Quarterly Monitoring Report – May 2020
Final Monitoring Report Under Task Order 005

Peninsula Corridor Electrification Project (PCEP)
Peninsula Corridor Joint Powers Board (JPB)/Caltrain
San Mateo, CA

June 17, 2020

PMOC Contract Number: DTFT60-14-D-00018
Task Order Number: 005
Project Number: DC-27-5346
Work Order Numbers: 07 and 09
OPs Referenced: 25 - Recurring Oversight and Related Reports
01 - Administrative Conditions and Requirements

PMOC Firm: **Kal Krishnan Consulting Services, Inc. (KKCS)**
800 South Figueroa Street, Suite 1210
Los Angeles, CA 90017

PMOC Lead: Michael B. Eidlin
Length of Time Firm Assigned to Project: 4 Years, 11 months
Length of Time Person Assigned to Project: 4 Years, 11 months

Executive Summary

A. Project Description

The Project Sponsor is the Peninsula Corridor Joint Powers Board (JPB) which operates rail service as Caltrain. The JPB is responsible for managing and delivering the project.

The Peninsula Corridor Electrification Project (PCEP) corridor is approximately 51 miles in length. This Core Capacity Improvement Project (CC) includes two components: infrastructure and rolling stock. The infrastructure component is comprised of the construction of Traction Power Substations (TPSS), the connection of those substations to the local utility system, and the installation of the Overhead Contact System (OCS) over the tracks beginning at the 4th and King Caltrain Station in San Francisco and ending at Tamien Station in San Jose. The infrastructure work also includes modifications to the wayside signal system and grade crossing signals to accommodate the new electrified rail system. In addition, four (4) existing rail tunnels will be enlarged to accommodate the expanded clearance envelope of the electrified vehicles.

The rolling stock component includes the design and procurement of ninety-six (96) Electric Multiple Unit (EMU) rail vehicles to replace approximately 75 percent of the existing diesel rolling stock. The initial EMU order was supplemented in December 2018 when the JPB exercised an option to purchase an additional 37 EMUs; the resulting fleet will consist of nineteen (19) seven-car trainsets. The additional 37 EMUs are not part of the JPB's Core Capacity grant. Caltrain's Central Equipment Maintenance and Operation Facility (CEMOF) is being modified to service the electrified vehicles.

The PCEP is part of a larger JPB initiative known as the Caltrain Modernization Program (CalMod). The CalMod program is separately installing a Positive Train Control (PTC) system, which is an advanced signal system that includes federally mandated safety improvements.

The project is being constructed primarily in the existing Caltrain corridor on rights-of-way (ROW) controlled by JPB/Caltrain. Additional ROW will be required to accommodate the TPSS and related facilities as well as elements of the OCS system; all ROW transactions will be made in accordance with the Uniform Relocation Act.

The PCEP Final Environmental Impact Report (FEIR) forecasts Caltrain ridership of 69,151 daily boardings in the year 2020 and 111,427 daily boardings in 2040, including service in 2040 to the Transbay Transit Center. This ridership represents an increase of 21.1% and 32.1% respectively, over the projected Caltrain ridership in those years without the core capacity improvements.

B. Project Status

- The project is in construction. The Full Funding Grant Agreement (FFGA) was executed on May 23, 2017; the Final Completion Date is August 22, 2022.
- *All major construction contracts have been awarded and the contractors are at work.*
- PG&E is constructing the improvements at its FMC and East Grand substations to provide permanent power to TPSS #2 and TPSS #1, respectively. The FMC substation has already been modified to provide interim power to TPSS #2 for testing purposes. *Responsibility for construction of the interconnection between FMC and TPSS #2 was recently transferred*

from the Electrification contractor's sub-contractor TRC to PG&E. PG&E is in the process of finalizing a contract package prior to soliciting bids for the work. PG&E's schedule shows construction starting on September 18, 2020 and the connection to temporary power at the FMC substation occurring on February 20, 2021. This schedule may delay the start of EMU testing on Segment 4.

- The JPB has procured an additional 37 EMUs from Stadler using a contract option; this will result in an initial electrified fleet of nineteen (19) seven car trains. This action will delay the delivery of the first complete trainset to the JPB until early 2020 because of the time required to produce and introduce the new seventh car into the first train set.
- *The PMOC conducted a virtual quarterly monitoring visit via Microsoft Teams videoconferencing and teleconferencing on May 19-20, 2020.*

C. Core Accountability Information through March 2020

FFGA **Core Accountability Items**			
Project Status: **In Construction**		Original at FFGA	Current Estimate (EAC)[1]
Cost	Cost Estimate	$ 1,930,670 934	$ 1,930,670 934
Contingency	Unallocated Contingency	$152,913,317	*$58,337,261*
	Total Contingency (Allocated plus Unallocated)	$315,533,611	*$118,909,637*
Schedule	Final Completion Date	August 22, 2022	August 22, 2022
		Amount ($)	Percent
Planned Value to Date[2]	Total budgeted cost of work scheduled to date[3]	*$1,026,363,458*	*53.16%*
Earned Value to Date	Budgeted cost of work completed to date, i.e., actual total value of work earned or done[3]	*$667,794,690*	*34.59%*
Actual Cost[4]	Total cost of work completed to date (actual total expenditures)[3]	*$871,288,503*	*45.13%*
		Amount ($)	Percent
Contracts	Total contracts awarded to date[4]	*$1,652,476,344*	*87.86%*
	Total construction contracts awarded to date[5] (construction & vehicle contracts only)	*$1,425,624,724*	*75.80%*
	Physical construction work completed[6,7] (amount of construction contract work actually completed)	*$625,351,285*	*43.87%*

Major Issue	Status	Comments/Actions/Planned Actions
Delay in completion of PG&E Intertie to Traction Power Substation (TPSS) No. 2.	*The JPB has negotiated an agreement with PG&E to construct both interconnections. The interconnection to TPSS #2 is now expected to be complete in February 2021.*	The construction of the southern intertie is required before the JPB's test track and Segment 4 can be electrified and local EMU testing and acceptance can begin. PG&E's schedule for completing the interconnection may delay the start of EMU testing on Segment 4.
Contractor Claims	The Electrification contractor has submitted a total of four claims; the most significant claim is associated with its efforts to provide Consistent Warning Time (CWT) at grade crossings.	The JPB and the Electrification contractor are engaged in a technically facilitated mediation process in an effort to resolve these issues. *Meetings are now focused on determining the direct cost of implanting the 2SC solution. The next meeting is scheduled for May 20, 2020.* The JPB reports that the mediation process has not yet addressed the issue of time.
Unresolved Schedule Impacts	The JPB is evaluating the Electrification contractor's Time Impact Analysis (TIA) for changes to the grade crossing warning system. The TIA and related documents allege a delay of 1,092 days. This delay is independent of delays associated with impacts to OCS foundation construction from differing site conditions; however, the two types of delays are not necessarily additive.	The JPB has rejected the contractor's recent schedule updates and is developing its own shadow schedule using the contractor's schedule information with some modified assumptions. The JPB's objective is to have the contractor produce a progress schedule update that can be accepted and used for management of the remainder of the contract. *A Risk Refresh workshop was held on April 1, 2020. This workshop is expected to yield a more accurate assessment of the project schedule and schedule related costs than the 2019 risk refresh, because the 2019 effort did not account for signal related activities. The PCEP risk team is still updating its shadow schedule to include the signal activities and will complete its risk analysis once the schedule work is complete.*

Technical Capacity and Capability	Scheduling capacity continues to be insufficient to meet the routine demands of the project. The System Integration Lead is only part-time in that position and needs assistance. *Rail Activation Planning is currently being managed by a member of the safety team with rail activation experience until a permanent Rail Activation Manager is hired.* *The PMOC is concerned that if the FRA favorably resolves the CWT issue, a large number of design related submittals may produce a backlog in documents awaiting review by the JPB's team.*	*The JPB reports that it is attempting to hire an additional scheduler to assist with delay analysis.* Systems Integration is ranked #5 on the PCEP Risk Register. *Rail Operations has engaged an independent consultant to assist it in developing materials for incorporation into the overall Rail Activation Plan.* The PMOC remains uncertain how the overall Rail Activation process will be managed. *The Chief Operating Officer, Rail, continues to recruit for a Director of Rail Activation, but has thus far been unsuccessful. The PMOC strongly supports filling this key position.*
OCS Construction Progress	Progress continues to be impacted by in-ground obstacles, causing redesign of some pole locations and inefficient foundation construction. *Off-track foundation construction resumed in April with more than 50 foundations installed during the month. On-track foundation construction is expected to resume in late-May. The JPB's most recent report shows 1,479 foundations remain out of a total of 3,140.*	The JPB continues to meet weekly with the contractor on the progress of potholing and foundation construction. Both parties have agreed to an objective of completing all foundations by December 31, 2020. This is a very aggressive goal in light of progress achieved to date. *The JPB has adopted a revised policy applicable to contractors working in proximity to active tracks.* This policy is expected to be beneficial to on-track OCS foundation production.
Consistent Warning Time (CWT) for Grade Crossings	The Electrification contractor is moving forward with design using a two (2) speed check solution which apparently will satisfy FRA and California Public Utilities Commission (CPUC) requirements.	*The JPB and its contractor met with the Federal Railroad Administration (FRA) on May 14, 2020 to review the status of its most recent comments on the grade crossing warning solution. The JPB plans to submit its responses promptly to the FRA and the FRA has stated that it expects to make its determination on whether the 2SC solution is based on existing technology, prior to the next scheduled meeting on June 19, 2020.*
Systems Integration and Testing	A number of complex Systems Integration issues are currently unresolved, including: • The Electrification contractor has submitted an initial cutover plan for two (2) locations in Segment	*The JPB is re-evaluating several standing meetings that address Systems Integration; Start-up and Testing; Rail Activation Planning; and, coordination matters with Rail Operations. The objective is to reduce the number of*

	4; this plan is currently under review by the JPB. • Potential changes to the communications system. • Impacts from the JPB's PTC activities on the cutover of signal and grade crossing systems.	*meetings and make the remaining meetings more productive.*
Date of Next Monitoring Visit:		*TBD 2020*
Date of Next Quarterly Review Meeting:		*July 28, 2020*

Core Accountability Table Footnotes:

[1] Current estimate is the remaining balance which includes known change orders that will draw from Contingency funds, both Allocated and Unallocated.

[2] Planned Value to Date is based upon the Program Schedule and Estimate (Rev. 4B) that were updated in October 2017 to reflect the FFGA delay.

[3] Work is defined as construction or manufacturing by Balfour Beatty, Stadler, PG&E, CEMOF, Tunnel Modification, and other Required Projects.

[4] Percentage is calculated based on a project value of $1,930,670,934.

[5] Total construction contracts awarded to date (construction & vehicle contracts only) includes design costs and executed change orders.

D. Major Problems and/or Issues

The continuing effects of the Coronavirus (COVID-19) as a global pandemic has impacted some activities related to the PCEP. Dates shown for future events are subject to change as a result of actions that may be taken by federal, state, and local governments, public and private sector employers, and individuals.

- The construction of the two (2) interconnections between PG&E's substations and the JPB's two (2) corresponding traction power substations will be performed by PG&E instead of BBII. This will delay the planned start of construction of the interconnection and may delay the start of local testing of the EMUs which will use the tracks in Segment 4.
- The Electrification contractor has now submitted a total of four claims; the most significant claim is associated with its efforts to provide the required warning time at grade crossings. Other claims include denial of a Design Variance Request for alternate feeder and contact wire; percent of payment for CWT under Allowance Item #10; and costs for an alternate designer for Segment 1A. The JPB and the Electrification contractor are engaged in a technically facilitated mediation process in an effort to resolve these issues. *The mediation has been in progress for several months and is now focused on the direct cost of implementing the 2SC grade crossing solution.*
- Two (2) major technical problems, the slow progress on OCS foundation construction, and the implementation of a solution to provide the required warning time for grade crossings, continue to create uncertainty for the project schedule. *The Electrification contractor's most recent Schedule Update Narrative for February 2020, received April 22, 2020, shows a Substantial Completion date of June 29, 2024, compared to the contractual date of August 10, 2020.* The JPB has rejected the contractor's recent schedule updates and is continuing to develop its own shadow schedule using a combination of the contractor's activities coupled with its own logic and durations where appropriate. *The JPB held a risk refresh*

workshop on April 1, 2020. However, the risk results are not yet available because the process of incorporating the contractor's latest signal related details into the shadow schedule is not complete. The schedule risk analysis, when completed, should provide more current and accurate insights into this issue. *The JPB's current Master Project Schedule (MPS) update, with a data date of April 1, 2020, shows a substantial completion date of January 31, 2022.* The PMOC remains concerned that the JPB does not have sufficient scheduling resources to review and analyze the contractor's most recent TIA and the associated claim while providing timely support to other project management activities.

- The JPB continues to move forward with its solution to provide the required warning time at grade crossings following electrification of the project. Design of the grade crossings is progressing slowly despite an agreement between the JPB and its contractor to use the Two Speed Check (2SC) solution. An outstanding issue is a determination by the Federal Railroad Administration (FRA) on whether the proposed 2SC solution uses existing technology. *The JPB and its contractor met with the FRA on May 14, 2020 and reviewed the FRA's most recent comments on the updated Preliminary Hazard Analysis (PHA) for the 2SC solution, as well as the proposed testing program. The JPB plans to promptly submit its formal responses to the FRA, and the FRA expects to make its determination on whether the 2SC solution uses existing technology by the time of the next planned meeting on June 19, 2020.*

- Construction of the Overhead Contact System (OCS) is far behind initial projections due to encountering numerous obstructions in planned pole locations. Foundation construction, which controls the ultimate pace of the program, improved in late spring 2019 after the JPB loosened restrictions on work in adjacent work areas. *Off-track foundation construction resumed in April 2020 and progress has been favorable. On-track foundation construction is expected to resume in late-May 2020.* The JPB continues to meet with the contractor weekly to plan upcoming work and address outstanding issues. *The JPB has adopted a revised policy applicable to contractors working in proximity to active tracks. This policy was implemented on April 1, 2020 and is expected to be beneficial to on-track OCS foundation production. The JPB and its contractor have agreed on the goal of completing foundation construction by December 31, 2020.*

- The PMOC remains concerned that the Contractor has not implemented procedures and processes to verify that the train clearance envelopes are preserved during the construction phase of the project, nor is there an intermediate catenary and appurtenance maintenance plan in place to ensure that a catenary component does not come loose and create a clearance issue. This issue has been brought to the Sponsor's attention on several occasions.

- The JPB established a system to reconcile responsibility for track access delays (TADs) and compute the associated costs. The prompt reconciliation and resolution of track access delays and the resulting costs continues to be a challenge. The JPB is now focused on meeting regularly with the contractor to review the recent track access delays and finding other methods to avoid or minimize the delays. The JPB reports that it is reducing the final costs of individual delays by closer attention to the circumstances causing the delays.

- The PCEP team is acquiring the remaining real estate needed for the project. The refinement of the design for the overhead contact system (OCS) as a result of pole shifts, and some modifications to the traction power system (TPS) have resulted in the creation of some new

parcels and modifications of other parcels. Timely acquisition of ROW has recently been elevated to medium on the PCEP's risk register.

E. PMOC's Final Monitoring Report Under Task Order 005

This is the PMOC's final monitoring report under Task Order 005. See Appendix I for additional details required to be included in this Final Report.

F. Monitoring Plan Items

- The PMOC is continuing to focus on the PCEP's schedule performance, including the JPB's mitigation of delays to OCS foundation installation, implementation of the dual speed check solution to provide the required warning time at grade crossings, and completion of Time Impact Analyses related to the previous two (2) issues. *The PMOC participated in the Risk Refresh on April 1, 2020 and is awaiting the results of the schedule risk assessment which has been delayed until the PCEP shadow schedule has been revised to incorporate additional signals activities from recent contractor schedules.* The PMOC will apply additional resources when a definitive schedule and/or an acceptable TIA is available from the JPB.
- The PMOC is continuing to monitor the JPB's Systems Integration activities and the development of its Rail Activation Plan (RAP). The RAP is moving forward and the PMOC has provided lessons learned from another agency's Rail Activation planning and management process. *Rail Operations has engaged an independent consultant to assist it with the assembly and development of materials pertinent to the internal workings of the Rail Operations Division and is contributing these materials to the Rail Activation Plan. Rail Operations continues to recruit for a Director of Rail Activation; however, how the Rail Activation process will be managed and implemented is not yet fully developed.*
- The PMOC continues its review of the JPB's updated Project Management Plan, Rev. 2 (PMP); Project Controls Plan, Rev. 2; Document Control Plan, Rev. 1; *Safety and Security Management Plan (SSMP), Rev. 6*; and several supporting procedures. The PMOC is providing comments to the PCEP team in the form of mark-ups as the reviews are completed.

2) Table of Contents

3) Significant PMOC Observations

This monitoring report covers the period from March 12, 2020 through May 20, 2020. The report contains information obtained during the PMOC's virtual monitoring discussions with PCEP staff and consultants on May 19-20, 2020, virtual meeting attendance, document reviews, telephone conversations, and general interaction with the project team.

A. Project Status

Environmental Process

The JPB recently determined that the alignment of the interconnections between PG&E's East Grand Ave. substation in South San Francisco and its FMC substation in San Jose, and the JPB's Traction Power Substations 1 and 2 respectively, are slightly different than the alignments that were subject to previous environmental review. The JPB has advised the FTA of this development and is providing the FTA with an assessment of the environmental consequences of the changes. The JPB's opinion is that the environmental consequences of the new alignments are not significantly different than the original alignments. The JPB also continues to monitor the compliance of its construction contractors with the requirements of its FFGA and the supporting environmental documents.

Support Services and Design

The JPB awarded contracts in early 2014 for Program Management Consultant Services; EMU Vehicle Consultant Services; and Electrification Services. The scope and status of work for each of the consultant contracts is described as follows:

Program Management: The consultant team provides various program management support services such as document control, project controls including estimating and scheduling, quality assurance, risk management and contract administration during implementation of the PCEP.

EMU Services: The consultant team provides EMU management and oversight support services which included development of the vehicle procurement documents, and now encompasses vehicle design reviews, vehicle-related Buy America compliance services, monitoring, and inspection during vehicle manufacture/assembly, integration of on-board systems with the JPB's PTC Project, design of modifications to the CEMOF; and support during the delivery, testing and commissioning of the EMUs.

The EMU Services team is currently working on the following tasks:

- *Negotiating with the EMU supplier to revise the vehicle delivery schedule.*
- Conducting the remaining final design reviews on software related items and monitoring First Article Inspections (FAI).
- Continue to support the JPB in discussions with the FRA on EMU compliance issues.
- Providing design support during construction of the CEMOF modifications.
- *The EMU team is adding two (2) personnel at Stadler's assembly facility in Salt Lake City, Utah; one person to witness tests on completed EMUs and the other to monitor Type Testing activities.*

Electrification Services: The consultant now provides design reviews and monitoring, and support of manufacture/assembly of products, construction, installation, integrated testing, and commissioning related to overhead catenary systems, traction power substations, communications, supervisory control and data acquisition (SCADA), rail signaling, and train controls. *The Electrification Services team also provided design support during construction (DSDC) during the installation of the OCS in the tunnels, which is nearing completion.*

The Electrification Services team is currently working on the following activities:

There is no significant change from the March 2020 Monitoring Report.

- Providing design oversight and direction to the Balfour-Beatty Infrastructure, Inc. (BBII) team.
- Continued to support the JPB in various ways related to resolution of the grade crossing warning time issue. These activities include interaction with BBII, the Union Pacific Railroad (UPRR), FRA, and the CPUC. Recent activities have been focused on providing the FRA with requested documentation to support its decision on whether the 2SC solution uses existing technology. The CWT issue continues to impact BBII's schedule for signal system design and installation because design is only progressing on a few selective crossings.
- *Supporting the JPB related to BBII's Single Phase Study being done to assess the impacts of the expected JPB loads on PG&E and Silicon Valley Power (SVP) facilities and customers.*
- Supporting discussions and negotiations with BBII related to various change orders.
- Participating in weekly meetings with the JPB's PTC management team.
- Providing oversight and direction to Aeronautical Radio, Incorporated, (ARINC), the SCADA supplier.
- Providing technical direction, as needed, to BBII related to PG&E's design of temporary and permanent power connections to the traction power system.
- Reviewing submittals and other materials prepared by BBII, ARINC, and ProVen.

Concurrent Non-Project Activities:

The JPB has an on-going capital construction program that includes several projects that will share some common elements with the PCEP. These projects have been designated as Concurrent Non-Project Activities (CNPAs), and the project elements that will be constructed for the benefit of the PCEP will be appropriately segregated for cost purposes. *Some CNPAs have been completed; the following are still active:*

- TPSS-2 Pole Relocation (Design): Design changes due to the relocation of a Santa Clara Valley Transportation Authority (VTA)/ Bay Area Rapid Transit District (BART) pole at the TPSS-2 location. This scope is funded by the VTA.
- OCS foundations, as part of the South San Francisco Station construction in Segment 2: This work is in construction and the PCEP work is now scheduled for completion in mid-2020. *Some foundation locations must change as a result of conflicts with the temporary station platform.*

- OCS foundations, as part of the 25th Avenue Grade Separation Project in San Mateo: the cutover date for the new elevated track is May 25, 2020, Memorial Day weekend; all foundations are expected to be installed by July 27, and substantial completion is May 2021.
- Installation of additional flip-up seats in EMU bike cars. This work will be funded locally.

Value Engineering (VE):

The project sponsor did not undertake a formal VE effort. However, the PCEP team undertook a significant cost reduction effort in late 2014 which identified an estimated $84.3M in potential cost savings achieved by eliminating or deferring certain tasks previously included in the baseline program. In addition, the procurement process for the Electrification D-B contract included the submission of alternate technical proposals (ATPs) to reduce cost or improve schedule. In addition to those ATPs that were incorporated into the Electrification contract, that contract contains a Value Engineering Change Proposal (VECP) clause whereby any savings that result from an accepted VECP are shared by the contractor and the JPB.

Procurement – Executed Contracts and Changes

The following contracts comprise the majority of the PCEP scope. No additional construction contracts are planned to follow the recent award of the CEMOF Modification contract.

Electrification: The electrification of the corridor is being performed using a design-build contract which was awarded to Balfour-Beatty Infrastructure, Inc. (BBII) and executed on August 15, 2016. The JPB issued a full NTP to BBII on June 19, 2017.

Electrification Contract Changes: *The JPB reported issuing Change Orders (COs) to BBII in the approximate amount of $1,588,977 since January 2020. The COs cover destressing of insulated rail joints, additional work on the single-phase study for SVP, insulated rail joints, asbestos pipe abatement, and additional utility potholing.*

EMU Vehicles: A total of 133 EMUs, consisting of a base order of 96 EMUs plus 37 additional EMUs purchased later using a contract option, are being supplied by Stadler US under a contract that was executed on August 15, 2016. The JPB issued a full NTP to Stadler on June 1, 2017. Design of the vehicles is being performed in Switzerland and final assembly of the vehicles will occur at a location near Salt Lake City, Utah.

EMU Contract Changes:

- *No EMU Contract Change Orders have been reported by the JPB for the months of February and March 2020.*
- The JPB is currently negotiating with Stadler to delay the delivery of some of the initial train sets until Segment 4 is electrified and ready for vehicle testing.
- *The JPB is negotiating with Stadler to supply a pantograph inspection system for the CEMOF.*

Systems Control and Data Acquisition (SCADA) Equipment: The JPB executed a sole-source contract with ARINC, Inc., for the supply of SCADA equipment in September 2017. The equipment will be used to control the traction power system and design and integration activities are underway. The SCADA contract is being managed by the Electrification consultant and installation of the SCADA equipment is being performed by BBII under the Electrification contract.

Tunnel Notching, OCS Installation and Drainage Improvements

A contract was awarded to ProVen Management, Inc. of Oakland, California, for Tunnel Notching and Drainage Improvements on the tunnels in Segment 1 of the PCEP corridor. The contract consists of two (2) main elements: notching of the four (4) tunnels to increase clearance for the new EMU vehicles; and drainage improvements in tunnels 1 and 4 for the benefit of Caltrain operations. The drainage improvements were performed as a Concurrent Non-Project Activity (CNPA) and was paid for by Caltrain. The JPB issued a Notice to Proceed to the contractor on October 6, 2018. Installation of the Overhead Contact System (OCS) in the tunnel bores was later added by Change Order.

Tunnel Contract Changes

The JPB issued a Change Order in February 2020 in the amount of $160,000 for an overrun in the quantity of hot-mix asphaltic concrete used as part of the CNPA drainage project.

Used Electrified Locomotives: The JPB, at its June 7, 2018 meeting, approved contracts to acquire and overhaul two (2) used electrified locomotives to perform initial testing of the electrification system. The locomotives arrived at Amtrak's yard in Oakland, CA, on June 6, 2019, and have been prepared for long term storage until needed for testing of the electrified system.

CEMOF Modifications: The JPB awarded a contract to ProVen Management, Inc. in the amount of $6,550,777 to modify the Central Equipment Maintenance and Operations Facility (CEMOF) to accommodate the new EMUs. ProVen was issued a full Notice to Proceed (NTP) on September 16, 2019. The CEMOF contract is the last of the PCEP's major construction contracts.

CEMOF Contract Changes

The JPB issued a Change Order in March 2020 in the amount of $15,221 for relocation of a ground wire and a substitute drain assembly.

Consultant Contracts:

On-call Construction Management Services for the PCEP: The JPB awarded a five-year contract to Jacobs Project Management Company (Jacobs) of Oakland, CA in 2019 to support electrification construction, the tunnel notching contract, modifications to the CEMOF, reconstruction of the Santa Clara Drill Track, installation of mini-high block platforms, and other work, as needed.

PG&E: *The JPB executed Modification 2 to Supplement 2 of its Master Agreement with PG&E to construct the interconnections between PG&E's two (2) substations and the JPB's two (2) corresponding TPSS.*

Upcoming Procurements: The JPB is developing the annual work directives for consultants; the objective is to have the work directives in place by July 1, 2020.

Project Delivery

Electrification Design-Build Contract

Design and Design-related Activity: Balfour-Beatty Infrastructure, Inc. (BBII) is responsible for the Final Design of the electrification and related facilities under the terms of its D-B

contract with the JPB. PGH Wong Engineering, Inc., is the Engineer of Record for the work. *The status of design activities for the OCS, TPS, and Signals systems are shown in Tables 1, 2, and 3 below. Note that the Signals design shows moving forward with installation upon completion of the 95% design.* The following design and design-related activities are currently under way:

- Advancing OCS and Traction Power System (TPS) design in all Segments.
- Work continues to address Caltrans' requirements for bridge protection barriers.
- 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.
- Continued discussions with FRA and CPUC on grade crossing design.
- Continued design on redundant fiber at TPS-2 and reviewed TPS-1 90% design package.
- Worked with BBII through Site Specific Work Plans (SSWPs) for upcoming field work.
- Continued to work with PG&E and Silicon Valley Power (SVP) to finalize the single-phase studies. *Began data conversion and model validation.*
- *Design of the 115 kV interconnections between Traction Power Substations 1 and 2 and the corresponding PG&E East Grand Avenue and FMC substations is nearly complete. The FMC-TPS 2 design is at the Issue for Construction (IFC) stage and most reviews are complete. The design for East Grand-TPS 1 is nearing IFC. This design work will be completed by TRC, a PG&E approved consulting firm, as a subcontractor to BBII and when complete, will be turned over to PG&E for procurement of a construction contractor.*
- *The JPB and BBII met with the FRA on May 14, 2020 to review the FRA's latest comments on the PHA and test plan for the 2SC grade crossing warning solution. The JPB plans to make a timely submittal of its formal response to the FRA's latest comments. The FRA expects to have a determination on whether the 2SC solution is based on existing technology prior to the next meeting which is scheduled for June 19, 2020.*

Table 1 - OCS Design Progress

Work Area	Required	Completed Previously	Completed this Period	Expected Completion
Segment 1	*12*	*2*	*0*	*1/11/2021*
Segment 2	*15*	*12*	*0*	*8/12/2020*
Segment 3	*6*	*6*	*0*	*6/28/2020*
Segment 4	*10*	*11*	*0*	*6/1/2020*
System-wide	*12*	*10*	*0*	*8/5/2019*
Totals	***55***	***41***	***0***	

Note: Data as of May 16, 2020

Table 2 – Traction Power Design Progress

Work Area	Required	Completed Previously	Completed this Period	Expected Completion
Segment 1	*3*	*1*	*1*	*8/31/2020*
Segment 2	*3*	*2*	*0*	*12/31/2020*
Segment 3	*2*	*1*	*1*	*3/18/2020*
Segment 4	*4*	*4*	*0*	*5/4/2020*
Systemwide	7	7	0	2/22/2019
Totals	***19***	***15***	***2***	

Note: Data as of May 16, 2020

Table 3 – Signals Design Progress

Work Area	Total Locations	65% Design	95% Design	IFC Design	*95% Design**
		Total # Submitted	Total # Submitted	Total # Submitted	*Expected Completion*
Segment 1	*26*	*26*	*10*	*0*	*6/3/2021*
Segment 2	*105*	*90*	*30*	*0*	*12/17/2020*
Segment 3	*68*	*53*	*8*	*0*	*6/15/2021*
Segment 4	*22*	*22*	*22*	*0*	*4/29/2020*
Total	*221*	*191*	*70*	*0*	

Note: Design Submittals Received as of May 2020

** JPB requested schedule includes installation after 95% design*

Contractor Claims: The Electrification contractor has submitted a total of four claims; the most significant claim is associated with its efforts to provide the required warning time at grade crossings. Other claims include denial of a Design Variance Request for alternate feeder and contact wire; percent of payment for CWT under Allowance Item #10; and costs for an alternate designer for Segment 1A. The four (4) claims are described in greater detail below.

The JPB and BBII, the Electrification contractor, continue to meet in a technically facilitated mediation process in an effort to resolve these issues. *The most recent mediation session was held on May 20, 2020.*

- The Electrification contractor has been reporting a delay to its substantial completion date for many months based on its alleged inability to begin work on the grade crossing warning system as planned in its baseline schedule. The delay has been day-for-day. The Electrification contractor submitted a delay claim on behalf of its signals' subcontractor, and shortly thereafter, submitted its Time Impact Analysis (TIA) for the delays associated with the grade crossing warning issue. The transmittal letter for the TIA presented a Change Order Cost Proposal in the amount of $239,550,209 consisting of $71,882,763 in Direct Costs and $167,667,445 in Delay Costs. The time impact presented in the letter is 1,092 calendar days, made up of 224 calendar days associated with Change Order No. 41 (the 5 MPH Solution) and 868 calendar days to perform the added scope or work. [**PMOC Note:** Prior to the development of the dual speed check solution, the contractor had been working on an approach which would have used a series of detectors to provide warning time based on train speeds in 5 mph increments. Change Order No. 41 was issued to the contractor for the direct cost of that work.] The amount of the subcontractor's claim mentioned above is included in the Change Order Cost Proposal. The JPB has denied the

contractor's claim. The JPB is proceeding with a detailed review of the TIA. The TIA process is the first step in determining whether the contractor suffered a delay, who is responsible for the delay, whether there are offsetting delays, and whether the delay is excusable and/or compensable. Once the circumstances are determined, there may be opportunities to mitigate schedule impacts by a variety of techniques.

- The Electrification contractor submitted a Design Variance Request (DVR) in 2017 to substitute alternative products for the specified Autotransformer Feeder (ATF) Wire and Static Wire used in the OCS. The JPB reviewed the request in 2017, but never took the formal action required to approve the request. The JPB subsequently rejected the DVR. The contractor does not agree with the JPB's position and has submitted a claim for resolution.

Construction Activity: The JPB provided the following report on construction activity. Table 4 below presents the status of construction of OCS foundations and erection of OCS poles in the different Segments and Work Areas:

- *Installed on-track and off-track foundations in Segment 3.*
- *Strung OCS feeder and static wires in Segment 3.*
- *Potholed at proposed OCS locations and utility locations in all Segments 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 installation of foundations at those locations.*
- *Relocated signal cables and remove abandoned facilities found in conflict with planned OCS foundations as conflicts were identified.*
- *Continued to install formwork, rebar, and high-voltage cable at TPS-2.*
- *Continued to install ductbank, manholes, drainage, and form and rebar work at TPS-1.*
- *Continued clearing and grubbing at Paralleling Station (PS)-4.*
- *Begin mobilization and site work at PS-5.*
- *Installed signal ductbank, conduits, and cables in Segment 2.*
- *Continued to install signal ductbank, conduits, and cables in Segment 4.*
- *Performed case installation at Control Point (CP) Bird and signal equipment kit installation at CP Coast.*
- *Set signal houses at mileposts 45.21 and 45.57.*
- *Continued drilling of rails for impedance bond connections in Segments 1, 2, 3, and 4 at various control points and crossings.*
- *Continued installation of insulated joints (IJs) in Segment 3.*
- *Install overhead bridge attachments at various locations in Segment 2 and 3.*
- *Worked with BBII through Site Specific Work Plans (SSWP) for upcoming field work.*

The JPB has implemented a revised policy applicable to contractors working in proximity to active tracks. This policy is expected to be beneficial to OCS foundation production. The policy change was implemented on April 1, 2020.

Table 4 – OCS Construction Progress (May 16, 2020)

Segment	Work Area	Foundations			Poles		
		Required[1,2,3]	April 2020	to Date	Required[2]	April 2020	to Date
1	**Tunnels**	32	0	32	32	0	32
	A	309	*0*	*0*	259	0	0
	B	237	*0*	*0*	177	0	0
2	**5**	*244[3]*	*0*	184	208	0	160
	4	314	*0*	240	253	*1*	*187*
	3	174[3]	*0*	63	140	0	36
	2	*247*	0	78	205	0	60
	1	*207*	0	79	154	0	33
3	**2**	*510*	*121*	*382*	460	*21*	*137*
	1	*391*	*7*	*360*	311	*15*	*220*
4	**A**	*241*	*0*	156	180	0	107
	B	*139*	0	87	124	0	70
	CEMOF	*96*	0	0	*88*	0	0
Total		***3,141***	***128***	***1,661***	***2591***	***37***	***1042***

[1]Foundations required do not match poles required as guy foundations are needed in some locations for extra support.

[2]The number of required poles and foundations fluctuate due to design changes.

[3]55 foundations in S2WA5 will be installed by the South San Francisco contractor and 64 foundations in S2WA3 will be installed by the 25th Avenue contractor.

Table 5 – Traction Power Construction Progress

Facility	Sitework			Substation Building			Low / High Voltage Equipment			Transformer			Gantry		
	Last Period	This Period	To Date	Last Period	This Period	To Date	Last Period	This Period	To Date	Last Period	This Period	To Date	Last Period	This Period	To Date
TPS-1	*42%*	*8%*	*50%*	*20%*	*0%*	*20%*	*57%*	*0%*	*57%*	*100%*	*0%*	*100%*	*44%*	*13%*	*57%*
TPS-2	*75%*	*0%*	*75%*	*20%*	*0%*	*20%*	*76%*	*7%*	*83%*	*100%*	*0%*	*100%*	*72%*	*0%*	*72%*
SWS-1	*54%*	*0%*	*54%*	*20%*	*54%*	*74%*	*44%*	*7%*	*51%*	*100%*	*0%*	*100%*	*16%*	*2%*	*18%*
PS-1	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
PS-2	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
PS-3	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
PS-4	*20%*	*0%*	*20%*	*0%*	*0%*	*0%*	*5%*	*0%*	*5%*	*100%*	*0%*	*100%*	*0%*	*6%*	*6%*
PS-5	*0%*	*7%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*5%*	*5%*
PS-6	*47%*	*2%*	*49%*	*20%*	*0%*	*20%*	*28%*	*16%*	*44%*	*100%*	*0%*	*100%*	*18%*	*0%*	*18%*
PS-7	*69%*	*0%*	*69%*	*20%*	*0%*	*20%*	*63%*	*0%*	*63%*	*100%*	*0%*	*100%*	*53%*	*13%*	*66%*

Note: Data as of May 16, 2020

Table 6 – Signal Installation Progress

Signal Locations	Anticipated 95% Design Completion per JPB Requested Schedule*	Installation Percent Complete	Anticipated Installation Complete per JPB Requested Schedule*	Testing Percent Complete	Anticipated Testing Completion per JPB Requested Schedule*
Segment 1	*6/3/2021*	*14%*	*7/6/2021*	*0%*	*7/29/2021*
Segment 2	*12/17/2020*	*19%*	*5/12/2021*	*0%*	*8/28/2021*
Segment 3	*6/15/2021*	*9%*	*10/4/2021*	*0%*	*12/10/2021*
Segment 4	*4/29/2020*	*25%*	*7/7/2020*	*0%*	*1/8/2021*

Note: Data as of May 16, 2020
** JPB requested schedule includes installation after 95% design*

SCADA Contract

- The Factory Acceptance Test (FAT) is expected to begin June 15, 2020; anticipated to be complete by July 7, 2020. *It is uncertain whether this test will be affected by the COVID-19 restrictions.*

Received responses from comments relating to test procedures. Provided the contractor with statements of no objection or comments to all 34 test procedures.

- **PMOC Observations:** *The PMOC is concerned that if the FRA concludes that the 2SC solution for grade crossing warning time uses proven technology, the contractor may release a large number of signal submittals for review by the Electrification Services consultant, which could potentially create a backlog in processing the reviews, leading to further delay of the signals work.*
- Caltrain continues in the Revenue Service Demonstration (RSD) phase with its new Positive Train Control (PTC) system and has demonstrated interoperability with its tenant railroads. Thus far, there have been few impacts to the PCEP as a result of PTC implementation. *The UPRR has recently notified the JPB that an additional six (6) types of locomotives, belonging to other railroads that operate on UPRR territory, must be tested for PTC interoperability. This additional testing is not expected to impact the PCEP.*
- *The JPB reports that it has reconciled the Track Access Delays (TADs) related to foundation work for Quarters 3 and 4 of 2019; delays associated with other activities are still being evaluated.*
- Caltrain Operations has implemented a change to its operating practices which could improve the contractors' track access and reduce track access delays and the resulting costs. *The change was implemented starting April 1, 2020 and the beneficial effects could be experienced beginning June 1, 2020 when on-track foundation installation resumes.*
- **PMOC Recommendation:** The JPB states that it is tracking and segregating the extra costs incurred to relocate foundations or otherwise avoid or relocate

the fiber optic cable installed by the Communications Based Overlay Signal System (CBOSS) - Positive Train Control (PTC) contractor. The PMOC notes that this information is being captured in the Change Order logs being maintained by the JPB and reviewed by the Change Management Board (CMB). The JPB should produce a report documenting the sources of funds used for the original installation of the CBOSS-PTC cabling, and documenting the costs incurred to date by the PCEP as described above. The report should also document any specifications or other technical direction previously given to the CBOSS-PTC contractor that required that the contractor avoid the areas and locations where the interferences have, or in the future occur. The JPB should consider initiating a back charge or other action to recover its extra costs as additional information is gathered. The PMOC notes that the FTA is unlikely to participate in costs associated with remediating the CBOSS-PTC fiber optic conflicts.

Real Estate Acquisition

Background Information

The PCEP is acquiring real estate for three (3) primary purposes: (1) for placement of Overhead Contact System (OCS) poles; (2) for the two (2) primary Traction Power Substations (TPSS); and (3) to provide electrical clearance and safety zones for the OCS wires. The corridor has been sub-divided into four (4) segments numbered from north to south to manage the electrification and other related work more effectively (See Appendix C).

The corridor spans three counties and the JPB must collaborate with Santa Clara County on the south, its home county of San Mateo, and the City and County of San Francisco on the north to exercise eminent domain power as necessary during the ROW acquisition process. The JPB executed an agreement with the Santa Clara Valley Transportation Authority (VTA) to exercise eminent domain on behalf of the JPB for property acquired in Santa Clara County, which includes all of Segment 4 and some portions of Segment 3. The JPB also executed an agreement with the San Mateo County Transit District (SamTrans) to act as the condemning agency for all property in San Mateo County. San Mateo County includes all properties in Segment 2 and some properties in Segments 1 and 3. The JPB was unsuccessful in reaching an agreement with the City Supervisor for the City of San Francisco related to the City's exercise of eminent domain powers on behalf of the JPB for properties located within the City and County of San Francisco (CCSF). The CCSF includes only properties in Segment 1 that will be needed later in the construction schedule.

Real Estate Activities

Initial Electrification construction took place in Segments 4 and 2 and has since been expanded to include all segments. Segment 4 includes electrification of a test track for testing and acceptance of the EMUs. Real estate acquisition is being coordinated with Electrification construction activities; however, the discovery of a variety of unexpected conditions at a large number of the planned OCS pole locations has resulted in the movement of numerous foundations, which in some cases requires acquisition of new rights-of-way.

The major challenges facing real estate are design changes that are impacting already acquired properties and design changes requiring new or re-defined acquisitions. Potholing for OCS

foundations, and follow-on construction work located outside of JPB owned right-of-way (ROW), require that the JPB acquire the property or an appropriate property right.

The JPB has revised its format for reporting real estate activities and is no longer providing tabular data in its monthly reports. The JPB continues to state that the contractor has not claimed any delays as a result of late delivery of required real estate. The real estate team has recently completed, or is conducting the following activities:

- *Reached settlement agreement with Willowbend Apartment's (Segment 3) legal counsel.*
- *Staff continues to review potential new pole locations and provide feedback to the design team.*
- *Staff continues to work with PCEP's internal signal team and BBII signal team to determine potential Real Estate interests.*
- *Staff completed review of all potential electrical safety zones (ESZs) in Segments 3 and 4 and started review of Segment 2. This process has identified a handful of potential ESZ acquisitions to discuss with the contractor.*
- *Finalized ESZ requirements for KB Homes (Segment 4) to confirm acquisition area to make First Written Offer to KB Homes and Google. Discussed pre-acquisition possession terms with Google.*
- *Submitted Diridon Hospitality (Segment 4) Resolution of Necessity (RON) package to VTA for its review.*
- *Completed appraisal of PG&E property (Segment 4) and engaged in discussions for early acquisition.*
- *Finalized appraisal map for Britannia Gateway (Segment 2) and achieved PG&E approval.*
- Continued to review parcel acquisition options for Marchese parcel with Santa Clara Valley Water District (SCVWD). (Segment 3)

➢ **PMOC Observation:** *The continued appearance of new or redefined parcels as a result of shifts in the placement of OCS poles, and more recently the location of signals equipment, is problematic if possession is needed before foundations can be constructed.* The JPB now holds regular meetings with BBII's designers in an attempt to avoid or minimize such situations. Parcel availability may now be impacting the contractor's ability to place foundation.

Third-party Agreements and Coordination

A significant number of third-party agreements were required to support the PCEP. These agreements are grouped into the following general categories, with status comments as appropriate to each:

Jurisdictional Agreements for Construction and Maintenance

The JPB has executed all agreements except the one with the Town of Atherton (Segment 2), which is no longer being pursued. The Town of Atherton must issue traffic control permits to the contractor, and the Town staff has been cooperative to date.

Jurisdictional Agreements for Exercise of Eminent Domain Powers

The JPB has executed agreements with the Santa Clara Valley Transportation Authority (VTA) and the San Mateo County Transportation District (SamTrans) under which the VTA and SamTrans will exercise eminent domain authority on behalf of the JPB, when such action is required, to acquire the real property rights located in the respective counties for the PCEP. The City and County of San Francisco (CCSF) declined to approve an agreement for use of its eminent domain powers on behalf of the PCEP.

Utility Relocation Agreements

The JPB's right to relocate utilities that exist within its PCEP corridor exists by virtue of the property rights it acquired when it purchased the corridor from the Southern Pacific Transportation Company (SP) in November 1991. The JPB has the right to cause the relocation of both overhead and underground utilities to accommodate its railroad activities upon thirty (30) days' notice to the utilities at the utilities expense. The JPB reports the following activities related to third-party utility work:

- *Palo Alto Power has hired a contractor to relocate its facilities.*
- Worked with all utilities on review of overhead utility line relocations based on the current design.
- Coordinated with PG&E and Silicon Valley Power on relocation and de-energization of parallel power facilities in Segment 3 to enable foundation construction and future pole installation.
- Continued to coordinate relocation by communication cable owners such as AT&T and Comcast. *AT&T's subcontractors are reported to have concerns about safe working conditions.*
- JPB continues to assist Comcast in obtaining permits for San Jose, Palo Alto, and Redwood City.
    - **PMOC Observation:** The JPB continues to coordinate closely with the various utility companies, especially on near term conflicts with construction activities.

The JPB has negotiated specialized agreements with the following entities:

Pacific Gas & Electric (PG&E)

PG&E will supply power from two (2) existing substations to the new PCEP Traction Power System. Both substations must be modified to provide the required power. The JPB has executed a Master Agreement with PG&E as well as Supplements 1 through 5 to that agreement. Supplement 4, which includes the cost of constructing the substation modifications, was fully executed on October 18, 2018. The parties disagreed on the allocation of costs for the work, and following discussions between the parties, PG&E filed an application with the CPUC for a cost allocation plan. *The CPUC's Administrative Law Judge announced a decision on May 7, 2020 that adopted a modified order affirming the cost allocation principles agreed to by the JPB and PG&E.*

Construction of the temporary power feed at PG&E's "FMC" substation in San Jose is complete and awaiting construction of the interconnection to TPSS #2. PG&E continues with the permanent modifications to both its FMC and East Grand Avenue Substations. Design of

the interconnections between PG&E's FMC substation and TPSS #2 and PG&E's East Grand substation and TPSS #1 by the PCEP's Electrification contractor is nearing completion by TRC, a PG&E approved design consultant.

The JPB has negotiated a modification of Supplement 2 with PG&E under which PG&E will perform construction of the two (2) interconnections. TRC will act as the Construction Manager for PG&E and the construction work will be procured by competitive bid. *The interconnection to TPSS #2 is now expected to be complete in February 2021 according to PG&E's schedule. This revised schedule may delay the electrification of Segment 4 for EMU testing.* The date for PG&E's supply of permanent power to the PCEP is currently shown as September 9, 2021; this activity is on the project's critical path.

California Public Utilities Commission (CPUC)

The CPUC is the FTA's Certified State Safety Oversight Agency (SSOA) for the State of California, and also has responsibility for grade crossing safety in the state. The PCEP's proposed solution to provide the required warning time at grade crossings must be approved by the CPUC before the modifications can be installed and the crossings returned to service. The JPB states that there is agreement on the use of two speed checks (2SC) to provide the required warning time at grade crossings between the PCEP team, Caltrain's Rail Operations, the Electrification contractor, the UPRR and the FRA. As noted elsewhere in this report, the JPB and BBII continue to meet with the FRA to progress the 2SC solution. *The next meeting with the FRA is scheduled for June 19, 2020.* The FRA has stated that it does not need to review the plans for each crossing but will defer to the CPUC's judgement. The JPB continues to file General Order (GO) 88B forms for each modified crossing for approval by the CPUC; these plans are developed in conjunction with the local jurisdictions. The CPUC has thus far approved six (6) crossings. The FRA does not approve the crossings, but has both regulatory and enforcement authority if the crossings do not perform as required by its regulations.

Union Pacific Railroad (UPRR)

The JPB is engaged in on-going confidential negotiations with the UPRR regarding a variety of issues. The UPRR is a tenant and operates service on tracks owned by Caltrain in the PCEP corridor; Caltrain operates service on tracks owned by the UPRR south of the PCEP corridor. The UPRR is considering selling its rights to operate freight service in the Caltrain corridor to a short line operator. This arrangement, if completed, could simplify bringing the freight service operator into conformance with the JPB's PTC system. The JPB stated that it is negotiating with the UPRR to acquire the short line rights for the tracks north of Santa Clara.

The UPRR imposed an increased lateral clearance requirement of 15 ft. between its MT-1 (northbound) track in Segment 4 of the corridor and some of the planned OCS pole locations. The typical clearance for railroad tracks is 8 ft. 6 in. The PCEP team reports that it continues to have difficulty in resolving the final locations of a few remaining poles with UPRR and is working with the railroad to resolve the issues.

The JPB received a letter from the UPRR, dated January 16, 2019, in which the railroad stated that it does not oppose the JPB's plan to provide the required grade crossing warning time, as long as the JPB complies with the CPUC and other regulatory requirements. This letter cleared the way to move forward with final regulatory approvals.

California High Speed Rail Authority (CHSRA)

The California High-Speed Rail Authority (CHSRA) proposes to operate in blended service with Caltrain in the PCEP corridor in the future. The CHSRA's 2018 Business Plan calls for initial construction of the Silicon Valley to Central Valley line from Diridon Station in San Jose to Bakersfield. The plan would also expand electrification of the Caltrain corridor south of San José to Gilroy. The CHSRA released the staff-recommended preferred alternative to the public in July 2019 for comment. The CHSRA Board will decide on the preferred alternative that will be evaluated in the Draft Environmental Impact Report/Environmental Impact Study (EIR/EIS). The CHSRA continues to be in discussions with Caltrain, Caltrans, the City of San José, Santa Clara County, Union Pacific Railroad, and other partners about right-of-way and operational options, including how passenger and diesel freight trains could share the corridor. This sharing may potentially allow enhanced electrified service all the way to Gilroy, eliminating the need to use passenger diesel trains in the corridor and potentially allow the line to be used for express high-speed rail operations between San Francisco and Gilroy.

Federal Railroad Administration (FRA)

The FRA has authority over the JPB's rail operations. As noted above and elsewhere in this report, the JPB is coordinating with the FRA on several issues, including technical issues related to the EMU vehicles, resolution of the CWT issue, and the agency's PTC program. Issues related to the EMU's are discussed in Section I of this report. The JPB continues to hold monthly conference calls with the FRA to discuss EMU issues and another call to discuss PTC progress.

B. Project Management Plan (PMP) and Sub-Plans

The PMOC is continuing its review of the JPB's updated PMP and several sub-plans and procedures. The PMOC is providing review comments on the updated documents in the form of tracked changes as it completes each review.

The JPB's Rail Activation Committee (RAC) is continuing to work on its Rail Activation Plan (RAP). The RAP must be in place before testing of the new EMU's can begin. The RAC is continuing to develop various sections of the RAP as well as the critical path schedule for rail activation activities. The PMOC has reviewed the schedule and provided comments to the RAC. *Rail Operations has begun development of several sections of the plan that deal with staffing, training, and other internal issues; these sections will be incorporated into the RAP.*

C. Project Management Capacity and Capability

The PCEP's office staff is predominantly working from home in response to public health directives issued in connection with the COVID-19 pandemic and policy directives issued by the JPB. Internal and external meetings continue using various web-based collaboration platforms such as Zoom, WebEx, Go to Meeting, and Microsoft Teams. Field personnel continue to perform their assigned duties in keeping with applicable safety plans and public health directives. The PCEP's leadership reports that productivity has been largely unaffected by the COVID-19 restrictions.

The JPB's Chief Operating Officer – Rail has retained an independent consultant to assist with the assembly and development of the Rail Activation Plan and other materials related to starting-up the electrified system from the Rail Operations side. The consultant has been

attending meetings of the Rail Activation and Systems Integration Committees as part of the assignment. The PMOC is uncertain whether Rail Operations will continue its recruitment for a Director, Rail Program Integration, after retaining the independent consultant.

The most recent PCEP organization chart is attached as Appendix D.

- **PMOC Recommendations:** *The PMOC continues to encourage the PCEP's leadership and Rail Activation and Systems Integration teams to move forward with determining who will lead the Rail Activation process and the relationship between Rail Activation and the other supporting activities.*
- The PMOC recommends that the JPB continue to monitor its backlog of RFIs, Change Notices, submittals, and other contractual documentation and increase office and field staff as appropriate to maintain the appropriate records and turn documents around as required by contract.

D. Project Cost

Table 7 below presents the PCEP cost estimate, dated November 16, 2016, as the estimate was revised and incorporated into the FFGA. The JPB is re-forecasting the estimated cost at completion (EAC) monthly, and the current information has been added to Table 7 for ease of comparison. The JPB had expected to re-baseline its Capital Cost Estimate in mid-2019 after it had assessed the cost and schedule impacts to the Electrification contract, had issued the CEMOF Modification contract, the last major construction contract, and completed its Monte Carlo risk assessment update to inform the contingency requirements. The CEMOF contract has been awarded and the Monte Carlo simulation has been completed and been reviewed by the PMOC. *The PMOC's review of the Monte Carlo model report revealed that the schedule information did not include recent information related to the completion of the signals work, and in particular, the impact of the final resolution of the grade crossing warning system. The upcoming April 1 Risk Refresh Workshop should address this concern.* In addition, the JPB states that it recently completed its assessment of the costs related to the various delays asserted by the Electrification contractor. *The PMOC expects that this information will be included in the risk modeling effort.*

Table 7 – Project Cost

STANDARD COST CATEGORY	Base Year Dollars w/o Contingency	Base Year Dollars Allocated Contingency	Base Year Dollars TOTAL	YOE Dollars TOTAL	*4-30-2020 Estimate at Completion Dollars*
10 GUIDEWAY & TRACK ELEMENTS (51 route miles)	9,930,050	3,443,415	13,373,465	14,256,739	*27,782,105*
20 STATIONS, STOPS, TERMINALS, INTERMODAL (NONE)	0	0	0	0	*0*
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	1,727,666	396,732	2,124,398	2,265,200	*7,894,705*
40 SITEWORK & SPECIAL CONDITIONS	197,354,697	42,465,878	239,820,575	255,072,402	*273,951,140*
50 SYSTEMS	429,641,995	46,687,882	476,329,877	504,445,419	*537,980,812*
60 ROW, LAND, EXISTING IMPROVEMENTS	26,526,146	8,447,380	34,973,526	35,675,084	*35,675,084*
70 VEHICLES (96)	564,044,890	8,364,433	572,409,323	625,544,147	*623,226,291*
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	279,886,974	29,338,981	309,225,955	323,793,010	*354,081,632*
90 UNALLOCATED CONTINGENCY			150,353,131	162,620,295	*60,180,527*
100 FINANCE CHARGES			6,600,802	6,998,638	*9,898,638*
Total Project Cost (10 - 100)			**1,805,211,052**	**1,930,670,934**	**1,930,670,934**

Note: Totals may not add due to rounding.

Project Expenditures

The status of the PCEP budget and expenditures through April 30, 2020, in SCC format, is shown on Table 8.

PMOC Note: The JPB publicly reports expenditures against a total project budget of $1,980,252,533. This higher amount includes expenditures prior to the project's entry into the Project Development (PD) phase, which is excluded from the FTA's project budget. Costs incurred prior to the project's entry into the PD phase were removed from the estimate at the FTA's request during its review of the FFGA materials.

Table 8 – Project Expenditures in SCC Format (4-30-2020)

Description of Work	FFGA Baseline Budget (A)	Approved Budget (B)	Cost This Month (C)	Cost To Date (D)	Estimate To Complete (E)	Estimate At Completion (F) = (D) + (E)
10 - GUIDEWAY & TRACK ELEMENTS	**$14,256,735**	**$27,308,610**	**$17,860**	**$24,937,345**	**$2,844,760**	**$27,782,105**
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)	$2,500,000	$2,500,000	$17,860	$129,453	$2,370,547	$2,500,000
10.07 Guideway: Underground tunnel	$8,110,649	$24,808,610	($0)	$24,807,892	$474,213	$25,282,105
10.07 Allocated Contingency	$3,646,090	$0	$0	$0	$0	$0
30 - SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	**$2,265,200**	**$6,654,353**	**$536,470**	**$2,999,433**	**$4,895,272**	**$7,894,705**
30.03 Heavy Maintenance Facility	$1,344,000	$6,654,353	$536,470	$2,999,433	$4,895,272	$7,894,705
30.03 Allocated Contingency	$421,200	$0	$0	$0	$0	$0
30.05 Yard and Yard Track	$500,000	$0	$0	$0	$0	$0
40 - SITEWORK & SPECIAL CONDITIONS	**$255,072,402**	**$270,728,484**	**$4,848,458**	**$172,099,895**	**$101,851,246**	**$273,951,140**
40.01 Demolition, Clearing, Earthwork	$3,077,685	$3,077,685	$1,254,000	$5,330,000	($2,252,315)	$3,077,685
40.02 Site Utilities, Utility Relocation	$62,192,517	$93,328,599	$817,527	$81,928,728	$12,399,871	$94,328,599
40.02 Allocated Contingency	$25,862,000	($0)	$0	$0	($0)	($0)
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	$2,200,000	$4,923,924	$1,628,052	$6,378,052	($1,454,128)	$4,923,924
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks	$32,579,208	$32,954,208	$38,250	$1,943,370	$31,010,838	$32,954,208
40.05 Site structures including retaining walls, sound walls	$568,188	$568,188	$0	$0	$568,188	$568,188
40.06 Pedestrian / bike access and accommodation, landscaping	$804,933	$764,933	$0	$0	$764,933	$764,933
40.07 Automobile, bus, van accessways including roads, parking lots	$284,094	$284,094	$0	$0	$284,094	$284,094
40.08 Temporary Facilities and other indirect costs during construction	$107,343,777	$114,216,852	$1,110,629	$76,519,744	$41,090,812	$117,610,556
40.08 Allocated Contingency	$20,160,000	$20,610,000	$0	$0	$19,438,953	$19,438,953
50 - SYSTEMS	**$504,445,419**	**$522,921,080**	**$3,820,001**	**$164,225,721**	**$373,755,092**	**$537,980,812**
50.01 Train control and signals	$97,589,149	$100,749,268	$3,638,312	$31,594,586	$70,046,220	$101,640,805
50.01 Allocated Contingency	$1,651,000	$0	$0	$0	$0	$0
50.02 Traffic signals and crossing protection	$23,879,905	$23,879,905	$0	$0	$23,879,905	$23,879,905
50.02 Allocated Contingency	$1,140,000	$1,140,000	$0	$0	$1,140,000	$1,140,000
50.03 Traction power supply: substations	$69,120,009	$97,744,787	$1,825,778	$34,627,756	$63,354,326	$97,982,082
50.03 Allocated Contingency	$31,755,013	$2,990,895	$0	$0	$2,763,958	$2,763,958
50.04 Traction power distribution: catenary and third rail	$253,683,045	$276,175,519	($1,644,090)	$97,945,389	$204,900,086	$302,845,476
50.04 Allocated Contingency	$18,064,000	$12,677,408	$0	$0	$165,288	$165,288
50.05 Communications	$5,455,000	$5,455,000	$0	$57,989	$5,397,011	$5,455,000
50.07 Central Control	$2,090,298	$2,090,298	$0	$0	$2,090,298	$2,090,298
50.07 Allocated Contingency	$18,000	$18,000	$0	$0	$18,000	$18,000
60 - ROW, LAND, EXISTING IMPROVEMENTS	**$35,675,084**	**$35,675,084**	**$48,139**	**$19,000,340**	**$16,674,745**	**$35,675,084**
60.01 Purchase or lease of real estate	$25,927,074	$25,927,074	$48,139	$18,871,765	$7,055,309	$25,927,074
60.01 Allocated Contingency	$8,748,010	$8,748,010	$0	$0	$8,748,010	$8,748,010
60.02 Relocation of existing households and businesses	$1,000,000	$1,000,000	$0	$128,574	$871,426	$1,000,000
70 - VEHICLES (96)	**$625,544,147**	**$624,682,944**	**$7,972,212**	**$202,926,356**	**$420,299,935**	**$623,226,291**
70.03 Commuter Rail	$589,167,291	$591,396,094	$7,972,212	$202,388,076	$391,584,698	$593,972,774
70.03 Allocated Contingency	$9,472,924	$6,455,098	$0	$0	$2,421,765	$2,421,765
70.06 Non-revenue vehicles	$8,140,000	$8,067,821	$0	$538,280	$7,529,541	$8,067,821
70.07 Spare parts	$18,763,931	$18,763,931	$0	$0	$18,763,931	$18,763,931
80 - PROFESSIONAL SERVICES (applies to Cats. 10-50)	**$323,793,010**	**$333,280,065**	**$1,944,352**	**$298,061,837**	**$56,019,794**	**$354,081,632**
80.01 Project Development	$130,350	$130,350	$0	$280,180	($149,830)	$130,350
80.02 Engineering (not applicable to Small Starts)	$180,227,311	$188,028,865	$225,138	$195,668,453	($3,572,198)	$192,096,255
80.02 Allocated Contingency	$1,866,000	($74,955)	$0	$0	$21,942	$21,942
80.03 Project Management for Design and Construction	$72,029,265	$74,932,188	$1,070,846	$75,357,909	$22,866,642	$98,224,551
80.03 Allocated Contingency	$9,388,080	$8,000,396	$0	$0	($0)	($0)
80.04 Construction Administration & Management	$23,677,949	$27,056,839	$644,402	$17,029,245	$21,026,275	$38,055,520
80.04 Allocated Contingency	$19,537,000	$16,158,109	$0	$0	$5,159,428	$5,159,428
80.05 Professional Liability and other Non-Construction Insurance	$3,500,000	$4,581,851	$0	$4,581,851	$0	$4,581,851
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.	$7,167,275	$8,651,684	$3,966	$5,104,341	$4,892,656	$9,996,996
80.06 Allocated Contingency	$556,000	$0	$0	$0	$0	$0
80.07 Surveys, Testing, Investigation, Inspection	$3,287,824	$3,388,781	$0	$39,858	$3,348,923	$3,388,781
80.08 Start up	$1,797,957	$1,797,957	$0	$0	$1,797,957	$1,797,957
80.08 Allocated Contingency	$628,000	$628,000	$0	$0	$628,000	$628,000
Subtotal (10 - 80)	**$1,761,052,001**	**$1,821,250,620**	**$19,187,492**	**$884,250,925**	**$976,340,844**	**$1,860,591,769**
90 - UNALLOCATED CONTINGENCY	**$162,620,295**	**$99,521,675**	**$0**	**$0**	**$60,180,527**	**$60,180,527**
Subtotal (10 - 90)	**$1,923,672,296**	**$1,920,772,296**	**$19,187,492**	**$884,250,925**	**$1,036,521,371**	**$1,920,772,296**
100 - FINANCE CHARGES	**$6,998,638**	**$9,898,638**	**$17,224**	**$6,242,295**	**$3,656,343**	**$9,898,638**
Total Project Cost (10 - 100)	**$1,930,670,934**	**$1,930,670,934**	**$19,204,717**	**$890,493,220**	**$1,040,177,714**	**$1,930,670,934**

Project Funding

The PCEP is relying on several sources of funding to complete the project. Table 9 below summarizes the JPB's funding plan, as updated through June 23, 2017. The updated funding plan shows total funding of $1,930,670,934, including $647 million in Section 5309 funds. The plan also includes federal funding from the Section 5307 Urbanized Area Formula program of $287,150,000.

The JPB has in-place an interim financing agreement for up to $150 million to provide additional cash flow flexibility to address differences in the timing of contractor invoices and the availability of drawdowns from funding sources.

The State of California awarded the JPB a $164,522,000 grant in 2018 under its Transportation and Intercity Rail Capital Program (TIRCP). The grant will fund the purchase of additional

EMUs using options included in the base contract with Stadler. The grant also includes targeted funding for 8-car platforms, improves wayside bicycle facilities (bike sharing and bike parking), and installs a broadband communications system that expands onboard Wi-Fi and enhances reliability by creating the capability to conduct remote diagnostics and optimize ongoing operations and maintenance.

Table 9 – Project Funding Summary

Funding Source	Planned/Budgeted*	Committed*	Total ($x1000)
Local	$0	$996,521	$996,521
Federal	0	$934,150	$934,150
Total	**$574,043**	**$1,356,628**	**$1,930,671**

*Definitions from Guidelines and Standards for Assessing Local Financial Commitment, FTA, June 2007

E. Project Schedule

The FFGA was executed on May 23, 2017.

The JPB completed a re-baselining of its Master Project Schedule (MPS) in December 2017; the current schedule reflects the execution of the FFGA, the issuance of the final NTPs to the EMU and Electrification contractors, and the impacts to the overall project resulting from these delays.

The JPB updates its MPS schedule monthly. The JPB had planned to re-baseline its current MPS earlier in 2019 to account for a number of significant changes including the contract award dates for the tunnel and CEMOF contracts; differing site conditions impacts on OCS construction; progress on the PG&E substations and interties; and implications of the CWT issue. The re-baselining was not accomplished as planned because the PCEP team did not receive an acceptable TIA (TIA 2) from the contractor for the delays associated with CWT. The JPB initially rejected TIA 2 as submitted by the contractor; however, it has been reviewing the TIA as well as the contractor's recent schedules to better understand the contractor's position.

The JPB provided additional materials to the PMOC on January 10, 2020 and made a presentation on its recent scheduling activities at QPRM No. 12, which satisfied Action Item 10.03 and the item has been closed.

The PMOC routinely communicates with the PCEP scheduling team as it continues the development its shadow schedule. The shadow schedule is being developed in the absence of an acceptable and approvable schedule update from the Electrification contractor. *The Electrification contractor's latest three schedule updates for December 2019 and January and February 2020 have all been received significantly late with respect to the contract requirements; the February 2020 schedule was received on April 22, 2020. The February 2020 schedule, when considered with the December 2019 and January 2020 schedules, provides sufficient detail on the signals design, construction, and testing activities for the PCEP scheduling team to complete the construction of its shadow schedule.*

The PMOC discussed scheduling progress with the PCEP scheduler on March 17, 2020 in advance of the April 1 Risk Refresh Workshop, and again during its virtual meeting on May 19, 2020. The PCEP team continues to reject the Electrification contractor's schedule submittals.

Schedule variances mentioned in the JPB's February, March, and April 2020 internal schedule updates include:

Electrification

1. *January and February progress schedules were not submitted on time by Balfour Beatty; the status of the January progress schedule remains "rejected." There is growing concern that BBII is unable to get caught up on schedule updates.*
2. *OCS foundation installation in January and February was zero, causing the overall completion of the OCS system to fall further behind schedule.*
3. *Design of PS1, PS-3, and PS-5 and construction at TPS-2 continues to progress at a slow rate. Forecasted substantial completion date for BBII may be in jeopardy due to delays in overall traction power facility (TPF) progress.*
4. *Signals design progress continues to lag behind baseline productivity levels; additionally, BBII has still not incorporated all Two Speed Check (2SC) impacts into their progress schedule. (PMOC Note: This information was provided in the February 2020 schedule update.)*

Tunnel

5. *A February progress schedule has not been submitted by ProVen; the status of the progress schedule remains "amend and resubmit."*

Vehicles -

6. *The March progress schedule/revised baseline schedule was submitted with significant issues; the progress schedule was not incorporated into MPS update.*

Table 10 below, which is based on the MPS C18.14 with a Data Date of April 1, 2020, shows the current projected dates for completion of various significant project activities.

Table 10 – Schedule Status

Milestone	Baseline	Grantee Forecast	PMOC Forecast
New Starts/Core Capacity Grant Agreement:	Not in MPS	5/23/2017 (A)	5/23/2017 (A)
Design/Build Notice to Proceed:	12/8/15 (P)	6/19/2017 (A)	6/19/17 (A)
Arrival of first EMU in Pueblo, CO	N/A	9/1/20 (P)	9/1/20 (P)
Arrival of First EMU at JPB	7/29/19	2-26-21 (P)	2-26-21 (P)
Final Engineering (FE) Completion:	04/3/18 (P)	3/31/21 (P)	3/31/21 (P)
Systems Integration Testing Completed:	01/29/19 (P)	1/31/22 (P)	1/31/22 (P)
Segment 4 Complete to Begin EMU Testing:	11/21/19	*3/25/21 (P)*	3/30/21 (P)
Completion of Interconnection from PG&E to TPSS 2	N/A	*12/10/20 (P)*	*2/20/21(P)*
Design/Build Substantial Completion:	02/16/19 (P)	1/31/22 (P)	1/31/22 (P)
Conditional Acceptance of First EMU Trainset:		8/19/21(P)	8/19/21 (P)
PG&E Provides Permanent Power:	9/9/21	9/9/21 (P)	9/9/21 (P)
Pre-Revenue Operation Completed:	05/7/20 (P)	2/1/22 (P)	2/1/22 (P)
Begin Phased Revenue Service:		2/1/22 (P)	2/1/22 (P)
Revenue Service Date (without Risk Contingency):	12/9/21 (P)	5/6/22 (P)	5/6/22 (P)
FFGA Final Completion Date:	05/7/20 (P)	8/22/2022 (P)	8/22/2022 (P)
(P) Planned Date (A) Actual Date			

Appendix E presents the PCEP's summary schedule C18.12 as contained in its February 2020 Schedule Update.

The following comments are based on a review of the various schedule materials available to the PMOC:

- *The Electrification contractor's most recent Schedule Update Narrative for February 2020, received April 22, 2020, shows a substantial completion date of June 29, 2024, compared to the contractual date of August 10, 2020, or a total delay of 1,420 calendar days to substantial completion. As noted above, and elsewhere, the contractor's February schedule submittal now contains the signal details necessary for the PCEP to complete its shadow schedule.*

- *The JPB has responded to the February schedule submittal with a Statement of Objection (SOO), rejecting the schedule.* The JPB's position is that the added activities reflect base contract work which the Contractor is required to complete by the contractual completion date. The JPB continues to reject the Electrification contractor's schedule updates because they do not reflect the actual work sequence and durations of the activities on the critical path. *The JPB's current MPS update, with a data date of April 1, 2020, does not take into account the signals information provided in the contractor's February 2020 update, but does reflects its assessment of realistic schedule activity durations and logic, and continues to show a substantial completion date of January 31, 2022.*

- The continued schedule slippage is due to the lack of resolution of the Consistent Warning Time (CWT) issue, which has caused a day-for-day delay based on the contractor's current schedule logic. The JPB has directed the Electrification contractor to proceed with the design of the grade crossing warning system using the 2SC approach to achieve acceptable warning time; however, the 2SC design work is moving forward very slowly. The JPB initially rejected the contractor's TIA2 submittal but is currently analyzing it using its own interpretations. The contractor has not submitted a TIA to account for the known delays to the OCS schedule due to Differing Site Conditions (DSCs), although the JPB has requested this information. *The JPB's review of TIA 2 has been in progress for several months and has not yet produced a result. The analysis of the TIA is a significant effort, but necessary to gain a clear understanding of the current status of the project's schedule.* As noted elsewhere, the JPB and its contractor are engaged in a technically facilitated mediation process in an attempt to resolve this and other issues. *The JPB reports that the mediation has not yet focused on the schedule component of this dispute.*

- The PCEP's current schedule includes revised logic related to the start of passenger service using the new EMUs; this approach is referred to as Phased Revenue Service. The PMOC understands that the JPB intends to conduct a short period of pre-revenue operations following the completion of integrated testing, and then transition to revenue service using the EMUs that have been accepted. This concept has not been described in detail but is expected to be included in the Rail Activation Plan currently being prepared. The JPB has determined that the Core Capacity requirements can be satisfied when fourteen (14) seven-car EMU trainsets are in revenue service. The Final Completion Date in the FFGA is August 22, 2022.

- **PMOC Observations:**
  - Uncertainty regarding the completion schedule for the PCEP is the most pervasive issue affecting the project.
  - The inability or unwillingness of the Electrification contractor to produce a realistic schedule for completion of the remaining work, which the JPB can accept contractually, is a significant factor preventing the parties from moving forward toward a common goal.
  - Despite the JPB's initiation of small groups focused on the resolution of specific issues, e.g., potholing and foundations, new real estate parcels, and signals design, actual progress remains slow and new challenges continue to appear and/or old issues remain unresolved. *The resumption of foundation installation is encouraging, and the JPB is hopeful that the contractor will take advantage of Caltrain's reduced operating schedule, due to the COVID-19 pandemic, to make significant progress in the corridor.*
  - The contractual relationship between the JPB and its Electrification contractor, as viewed by the PMOC in observing meetings, reviewing correspondence, meeting minutes, and the exchange of technical documents, is seldom collaborative and occasionally combative. Both parties must be spending an enormous amount of resources to sustain this condition. This is money and energy that could be better spent working together to complete the project in a timely fashion.

F. Quality Assurance / Quality Control (QA/QC)

The following specific quality management activities were reported for the PCEP:

- *Finalized the audit of BBII Field Activities Rail Welding on second shift. The Audit report was issued. The following 115 welds were good.*
- *Conducted three design package audits of PGH Wong with no Findings.*
- *PCEP 2019 Audit of Salt Lake City (SLC): Response in Stadler's court.*
- *EMU sub-supplier audit results are with Stadler for resolution.*
- *Stadler has begun to reschedule the balance of planned USA-based audits that have been postponed due to COVID-19 travel restrictions*
- *PCEP is adding an onsite test witness to its team at Stadler's plant in Salt Lake City, Utah.*

- **PMOC Observations and Recommendations:** The PMOC has initiated a discussion on the role of the PCEP's quality management team as related to the Systems Integration, Rail Activation, Safety and Security Certification, and Testing and Start-up activities that will be required as the project develops its overall plan for these current and late stage activities.

G. Safety and Security

The JPB contracts for safety and security consulting services to support the PCEP. The PCEP safety team also supports the JPB, which does not currently have an agency Safety Director.

The JPB has set a target date of June 15, 2020 to begin the transition back to the office. PCEP team members will need to continue with precautionary measures that comply with the County Health Ordinance; the Coronavirus Disease 2019 (COVID-19) back-to-work plan will include the need to wear a mask in the office on a regular basis.

The PCEP safety team continues to monitor the safety performance of the various contractors and subcontractors working on the project, including their compliance with Site Specific Work Plans.

BBII, the Electrification contractor, recently reported the following incidents:

- *5/12/2020 BBII employee struck 3 parked vehicles with a water truck.*
- *5/14/2020 BBII bucket truck collided with a rail cart which was hauling an OCS pole causing derailment and damage to front end of Bucket truck.*
- *5/21/2020 During the testing of signal circuits, a BBII subcontractor blew a fuse and it took 43 minutes to resolve. The incident was not reported properly, and the investigation process was not initiated with post-incident drug testing. PCEP's safety team is investigating.*

BBII and its subcontractors have had a number of incidents recently that will require renewed attention to its safety program. BBII is in the process of completing its annual safety review; there were six (6) reportable injuries in 2019. BBII is in the process of updating its Safety and Security Certification Plan (SSCP), which will be incorporated into the project's SSMP. The contractor is also updating the Threat and Vulnerability Assessment (TVA).

The PCEP's safety management team continues to hold regular monthly meetings of the Fire and Life Safety Committee (FLSC) and the Safety and Security Certification Review Committee. The Fire and Life Safety Committee is setting up training for local first responders. The Electrification contractor's safety director is developing a program and materials. Electrification training will start with classroom training followed by live-wire training after the EMU's arrive.

Readiness for Electrified Rail Operations

The PCEP has established a Rail Activation Committee (RAC). The RAC is currently chaired by Sal Gilardi, one of the two principals of the safety contractor, until a permanent chair is named. The RAC includes representatives from the PCEP's technical consultants and the JPB's Rail Operations group. *The JPB is considering how to best organize and coordinate the rail activation, systems integration and testing, and commissioning meetings to avoid overlap and duplication and make the resulting meetings more productive. The most recent meeting of the RAC took place on May 21, 2020. Several sections of the plan are still being developed including a training plan for maintenance personnel and a maintenance schedule for the EMUs that allocates space and timing of visits at the CEMOF. The RAC believes that the current Rail Activation Schedule dated January 2020 requires an update. The RAC held a Rail Activation Risk Register; a total of 34 risks were discussed. The next meeting of the RAC is scheduled for June 18, 2020.*

- **PMOC Observations:** *The PMOC was pleased to learn that the JPB accepted its recommendation and conducted a workshop to identify the potential risks associated with the rail activation process, including testing and commissioning, systems integration, safety and security certification, rail operator and maintainer hiring and training, and revenue service demonstration.*
- The PMOC is concerned that the dispersion of construction activity throughout much of the 51-mile rail corridor, including several off-track locations, and the additional challenge of multi-shift activity, may exceed the current capacity of the safety team. The PMOC was pleased to learn that the safety team recently increased its staff by two (2).
- The PMOC remains concerned that a formal clearance signoff process is not in place prior to returning track to service on the various contracts within the PCEP, e.g., following the erection of catenary appurtenances.

H. Americans with Disabilities Act (ADA)

The new EMU vehicles will be equipped with powered on-board lifts to aid passengers using mobility devices. The JPB requested the FTA's concurrence to reduce the number of on-board lifts from 32 per train set to 16 per train set, and to phase the installation of the lifts. The JPB's proposal calls for initial installation of two (2) lifts per train set, one (1) each in the northernmost car and one (1) in the following car, which will be equipped with an accessible restroom. The remaining four (4) lifts per train set are to be installed prior to the start of blended service with the CHSRA trains. The FTA, following its review of the JPB's proposal and further clarification provided by a conference call, concurred with the JPB's proposed reduction in the total number of passenger lifts per train set. The phased installation of the lifts was also discussed and associated grant timing considerations. Caltrain's Rail Operations Department recently requested the interim removal of the two (2) on-board lifts until such time as the EMUs operate in blended service with the CHSRA trains. The justification for this request is that the space occupied by the on-board lifts will interfere with the movement of passengers using the stairs where the lifts are installed. Further, the accommodation of passengers using mobility devices and wishing to use the restroom can be accomplished by de-boarding the passenger and repositioning the train at any station, a procedure currently in use. The change was approved by the Change Management Board at its September 2019 meeting.

The new EMU vehicles must comply with the FTA's current ADA requirements and the guidance in FTA Circular 4710.1.

I. Buy America

- The EMU vehicle consultant reports that Stadler's Buy America compliance continues to exceed the 60% requirement. *The vehicle consultant is awaiting updated information from Stadler before determining whether it will perform an intermediate Buy America audit.*
- The PMOC recently learned that the Electrification contractor is supplying primary traction power transformers that are manufactured in Europe. The PMOC has requested that the PCEP's QA Manager determine how this will affect the contractor's Buy America compliance requirement. *The PCEP's Quality Manager had not obtained any supporting information from the Electrification contractor.*

J. Vehicles

The JPB placed an order for ninety-six (96) new bi-level EMU vehicles to be produced by Stadler US, Inc. and delivered in six-car train sets. The JPB ordered an additional thirty-seven (37) EMUs in December 2018 using an option in the Stadler contract. The JPB has now ordered an electrified fleet of one hundred thirty-three (133) EMUs configured as nineteen (19) seven-car trains. The JPB has remaining options to purchase up to fifty-nine (59) more EMUs at prices based on the date when the option is exercised.

The EMU contract contained an option for Stadler to maintain the vehicles; the JPB did not exercise this option and the vehicles will be maintained by TASI, the JPB's current rail operator. The JPB states that Stadler will provide on-site training and assistance for TASI's personnel for two (2) years following vehicle acceptance.

The EMUs were ordered with two (2) sets of doors, one set at approximately 22" above top of rail, and one at approximately 50.5" above top of rail. Initially, only the lower set of doors will be activated, and a small step will automatically deploy outside the vehicle to reduce the boarding height to the current platforms. The PCEP's Change Management Board, at its September 2019 meeting, approved the JPB's request for a change order to install temporary panels in place of the high-level doors until the trains operate in blended service with the CHSRA. The high-level doors will be placed in storage until they are installed for blended service with the CHSRA. When the EMUs operate in blended service with the CHSRA vehicles, the high-level doors will be operated to provide level boarding at the higher CHSRA platforms at those stations served by both systems. See additional discussion under Regulatory Issues below.

Stadler reported the following progress on the vehicles:

- COVID-19 continued to cause mixed disruptions of Stadler's Activities:
    - Switzerland-based management, administrative, and engineering personnel continued to work from home.
    - Switzerland-based production continued to operate near normal. Car shells and truck frames shipments on schedule.
    - Salt Lake City-based management, administrative, and engineering personnel worked from home alternate days.
    - Salt Lake City-based testing of Trainset No. 1 halted since key Stadler and sub-supplier personnel cannot travel to Salt Lake City. The current delay is estimated at a day for each day of COVID-19 restrictions.
    - Stadler has material for about three (3) trainsets, but the disrupted supply chain will likely create shortages and delays.
- PCEP oversight and administration of Project unaffected. PCEP QA representatives are onsite in Altenrhein and Salt Lake City facilities.
- Final Design Reviews remain to be completed for three systems. These software-based systems include 'Train Control,' 'Monitoring and Diagnostics,' and 'Car Control.' Completion is scheduled for early in 2020 and must be performed before design conformance Type Testing commences in June 2020.
- FAIs continue to have their paperwork formalized and closed out.

- 33 car shells have been shipped from Stadler - Switzerland with 28 onsite in Stadler's Salt Lake City facility.

The FRA on-site design review that was planned for April 2020 at Stadler's Salt Lake City facility is being rescheduled for July 2020 because of the travel restrictions associated with the COVID-19 pandemic. This on-site design review will be an opportunity to see an assembled seven-car train, including the bike cars, and review the internal signage and placards.

Regulatory Issues

The FRA, in a letter dated June 8, 2018, denied the JPB's request for a waiver on the use of the high-level doors for emergency egress from the EMUs. The JPB previously developed an alternative to address this possible outcome. The alternative is complicated and requires creation of an interim configuration that replaces the high-level doors with an emergency exit window. The JPB's Change Management Board, as noted above, approved the installation of temporary panels in place of the high-level doors until the trains operate in blended service with the CHSRA.

The JPB's Change Management Board, at its September 2019 meeting, approved the JPB's request for a change order that will install additional flip-up seats and railings in each of its bike cars. The flip-up seats and railings accommodate access to emergency egress windows in the bike cars. This request came from Caltrain's bicycle user community. The JPB has reviewed the issue with the car manufacturer and the FRA and states that the EMUs are in compliance with applicable FRA regulations. *The FRA will have an opportunity to view this configuration on its next visit to Stadler's Salt Lake City facility in July 2020.*

The FRA denied the JPB's request for a waiver for a passenger emergency door opening system that is safer for the Caltrain System; the required system will be installed. A single waiver request related to train alternate crashworthiness design standards remains with the FRA for review and disposition. This waiver is the first of its type and has taken longer than originally anticipated. FRA has stated that a decision will be forthcoming in the near future.

4) Project Risk and Contingency

The PCEP has been implementing its RIMP (Risk Identification and Mitigation Plan) since its development in 2014. The PCEP's Risk Management Lead conducts weekly updates of a sub-set of the Risk Register and the project's Risk Management Committee meets monthly to review those risks proposed for retirement, risks with a major change in severity, and proposed additions to the Risk Register. The JPB has also created a "Watch List" of possible occurrences such as currency fluctuations or labor shortages to better understand the PCEP's risk position.

The JPB conducted a Risk Refresh Workshop on April 1, 2020; because of the COVID-19 pandemic, the workshop was held using web-collaboration software. The workshop was well planned and executed, and all risks on the Risk Register were reviewed and re-graded as needed. The next step is to analyze the results of the workshop using the Monte Carlo simulation model for both cost and schedule risks. The direct cost of risk has been determined; however, that result has not been reported. Schedule risk has not been analyzed because the PCEP schedule team is still incorporating the remaining new signal details into the Master Project Schedule. The schedule risk simulation will be run once the schedule is complete, The PCEP team plans to apply schedule mitigation strategies before finalizing the schedule results.

The mitigated schedule will be used to determine the indirect cost of risk, i.e., the cost resulting from the modeled schedule delay multiplied by the daily overhead charges of the various project participants. The total cost of risk is the sum of the direct and indirect costs of risk plus a management reserve. The results of the workshop are expected to be released in early June 2020.

The following are the Top Risks, with risk number, shown on the current PCEP risk register. Risks shown in italics are new to the list of Top Risks since the previous monitoring report. *Note that the current list of Top Risks is shorter because of the recent re-grading with the cut-off score of 18 or higher; this list will expand with the next report, in keeping with the Risk Assessment Committee's recent decision to consider risks graded 12 or higher as Top Risks*

(314) The contractor may not complete and install signal design including Two-speed check (2SC) modifications within budget and schedule.

(303) Extent of differing site conditions and associated redesign efforts results in delays to the completion of the electrification contract and increases program costs.

(313) Sub-optimal contractor sequencing, when progressing design and clearing foundation locations may result in construction inefficiencies.

(267) Additional property acquisition is necessitated by change in design.

Appendix G is a listing of the top project risks from the most recent PCEP Risk Register.

The following are other current risk related activities:

- *The Risk Identification and Mitigation Plan has been revised to respond to the PMOC's comments and is currently being reviewed by PCEP leadership. It will be transmitted to the PMOC after it is approved.*
- *The Risk Management Committee decided to change the standard for Top Risks to a score of twelve (12) or higher; previously the standard was 18 or higher.*
- *The Rail Activation Risk Register was developed; risks will be grouped into one of three categories: Risks already in the risk register; risks that are PCEP responsibility; and risks that are the JPB's responsibility.*
- *The Systems Integration Risk Register will not move forward at this time, but will come back at a later date.*
- *The Contractor Risk Management Program will also not proceed at this time; the program will come back at a later date.*

➢ **PMOC Observations:** The PMOC was pleased by the JPB's decision to advance the date for risk refresh workshop. The use of up-to-date schedule information in the risk modeling process will be helpful in assessing the overall outlook for the project.

➢ The changes in risk ranking, and the addition of new risks or the retirement of existing risks, is the result of the PCEP's risk management process. The decisions are made at the Monthly Risk Management Committee meetings and the rationale for the changes is not always fully articulated in the monthly risk register updates reviewed by the PMOC.

5) Discussion of Monitoring Plan Items

- The PMOC will continue to focus on the PCEP's schedule performance, including the JPB's mitigation of delays to OCS foundation installation, implementation of the 2SC solution to provide the required warning time at grade crossings, and completion of Time Impact Analyses related to the previous two (2) issues. *The PMOC conducted a conference call with the PCEP's scheduler on March 17, 2020 to go through preparations for the upcoming Risk Refresh to be held on April 1, 2020.* The PMOC will apply additional resources when a definitive schedule and/or an acceptable TIA is available from the JPB.
- The PMOC will continue to monitor the JPB's Systems Integration activities and the development of its Rail Activation Plan (RAP*).* The RAP is moving forward and the PMOC has provided lessons learned from another agency's recent Rail Activation planning process to inform both the process and schedule.
- The PMOC continues its review of the JPB's updated Project Management Plan, Rev. 2 (PMP); Project Controls Plan, Rev. 2; Document Control Plan, Rev. 1; Safety and Security Management Plan (SSMP), Rev. 5; Risk Identification and Mitigation Plan, Rev 2A; and several supporting procedures. The PMOC is providing comments in the form of marked-up documents as the reviews are completed.

6) Action Items

Table 11 shows the status of Action items as of March 11, 2020.

Table 11 – Action Items

No.	Action Item	Discussion	Agreed Due Date	Responsibility Agency/Name	Status
9.02	Complete an inventory of any on-board or wayside equipment purchased for CBOSS which will not be used for PTC.	General status of on-board and wayside equipment provided.	NLT QPRM #13	Bouchard	Inventory to be completed by QPRM #13.
10.01	Verify the extent of TASI Involvement in implementing the planned Grade Crossing Solution.	It is unclear whether anyone has discussed with TASI its role in servicing and implementing the CWT solution.	NLT QPRM #13	Bouchard	The issue of TASI's involvement in implementing the 2SC approach will be addressed before QPRM #13.

No.	Action Item	Discussion	Agreed Due Date	Responsibility Agency/Name	Status
10.02	Verify that FRA does not consider 2 Speed Check solution New and Innovative Technology.	*FRA has provided two sets of comments, one on the updated Preliminary Hazard Analysis and one on the Test Plan.*	ASAP	Funghi/Cocke	*A Conference Call with FRA took place on May 14, 2020. JPB has agreed to provide formal responses to the most recent FRA comments very quickly. FRA agreed to provide a determination before the next call scheduled for June 18, 2020.*
10.03	Implement a Schedule Containment Workshop prior to QPRM #11.	Bring PMOC schedule expertise to assist in working through TIAs	QPRM #12	Eidlin	JPB provided draft documents October 17, 2019. PMOC provided comments and further discussions held 12/17/19. JPB to finalize before QPRM #12. Additional materials received 1/10/2020.

No.	Action Item	Discussion	Agreed Due Date	Responsibility Agency/Name	Status
10.04	JPB to add a bullet to the PG&E slide for future meetings updating the status of the Continuing Control issue. Close item 5.05	Indicate what direction resolution is progressing	Prior to QPRM #13	Funghi/Larano	*Closed – JPB provided draft language that was discussed with and approved by FTA's Regional Counsel. That language was incorporated into Amendment 2 of Supplement 2 to the PG&E Master Agreement.*

Legend: Colored italics indicate a new entry from the previous version. Shaded cells indicate a completed item.
Colored italics indicate a new entry from the previous version. Shaded cells indicate a completed item. Items are removed from the Action Item list for the second report following the report in which they are reported complete.

Appendix A: List of Acronyms

Acronyms	List of Terms
2SC	Two Speed Check Grade Crossing Approach Warning System
AAR	Association of American Railroads
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ARINC	Aeronautical Radio, Incorporated
ATF	Autotransformer Feeder
ATP	Alternate Technical Proposal
BAAQMD	Bay Area Air Quality Management District
BAFO	Best and Final Offer
BART	Bay Area Rapid Transit District
BBII	Balfour-Beatty Infrastructure, Inc.
BGSP	Broadway Grade Separation Project
Caltrans	California Department of Transportation
CAR	Corrective Action Request
CBOSS	Communications Based Overlay Signal System
CC	FTA's Core Capacity Improvement Program
CCB	Change Control Board
CCIP	Contractor Controlled Insurance Program
CCSF	City and County of San Francisco
CEL	Certified Elements List
CEMOF	Central Equipment Maintenance and Operations Facility
CEQA	California Environmental Quality Act
CGA	Construction Grant Agreement
CHSRA	California High-Speed Rail Authority
CIG	FTA's Capital Investment Grant Process
CIL	Certifiable Items List
CMB	Change Management Board
CM/GC	Construction Manager/General Contractor
CNPA	Concurrent Non-Project Activity
CO	Change Order
CP	Control Point
CPUC	California Public Utilities Commission
CSCG	City/County Staff Coordinating Group
CWT	Constant Warning Time
D-B	Design-Build
DBB	Design-Bid-Build
DBE	Disadvantaged Business Enterprise
DEIR	Draft Environmental Impact Report
DQP	Design Quality Plan
DRB	Disputes Review Board
DSC	Differing Site Condition

Acronyms	List of Terms
DSDC	Design Support During Construction
DVR	Design Variance Request
EA	Environmental Assessment
EAC	Estimate at Completion
EE	Entry into Engineering
EIR	Environmental Impact Report
EIS	Environmental Impact Study
EMU	Electric Multiple Unit Rail Vehicle
ESZ	*Electrical Safety Zone*
ETB	Electrified Trolley Buses
FAI	First Article Inspection
FAT	*Factory Acceptance Test*
FCD	Final Completion Date
FD	Final Design
FEIR	Final Environmental Impact Report
FERC	Federal Energy Regulatory Commission
FFGA	Full Funding Grant Agreement
FLSC	Fire Life Safety Committee
FMOC	Financial Management Oversight Consultant
FMP	Fleet Management Plan
FONSI	Finding of No Significant Impact
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FWO	First Written Offer
FY	Fiscal Year
GO	General Order (issued by the CPUC)
HSR	High-Speed Rail
ICE	Independent Cost Estimate
I-ETMS	Interoperable Electronic Train Management System
IFB	Invitation for Bids
IFC	Issued for Construction
IGA	Inter-Governmental Agreement
IJ	Insulated Joints
Cal ISO	California Independent System Operator
ITCS	Incremental Train Control System
JPB or PCJPB	Peninsula Corridor Joint Powers Board
Jacobs	Jacobs Project Management Company
KKCS	Kal Krishnan Consulting Services, Inc.
LNTP	Limited Notice to Proceed
LONP	Letter of No Prejudice
LPMG	Local Policy Makers Group
MCC	Management Capacity and Capability
MOU	Memorandum of Understanding

Acronyms	List of Terms
MPS	Master Project Schedule
MRS	Modern Railway Systems
MTC	Metropolitan Transportation Commission
NCR	Non-conformance Report
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NTO	Notice to Owner (for Utility Relocation)
NTP	Notice to Proceed
OCS	Overhead Contact System/Overhead Catenary System
PCEP	Peninsula Corridor Electrification Program
PCWG	Peninsula Corridor Working Group
PD	Project Development Phase
PG&E	Pacific Gas and Electric
PHA	Preliminary Hazard Assessment
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
ProVen	ProVen Management, Inc.
PS	Paralleling Station for Traction Power Supply
PTC	Positive Train Control
PTG	Parsons Transportation Group
QA	Quality Assurance
QAP	Quality Assurance Plan
QC	Quality Control
QMP	Quality Management Plan
QPRM	Quarterly Progress Review Meeting
RAC	Rail Activation Committee
RAMP	Real Estate Acquisition and Management Plan
RAP	Rail Activation Plan
RE	Resident Engineer
RFI	Request for Information
RFMP	Rail Fleet Management Plan
RFP	Request for Proposal
RIMP	Risk Identification and Mitigation Plan
RON	Resolution of Necessity (for Eminent Domain purposes)
ROW	Right of Way
RSD	Revenue Service Date or Revenue Service Demonstration
RWIC	Roadway Worker in Charge
RWP	*Roadway Worker Protection*
RWQCB	Regional Water Quality Control Board
SamTrans	San Mateo County Transit District
SCADA	Supervisory Control and Data Acquisition
SCC	Standard Cost Category
SCVTA/VTA	Santa Clara Valley Transportation Authority

Acronyms	List of Terms
SCVWD	Santa Clara Valley Water District
SF	City of San Francisco
SFCTA	San Francisco County Transportation Authority
SFMTA	San Francisco Municipal Transportation Agency
SHPO	State Historic Preservation Office
SJ	City of San Jose
SLC	Salt Lake City
SMCTA	San Mateo County Transportation Authority
SME	Subject Matter Expert
SOGR	State of Good Repair
SONO	Statement of No Objection
SOO	*Statement of Objection*
SP	Southern Pacific Transportation Company
SSCP	Safety and Security Certification Plan
SSI	Sensitive Security Information
SSMP	Safety and Security Management Plan
SSOA	State Safety Oversight Agency
SSWP	*Site Specific Work Plan*
SVP	Silicon Valley Power
TAD	Track Access Delay
TASI	Transit America Services, Inc.
TEAM	Transportation Electronic Award Management System
TIA	Time Impact Analysis
TIRCP	Transportation and Intercity Rail Capital Program
TJPA	Transbay Joint Powers Authority
TPF	*Traction Power Facility*
TPS	Traction Power System
TPSS	Traction Power Substation
TrAMS	Transportation Award Management System
TTCI	Transportation Technology Center, Inc.
TVA	Threat and Vulnerability Analysis
TVM	Transit Vehicle Manufacturer
UPRR	Union Pacific Railroad
USDOT	U. S. Department of Transportation
USFWS	United States Fish and Wildlife Service
VE	Value Engineering
VECP	Value Engineering Change Proposal
VTA	Santa Clara Valley Transportation Authority
WPC	Wayside Power Cabinet
YOE	Year of Expenditure

Appendix B: Safety and Security Checklist

Project Overview			
Project Mode	Commuter Rail		
Project Phase	FFGA – Construction		
Project Delivery Method	Design-Build, Design-Bid-Build		
Project Plans	**Version**	**Review by FTA**	**Status**
Safety and Security Management Plan (SSMP)	Rev 4	Y	Under Review
Safety and Security Certification Plan (SSCP)	Rev 0		Under Review
System Safety Program Plan (SSPP)	Rev 7		Under Review
System Security Plan or Security and Emergency Preparedness Plan (SEPP)	Rev 0		SSP being revised
Construction Safety and Security Plan (CSSP)	V3 Part C of SPs		In Contract Documents

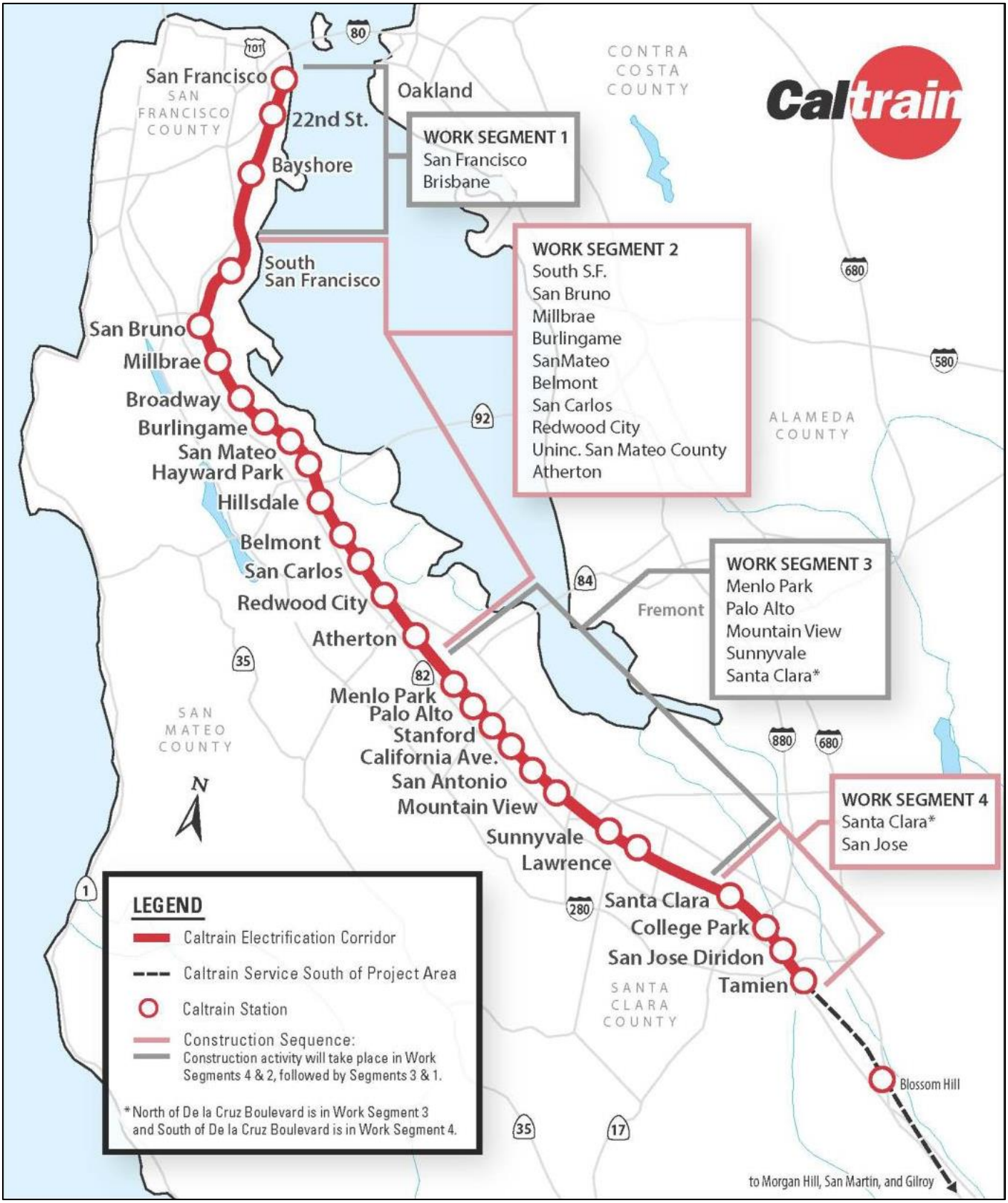
Area of Focus	**Y/N**	**Notes/Status**
Safety and Security Authority		
Is the Project Sponsor subject to 49 CFR Part 659 state safety oversight requirements?	Y	
Has the state designated an oversight agency as per 49 CFR Part 659.9?	Y	California Public Utilities Commission is SSOA; the FTA certified California's SSOA program on October 23, 2018.
Has the oversight agency reviewed and approved the Project Sponsor's Security Plan or SSPP as per 49 CFR Part 659.17?	TBD	Not known at this time
Did the oversight agency participate in the last Quarterly Program Review Meeting?	N	QPRM No. 12 was held January 22, 2020
Has the Project Sponsor submitted its safety certification plan to the oversight agency?	TBD	SSCP submitted Rev. 0 which is currently under review.
Has the Project Sponsor implemented security directives issued by the Department of Homeland Security and/or Transportation Security Administration?	Y	No directives have been received at this time; Transit Police is the liaison between DHS and Caltrain.
SSMP Monitoring		
Is the SSMP project-specific, clearly demonstrating the scope of safety and security activities for this project?	Y	
Does the Project Sponsor review the SSMP and related project plans to determine if updates are necessary?	Y	
Does the Project Sponsor implement a process through which the Designated Function (DF) for Safety and DF for Security are integrated into the overall project management team? Please specify.	Y	In the SSMP and Section 11.0 of the PMP.
Does the Project Sponsor maintain a regularly scheduled report on the status of safety and security activities?	Y	Safety & Security activities are reported in the monthly PCEP report.
Has the Project Sponsor established staffing requirements, procedures and authority for safety and security activities throughout all project phases?	Y	Section 3.0 of SSMP

Area of Focus	Y/N	Notes/Status
Does the Project Sponsor update the safety and security responsibility matrix/organizational chart as necessary?	Y	
Has the Project Sponsor allocated sufficient resources to oversee or carry out safety and security activities?	Y	
Has the Project Sponsor developed hazard and vulnerability analysis techniques, including specific types of analysis to be performed during different project phases?	Y	PHA Rev. 1, APR 16
Does the Project Sponsor implement regularly scheduled meetings to track to resolution any identified hazards and/or vulnerabilities?	Y	Yes, in Safety and Certification Committee meetings which started in December 2016 on a project level and through our "Capital Safety Committee" which meets monthly. IndustrySafe is also being used to track safety activities.
Does the Project Sponsor monitor the progress of safety and security activities throughout all project phases? Please describe briefly.	Y	Yes, through the Safety & Security Certification Committee and the Fire/Life Safety Committee which are ongoing committees throughout the life of the project.
Does the Project Sponsor ensure the conduct of preliminary hazard and vulnerability analyses? Please specify the analyses conducted.	Y	PHA Rev. 1 APR 16, Under review. A PHA has been prepared for changes to the CEMOF facility to accommodate the new EMUs. A PHA has been prepared to address the 2SC grade crossing warning approach and provided to the FRA. TVA Rev. 1 APR 16, Under review. OHA is currently being developed.
Has the Project Sponsor ensured the development of safety design criteria?	Y	
Has the Project Sponsor ensured the development of security design criteria?	Y	
Has the Project Sponsor ensured conformance with safety and security requirements in design?	Y	Design Criteria checklists are currently being developed and reviewed by the Safety & Security Certification Review Committee.
Has the Project Sponsor verified conformance with safety and security requirements in equipment and materials procurement?	Y	Through the Safety & Security Certification Process.
Has the Project Sponsor verified construction specifications conformance?	Y	Currently only for foundation construction and OCS pole erection which is under way.
Has the Project Sponsor identified safety and security critical tests to be performed prior to passenger operations?	Y	Addressed in SSMP as required by D/B Contractor during construction.
Has the Project Sponsor verified conformance with safety and security requirements during testing, inspection, and start-up phases?	Y	Addressed in SSMP and SSCP.
Has the Project Sponsor evaluated change orders, design waivers, or test variances for potential hazards and/or vulnerabilities?	Y	Through the Change Management Board.
Has the Project Sponsor ensured the performance of safety and security analyses for proposed work-arounds?	Y	This is included in the Rail Activation Committee scope during testing/startup activities. BBII's Safety & Security Certification flow chart identifies the process.

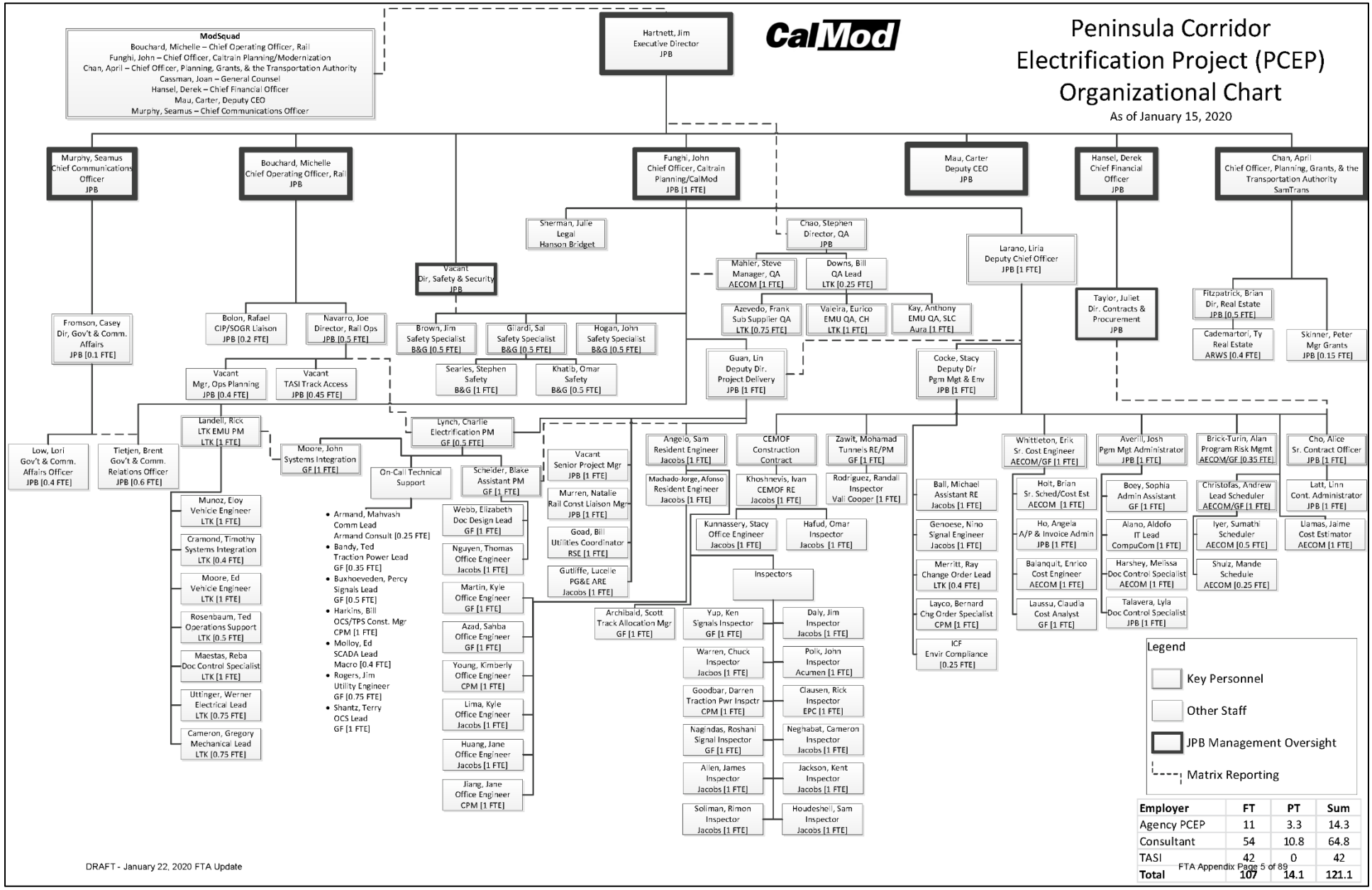
Area of Focus	Y/N	Notes/Status
Has the Project Sponsor demonstrated through meetings or other methods the integration of safety and security in the following: • Activation Plan and Procedures • Integrated Test Plan and Procedures • Operations and Maintenance Plan • Emergency Operations Plan	Y Y N N	A Rail Activation Plan has been prepared and is being refined for initial testing and operation of the new EMUs. The Rail Activation Committee has been meeting regularly since May 2019 and a Rail Activation Schedule has been prepared and an Integrated Test Plan and Procedures developed.
Has the Project Sponsor issued final safety and security certification?	N	Project is in construction. Final Completion Date is 8-22-2022.
Has the Project Sponsor issued the final safety and security verification report?	N	Project is in construction. Final Completion Date is 8-22-2022.
Construction Safety		
Does the Project Sponsor have a documented/implemented Contractor Safety Program with which it expects to comply?	Y	The Design/Build contractors "Construction Safety Program" and "Health and Safety Plan" have been accepted.
Does the Project Sponsor's contractor(s) have a documented company-wide safety and security program plan?	Y	System Safety Plan submitted and Approved 2/1/2017
Does the Project Sponsor's contractor(s) have a site-specific safety and security program plan?	Y	Rev. 2 submitted and Approved 12/9/2016
How do the Project Sponsor's OSHA statistics compare to the national average for the same type of work?		*The review of the Design-Build contractor's reported OSHA statistics revealed that some incidents had been miss-classified; this raised the Incident Rate above 3.0 for the period.* The project showed a Total Recordable Incident Rate of 2.033 for the year 2019 compared to the most recent (2018) BLS rate of 2.6 for Heavy and Civil Engineering construction.
If the comparison is not favorable, what actions are being taken by the Project Sponsor to improve its safety record?		The D-B contractor reviews all incidents with its employees at its monthly safety meetings.
Federal Railroad Administration		
If shared track: has the Project Sponsor submitted its waiver request application to FRA? (Please identify specific regulations for which waivers are being requested.)	Y	Waivers approved 1/13/2016 for 49 CFR: 49 CFR 238.203, Static end strength; 238.205, Anti- climbing mechanism; and 238.207, link between coupling mechanism and car body.
If shared corridor: has the Project Sponsor specified specific measures to address safety concerns?	Y	In Caltrain/TA Services/UP Passenger Train Emergency Preparedness Plan and Caltrain System Safety Program Plan
Is the Collision Hazard Analysis underway?	Y	Car body testing and Collision Analysis has been completed and report sent to FRA.
Other FRA required Hazard Analysis – Fencing, etc.?	TBD	This is an operating ROW and no service change is expected.
Does the project have Quiet Zones?	TBD	This is an operating ROW and no service change is expected.
Does FRA attend the Quarterly Review Meetings?	Y	FRA attended QPRM No. 12 on January 22, 2020.

Appendix C: Project Map

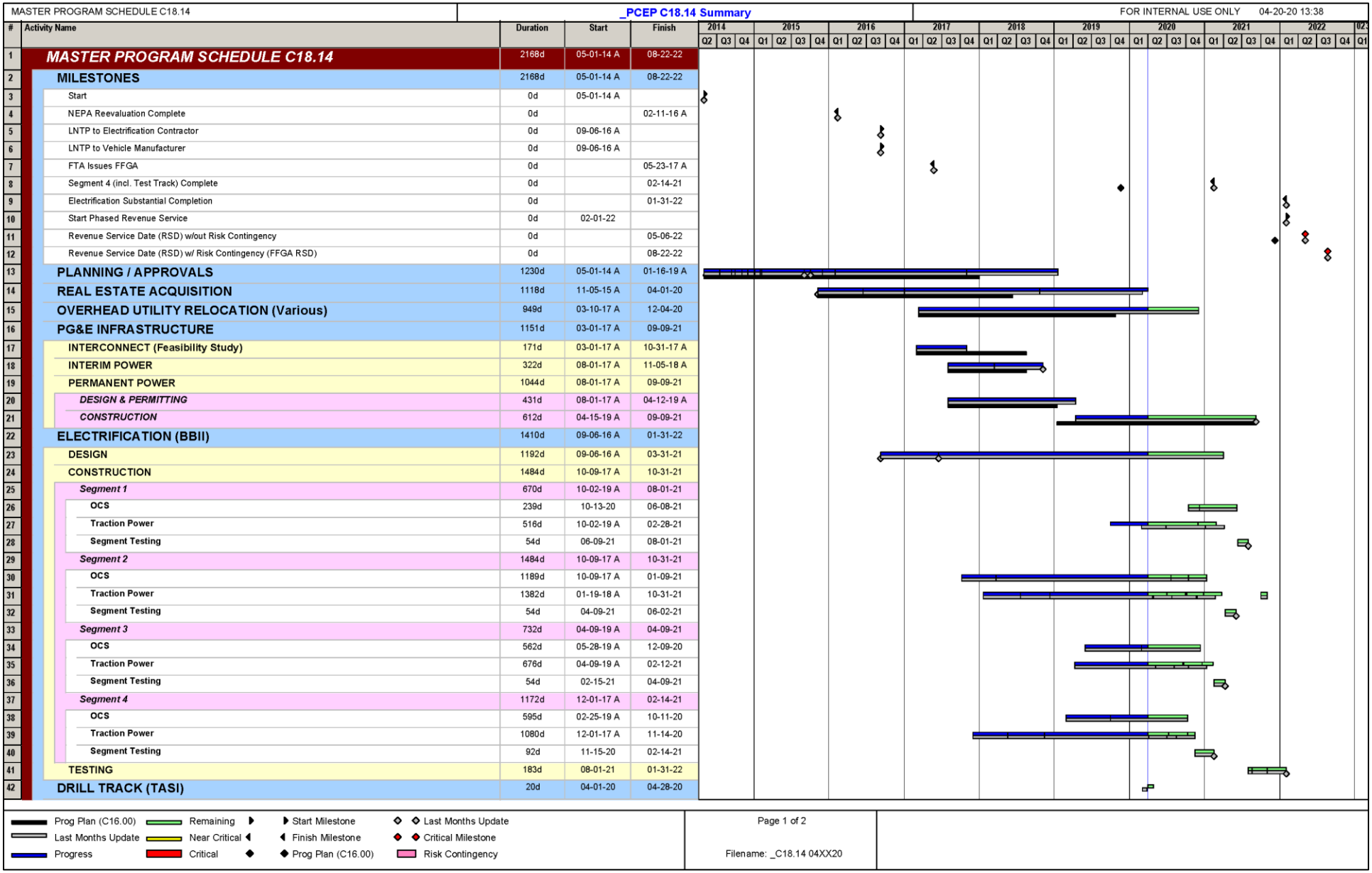
Figure 1
Peninsula Corridor Electrification Project Map



Appendix D: PCEP Organization Chart



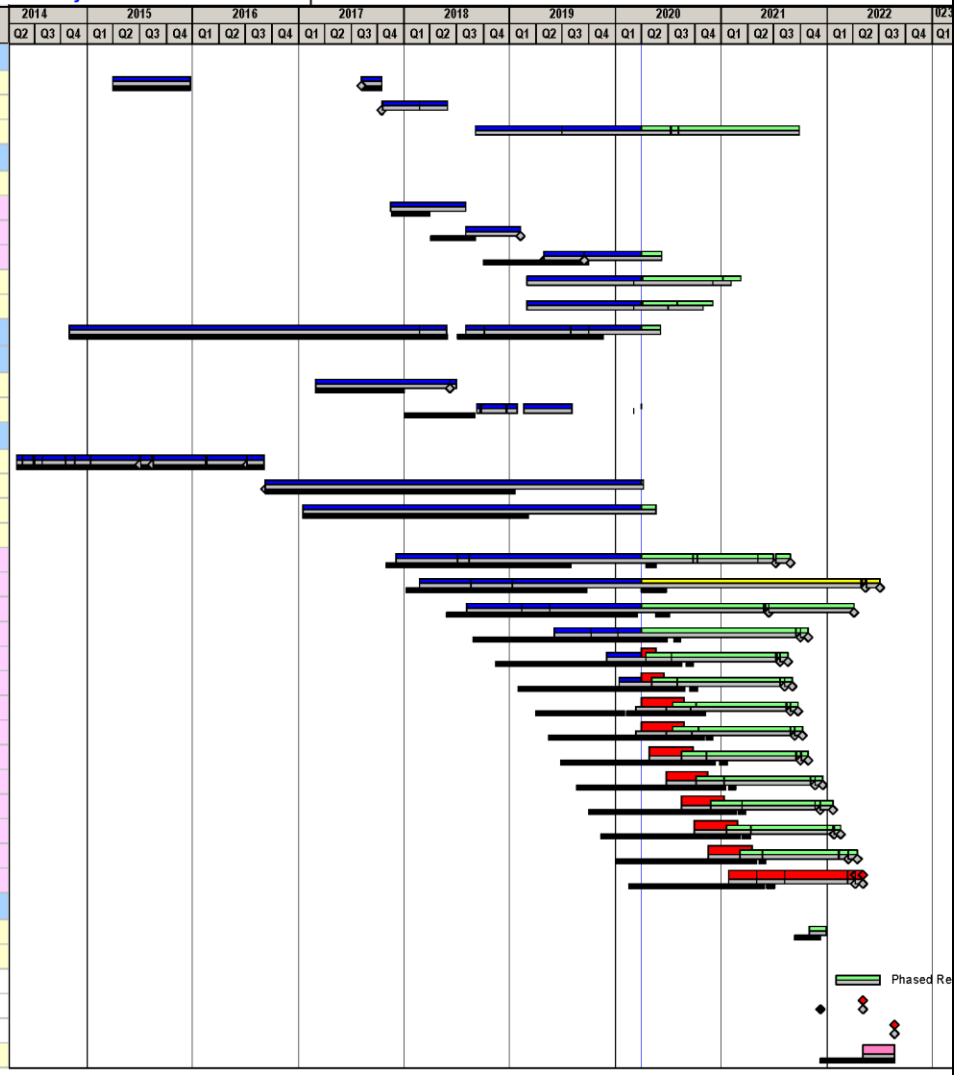
Appendix E: Summary Project Schedule



#	Activity Name	Duration	Start	Finish
1	MASTER PROGRAM SCHEDULE C18.14	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		02-14-21
9	Electrification Substantial Completion	0d		01-31-22
10	Start Phased Revenue Service	0d	02-01-22	
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	1118d	11-05-15 A	04-01-20
15	OVERHEAD UTILITY RELOCATION (Various)	949d	03-10-17 A	12-04-20
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*	431d	08-01-17 A	04-12-19 A
21	*CONSTRUCTION*	612d	04-15-19 A	09-09-21
22	ELECTRIFICATION (BBII)	1410d	09-06-16 A	01-31-22
23	DESIGN	1192d	09-06-16 A	03-31-21
24	CONSTRUCTION	1484d	10-09-17 A	10-31-21
25	*Segment 1*	670d	10-02-19 A	08-01-21
26	OCS	239d	10-13-20	06-08-21
27	Traction Power	516d	10-02-19 A	02-28-21
28	Segment Testing	54d	06-09-21	08-01-21
29	*Segment 2*	1484d	10-09-17 A	10-31-21
30	OCS	1189d	10-09-17 A	01-09-21
31	Traction Power	1382d	01-19-18 A	10-31-21
32	Segment Testing	54d	04-09-21	06-02-21
33	*Segment 3*	732d	04-09-19 A	04-09-21
34	OCS	562d	05-28-19 A	12-09-20
35	Traction Power	676d	04-09-19 A	02-12-21
36	Segment Testing	54d	02-15-21	04-09-21
37	*Segment 4*	1172d	12-01-17 A	02-14-21
38	OCS	595d	02-25-19 A	10-11-20
39	Traction Power	1080d	12-01-17 A	11-14-20
40	Segment Testing	92d	11-15-20	02-14-21
41	TESTING	183d	08-01-21	01-31-22
42	DRILL TRACK (TASI)	20d	04-01-20	04-28-20

MASTER PROGRAM SCHEDULE C18.14 | _PCEP C18.14 Summary | FOR INTERNAL USE ONLY 04-20-20 13:38

#	Activity Name	Duration	Start	Finish
43	SCADA (Arinc)	1652d	03-30-15 A	09-28-21
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	780d	09-04-18 A	09-28-21
47	CEMOF (Various)	863d	11-16-17 A	03-08-21
48	CEMOF MODIFICATIONS (ProVen)	669d	11-16-17 A	06-09-20
49	*DESIGN*	178d	11-16-17 A	07-31-18 A
50	*BID & AWARD*	132d	08-01-18 A	02-07-19 A
51	*CONSTRUCTION*	292d	04-29-19 A	06-09-20
52	PANTORGRAPH INSPECTION & MONITORING SYSTEM (Ctr TBD)	513d	03-01-19 A	03-08-21
53	SCISSOR LIFT WORK PLATFORM (Ctr TBD)	446d	03-01-19 A	12-01-20
54	TUNNEL MODIFICATION (ProVen)	1460d	10-31-14 A	06-04-20
55	ELECTRIC LOCOMOTIVE (Amtrak / Mitsui)	805d	03-01-17 A	04-01-20
56	BID & AWARD	348d	03-01-17 A	06-29-18 A
57	REHAB / TEST/ TRAIN / SHIP	407d	09-10-18 A	04-01-20
58	EMU (Stadler)	2132d	05-01-14 A	07-01-22
59	DEVELOP RFP, BID & AWARD	612d	05-01-14 A	09-02-16 A
60	DESIGN	936d	09-06-16 A	04-07-20
61	PROCUREMENT (Material)	872d	01-16-17 A	05-19-20
62	MANUFACTURING & TESTING	1195d	12-04-17 A	07-01-22
63	*TRAINSET 1*	975d	12-04-17 A	08-27-21
64	*TRAINSET 2*	1137d	02-22-18 A	07-01-22
65	*TRAINSET 3*	957d	08-06-18 A	04-05-22
66	*TRAINSET 4*	628d	06-03-19 A	10-27-21
67	*TRAINSET 5*	450d	12-02-19 A	08-20-21
68	*TRAINSET 6*	430d	01-13-20 A	09-03-21
69	*TRAINSET 7*	388d	04-01-20	09-24-21
70	*TRAINSET 8*	398d	04-01-20	10-08-21
71	*TRAINSET 9*	395d	04-27-20	10-29-21
72	*TRAINSET 10*	390d	06-22-20	12-17-21
73	*TRAINSET 11*	375d	08-17-20	01-21-22
74	*TRAINSET 12*	365d	09-28-20	02-18-22
75	*TRAINSET 13*	370d	11-16-20	04-15-22
76	*TRAINSET 14*	335d	01-25-21	05-06-22
77	TESTING & STARTUP (JPB)	211d	10-31-21	08-22-22
78	PRE-REVENUE TESTING	61d	10-31-21	12-30-21
79	REVENUE OPERATIONS	144d	02-01-22	08-22-22
80	Phased Revenue Service	109d	02-01-22	07-01-22
81	Revenue Service Date (RSD) w/out Risk Contingency	0d		05-06-22
82	Revenue Service Date (RSD) w/ Risk Contingency (FFGA RSD)	0d		08-22-22
83	RISK CONTINGENCY	108d	05-07-22	08-22-22

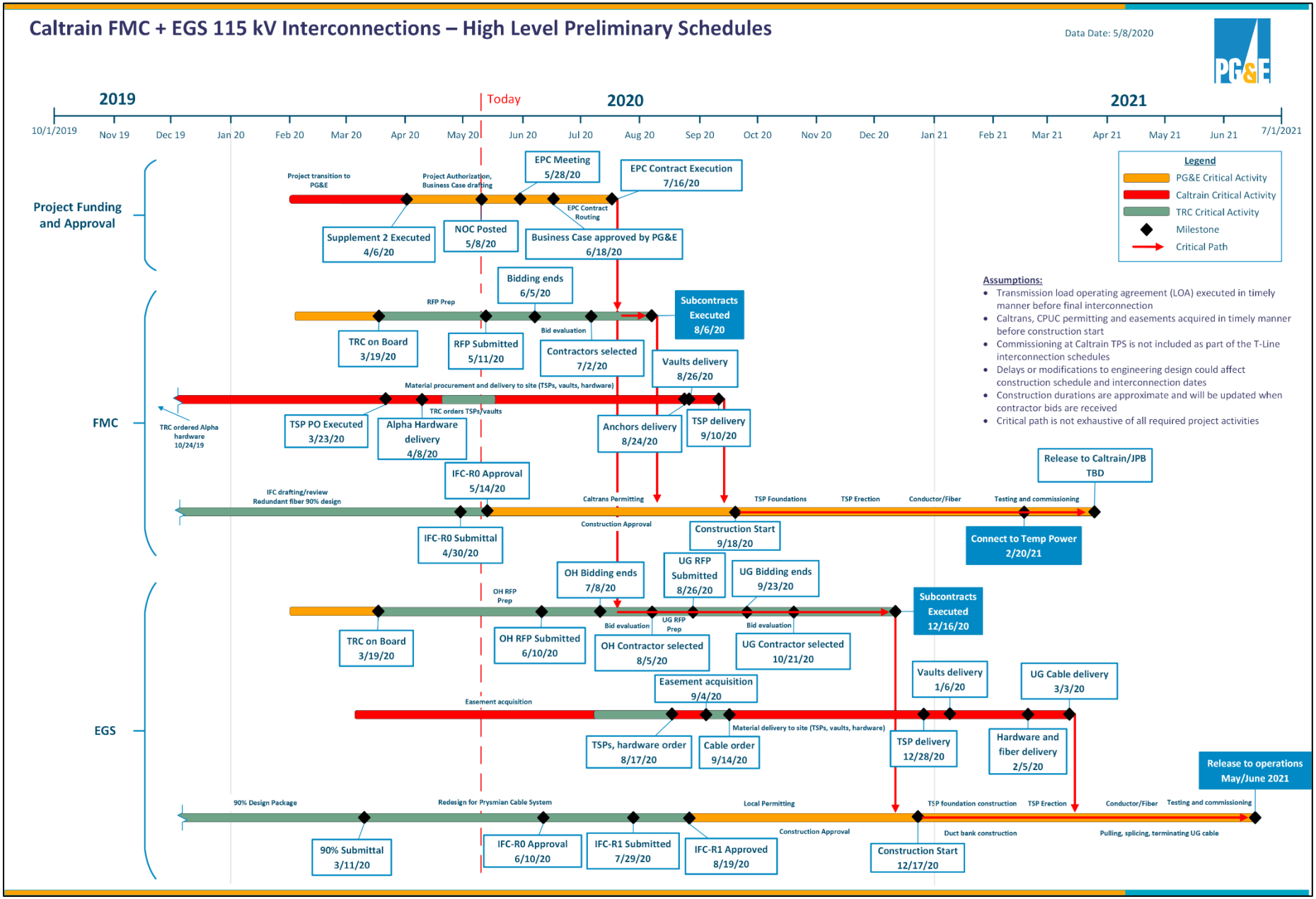


Prog Plan (C16.00) | Remaining | Start Milestone | Last Months Update
Last Months Update | Near Critical | Finish Milestone | Critical Milestone
Progress | Critical | Prog Plan (C16.00) | Risk Contingency

Page 2 of 2

Filename: _C18.14 04XX20

Appendix F: PG&E Interconnection Schedule



Appendix G: Top Project Risks

Program Risk Register

Version Date: May 15, 2020 - Top Risks

	1	2	3	4	5
	LOW	MEDIUM	HIGH	VERY HIGH	SIGNIFICANT
Probability	< 10%	10% - 50%	50% - 75%	75% - 90%	> 90%
Cost	< $500 K	$500 K - $2 M	$2 M - $10 M	$10 M - $20 M	$20 M - $50 M
Schedule	< 1 Month	1 - 3 Months	3 - 6 Months	6 - 12 Months	> 12 Months

ID	RBS		RISK DESCRIPTION	EFFECT(S)	TYPE	IMPACT			PRIORITY		OWNER	MITIGATION ACTIONS	RETIREMENT DATE(S)	NOTES	A-C	STATUS & REMARK(S)
	FUNC. (P)	FUNC. (S)				PROBABILITY	COST	SCHEDULE	GRADING							
314	Elect.	Construction	The contractor may not complete and install signal design including Two-speed check (2SC) modifications within budget and schedule.	Delay and additional cost for rework.	T	4	5	3	32		DB	1. Streamline design reviews. 2. Initiate construction prior to IFC. 3. Consolidate locations for testing, where possible.	Completion of Segment 4	Schedule impact graded against forecast signals completion of Sep 2021 JF; BB has committed to provide updated design schedule be end of this week; AST: reevaluate schedule grade at that time. A. Christofes 4/1/2020		See Risk #279 for status prior to rewording and addition of this risk.
303	Elect.	Physical Site	Extent of differing site conditions and associated redesign efforts results in delays to the completion of the electrification contract and increases program costs.	Extends construction of design-build contract with associated increase in project costs •DSC design cost •Inefficiencies •Construction costs related to DSCs (i.e., larger foundations) •Additional potholing	T	4	4	3	28		Guan	1. Define process for resolving DSCs to clear locations for foundation installation. 2.Develop "playbook" of responses to RFIs associated with responding to DSCs 3. Add additional potholing crews to increase production and deal spacifically with DSCs. 4. Organize PCEP staff to expedite responses to RFIs. 3. BBI to empower field supervision to identify and respond to obstacles.	Completion of Segment 4	Schedule graded against forecast foundation completion of Dec 2020 - A. Christofes 4/13/2020		1. JPB and BBII continue to have regular working sessions between JPB OE and BBII Field Engineers to resolve conflicts. 2. RSE continues to provide field support on utility locating to help resolve conflicts. 3. BBII will be increase design resources to support re-design required due to DSCs. 4. JPB will perform expedited reviews on DCNs to shorten overall cycle of design. 5. BBII will continue to keep stockpile of long cages to deal with DSCs. 2.Add weekly foundation schedule meeting to review foundation schedule and outstanding items that may impact the schedule. - L. Guan – 4/27/2020
313	Elect.	Construction	Sub-optimal contractor sequencing, when progressing design and clearing foundation locations may result in construction inefficiencies	Contractor claims for increase in construction and design costs, and reduced production rates extending construction duration	T	5	3	1	20		DB	1. Positively identify known utilities in advance of foundation construction. 2. Pothole foundation locations when all design elements have been taken into consideration including line of sight, adjustment of poles, etc. 3. Conduct workshop with BBI to identify improved productivity. 4. Conduct frequent coordination meetings between BBI and JPB staff and consultants to address issues on foundation locations and to make timely decisions.	Completion of Segment 4	None		Challenge is to have sufficient number of potholes complete before advancing foundation work. Need to staff with more potholing crews than foundation crews. Off-track and on-track foundation operations proceeding. Success in Segment 3. Segment 2 and 4 - many conflicts with a protracted time to resolve. Office engineering staff supporting Belfour. Conflicts must be coordinated with the owning authority to develop an acceptable mitigation. Conflicts with signal cable - need to determine if cable is in service or not. If not - cut; if in service - look for slack to move out of the path of the foundation. - C. Lynch 7/19/2019 Reworded to include communication between contractor and sub-contractors per Risk Assessment Committee - 8/27/19.
267	Elect.	Construction	Additional property acquisition is necessitated by change in design.	New project costs and delays to schedule.	T	3	2	4	18		Fitzpatrick	1. Project delivery team to work with contractor to ID new parcels well before they are needed for construction 2. Expedite development of plats and legals 3. Enter into work directives for appraisal and acquisition before parcels are identified 4. Work with project team to integrate property acquisition schedule into overall project schedule.	Completion of Construction	Most acquisition is for easements, some foundations not on JPB property, maximum time impact of 3 months. Inefficiencies but not major impact. - 12/21/2018		Design change necessitated by UP and PG&E requests in Segment 4. May not be able to procure property in time for construction. - B. Fitzpatrick 4/17/2019 No change. - B. Fitzpatrick 5/28/2019 No change - B. Fitzpatrick 7/16/2019 No change - B. Fitzpatrick 8/27/2019 No change - B. Fitzpatrick 10/1/2019 No change - B. Fitzpatrick 11/07/2019 No change - B. Fitzpatrick 1/2/2020 No change - B. Fitzpatrick 2/25/2020 Mitigation #4 added. - B. Fitzpatrick 4/7/2020

Appendix H: PMOC Team

The report was prepared by the Task Order Manager, **Mike Eidlin**, J.D. (KKCS) who has more than 40 years of complex project management experience including over 26 years in transit. Mr. Eidlin possesses a B.S. degree, a graduate Degree of Engineer, and a Juris Doctor degree. He is a licensed attorney in the State of Oregon. He has been working as a PMOC for 15 years.

Brett L. Rekola, **P.E. (KKCS)**, contributed to the preparation of the report and provided the Quality Assurance of the report. Mr. Rekola is the Program Manager for KKCS' FTA PMOC prime contract. He is a California professional civil engineer with more than thirty (30) years of experience managing railroad maintenance, planning, and design, construction, and rail operations. He has served as a program manager delivering port/rail/public works projects and programs.

Nancy Voltura (KKCS), assisted with the report. Ms. Voltura has over forty (40) years of Quality Assurance (QA) experience working as a QA Engineer, QA Auditor and QA Manager on large design and construction projects. Ms. Voltura is a trained Apparent Cause Analyst evaluating heavy construction quality issues, is a trained professional QA Auditor and has been a certified Lead QA Auditor per ASME/NQA-1 and N45.2.23 standards.

Kevin Byers, P.S.P. (KKCS) assisted with the report. He is KKCS' Project Scheduling Manager, holds a B.S. degree in Construction Management, and has 26 years' experience in scheduling and claims analysis for railroad and rail transit projects.

The administrative Quality Control review of this report was done by **Janice Johnson, (KKCS)**, who also serves as the Contracts & Terms Manager. Ms. Johnson has a background in English Studies and over twenty (20) years of experience providing quality review checks of PMOC work products.

Appendix I: Final Report - Required Additions

OP-25 provides the following guidance for the PMOC's Final Report at the end of a Task Order:

> While this report should be organized according to the outline for the recurring reports, it should highlight in a broad way the most important events, issues, hurdles, resolutions, actions taken and actions pending during the project life, so that the report is instructive to others. In addition, the Final Report should describe the impacts of the project on the Grantee's staff (administration, operations, and maintenance), include lessons learned, and transit operations/overall system performance.

1. Important Events

1.1. FTA Approved PCEP Entry into Project Development - April 16, 2015.

1.2. Completion of National Environmental Policy Act (NEPA) [FTA Acceptance of JPB's Environmental Re-evaluation] – February 11, 2016

1.3. JPB Submits Materials for New Starts Evaluation and Rating – September 2015

1.4. FTA Includes PCEP in the President's FY 2017 Budget with Medium-High Rating

1.5. JPB Requests FTA Approval of Entry into Engineering (EE) - April 12, 2016

1.6. FTA Approved PCEP's EE - August 12, 2016

1.7. JPB Requests Full Funding Grant Agreement (FFGA) - September 9, 2016.

1.8. Award of FFGA - May 23, 2017

1.9. Limited Notice to Proceed on Electrification and Electric Multiple Unit (EMU) rail vehicle contracts - September 6, 2016, consistent with the FTA's automatic pre-award authority for Core Capacity projects in the Engineering Phase.

1.10. Final Notice to Proceed (LNTP) on Electrification and EMU Contracts

- June 1, 2017 for EMU (Stadler)
- June 19, 2017 for Electrification (Balfour-Beatty)

1.11. President Declares COVID-19 Pandemic a National Emergency – March 13, 2020

1.12. California Governor Declares COVID-19 Lockdown – March 19, 2020

2. Issues

2.1. The PCEP's leadership set a very aggressive schedule for the project from the outset. Requests for Proposals (RFP) for the Electrification Design-Build (D-B) Contract and the Electric Multiple-Unit Rail Vehicles were released before the project entered Engineering. The aggressive schedule may have limited the PCEP's management's consideration of some issues that might otherwise have been more fully considered and potentially a resolved under a less constrained schedule.

2.2. The railroad corridor from San Jose to San Francisco has been in passenger railroad use since 1863; the JPB took over operation of passenger service in the corridor 1992. The project team did not anticipate the very significant amount of unknown conditions that would be encountered within the railroad corridor during the potholing operations

performed by the Electrification contractor. Under the terms of the Electrification Design-Build contract, the JPB has responsibility for the subsurface conditions within its rights-of-way (ROW). Unanticipated conditions encountered during potholing fall under the contractual designation of Differing Site Conditions (DSCs). The significant number of DSCs encountered has delayed the progress of design and construction of the foundations for the Overhead Contact System.

2.3. The Caltrain system is very heavily used by San Francisco Bay Area commuters. Caltrain service (pre-pandemic) operated forty-six (46) trains per weekday in each direction between San Francisco and San Jose between the hours of 5 a.m. and 11 p.m. plus the Union Pacific Railroad (UPRR) operated another six (6) freight trains daily. Service frequency was reduced on weekends. Because much of the Electrification contractor's early work involved potholing and foundation construction within the active rail corridor, safety considerations for construction workers and maintenance of regular service schedules for passengers is of paramount importance. Significant effort by the JPB went into developing a plan for the location and timing of the contractor's work, and the type of Roadway Worker Protection to be provided by the JPB. This plan was made part of the contract and designated work windows that would be made available to the contractor, and limited the locations where the contractor could work at given times. Despite the extensive planning, the Electrification contractor has encountered significant delays due to inability to access the tracks as promised in the contract documents; these are referred to as Track Access Delays (TADs). Each TAD must be recorded, responsibility must be assessed (not all TADs are the fault of the JPB), and the impacts (both time and cost) must be determined. In those cases where the JPB is solely responsible for the TAD, the contractor is entitled to compensation under the contract. TADs continue to impact the contractor, although the reduced service schedules due to the COVID-19 pandemic have made track access easier to obtain.

2.4. Grade crossing accidents are a serious problem for the railroad industry and for Caltrain. The corridor between San Francisco and San Jose has forty-two (42) grade crossings, each protected by required warning equipment such as flashing lights and crossing gates. Grade crossing warning equipment and the required warning time is regulated by the Federal Railroad Administration (FRA). The technology used to activate the warning systems by railroads operating diesel equipment will not function properly when a railroad is electrified. The Electrification contractor is responsible for the design and installation of the equipment needed to provide adequate warning time when Caltrain initiates electrified operation of its EMUs.

The JPB, at the time the Electrification contract was awarded, was in the process of implementing the federally mandated Positive Train Control (PTC) system. The System selected by the JPB, referred to a Communications Based Overlay Signal System – Positive Train Control (CBOSS-PTC) included wireless activation for the grade crossing warning equipment. The Electrification contract includes references to CBOSS-PTC in its specifications. The JPB, in early 2017 and after award of the Electrification contract, terminated its contract with the CBOSS-PTC contractor. The termination of the CBOSS-PTC contractor resulted in uncertainty on the part of the Electrification contractor as to how the grade crossing warning system would be activated. The issue was raised by the Electrification contractor, and ultimately resulted in the contractor's delay in moving forward with the signals design work.

The issue is further complicated by the UPRR freight service in the corridor which has trains travelling at significantly slower speeds than the Caltrain passenger trains. The Electrification contractor, and its signals subcontractor, through discussions with the PCEP team have proposed a two speed-check (2SC) solution. FRA representatives have participated in several meetings with the parties to discuss the 2SC solution as it will be implemented in an electrified environment. The issue and the associated documentation has been under review by FRA Headquarters' personnel for several months and FRA expects to render a determination on whether the solution uses proven technology in June 2020.

The delay of the signals design work has been continuing for several years and is determining the critical path to substantial completion of the Electrification contract. The contractor's February 2020 monthly schedule update narrative, the most recently submitted, and which has been rejected by the JPB, shows a substantial completion date of June 29, 2024, compared to the contractual date of August 10, 2020, or a total delay of 1420 calendar days to substantial completion.

The JPB and the Electrification contractor were unable to resolve the issue using the dispute resolution provisions of the contract and the contractor ultimately filed a claim on behalf of its signal subcontractor. That claim, the contractor's associated Change Order Cost Proposal, and three (3) other claims are the subject of a technically facilitated mediation process discussed below.

2.5. The PCEP has lost significant time; this is apparent when the current status of work is compared to the original schedule. The schedule slippage is due in large part to the issues described elsewhere in this report. Substantial completion of the Electrification contract has slipped from August 10, 2020 to January 31, 2022 according to the PCEP's latest schedule. However, the Electrification contractor's most recent schedule update, which has been rejected by the JPB, shows substantial completion on June 29, 2024.

The PCEP currently employs one full-time and one part-time scheduler. The schedule team is responsible for reviewing all contractors monthly schedule submittals, analyzing any Time Impact Analyses (TIAs) submitted by a contractor, maintaining the Master Project Schedule (MPS), supporting the risk analysis process, and responding to routine schedule inquiries from other members of the PCEP team. The schedule team has been unable, due to lack of complete information on the signals schedule, to develop its own projection for the completion of the project until very recently. The PMOC has recommended for some time that the PCEP increase its scheduling capability, and has held schedule containment workshops to support the scheduling effort. The lack of additional scheduling capacity makes it difficult for the current scheduling team to address issues such as the time related impacts of differing site conditions and other contract changes which require attention.

2.6. The PCEP includes several contracts for independent project elements, i.e., electrifying the system and making necessary changes to the signal system; supplying new electric trains, supplying new systems control and data acquisition equipment, and modifying the CEMOF to accommodate the new electric trains. In addition, the JPB has acquired and installed a new Positive Train Control system which must be taken into account by the other contractors. These diverse project elements must be physically integrated to provide a safe and reliable commuter rail system. The JPB is responsible for the integration of

these diverse elements because none of contractors have been assigned that responsibility through their contracts. Each contractor has its own integration responsibilities as related to its finished product, but none has the overall responsibility. The PCEP team has designated a Systems Integration (SI) lead from its Electrification Support consultant. This individual is assigned half-time to the SI function and the remaining half-time to support of the signals design effort. In addition to his SI role, he also participates in Rail Activation and Testing and Commissioning activities. Systems Integration has been among the top risks on the PCEP's risk register until recently, and the PMOC's opinion is that it remains among the top risks. The PMOC's opinion is that additional staff is needed to support these critical activities.

2.7. The Electrification contractor has filed four (4) separate claims, two (2) of which are directly related to the grade crossing warning issue described above and two (2) which are unrelated. The Electrification contract contains a progressive dispute resolution process which included use of a Disputes Review Board (DRB) as a final step. The PCEP leadership unilaterally discontinued the DRB process in mid-2019 because it concluded that the Electrification contractor was attempting to avoid the early steps in the dispute resolution process by going directly to the DRB. The PCEP introduced an alternative dispute resolution process called "technically facilitated mediation" which employs a third-party mediator supported by a technically qualified subject matter expert, in this case one qualified in rail signals design. The first substantive mediation session was held on December 16, 2019. The mediation process has continued with meetings approximately monthly; the latest was held May 20, 2020. The CalMod Chief Officer reports that the mediation is currently focused on the direct cost of implementing the 2SC solution and has not yet addressed the time impact associated with the delay in signal design.

3. Hurdles

3.1. The Town of Atherton filed suit in February 9, 2015 challenging the validity of the Final Environmental Impact Report (FEIR) adopted by the JPB in early 2015. The suit alleges, in part, that the description of the project's impacts is inadequate. The plaintiff did not request injunctive relief and the litigation proceeded. The formal hearing was held on September 2, 2016 and the Court issued its Final Order in the JPB's favor on September 26, 2016. The plaintiffs did not appeal the Court's Final Order.

3.2. Portions of the PCEP corridor are in nineteen (19) municipalities and three (3) counties. The JPB and its PCEP team have been diligent in not only obtaining agreements with all but one of these jurisdictions, but in working collaboratively with the staff of the jurisdictions to promptly solve any permitting, environmental or construction related issues.

3.3. The FTA recommended the award of an FFGA for the PCEP on January 16, 2017; the Congressional Notice period expired on February 17, 2017. The FTA notified the JPB on February 17, 2017 that it was deferring a decision on whether to execute the FFGA, to allow the PCEP to be considered in conjunction with the development of the President's Fiscal Year (FY) 2018 Budget, and the companion FTA Report to Congress on Annual Funding Recommendations for the Capital Investment Grant (CIG) Program. The JPB, following receipt of the FTA's letter of February 17, 2017, took steps to suspend certain non-critical activities to conserve cash until there was more clarity related to the award of the FFGA. The JPB previously issued Limited Notices to Proceed (LNTPs) for both the

electrification and EMU procurement contracts on September 6, 2016 and work is underway on design and related non-construction activities. The JPB had intended to issue full Notices to Proceed (NTPs) on March 1, 2017, following execution of an FFGA. The JPB announced on February 27, 2017 that it had reached agreement with both the electrification and EMU contractors to extend the respective LNTPs through June 30, 2017. It was unclear during this time whether the FFGA was in jeopardy of not being executed or was merely delayed.

Following execution of the FFGA, the JPB issued a Change Order to the Electrification contractor in the amount of $9.6 million plus 104 days extension and to the EMU contractor in the amount of $490,000 plus a delay of two months in the delivery of the first two trainsets. In summary, the delay in receiving the FFGA cost the PCEP more than $10 million in Change Order costs to the two (2) main contractors and resulted in a reduction of the initial 371 days of schedule contingency by 115 days, leaving a remaining schedule contingency of 256 days.

3.4. The FTA, prior to award of the FFGA, required the JPB to provide additional financial assurance that the project could withstand an increase in total cost beyond the FFGA amount. The JPB requested additional financial support from its existing funding partners. The support was provided through a "Seven-Party Supplement to 2012 Memorandum of Understanding (MOU) Regarding Financial Commitments to Address Funding Gap for the Peninsula Corridor Electrification Project." The other funding partners insisted on an active PCEP oversight role as a condition of providing the additional financial support.

Representatives of the various funding partners currently attend most of the PCEP's significant project management meetings. The funding partners also participate as voting members of the PCEP's Change Management Board (CMB); one representative is currently serving as Chair of the CMB. The funding partners' representatives take an active role in CMB discussions of proposed Change Orders. They have also encouraged the PCEP to produce various charts, graphs, and other materials to clearly present the state of the project from a cost and schedule perspective. The PMOC's opinion is that the funding partners' participation and active engagement in oversight of the PCEP has been beneficial to all parties.

3.5. The JPB, prior to the start of the PCEP, entered into a contract for design and installation of a federally mandated Positive Train Control (PTC) system. The PTC project was behind schedule and the JPB terminated the contractor for default. Opposing lawsuits resulted and the litigation continues. The JPB then entered into a contract with another supplier to complete the PTC system within the federally permitted schedule. Caltrain service is now operating its PTC equipped trains in what the FRA terms Revenue Service Demonstration (RSD) and is on a path to becoming fully PTC compliant under FRA rules. The impact on the PCEP was two-fold, first was a change in the electronic equipment to be installed on the EMUs, second was a change in the method of activation of the grade crossing system. This second impact is described in detail in the **Issues** section above. In addition to these two impacts, the pressure to complete PTC certification was a significant area of concern to Caltrain Rail Operations, as it competed with many of the other passenger and freight rail systems in the country for very scarce technical resources. Caltrain's Rail Operations team was able to test and certify its PTC system with minimal impact on the PCEP's construction activities.

3.6. The California High-Speed Rail Authority (CHSRA) is one of the nine-parties providing local funding for the PCEP. The CHSRA proposes, at a later date, to operate in blended service with Caltrain in this corridor. The planned joint use by Caltrain and the CHSRA of the electrified corridor means that design decisions that potentially impact future CHSRA operations must be considered by the PCEP. For example, the extent of notching of the four (4) existing Caltrain tunnels was uncertain for some time because the CHSRA had not determined the maximum size of high-speed train that would be used. The PCEP accommodated a request by CHSRA to re-locate some of its catenary poles to permit future curve straightening by the CHSRA to allow higher-speed running by its trains; this work was funded by CHSRA as a Concurrent Non-Project Expenditure (CNPA). Future blended service will require Caltrain's EMU's to be equipped with both low and high-level doors that are capable of providing boarding at existing Caltrain low-level platforms, and level boarding at the higher CHSRA platforms at those stations to eventually be served by both systems.

3.7. The PCEP will be powered by electricity supplied by Pacific Gas & Electric Company (PG&E). PG&E will supply 115 kV power from its FMC substation in San Jose to the PCEP's traction power substation (TPSS) #2 and from its East Grand substation in South San Francisco to TPSS #1; both PG&E substations must be modified to provide the required power. The JPB has executed a Master Agreement with PG&E, as well as Supplements 1 through 5 to that agreement. The Master Agreement and its Supplements impose various conditions that impact the cost, schedule, and technical requirements of the PCEP. Permanent power for the PCEP will not be available until September 9, 2021. Temporary power to permit initial testing of the EMUs was addressed under Supplement 5 of the Master Agreement and is currently available at PG&E's FMC substation in San Jose; the PCEP's TPSS #2 is not sufficiently complete to use this power. Supplement 4 includes the cost of constructing the substation modifications; however, the parties disagreed on the allocation of costs for the work. Following discussions between the parties, PG&E filed an application with the California Public Utilities Commission (CPUC) for a cost allocation plan. The CPUC's Administrative Law Judge announced a decision on May 7, 2020 that adopted a modified order affirming the cost allocation principles agreed to by the JPB and PG&E.

The details of design and construction of the inter-connections between the two (2) PG&E substations and the PCEP's corresponding traction power substations (TPSS) was not fully understood at the time the Electrification contract was awarded. The design of the inter-connections must be done by a PG&E approved engineer and similarly, construction must be performed by a PG&E approved contractor. The PCEP's plan was to have the Electrification contractor sub-contract that work to an engineering firm approved by PG&E and then constructed by a PG&E approved sub-contractor. Design of both interconnections is nearing completion by TRC, a PG&E approved design consultant as a sub-consultant to the Electrification contractor. TRC was also to construct the inter-connections; however, it declined to perform the construction, citing unacceptable business risk.

The JPB recently transferred responsibility for construction of the two (2) interconnections from the Electrification contractor's sub-contractor TRC to PG&E under a negotiated modification to Supplement No. 2 of the PG&E Master Agreement. PG&E is now finalizing a contract package prior to soliciting bids for the work. PG&E's schedule shows

construction of the southern interconnection starting on September 18, 2020 and the connection to temporary power at the FMC substation occurring on February 20, 2021.

3.8. Wildfires in California during the summers of 2018 and 2019 resulted in a shortage of qualified high-voltage construction personnel, because crews were needed to make changes in the state's transmission system to avoid creating additional wildfire risk. This shortage of crews impacted both PG&E's work on its own substations being modified to serve the PCEP, but also for the Electrification contractor whose crews were working on the PCEP facilities.

3.9. The emergence of the COVID-19 Global Pandemic in early 2020 has been a life-altering event for most Americans as well as people around the world. The impacts to the PCEP can generally be described as follows:

- Agency staff, consultants, and contractors were initially affected by local Shelter In-place Orders issued by local health authorities. These Shelter In-place Orders prohibited individuals from working in their offices or normal places of employment, and limited daily activities and routines for virtually everyone.
- The PCEP was designated as an Essential Activity by the City and County of San Francisco which permitted construction and other project related activities to continue with appropriate health-related safeguards.
- Most office workers and consultants continued to work from home using web-based conferencing software and telephone/teleconference communications. These techniques allowed most routine project meetings to continue.
- Field personnel continue to perform their assigned duties in keeping with applicable safety plans and public health directives. The PCEP's leadership reports that productivity has been largely unaffected by the COVID-19 restrictions.
- Once the scope of the COVID related restrictions became apparent, most project contractors, sub-contractors, and suppliers notified their respective owners, prime contractors, and customers, that there normal business activities were being affected by the COVID-19 pandemic, and asserting or reserving whatever commercial protections might be available to them under their respective contracts.
- The EMU contract, particularly, has an international supply chain. A number of Stadler's foreign suppliers provided notice of COVID-related impacts. Activities at the Salt Lake City, Utah, assembly facility were briefly interrupted until they were allowed to resume as an essential activity. Stadler took steps to alter normal work practices to comply with health directives for both office staff and production workers which allowed near-normal production to resume. A significant impact resulted from the International Travel Ban which prevented European software engineers from travelling to the Salt Lake City facility to troubleshoot Trainset 1 as it nears initial completion and prepares for transfer to the AAR Test Track in Pueblo, Colorado, to complete its type testing. This impact is a day-for-day delay.

4. Impacts to Agency Staff

The JPB, at the time it initiated the PCEP, had little recent experience with the FTA's Capital Investment Grant (CIG) program, and few staff members that had been on a project that was funded by the FTA's New Starts process. The JPB hired an independent consultant as Project Delivery Manager to lead this effort. The individual had prior experience with the Washington Metropolitan Area Transit Authority (WMATA) and most recently led the Houston Metro's inaugural light rail transit (LRT) project. The JPB built the initial PCEP team with a small number of JPB staff augmented by three (3) consultant teams, one each for Program Management, Electrification Support, and Vehicle Support. Each of these teams had senior members with recent experience with FTA's New Starts program. The JPB's staff assigned to the PCEP, with few exceptions, also lacked experience managing projects of the size and complexity of the PCEP.

5. Overall System Performance

5.1. Caltrain's rail ridership was very high pre-pandemic and was a major factor leading to the implementation of the PCEP. Caltrain operations reported at the June 4, 2020 JPB meeting that in April 2020, Caltrain's Average Weekday Ridership (AWR) decreased by 97.7 percent to 1,547 from April 2019 AWR of 67,728. The total number of passengers who rode Caltrain in April 2020 decreased by 97.6 percent to 38,858 from 1,593,266 April 2019 ridership. Caltrain experienced a significant decline in ridership due to the COVID-19 pandemic and the implementation of the Bay Area wide and Statewide shelter-in place orders in mid-March 2020 to prevent the spread of the virus. Caltrain, in response to the drop in ridership, reduced its weekday service from forty-six (46) trains in each direction to a total of forty-two (42) trains.

5.2. Caltrain's revenue operations have not been significantly affected by PCEP construction activities, with one exception. That exception was the interruption of weekend service between the Fourth and King terminus in downtown San Francisco and the Bayshore station for a total of thirty-three (33) weekends during the winter of 2018-19 and 2019-20. These weekend closures were needed to allow construction work on four (4) tunnels to be accomplished in an effective manner. Caltrain provided passengers with service to and from Bayshore using a bus bridge to connect to rail operations to the south.

5.3. The PCEP was one of two (2) major components of the Caltrain Modernization Program (CalMod) program. The second major component of CalMod was the CBOSS-PTC project, described earlier, that was already underway. Although both the PCEP and the C-BOSS-PTC projects reported to the same JPB executive, they did not share common project management.

The JPB also has an on-going capital construction program in addition to the CalMod projects. The capital construction program focuses primarily on grade crossing improvements, including grade-separation projects. Several of the JPB's capital projects included elements that could be completed in conjunction with the PCEP as Concurrent Non-Project Activities (CNPAs). The most significant CNPAs were the 25th Avenue Grade Separation, the South San Francisco Station, the Los Gatos Bridge Replacement and Track and Drainage Improvements in some of the tunnels. In most cases, the PCEP components of these projects were minor in comparison to the primary project scope.

6. Lessons Learned

CalMod

CALTRAIN ELECTRIFICATION PROJECT

Lessons Learned Summary

The lessons learned program was developed with the assistance of FTA Project Management Oversight Program (PMOP) contractors, transit properties, and FTA regional engineers. Capturing and disseminating lesson learned can assist an organization in advancing major capital transit projects professionally, efficiently, and in conformance with applicable statutes, regulations, and guidance as well as sound engineering and project management practices. The focus of lessons learned is to facilitate the delivery of a project on time, within budget, in conformance with approved plans and specifications, and is efficiently and effectively implemented.

The Peninsula Corridor Electrification Program (PCEP) conducted a series of interviews with key project staff to identify lessons learned that could be used both during the PCEP and for other projects advanced by the Joint Powers Board (JPB). Sample lessons learned summaries and an extract from the lessons learned log are included in this brochure. Project participants are encouraged to submit additional lessons learned at any time during the execution of the PCEP.

Land Acquisition

Date: June 18, 2018

Abstract: Identification of property that would be required for the construction of the electrification project was made during the design phase, leading up to the release of the request for proposal (RFP). Based upon the 35 percent plans, right-of-way requirements were identified, and the contract committed JPB to delivering those parcels prior to the completion of construction in each work segment.

Changes in the design, subsequent to the 35 percent level necessitated changes in the right-of-way requirements. Under the current contract between JPB and the contractor, JPB is responsible for responding to requests for changes in right-of-way with acquisition as noted in the contract: prior to the completion of construction within each work segment.

Project Phase(s): Design and construction **Lesson Learned Category**: Real Estate
Project Cycle Phase (Primary): Design **Project Cycle Phase (Secondary):** Requirements Analysis

Background: The electrification contract assumed that right-of-way would be identified early in the design process (i.e., 35% plans) and that any changes to ROW requirements would be forwarded to Real Estate for acquisition.

The Lesson: The electrification contract should have accommodated a process in which design and real estate interact to optimize land takes at the best price. Small changes in design could have reduced acquisition costs and accelerated purchases rather than Real Estate meeting requests for land with no opportunity for modifications.

Applicability: Identification of required right-of-way takes place throughout the construction process in a design-build contract and therefore this lesson has applicability.

Contractor Construction Work Windows

Date: June 18, 2018

Abstract: Contractor construction work windows were developed during the formulation of the request for proposal (RFP) for the design-build contract covering electrification of the Peninsula Corridor. Project staff in collaboration with Operations staff developed a schedule that would grant track access to the contractor during certain times and for certain durations along the entire corridor. Constraints on working in adjacent segments and the order in which segments would be made available was specified.

When put into practice, the contractor found that contract work windows were not available in entirety and to the extent envisioned in the RFP.

Project Phase(s): Design and construction **Lesson Learned Category**: Schedule

Project Cycle Phase (Primary): Planning **Project Cycle Phase (Secondary):** Construction

Background: Development of the work window schedule did not fully appreciate the consequences of decisions made during planning of track time and as a consequence were unable to deliver anticipated track time to contractor.

The Lesson: Work track access time should be developed collaboratively between design, construction, and operations staff. All parties need to appreciate the expectations of the contractor to deliver work windows once a final schedule is established which includes delivery of entire work areas rather than limited portions

Applicability: Work window planning and implementation must take place prior to the issuance of the RFP and must be finalized prior to the execution of a contract between the agency and the contractor. Construction pricing and schedule and dependent upon a firm understanding of when construction may take place within the rail right-of-way.

A comprehensive approach to developing and maintaining work windows is required and periodic reevaluation and refinement is required. Such refinements may constitute change orders with attendant cost and schedule implications. Consequentially, this lesson applies to both the time period leading up to release of the RFT and continues through the duration of the construction period.

LL#	LESSON OWNER	EFFECT CATEGORY	PROJECT CYCLE PHASE PRIMARY	PROJECT CYCLE PHASE SECONDARY (Optional)	LESSON LEARNED CATEGORY	STATEMENT OF SUCCESS OR PROBLEM (5WH)	RECOMMENDATIONS FOR FUTURE CONSIDERATION	Reference to LL#	Project	General Comments
003			DV	C		The project schedule was influenced by political and financial requirements and did not properly take into account resource constraints needed along the critical path.	The project schedule should be developed in an unbiased, technical manner uninfluenced by external influences. Critical deficiencies like insufficient number of design personnel should be fully considered in developing the schedule.		E	
004			P	C		Development of the work window schedule did not fully appreciate the consequences of decisions made during planning of track time and as a consequence were unable to deliver anticipated track time to contractor.	Work track access time should be developed collaboratively between design, construction, and operations staff. All parties need to appreciate the expectations of the contractor to deliver work windows once a final schedule is established which includes delivery of entire work areas rather than limited portions.		E	
005			P	C		The contractor's schedule was not sufficiently vetted to understand the real ability to carry out construction on schedule.	The contractor's schedule should have been resource loaded to understand how productivity was to be achieved. When productivity failed to meet the plan, the project management team needs to intervene quickly and require a response based upon original expectations for project delivery.		E	
006			C	O	$	Review of deliverables did not typically include both technical and schedule checks. Deliverables therefore, may have been delivered behind schedule resulting in project schedule delays.	Reviewers need to confirm timely completion and submittal of documents submitted for review and require remedial action as late deliveries affects overall project progress.		E	
007			O	D		Professional staffing levels were low for a project of this magnitude resulting in the risk of insufficient resources for timely attention to issues. The lack of redundancy in professional staffing creates the potential for delayed responses to critical issues, particularly when changes in personnel and vacation schedule occur.	Professional staffing should include sufficient staff and staffing depth to ensure timely response to critical issues and changes in personnel.		E	
008			RA	D		Planimetric and survey control was not completed in advance of preliminary engineering.	Base mapping should be completed in advance of preliminary design and prior to turning design over to a design-build contractor to avoid rework.		E	
009				D		Railroad stationing was changed for an associated project but resulted in difficulty reconciling equipment locations and utility crossings that were keyed to the old stationing system.	Changes in railroad stationing should be made only in limited circumstances and certainly not during the performance of a major contract affecting the entire alignment.		E	
010			RA	C		Changes in the CBOSS plans resulted in equipment not being placed where proposed resulting in uncertainties for subsequent design and construction.	Associated projects should be developed recognizing those capital improvements in the immediate horizon. Final configuration of projects should be properly documented in as-builts and verified.		E	

C Construction | P Program Management | RA Requirements Analysis | DV Development | Other | Real Estate | Organizational | O Operations | Schedule | $ Budget