority (5% of Stadler Contract)				**5% x $550,899,459 = $27,544,973**	
Date	**Change Number**	**Description**	**CCO Amount**	**Change Order Authority Usage[1]**	**Remaining Authority**
09/22/2017	STA-056-CCO 001	Contract General Specification and Special Provision Clean-up	$0	0.00%[2]	-
10/27/2017	STA-056-CCO 002	Prototype Seats and Special Colors	$55,000	0.20%	$27,489,973
11/02/2017	STA-056-CCO 003	Car Level Water Tightness Test	$0	0.00%[2]	-
12/05/2017	STA-056-CCO-004	Onboard Wheelchair Lift 800 Pound Capacity Provisions	$848,000	3.08%	$26,641,973
11/03/2017	STA-056-CCO 005	Design Progression (multiple)	$0	0.00%[2]	-
12/12/2017	STA-056-CCO 006	Prototype Seats and Special Colors	($27,500)	(0.10%)	$26,669,473
01/17/2018	STA-056-CCO 007	Multi-Color Destination Signs	$130,760	0.47%	$26,538,713
02/09/2018	STA-056-CCO-008	Adjustment to Delivery and LDs due to delayed FNTP	$490,000	0.00%[2]	-
02/12/2018	STA-056-CCO-009	Ship Cab Mock-up to Caltrain	$53,400	0.19%	$26,485,313
04/17/2018	STA-056-CCO-010	Onboard Wheelchair Lift Locations	($1,885,050)	(6.84%)	$28,370,363
04/17/2018	STA-056-CCO-011	Multiple Change Group 3 and Scale Models	$0	0.00%[2]	-
10/29/2018	STA-056-CCO-012	Multiple Change Group 4	$0	0.00%[2]	-
10/29/2018	STA-056-CCO-013	Wheelchair Lift Installation Redesign	$228,400	0.83%	$28,141,963
12/14/2018	STA-056-CCO-014	PTC System Change	$0	$0.00%	-
12/22/2018	STA-056-CCO-015	EMU Option Cars	$172.800.047	0.00%[2]	-
		Total	**$172,693,057**	**(2.17%)**	**$28,141,963**

Notes:

1. When the threshold of 75% is reached, staff may return to the Board to request additional authority.
2. Change approved by the Board of Directors – not counted against the Executive Director's Change Order Authority.

SCADA Contract

Change Order Authority (15% of ARINC Contract)					**15% x $3,446,917 = $517,038**
Date	**Change Number**	**Description**	**CCO Amount**	**Change Order Authority Usage[1]**	**Remaining Authority**
	None to date				
		Total	**$0**	**0.00%**	**$517,038**

Notes:

1. When the threshold of 75% is reached, staff may return to the Board to request additional authority.
2. Change approved by the Board of Directors – not counted against the Executive Director's Change Order Authority.

Tunnel Modifications Contract

Change Order Authority (10% of ProVen Contract)					**10% x $55,077,777 = $5,507,778**
Date	**Change Number**	**Description**	**CCO Amount**	**Change Order Authority Usage[1]**	**Remaining Authority**
	None to date				
		Total	**$0**	**0.00%**	**$5,507,778**

Notes:

1. Tunnel modifications contract ($55,077,777) includes: Notching ($25,281,170), Drainage ($13,196,607) and OCS Installation ($16,600,000).
2. When the threshold of 75% is reached, staff may return to the Board to request additional authority.
3. Change approved by the Board of Directors – not counted against the Executive Director's Change Order Authority.

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Appendix F – Risk Table

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Listing of PCEP Risks and Effects in Order of Severity

ID	RISK DESCRIPTION	EFFECT(S)
303	Extent of differing site conditions and delays in resolving differing site conditions delays completion of electrification increases program costs. Contractor is encountering more DSCs than anticipated and taking longer to resolve.	More differing site conditions and longer to resolve. Extends construction of foundations and the OCS system and results in less efficient construction of foundations.
242	Track access does not comply with contract-stipulated work windows.	Contractor claims for delays, schedule delays and associated costs to owner's representative staff.
279	BBII may be unable to develop grade crossing modifications that meets stakeholder and regulatory requirements within the program schedule.	Delay to revenue service and associated costs for delay.
257	Potential that modifications to the PTC database and signal software are not completed in time for cutover and testing.	Failure to follow the Configuration Management process will result in delays to completing PCEP signal cutovers. This could delay milestone completion as well as project substantial completion.
223	Major program elements may not be successfully integrated with existing operations and infrastructure in advance of revenue service.	Proposed changes resulting from electrification may not be fully and properly integrated into existing system. Rework resulting in cost increases and schedule delays
267	Additional property acquisition may be necessitated.	New project costs and delays to schedule.
308	Rejection of DVR for ATF and static wires results in cost and schedule impacts to PCEP.	Delay and delay claims
209	Inadequate TASI resources may delay construction activities	• Delays to construction/testing. • Delays to completion of infrastructure may delay acceptance of vehicles
268	Decisions on stakeholder requested changes to the vehicles (e.g., High Level Doors in lieu of windows as emergency exits) delays revenue service date.	Delays to completion of construction and additional cost to changes in design.

ID	RISK DESCRIPTION	EFFECT(S)
298	Changes to PTC implementation schedule could delay completion of the electrification work. Cost and schedule of BBII contract could increase as a result of change in PTC system	1. Changes in datafiles could affect what Balfour provides; could delay timing for testing; could change books that FRA had to review. 2. Full integrated testing between EMU and wayside cannot be conducted without PTC in place. 3. Delays to completion of signal system could result in conflicts with PTC testing and PCEP construction and integrated testing. 4. Potential for track access impacts due to PTC testing.
302	May not have a 110-mph electrified section of track that will be ready for testing for final acceptance of vehicle.	Contract with Stadler implies readiness of Electrification Project and track upgrades for EMU testing Delays in testing may increase Caltrain costs.
240	Property not acquired in time for contractor to do work. Property Acquisition not complete per contractor availability date <>Fee <>Easement <>Contract stipulates that if parcels are not available by contract date, there is only a delay if parcels are not available by the time contractor completes the Segment	• Potential delays in construction schedule
263	Collaboration across multiple disciplines to develop a customized rail activation program may fail to comprehensively address the full scope of issues required to operate and maintain an electrified railroad and decommission the current diesel fleet.	Delay in testing of EMUs. Delay in Revenue Service Date. Additional costs for Stadler and BBII due to overall schedule delays.
312	Project executed the OCS Option; increase procurement durations for necessary OCS Parts (Conductor Rail) has led to an associated increase in costs and schedule duration for the overall project. This	Additional cost to project, primarily from additional bus bridges.

ID	RISK DESCRIPTION	EFFECT(S)
28	Current approach will be not to modify stations to achieve level boarding at this time but develop a definitive plan to accomplish in the future. Possible that FRA / FTA reject this approach.	Schedule delay - 12 months Additional study costs to resolve Increases cost and difficulty of achieving compliance Changes required to platforms and/or vehicles to achieve level boarding compliance Worst case is need to modify all platforms to achieve level boarding w/o mini-high blocks
304	FRA has concerns in how bikes are placed on new EMUs.	Protracted negotiations with FRA to achieve original design
67	Relocation of overhead utilities must precede installation of catenary wire and connections to TPSs. Relocation work will be performed by others and may not be completed to meet BBII's construction schedule.	Delay in progress of catenary installation resulting in claims and schedule delay
115	Other capital improvement program projects compete with PCEP for track access allocation and requires design coordination (design, coordination, integration).	Schedule delay as resources are allocated elsewhere, won't get track time, sequencing requirements may delay PCEP construction, track access requirements must be coordinated.
136	UP reviews of BBI design may extend project duration.	Delays to completion of design and claims for delay.
174	Installation of electrification infrastructure may require the relocation of signals, which would affect the block design.	Cost and schedule impacts resulting from the design, construction, and testing of modified signal system and review of revised block design.
261	EMU electromechanical emissions and track circuit susceptibility are incompatible.	Changes on the EMU and/or signal system require additional design and installation time and expense.
276	BBII may be unable to get permits required by jurisdictions for construction in a timely manner.	Additional cost and time resulting from delays to construction
277	Inadequate D-B labor to support multiple work segments	Additional cost and time

ID	RISK DESCRIPTION	EFFECT(S)
280	Field equipment installed by D/B contractor may not communicate with the Central Control Facility (CCF), the Back-Up Central Control Facility (BCCF) through SCADA and function as designed.	Could require the acquisition and installation of additional equipment at BCCF and CCF. Could therefore require additional cost and time
281	Additional work in the form of signal/pole adjustments may be required to remedy sight distance impediments arising from modifications to original design.	Add repeater signals, design duct bank would result in increased design and construction costs.
285	Potential for inflation, (except with respect to Maintenance Option) to increase contractor costs.	Higher cost
286	Potential for wage escalation, (except for Maintenance Option) to increase contractor costs.	Higher cost
287	Design changes may necessitate additional implementation of environmental mitigations not previously budgeted.	Increased cost for environmental measures and delays to construct and overall delay in construction schedule
295	Contractor may not be able to complete tunnel work within contractual requirement to complete within the 28 scheduled weekends due to the extent and complexity of the work and need to coordinate civil/structural work with electrical work. • Contractor may not be able to complete notching and grouting work during 24 weekend shutdowns • Notching work could adversely affect radio communication equipment in the tunnels; solution to avoid impact may not be developed in time to implement. • Resolution of utility conflicts at portal structures.	Delays to completion of construction and associated claims costs.
296	BBII needs to complete interconnection and traction power substations be sufficiently complete to accept interim power	Delay in testing and increased costs
297	Cost and schedule of Stadler contract could increase as a result of this change in PTC system Delay of PTC may delay acceptance of EMUs.	1) Full integrated testing between EMU and wayside cannot be conducted without PTC in place. 2) Delay in EMU final design for PTC and potential PTC interfaces. Need to finalize braking system sequence priority.
307	Potential for Stadler's sub-suppliers to fall behind schedule	Late delivery of vehicles, which could delay testing of the electrification system, commissioning of the vehicles, and RSD.

ID	RISK DESCRIPTION	EFFECT(S)
309	Potential that vehicles will not receive timely notification from FRA of compliance with acceptable alternate crash management standards	Delays to completion of construction and additional cost to changes in design.
13	Vehicle manufacturer could default.	Prolonged delay to resolve issues (up to 12 months) Increase in legal expenses Potential price increase to resolve contract issue
10	Delays in parts supply chain result in late completion of vehicles.	• Delay in obtaining parts / components. • Cost increases. (See Owner for allocation of costs) • Schedule increase - 3 months (See Owner for allocation of damages associated with this Risk)
12	Potential for electromagnetic interference (EMI) to private facilities with sensitive electronic equipment caused by vehicles.	• Increased cost due to mitigation • Potential delay due to public protests or environmental challenge.
56	Lack of O&M support for testing and/or vehicle operations. Includes operational readiness and personnel hired and scheduled to be trained.	• Testing delayed. • Change order for extended vehicle acceptance.
88	Construction safety program fails to sufficiently maintain safe performance.	Work stoppages due to safety incidents resulting in schedule delay and additional labor costs.
161	Unanticipated costs to provide alternate service (bus bridges, etc.) during rail service disruptions.	Cost increase.
183	Installation and design of new duct bank takes longer because of UP coordination	Schedule - Delay. May need to use condemnation authority to acquire easement. Cost - Additional cost for PG&E to make connections increasing project costs
247	Timely resolution of 3rd party design review comments to achieve timely approvals	Delay to completion of design and associated additional labor costs.

ID	RISK DESCRIPTION	EFFECT(S)
259	Work on 25th Avenue Grade Separation Project could delay Balfour construction schedule.	• Increased cost for BBI as catenary construction in this section was anticipated to be constructed under the 25th Avenue Grade Separation Project. • Potential delays in construction schedule • Risk is delay to BBI
270	OCS poles or structures as designed by Contractor fall outside of JPB row	Additional ROW Take, additional cost and time
294	UP does not accept catenary pole offsets from centerline of track necessitating further negotiation or relocation of poles	Delay to construction and additional costs for redesign and ROW acquisition.
311	Although project recordable injuries remain below the industry average, there have been numerous small impact incidents occurring that could potentially lead to a more serious event occurring.	The occurrence of a high impact safety event could result in project rework, construction delays, and increased project costs.
82	Unexpected restrictions could affect construction progress: <> night work <> noise <> local roads <> local ordinances	• Reduced production rates. • Delay
119	Coordination of electrification design with Operations	• Qualified individuals may not be available. • Training may take longer than anticipated.
241	Segment 4 substantially complete (Segment 4, TPS-2, Interconnect) may not be installed prior to scheduled exercising of EMUs	Inability to exercise EMUs
253	Risk that existing conditions of Caltrans-owned bridges will not support bridge barriers. The existing bridge conditions and structural systems are unknown and may not support mounting new work Design will need to prove new barriers will not impact existing capacity of the bridges prior to Caltrans's approval for construction. Without approval of design and issuance of permit, there is risk to the schedule for the work and also budget if during design existing bridge will require some upgrades due to the introduction of new attachments.	Delays to issuance of permit for construction while negotiating and executing an operation and maintenance agreement for equipment installed on bridges; existing bridge deficiencies could result in additional costs to PCEP.

ID	RISK DESCRIPTION	EFFECT(S)
11	Risks in achieving acceptable vehicle operations performance: <> software problems <> electrical system problems <> mechanical problems <> systems integration problems Increased issues lately with vehicles regarding system integration and compatibility.	Cost increase. Delays vehicle acceptance Potential spill-over to other program elements
14	Late changes in vehicle specification or requirements.	Schedule delay. Cost increase.
16	Inter-operability issues with diesel equipment.	Cost increase.
31	New cars possibly not reliable enough to be put into service as scheduled	Operating plan negatively impacted
78	Need for unanticipated, additional ROW for new signal enclosures.	Delay while procuring ROW and additional ROW costs.
154	Potential for encountering unidentified or unknown underground utility crossings along the corridor. Could impose unanticipated rights or requirements on the design.	Additional cost and time to acquire ROW by condemnation
171	Electrification facilities could be damaged during testing.	Delay in commencing electrified operations.
190	Track roughness and cant could present problems for European vehicles which are accustomed to a higher class of track bed maintenance. Becomes problematic with concept of specifying "off-the-shelf" design.	Vehicle cost increase. Vehicle delivery delay.
250	Potential for municipalities to request betterments as part of the electrification project.	Delay to project schedule in negotiating betterments as part of the construction within municipalities and associated increased cost to the project as no betterments were included in the project budget.
251	Subcontractor and supplier performance to meet aggressive schedule <>Potential issue meeting Buy America requirements	Delay to production schedule resulting in increased soft costs and overall project schedule delay.

ID	RISK DESCRIPTION	EFFECT(S)
271	Need for additional construction easements beyond that which has been provided for Contractor proposed access and staging	Additional cost and time
272	Final design based upon actual Geotech conditions	Could require changes
288	Independent checker finds errors in signal design and technical submittals	Additional cost and time
289	Coordination and delivery of permanent power for power drops for everything except traction power substations along alignment	Can't test resulting in delays to schedule and associated additional project costs.
291	Order/manufacture of long lead items prior to 100% IFC design document that proves to be incorrect	Design change and/or delays
292	Potential that UPS will not fit in the spaces allotted to communications work within the buildings.	Requisite backup capacity units under design criteria could result in the need for larger unit than originally planned resulting in design and fabrication changes and associated schedule delays and costs.
19	Potential for vehicle delivery to be hampered by international conflict; market disruption; labor strikes at production facility.	Delay in production of vehicle with associated cost implications.
21	EMU production delay. Possible that there are quality issues, failed factory tests, poor integration / control of suppliers.	Schedule Increase - up to 6 months (6 months float already built into 36 month schedule)
27	Vehicle power consumption may not meet requirements. <>System impact study and load flow show no issues	Issue with PG&E. Can't run full acceleration.
42	Full complement of EMUs not available upon initiation of electrified revenue service	Late delivery impacts revenue service date.
55	Failure to pass Qualification Testing. I70.	Cost Increase - minimal Schedule delay
61	Latent defects in EMU vehicles.	Unbudgeted costs incurred from legal actions. Repairs take trains out-of-service.
101	PG&E may not be able to deliver permanent power for the project within the existing budget and in accordance with the project schedule	Additional project costs; potential delay to revenue service date

ID	RISK DESCRIPTION	EFFECT(S)
150	Number of OCS pole installation is significant. Any breakdown in sequencing of operations or coordination of multiple crews will have a substantial effect on the project.	Delay.
245	Failure of BBI to submit quality design and technical submittals in accordance with contract requirements • $3-$5M/month burn rate for Owner's team during peak	Delays to project schedule and additional costs for preparation and review of submittals.
252	Failure of BBI to order/manufacture long lead items prior to 100% IFC design document approval by JPB	Delays to project schedule and additional cost for contractor and JPB staff time.
266	Relocation of Verizon must precede installation of foundations and connections to TPSs. Relocation work will be performed by others and may not be completed to meet BBII's construction schedule.	Delay in progress of catenary installation resulting in claims and schedule delay
306	Possible legal challenge and injunction to any changes in PCEP requiring subsequent CEQA or NEPA environmental clearance documentation/actions.	Worst case: a judge issues an injunction, which would prohibit any work ONLY on the project scope of the environmental document. Impact to the project from cost and schedule impact depends on if work is on the critical or becomes on the critical path.
1	Compatibility of new vehicle with existing maintenance facilities.	Vehicles cannot be maintained in the current maintenance facility or increased cost of maintenance due to use of incompatible facilities.
8	Change orders if decisions are made following award	Change orders if decisions are made following award
23	Manufacturer cannot control vehicle weight to meet specifications.	Increased operating cost.
25	Potential that vehicles cannot meet requirements for "Mean Time to Repair" (MTTR).	Increased maintenance cost.
32	Failure to come up to speed on stakeholder safety requirements: <> FTA <> FRA <> CPUC	Takes longer than expected to gain FRA/FTA concurrence on waiver and/or level boarding requirements.
51	Damage during delivery of first six EMUs.	Schedule delay

ID	RISK DESCRIPTION	EFFECT(S)
53	Failure to meet Buy America requirements. (Contractor definition of component v. sub-component may not be accepted by Caltrain / FTA.)	Potential need for negotiations that might lead to delay of project award. (BA is not negotiable)
54	Infrastructure not ready for vehicles (OCS, TPS, Commissioning site / facility).	Increases cost if done off property
69	Potential need for additional construction easements. Especially for access and laydown areas. Contractor could claim project is not constructible and needs more easements after award.	Increased cost Delay
87	Unanticipated HazMat or contaminated hot spots encountered during foundation excavations for poles, TPSS, work at the yards.	Increased cost for clean-up and handling of materials and delay to schedule due to HazMat procedures.
93	Unanticipated subsurface conditions affecting pole or TPSS installation.	• Delay taking actions to remedy conditions or relocate foundations. • Increased cost for design and construction of remediation
106	Potential that DB contractor will have insufficient field resources (personnel or equipment) to maintain aggressive schedule. Multiple segments will need to be under design simultaneously. Labor pool issue. 32 qualified linemen will be needed. Potential there is not enough available. Big storm damage anywhere in US will draw from the pool to make line repairs. Possible shortages with other specialty crafts as well.	Delay.
146	Wayside signal / pole adjustments to avoid sighting distance problems.	Change order.
151	Public could raise negative concerns regarding wheel/rail noise.	Increased cost to mitigate: <> grind rails <> reprofile wheels <> sound walls

ID	RISK DESCRIPTION	EFFECT(S)
182	Compliance with Buy America requirements for 3rd party utility relocations. <>Utility relocations covered under existing Caltrain agreements that require utilities to move that will not have effect on project cost - will not be Buy America <>Installation of new equipment inside PG&E substations that will provide all PG&E customers, about 1/6 of that provides power to our system - is upgrade that benefits all customers subject to Buy America requirements, is it 1/6th, or 100% <>Risk is substation not relocations <>Substation equipment is available domestically, has 6 month longer lead time and increased cost of 20%	• Increased cost • Delay
189	EMUs will need I-ITCS equipment that is compatible with wayside equipment. Same supplier thereby reducing the risk.	Could drive up price because the car builder may not be a priority customer.
192	Environmental compliance during construction. - Potential impact to advancing construction within the vicinity of any cultural finds that are excavated. - Failure to meet the commitments contained within the PCEP EA, FEIR and permit conditions	• Delay • Cost increase
195	Introduction of electrified train service will require training of first responders in working in and around the rail corridor. The new vehicles will be considerably quieter than the existing fleet and the presence of high voltage power lines will require new procedures for emergency response. A new training program will need to be developed and disseminated for: • Fire, police, and first responders • Local communities • Schools	Safety hazards resulting in incidents that delay construction and increase labor cost. Delays in RSD until training is completed as requirement of safety certification process.

ID	RISK DESCRIPTION	EFFECT(S)
237	JPB needs an agreement with each city in which catenary will be strung over an existing grade crossing (17 in all) under GO 88 (grade crossings). These agreements must be executed subsequent to installing overhead catenary. JPB is preparing a response to CPUC while working with the cities. Delays in reaching agreement could have impacts on schedule and budget.	Not completing the grade crossing diagnostics and getting agreement from the cities on the results can result in delays to necessary approvals for the project and revenue service.
244	Determine that there is sufficient storage for both EMU and Diesel fleets while maintaining Yard/Vehicle operability.	Potential delay in completion of Test & Commissioning due to vehicle movements & logistics
248	3rd party coordination <>Jurisdictions, Utilities, UP, Contractors <>D/B needs to provide timely information to facilitate 3rd party coordination <>Risk is for construction	Delays in approvals resulting in project schedule delays and associated costs.
249	Coordination and delivery of permanent power for power drops along alignment	Delays in completion of construction and testing with associated increase in costs.
254	Potential that bridge clearance data are inaccurate and that clearances are not sufficient for installation of catenary.	Results in additional design and construction to create sufficient clearance.
269	Potholing unearths the fact that pole locations conflict with utilities. OCS pole or structure locations as designed by Contractor conflict with utilities where conflict could have been avoided by allowable final design adjustments.	Additional cost and time
273	Contractor generates new hazardous materials, necessitates proper removal and disposal of existing hazardous materials identified in the Contract for D-B remediation.	Delay to construction while removing and disposing of hazardous materials resulting in schedule delay, increased construction costs, and schedule delay costs.
274	JPB as-built drawings and existing infrastructure to be used as basis of final design and construction is not correct	Additional cleanup of as-builts after PCEP construction
275	DB fails to verify as-built drawings and existing infrastructure	Additional cleanup of as-builts after PCEP construction
278	Failure of D/B contractor and subcontractors and suppliers to meet Buy America requirements	Delays while acceptable materials are procured and additional costs for delays and purchase of duplicative equipment.
282	Failure to maintain dynamic envelope and existing track clearances consistent with requirements.	Redesign entailing cost and schedule impacts.
283	Fluctuation in foreign currency v US dollar	Increase in costs

ID	RISK DESCRIPTION	EFFECT(S)
284	Compliance with project labor agreement could result in inefficiencies in staffing of construction.	Increase in labor costs and less efficient construction resulting in schedule delays.
290	Delays in agreement and acceptance of initial VVSC requirements database.	Delay to design acceptance
293	Readiness of 115kV interconnect for temporary power to support testing	Delay in testing

Appendix G – MMRP Status Log

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Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
AES-2a: Minimize OCS construction activity on residential and park areas outside the Caltrain ROW.	**X**	**X**			Ongoing	The OCS proposed construction schedule has been provided to the JPB. OCS construction began the week of October 2, 2017. The D-B has used the potholing process to assist in locating conflicts in the 35% design and attempting to relocate OCS pole locations within the ROW, thereby avoiding parks and residential areas.
AES-2b: Aesthetic treatments for OCS poles, TPFs in sensitive visual locations, and Overbridge Protection Barriers.	**X**				Ongoing	The design requirements indicated in the measure have been implemented as described, and coordination with the specific jurisdictions regarding pole colors and design, TPFs, and Overbridge Protection Barriers, is ongoing.
AES-4a: Minimize spillover light during nighttime construction.		**X**			Ongoing	OCS construction began the week of October 2, 2017. The BBI community relations lead has notified nearby residents of upcoming construction. During construction, lighting is faced inward, towards the railroad tracks, and any complaints will be documented and addressed by the BBI community relations lead.
AES-4b: Minimize light spillover at TPFs.	**X**				Upcoming	The design requirements indicated in the measure are being used in the design process of the TPFs.
AQ-2a: Implement BAAQMD basic and additional construction mitigation measures to reduce construction-related dust.	**X**	**X**			Ongoing	The Dust Mitigation Plan was submitted to the JPB. The requirements in the Dust Mitigation Plan will be implemented throughout the construction period and documented in daily reports.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
AQ-2b: Implement BAAQMD basic and additional construction mitigation measures to control construction-related ROG and NOX emissions.	**X**	**X**			Ongoing	The Equipment Emissions Control Plan was submitted to the JPB. The requirements in the Equipment Emissions Control Plan will be implemented throughout the construction period and documented in daily reports.
AQ-2c: Utilize clean diesel-powered equipment during construction to control construction-related ROG and NOX emissions.	**X**	**X**			Ongoing	The Equipment Emissions Control Plan was submitted to the JPB. The requirements in the Equipment Emissions Control Plan will be implemented throughout the construction period and documented in daily reports.
BIO-1a: Implement general biological impact avoidance measures.	**X**	**X**			Ongoing	Worker Environmental Awareness Training is provided to all project-related personnel before they work on the project. All measures as described will be implemented throughout the construction period and documented in daily reports.
BIO-1b: Implement special-status plant species avoidance and revegetation measures.	**X**	**X**	**X**		Complete	Not applicable. Subsequent habitat assessment and avoidance of Communication Hill eliminated any potential to affect special-status plant species. The measure is not needed.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
BIO-1c: Implement California red-legged frog and San Francisco garter snake avoidance measures.	**X**	**X**			Ongoing	Pre-construction surveys are occurring no more than 7 days prior to the initiation of construction activities nearby/adjacent to potential habitat for CRLF and SFGS. The Wildlife Exclusion Fencing Plan for Segments 2 and 4 was submitted and approved by the wildlife agencies, and installation and monitoring of wildlife exclusion fencing is ongoing. No CRLF / SFGS or sign of each species has been observed to date on the Project. A separate Wildlife Exclusion Fencing Plan will be submitted for Segments 1 and 3, prior to initiation of construction activities in those segments.
BIO-1d: Implement western pond turtle avoidance measures.	**X**	**X**			Ongoing	Pre-construction surveys are occurring no more than 7 days prior to the initiation of construction activities nearby/adjacent to potential habitat for WPT. No WPT or WPT sign have been observed to date on the Project.
BIO-1e: Implement Townsend's big-eared bat, pallid bat, hoary bat, and fringed myotis avoidance measures.	**X**	**X**			Ongoing	Pre-construction surveys are occurring no more than 7 days prior to the initiation of construction activities with the potential to disturb bats or their habitat. No special-status bats or sign have been observed to date on the Project.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
BIO-1f: Implement western burrowing owl avoidance measures.	**X**	**X**			Ongoing	Protocol surveys for Western Burrowing Owl were conducted from April 2017 through July 2017 at previously identified potentially suitable habitat locations. Note that all of these locations are in Construction Segment 4 (southern Santa Clara and San Jose). No Burrowing Owls were observed during the surveys. Construction in Segment 4 is anticipated to occur in 2018. Prior to construction activities in Segment 4, pre-construction surveys of the potential habitat areas will occur no more than 7 days prior to the onset of construction activities. In addition, protocol surveys were initiated in March 2018, and were completed in June 2018, at the previously identified potentially suitable habitat locations, which will allow work to occur during the 2019 breeding season, if necessary. No Burrowing Owls were observed during the 2018 surveys. Protocol surveys for Western Burrowing Owl will be initiated once again in March 2019 in Segment 4. No Burrowing Owls have been observed to date on the Project.
BIO-1g: Implement northern harrier, white-tailed kite, American peregrine falcon, saltmarsh common yellowthroat, purple martin, and other nesting bird avoidance measures.	**X**	**X**			Ongoing	Nesting Bird surveys were conducted from February 1 through September 15, 2017 prior to project-related activities with the potential to impact nesting birds. No active nests were observed during this reporting period. Nesting Bird surveys were initiated on February 1, 2018 and continued throughout the reporting period. No Nesting Bird surveys were conducted during this reporting period and no

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
						active nests were observed during day-to-day construction monitoring. Nesting bird surveys will be initiated once again on February 1st, 2019.
BIO-1h: Conduct biological resource survey of future contractor-determined staging areas.	**X**	**X**			Ongoing	The agency-approved Qualified Biologist has conducted surveys of the staging areas currently being used for construction activities. No special-status species or other potentially sensitive biological resources were observed. The agency-approved Qualified Biologist will continue to survey ahead of the initiation of activities at planned staging areas as the Project moves into new construction areas.
BIO-1i: Minimize impacts on Monarch butterfly overwintering sites.	**X**	**X**			Ongoing	The agency-approved Qualified Biologist has periodically monitored the project limits to evaluate the presence of Monarch butterfly overwintering sites. No Monarch butterfly overwintering sites have been observed on the Project to date.
BIO-1j: Avoid nesting birds and bats during vegetation maintenance.				**X**	Upcoming	To be completed during Project operation.
BIO-2: Implement serpentine bunchgrass avoidance and revegetation measures.	**X**	**X**	**X**		Complete	Not applicable. Subsequent habitat assessment and avoidance of Communication Hill eliminated any potential to affect serpentine bunchgrass. This measure is no longer needed.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
BIO-3: Avoid or compensate for impacts on wetlands and waters.	**X**	**X**	**X**		Complete	The JPB has compensated for unavoidable wetland impacts by purchasing adequate credits from a wetlands mitigation bank approved by USACE and SFRWQCB.
BIO-5: Implement Tree Avoidance, Minimization, and Replacement Plan.	**X**	**X**	**X**		Ongoing	Tree removal and pruning activities were initiated in August 2017 under the guidance of the BBI Arborist, and in accordance with the Tree Avoidance, Minimization, and Replacement Plan. Tree Removal and Pruning status is provided to the JPB on a weekly basis.
BIO-6: Pay *Santa Clara Valley Habitat Plan* land cover fee (if necessary).	**X**				Complete	Not applicable. The SCVHP does not apply to the Project because TPS2, Option 1 was not selected and OCS does not extend to Communication Hill. This measure is not needed.
CUL-1a: Evaluate and minimize impacts on structural integrity of historic tunnels.	**X**				Upcoming	To be implemented prior to construction in tunnels.
CUL-1b: Minimize impacts on historic decorative tunnel material.	**X**				Upcoming	To be implemented prior to construction in tunnels. Historic American Engineering Record (HAER) documentation was completed in October 2018, pursuant to this measure.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
CUL-1c: Install project facilities in a way that minimizes impacts on historic tunnel interiors.	**X**				Upcoming	To be implemented prior to construction in tunnels.
CUL-1d: Implement design commitments at historic railroad stations	**X**				Complete	The Qualified Architectural Historian completed and submitted the HABS Level III documents to the JPB for all seven of the historic stations. Pole placement has been designed to minimize the visual impact to historic stations and all design changes are reviewed by the Environmental Compliance Lead to ensure the mitigation measure is being implemented as the design of the project progresses.
CUL-1e: Implement specific tree mitigation considerations at two potentially historic properties and landscape recordation, as necessary.	**X**	**X**			Complete	It was determined that the project is not acquiring any ROW at either of the subject properties so all tree effects would be within the JPB ROW. Therefore, the APE does not include these two historic properties. This measure is no longer needed.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
CUL-1f: Implement historic bridge and underpass design requirements.	X				Ongoing	This measure is being implemented as described during the design process and will be incorporated into the final design. The four bridges that are included in the MMRP are rail bridges crossing over another feature. Design of the OCS system is taking into account that there are requirements that restrict the design. Thus far, the designs for Construction Segments 2 & 4 are in process and designs are not yet complete. The D-B will forward to the Architectural Historian once complete.
CUL-2a: Conduct an archaeological resource survey and/or monitoring of the removal of pavement or other obstructions to determine if historical resources under CEQA or unique archaeological resources under PRC 21083.2 are present.	X				Ongoing	Periodic inspections of ground surface areas along the alignment, in conjunction with cultural monitoring as-needed of project activities in culturally sensitive areas are ongoing. The Archaeological Final Report will be provided at the conclusion of construction activities.
CUL-2b: Conduct exploratory trenching or coring of areas where subsurface project disturbance is planned in those areas with "high" or "very high" potential for buried site.	X				Ongoing	Exploratory trenching and subsurface testing of all potentially culturally sensitive areas occurred prior to the initiation of construction activities in those areas. The results will be included in the Archaeological Final Report. No cultural resources requiring the development of a treatment plan were observed. A Native American monitor has been present for all exploratory trenching and subsurface testing work.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
CUL-2c: Conduct limited subsurface testing before performing ground-disturbing work within 50 meters of a known archaeological site.	**X**				Ongoing	Exploratory trenching and subsurface testing of all potentially culturally sensitive areas occurred prior to the initiation of construction activities in those areas. The results will be included in the Archaeological Final Report. No cultural resources requiring the development of a treatment plan were observed. A Native American monitor has been present for all exploratory trenching and subsurface testing work.
CUL-2d: Conduct exploratory trenching or coring of areas within the three zones of special sensitivity where subsurface project disturbance is planned.	**X**				Ongoing	Exploratory trenching and subsurface testing of all potentially culturally sensitive areas occurred prior to the initiation of construction activities in those areas. The results will be included in the Archaeological Final Report. No cultural resources requiring the development of a treatment plan were observed. A Native American monitor has been present for all exploratory trenching and subsurface testing work.
CUL-2e: Stop work if cultural resources are encountered during ground-disturbing activities.	**X**	**X**			Ongoing	No prehistoric or historic-period cultural materials have been observed during cultural monitoring.
CUL-2f: Conduct archaeological monitoring of ground-disturbing activities in areas as determined by JPB and SHPO.		**X**			Ongoing	Cultural monitoring as-needed of project activities in culturally sensitive areas is ongoing. The Archaeological Final Report will be provided at the conclusion of construction activities.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
CUL-3: Comply with state and county procedures for the treatment of human remains discoveries.		X			Ongoing	No human remains have been observed to date on the Project.
EMF-2: Minimize EMI effects during final design, Monitor EMI effects during testing, commission and operations, and Remediate Substantial Disruption of Sensitive Electrical Equipment.	X	X	X		Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Designs are submitted and reviewed/commented on by JPB. Monitoring EMI effects will occur post construction.
GEO-1: Perform a site-specific geotechnical study for traction power facilities.	X				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Geotechnical studies and results are submitted to JPB as completed.
GEO-4a: Identification of expansive soils.	X				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Geotechnical studies and results are submitted to JPB as completed.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
GEO-4b: Mitigation of expansive soils.	**X**				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Geotechnical studies and results are submitted to JPB as completed.
HAZ-2a: Conduct a Phase II Environmental Site Assessment prior to construction.	**X**				Complete	A Phase II Environmental Assessment was completed prior to construction by the JPB consultant, and the results were provided to BBI, and the required mitigation is being implemented prior to the initiation of construction activities.
HAZ-2b: Implement engineering controls and best management practices during construction.	**X**	**X**			Ongoing	Field activities are being monitored daily for significant color changes or odors which may indicate contamination.
HYD-1: Implement construction dewatering treatment, if necessary.	**X**	**X**			Ongoing	Facilities & BMPs are in place to deal with this requirement should it arise in the OCS foundations.
HYD-4: Minimize floodplain impacts by minimizing new impervious areas for TPFs or relocating these facilities.	**X**				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. The TPFs in Construction Segments 2 & 4 are currently in final design and design for TPFs in Construction Segments 1 & 3 has begun. The design minimizes hardscape only to required structure foundations; yard areas are to receive a pervious material.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
HYD-5: Provide for electrical safety at TPFs subject to periodic or potential flooding.	**X**			**X**	Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. The TPFs in Construction Segments 2 & 4 are currently in final design and design for TPFs in Construction Segments 1 & 3 has begun. The design plan currently raises the TPFs above the floodplain.
HYD-7: Implement sea level rise vulnerability assessment and adaptation plan.				**X**	Ongoing	The JPB has initiated this measure and preparation of the sea level rise vulnerability assessment and adaptation plan is underway.
NOI-1a: Implement Construction Noise Control Plan.	**X**	**X**			Ongoing	The Noise and Vibration Control Plan has been submitted and is being implemented. Field activity is monitored per the Plan. If allowable noise levels are near or exceed allowable noise levels, mitigation such as blankets are used from that point forward.
NOI-1b: Conduct site-specific acoustical analysis of ancillary facilities based on the final mechanical equipment and site design and implement noise control treatments where required.	**X**				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Design is still in process and a noise study is currently being performed.
NOI-2a: Implement Construction Vibration Control Plan.	**X**	**X**			Ongoing	The Noise and Vibration Control Plan has been submitted and is being implemented. Field activity is monitored per the Plan.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
PSU-8a: Provide continuous coordination with all utility providers.	**X**	**X**			Ongoing	The design requirements indicated in the measure will be implemented through the final design as described. Coordination with utility providers is ongoing and there have not been any service interruptions thus far.
PSU-8b: Adjust OCS pole foundation locations.	**X**				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described.
PSU-8c: Schedule and notify users about potential service interruptions.	**X**	**X**			Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. There have not been any service interruptions thus far.
PSU-9: Require application of relevant construction mitigation measures to utility relocation and transmission line construction by others.	**X**	**X**			Ongoing	JPB has initiated coordination with PG&E regarding transmission line construction. PG&E is currently raising overcrossing lines in Segment 2.
TRA-1a: Implement Construction Road Traffic Control Plan.	**X**	**X**			Ongoing	The D-B has begun traffic control design and permit applications with cities in Segments 2 and 4. Designs have been completed and approved for all cross-over bridges in Segments 2 and 4.
TRA-1c: Implement signal optimization and roadway geometry improvements at impacted intersections for	**X**	**X**			Upcoming	This measure has not started

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
the 2020 Project Condition.						
TRA-2a: Implement construction railway disruption control plan.	**X**	**X**			Ongoing	Minimization of railway disruption is being coordinated by the Site Specific Work Plan. A Construction Railway Disruption Control Plan was prepared to document the measures that are being implemented.
TRA-3b: In cooperation with the City and County of San Francisco, implement surface pedestrian facility improvements to address the Proposed Project's additional pedestrian movements at and immediately adjacent to the San Francisco 4th and King Station.	**X**	**X**	**X**		Upcoming	This measure has not started.
TRA-4b: Continue to improve bicycle facilities at Caltrain stations and partner with bike share programs where available following guidance in Caltrain's Bicycle Access and Parking Plan.				**X**	Ongoing	The JPB adopted the Caltrain Bicycle Parking Management Plan in November 2017, and staff have been working to implement the Plan's recommendations to improve wayside bike parking facilities along the corridor. Staff have also been coordinating with local jurisdictions that have launched bikeshare pilot programs to safely site bicycles near Caltrain stations.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
NOI-CUMUL-1: Implement a phased program to reduce cumulative train noise along the Caltrain corridor as necessary to address future cumulative noise increases over FTA thresholds				**X**	Upcoming	This measure will be implemented during project operation.
NOI-CUMUL-2: Conduct project-level vibration analysis for Blended System operations and implement vibration reduction measures as necessary and appropriate for the Caltrain corridor				**X**	In Progress	CHSRA is conducting this analysis as part of the EIR/EIS for the San Francisco to San Jose section.
TRA-CUMUL-1: Implement a phased program to provide traffic improvements to reduce traffic delays near at-grade crossings and Caltrain stations				**X**	Upcoming	This measure will be implemented during project operation.
TRA-CUMUL-2: Implement technical solution to allow electric trolley bus transit across 16th Street without OCS conflicts in cooperation with SFMTA.	**X**				Complete	Not applicable. SFMTA has elected to not electrify the 16th Street crossing. This measure no longer applies.
Mitigation Measure TRA-CUMUL-3: As warranted, Caltrain and freight operators will partner to provide Plate H clearance as feasible between San Jose and Bayshore.				**X**	Upcoming	This measure will be implemented during project operation.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
AES-2a: Minimize OCS construction activity on residential and park areas outside the Caltrain ROW.	**X**	**X**			Ongoing	The OCS proposed construction schedule has been provided to the JPB. OCS construction began the week of October 2, 2017. The D-B has used the potholing process to assist in locating conflicts in the 35% design and attempting to relocate OCS pole locations within the ROW, thereby avoiding parks and residential areas.
AES-2b: Aesthetic treatments for OCS poles, TPFs in sensitive visual locations, and Overbridge Protection Barriers.	**X**				Ongoing	The design requirements indicated in the measure have been implemented as described, and coordination with the specific jurisdictions regarding pole colors and design, TPFs, and Overbridge Protection Barriers, is ongoing.
AES-4a: Minimize spillover light during nighttime construction.		**X**			Ongoing	OCS construction began the week of October 2, 2017. The BBI community relations lead has notified nearby residents of upcoming construction. During construction, lighting is faced inward, towards the railroad tracks, and any complaints will be documented and addressed by the BBI community relations lead.
AES-4b: Minimize light spillover at TPFs.	**X**				Upcoming	The design requirements indicated in the measure are being used in the design process of the TPFs.
AQ-2a: Implement BAAQMD basic and additional construction mitigation measures to reduce construction-related dust.	**X**	**X**			Ongoing	The Dust Mitigation Plan was submitted to the JPB. The requirements in the Dust Mitigation Plan will be implemented throughout the construction period and documented in daily reports.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
AQ-2b: Implement BAAQMD basic and additional construction mitigation measures to control construction-related ROG and NOX emissions.	**X**	**X**			Ongoing	The Equipment Emissions Control Plan was submitted to the JPB. The requirements in the Equipment Emissions Control Plan will be implemented throughout the construction period and documented in daily reports.
AQ-2c: Utilize clean diesel-powered equipment during construction to control construction-related ROG and NOX emissions.	**X**	**X**			Ongoing	The Equipment Emissions Control Plan was submitted to the JPB. The requirements in the Equipment Emissions Control Plan will be implemented throughout the construction period and documented in daily reports.
BIO-1a: Implement general biological impact avoidance measures.	**X**	**X**			Ongoing	Worker Environmental Awareness Training is provided to all project-related personnel before they work on the project. All measures as described will be implemented throughout the construction period and documented in daily reports.
BIO-1b: Implement special-status plant species avoidance and revegetation measures.	**X**	**X**	**X**		Complete	Not applicable. Subsequent habitat assessment and avoidance of Communication Hill eliminated any potential to affect special-status plant species. The measure is not needed.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
BIO-1c: Implement California red-legged frog and San Francisco garter snake avoidance measures.	**X**	**X**			Ongoing	Pre-construction surveys are occurring no more than 7 days prior to the initiation of construction activities nearby/adjacent to potential habitat for CRLF and SFGS. The Wildlife Exclusion Fencing Plan for Segments 2 and 4 was submitted and approved by the wildlife agencies, and installation and monitoring of wildlife exclusion fencing is ongoing. No CRLF / SFGS or sign of each species has been observed to date on the Project. A separate Wildlife Exclusion Fencing Plan will be submitted for Segments 1 and 3, prior to initiation of construction activities in those segments.
BIO-1d: Implement western pond turtle avoidance measures.	**X**	**X**			Ongoing	Pre-construction surveys are occurring no more than 7 days prior to the initiation of construction activities nearby/adjacent to potential habitat for WPT. No WPT or WPT sign have been observed to date on the Project.
BIO-1e: Implement Townsend's big-eared bat, pallid bat, hoary bat, and fringed myotis avoidance measures.	**X**	**X**			Ongoing	Pre-construction surveys are occurring no more than 7 days prior to the initiation of construction activities with the potential to disturb bats or their habitat. No special-status bats or sign have been observed to date on the Project.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
BIO-1f: Implement western burrowing owl avoidance measures.	X	X			Ongoing	Protocol surveys for Western Burrowing Owl were conducted from April 2017 through July 2017 at previously identified potentially suitable habitat locations. Note that all of these locations are in Construction Segment 4 (southern Santa Clara and San Jose). No Burrowing Owls were observed during the surveys. Construction in Segment 4 is anticipated to occur in 2018. Prior to construction activities in Segment 4, pre-construction surveys of the potential habitat areas will occur no more than 7 days prior to the onset of construction activities. In addition, protocol surveys were initiated in March 2018, and were completed in June 2018, at the previously identified potentially suitable habitat locations, which will allow work to occur during the 2019 breeding season, if necessary. No Burrowing Owls were observed during the 2018 surveys.
BIO-1g: Implement northern harrier, white-tailed kite, American peregrine falcon, saltmarsh common yellowthroat, purple martin, and other nesting bird avoidance measures.	X	X			Ongoing	Nesting Bird surveys were conducted from February 1 through September 15, 2017 prior to project-related activities with the potential to impact nesting birds. No active nests were observed during this reporting period. Nesting Bird surveys were initiated on February 1, 2018 and continued throughout the reporting period. Active nests were observed during this reporting period, and no-disturbance buffers were implemented to avoid any impacts to active nests, and all project activities which occurred nearby active nests were monitored by agency-approved

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
						biological monitors.
BIO-1h: Conduct biological resource survey of future contractor-determined staging areas.	**X**	**X**			Ongoing	The agency-approved Qualified Biologist has conducted surveys of the staging areas currently being used for construction activities. No special-status species or other potentially sensitive biological resources were observed. The agency-approved Qualified Biologist will continue to survey ahead of the initiation of activities at planned staging areas as the Project moves into new construction areas.
BIO-1i: Minimize impacts on Monarch butterfly overwintering sites.	**X**	**X**			Ongoing	The agency-approved Qualified Biologist has periodically monitored the project limits to evaluate the presence of Monarch butterfly overwintering sites. No Monarch butterfly overwintering sites have been observed on the Project to date.
BIO-1j: Avoid nesting birds and bats during vegetation maintenance.				**X**	Upcoming	To be completed during Project operation.
BIO-2: Implement serpentine bunchgrass avoidance and revegetation measures.	**X**	**X**	**X**		Complete	Not applicable. Subsequent habitat assessment and avoidance of Communication Hill eliminated any potential to affect serpentine bunchgrass. This measure is no longer needed.

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
BIO-3: Avoid or compensate for impacts on wetlands and waters.	**X**	**X**	**X**		Complete	The JPB has compensated for unavoidable wetland impacts by purchasing adequate credits from a wetlands mitigation bank approved by USACE and SFRWQCB.
BIO-5: Implement Tree Avoidance, Minimization, and Replacement Plan.	**X**	**X**	**X**		Ongoing	Tree removal and pruning activities were initiated in August 2017 under the guidance of the BBI Arborist, and in accordance with the Tree Avoidance, Minimization, and Replacement Plan. Tree Removal and Pruning status is provided to the JPB on a weekly basis.
BIO-6: Pay *Santa Clara Valley Habitat Plan* land cover fee (if necessary).	**X**				Complete	Not applicable. The SCVHP does not apply to the Project because TPS2, Option 1 was not selected and OCS does not extend to Communication Hill. This measure is not needed.
CUL-1a: Evaluate and minimize impacts on structural integrity of historic tunnels.	**X**				Upcoming	To be implemented prior to construction in tunnels.
CUL-1b: Minimize impacts on historic decorative tunnel material.	**X**				Upcoming	To be implemented prior to construction in tunnels.

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
CUL-1c: Install project facilities in a way that minimizes impacts on historic tunnel interiors.	**X**				Upcoming	To be implemented prior to construction in tunnels.
CUL-1d: Implement design commitments at historic railroad stations	**X**				Complete	The Qualified Architectural Historian completed and submitted the HABS Level III documents to the JPB for all seven of the historic stations. Pole placement has been designed to minimize the visual impact to historic stations and all design changes are reviewed by the Environmental Compliance Lead to ensure the mitigation measure is being implemented as the design of the project progresses.
CUL-1e: Implement specific tree mitigation considerations at two potentially historic properties and landscape recordation, as necessary.	**X**	**X**			Complete	It was determined that the project is not acquiring any ROW at either of the subject properties so all tree effects would be within the JPB ROW. Therefore, the APE does not include these two historic properties. This measure is no longer needed.

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
CUL-1f: Implement historic bridge and underpass design requirements.	X				Ongoing	This measure is being implemented as described during the design process and will be incorporated into the final design. The four bridges that are included in the MMRP are rail bridges crossing over another feature. Design of the OCS system is taking into account that there are requirements that restrict the design. Thus far, the designs for Construction Segments 2 & 4 are in process and designs are not yet complete. The D-B will forward to the Architectural Historian once complete.
CUL-2a: Conduct an archaeological resource survey and/or monitoring of the removal of pavement or other obstructions to determine if historical resources under CEQA or unique archaeological resources under PRC 21083.2 are present.	X				Ongoing	Periodic inspections of ground surface areas along the alignment, in conjunction with cultural monitoring as-needed of project activities in culturally sensitive areas are ongoing. The Archaeological Final Report will be provided at the conclusion of construction activities.
CUL-2b: Conduct exploratory trenching or coring of areas where subsurface project disturbance is planned in those areas with "high" or "very high" potential for buried site.	X				Ongoing	Exploratory trenching and subsurface testing of all potentially culturally sensitive areas occurred prior to the initiation of construction activities in those areas. The results will be included in the Archaeological Final Report. No cultural resources requiring the development of a treatment plan were observed. A Native American monitor has been present for all exploratory trenching and subsurface testing work.

Mitigation Monitoring and Reporting

Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
CUL-2c: Conduct limited subsurface testing before performing ground-disturbing work within 50 meters of a known archaeological site.	**X**				Ongoing	Exploratory trenching and subsurface testing of all potentially culturally sensitive areas occurred prior to the initiation of construction activities in those areas. The results will be included in the Archaeological Final Report. No cultural resources requiring the development of a treatment plan were observed. A Native American monitor has been present for all exploratory trenching and subsurface testing work.
CUL-2d: Conduct exploratory trenching or coring of areas within the three zones of special sensitivity where subsurface project disturbance is planned.	**X**				Ongoing	Exploratory trenching and subsurface testing of all potentially culturally sensitive areas occurred prior to the initiation of construction activities in those areas. The results will be included in the Archaeological Final Report. No cultural resources requiring the development of a treatment plan were observed. A Native American monitor has been present for all exploratory trenching and subsurface testing work.
CUL-2e: Stop work if cultural resources are encountered during ground-disturbing activities.	**X**	**X**			Ongoing	No prehistoric or historic-period cultural materials have been observed during cultural monitoring.
CUL-2f: Conduct archaeological monitoring of ground-disturbing activities in areas as determined by JPB and SHPO.		**X**			Ongoing	Cultural monitoring as-needed of project activities in culturally sensitive areas is ongoing. The Archaeological Final Report will be provided at the conclusion of construction activities.

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
CUL-3: Comply with state and county procedures for the treatment of human remains discoveries.		X			Ongoing	No human remains have been observed to date on the Project.
EMF-2: Minimize EMI effects during final design, Monitor EMI effects during testing, commission and operations, and Remediate Substantial Disruption of Sensitive Electrical Equipment.	X	X	X		Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Designs are submitted and reviewed/commented on by JPB. Monitoring EMI effects will occur post construction.
GEO-1: Perform a site-specific geotechnical study for traction power facilities.	X				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Geotechnical studies and results are submitted to JPB as completed.
GEO-4a: Identification of expansive soils.	X				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Geotechnical studies and results are submitted to JPB as completed.

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
GEO-4b: Mitigation of expansive soils.	**X**				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Geotechnical studies and results are submitted to JPB as completed.
HAZ-2a: Conduct a Phase II Environmental Site Assessment prior to construction.	**X**				Complete	A Phase II Environmental Assessment was completed prior to construction by the JPB consultant, and the results were provided to BBI, and the required mitigation is being implemented prior to the initiation of construction activities.
HAZ-2b: Implement engineering controls and best management practices during construction.	**X**	**X**			Ongoing	Field activities are being monitored daily for significant color changes or odors which may indicate contamination.
HYD-1: Implement construction dewatering treatment, if necessary.	**X**	**X**			Ongoing	Facilities & BMPs are in place to deal with this requirement should it arise in the OCS foundations.
HYD-4: Minimize floodplain impacts by minimizing new impervious areas for TPFs or relocating these facilities.	**X**				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. The TPFs in Construction Segments 2 & 4 are currently in final design and design for TPFs in Construction Segments 1 & 3 has begun. The design minimizes hardscape only to required structure foundations; yard areas are to receive a pervious material.

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
HYD-5: Provide for electrical safety at TPFs subject to periodic or potential flooding.	**X**			**X**	Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. The TPFs in Construction Segments 2 & 4 are currently in final design and design for TPFs in Construction Segments 1 & 3 has begun. The design plan currently raises the TPFs above the floodplain.
HYD-7: Implement sea level rise vulnerability assessment and adaptation plan.				**X**	Ongoing	The JPB has initiated this measure and preparation of the sea level rise vulnerability assessment and adaptation plan is underway.
NOI-1a: Implement Construction Noise Control Plan.	**X**	**X**			Ongoing	The Noise and Vibration Control Plan has been submitted and is being implemented. Field activity is monitored per the Plan. If allowable noise levels are near or exceed allowable noise levels, mitigation such as blankets are used from that point forward.
NOI-1b: Conduct site-specific acoustical analysis of ancillary facilities based on the final mechanical equipment and site design and implement noise control treatments where required.	**X**				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. Design is still in process and a noise study is currently being performed.
NOI-2a: Implement Construction Vibration Control Plan.	**X**	**X**			Ongoing	The Noise and Vibration Control Plan has been submitted and is being implemented. Field activity is monitored per the Plan.

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
PSU-8a: Provide continuous coordination with all utility providers.	**X**	**X**			Ongoing	The design requirements indicated in the measure will be implemented through the final design as described. Coordination with utility providers is ongoing and there have not been any service interruptions thus far.
PSU-8b: Adjust OCS pole foundation locations.	**X**				Ongoing	The design requirements indicated in the measure are being implemented through the final design as described.
PSU-8c: Schedule and notify users about potential service interruptions.	**X**	**X**			Ongoing	The design requirements indicated in the measure are being implemented through the final design as described. There have not been any service interruptions thus far.
PSU-9: Require application of relevant construction mitigation measures to utility relocation and transmission line construction by others.	**X**	**X**			Ongoing	JPB has initiated coordination with PG&E regarding transmission line construction. PG&E is currently raising overcrossing lines in Segment 2.
TRA-1a: Implement Construction Road Traffic Control Plan.	**X**	**X**			Ongoing	The D-B has begun traffic control design and permit applications with cities in Segments 2 and 4. Designs have been completed and approved for all cross-over bridges in Segments 2 and 4.
TRA-1c: Implement signal optimization and roadway geometry improvements at impacted intersections for	**X**	**X**			Upcoming	This measure has not started

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
the 2020 Project Condition.						
TRA-2a: Implement construction railway disruption control plan.	**X**	**X**			Ongoing	Minimization of railway disruption is being coordinated by the Site Specific Work Plan. A Construction Railway Disruption Control Plan was prepared to document the measures that are being implemented.
TRA-3b: In cooperation with the City and County of San Francisco, implement surface pedestrian facility improvements to address the Proposed Project's additional pedestrian movements at and immediately adjacent to the San Francisco 4th and King Station.	**X**	**X**	**X**		Upcoming	This measure has not started.
TRA-4b: Continue to improve bicycle facilities at Caltrain stations and partner with bike share programs where available following guidance in Caltrain's Bicycle Access and Parking Plan.				**X**	Ongoing	The JPB adopted the Caltrain Bicycle Parking Management Plan in November 2017, and staff have been working to implement the Plan's recommendations to improve wayside bike parking facilities along the corridor. Staff have also been coordinating with local jurisdictions that have launched bikeshare pilot programs to safely site bicycles near Caltrain stations.

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Mitigation Measure	Mitigation Timing				Status	Status Notes
	Pre-Construction	Construction	Post-Construction	Operation		
NOI-CUMUL-1: Implement a phased program to reduce cumulative train noise along the Caltrain corridor as necessary to address future cumulative noise increases over FTA thresholds				**X**	Upcoming	This measure will be implemented during project operation.
NOI-CUMUL-2: Conduct project-level vibration analysis for Blended System operations and implement vibration reduction measures as necessary and appropriate for the Caltrain corridor				**X**	In Progress	CHSRA is conducting this analysis as part of the EIR/EIS for the San Francisco to San Jose section.
TRA-CUMUL-1: Implement a phased program to provide traffic improvements to reduce traffic delays near at-grade crossings and Caltrain stations				**X**	Upcoming	This measure will be implemented during project operation.
TRA-CUMUL-2: Implement technical solution to allow electric trolley bus transit across 16th Street without OCS conflicts in cooperation with SFMTA.	**X**				Complete	Not applicable. SFMTA has elected to not electrify the 16th Street crossing. This measure no longer applies.
Mitigation Measure TRA-CUMUL-3: As warranted, Caltrain and freight operators will partner to provide Plate H clearance as feasible between San Jose and Bayshore.				**X**	Upcoming	This measure will be implemented during project operation.