



PROJECT MANAGEMENT OF THE CALTRAIN MODERNIZATION PROGRAM

[Issue](#) | [Summary](#) | [Glossary](#) | [Background](#) | [Discussion](#) | [Findings](#) | [Recommendations](#)
[Requests for Responses](#) | [Methodology](#) | [Bibliography](#) | [Appendixes](#) | [Responses](#)

ISSUE

Does Caltrain have the necessary processes in place to manage effectively and efficiently the Caltrain Modernization Program (CalMod) and is the public able to easily obtain useful information about the project's status?

SUMMARY

Caltrain has experienced a 132 percent increase in ridership since 1998 and expects that upturn to continue due to anticipated population and job growth. To address this increase as well as other concerns, Caltrain has undertaken a \$1.98 billion modernization program. The program includes the electrification of the commuter rail system from San Francisco to San Jose (52 of Caltrain's 77 miles between San Francisco and Gilroy) and the replacement of 75 percent of Caltrain's diesel trains with electric trains (recent new funding may increase that number).¹ These changes are expected to increase passenger capacity and revenues, improve train performance, reduce engine noise, and improve regional air quality.

The San Mateo County Civil Grand Jury (Grand Jury) investigated whether the Peninsula Corridor Joint Powers Board (PCJPB), which owns (San Francisco to San Jose) and operates (San Francisco to Gilroy) the Caltrain commuter rail system, has adequate management processes in place for a project of this scale. The Grand Jury also investigated whether the public has access to meaningful information about the status of the project.

The Grand Jury finds that the Caltrain has adequate management processes in place to implement a project of this scale. The Grand Jury concludes, however, that it is difficult for the public to find and access useful, summary project information and that searching for key project terms on the Caltrain and CalMod websites does not yield useful results.

GLOSSARY

Caltrain Modernization Program (CalMod) - Caltrain Modernization Program of which the Peninsula Corridor Electrification Project is the major component, along with other associated future upgrades to Caltrain's systems.

Caltrain – The name under which the Peninsula Corridor Joint Powers Board (PCJPB) operates passenger train service from San Francisco to Gilroy.

Caltrain Peninsula Corridor - The transportation corridor along the San Francisco Peninsula, including Caltrain rail service and the cities from San Francisco to San Jose.²

¹ Grand Jury email exchange with a Caltrain senior manager.

² "Electrification of Caltrain," Wikipedia contributors, Wikipedia, The Free Encyclopedia, accessed March 23, 2018. <https://en.wikipedia.org/w/index.php?title=Caltrain&oldid=831892316>.

Caltrans - California Department of Transportation, a department of the California State Transportation Agency.

Full Funding Grant Agreement – The Full Funding Grant Agreement is used by the Federal Transit Administration for making a major grant, which in exchange for federal funds the grantee commits to complete its project on time, within budget, and in compliance with all applicable federal requirements, and to bear any cost increases that might occur after award and execution of the agreement.³

Peninsula Corridor Joint Powers Board (PCJPB) - The Peninsula Corridor Joint Powers Board owns (San Francisco to San Jose) and operates (San Francisco to Gilroy) Caltrain's rail service. The PCJPB is made up of nine representatives, three from the City and County of San Francisco, three from the San Mateo County, and three from Santa Clara County.⁴

Peninsula Corridor Electrification Project (PCEP) – The Peninsula Corridor Electrification Project, is the key component of the Caltrain Modernization Program. The PCEP will electrify the Caltrain Peninsula Corridor from San Francisco to San Jose, replace diesel-trains with electric trains, and increase service by one train per peak hour per direction (from five to six trains).⁵ Depending on potential High Speed Rail scheduling, capacity will exist for additional trains.⁶

Positive Train Control (PTC) –Positive Train Control is an advanced system designed to automatically stop a train before certain accidents occur. PTC is designed to prevent train-to-train collisions, derailments caused by excessive train speed, train movements through misaligned track switches, and unauthorized train entry into railroad work zones. PTC will not prevent vehicle-train accidents at grade crossings, or those due to track and other equipment failures.

San Mateo County Transit District (SamTrans) – The administrative body for the principal public transit and transportation programs in San Mateo County. SamTrans operates San Mateo county bus service. By contract it manages the operation of both Caltrain and the San Mateo County Transportation Authority.

³ “Full Funding Grants Agreement Guidance,” Federal Transit Administration, December 5, 2002.

<https://www.transit.dot.gov/regulations-and-guidance/fta-circulars/full-funding-grant-agreements-guidance>.

⁴ “Joint Powers Agreement Peninsula Corridor Project,” Caltrain, October 3, 1996.

<http://www.caltrain.com/Assets/Executive/PDF/Joint+Powers+Agreement.pdf>.

⁵ “Peninsula Corridor Electrification Project,” Caltrain, accessed April 7, 2018.

<http://www.caltrain.com/projectsplans/CaltrainModernization/Modernization/PeninsulaCorridorElectrificationProject.html>.

⁶ Grand Jury email exchange with a Caltrain senior manager.

BACKGROUND

Rail travel on the Peninsula Corridor began in 1863 as the privately-owned San Francisco and San Jose Railroad Company. Ownership of the railroad has gone through several changes, including long-term ownership by the Southern Pacific Railroad. Since 1991, the Peninsula Corridor Joint Powers Board (PCJPB) has owned and operated Caltrain, which now runs 77 miles from San Francisco to Gilroy.⁷ The PCJPB is made up of representatives appointed by the City and County of San Francisco, the San Mateo County Transit District, and the Santa Clara Valley Transportation Authority.

Passing through seventeen cities across three counties, Caltrain's total service area has over 3 million residents from urban San Francisco through suburban Silicon Valley, and on to rural Gilroy. With world-class universities and concentrations of high-tech and bio-tech firms, the area serviced by Caltrain has experienced rapid job growth and is expected to continue to grow in the coming years.⁸

Currently, Caltrain serves an average of 62,190 weekday riders, up from 26,794 in 1998.^{9,10} Steady increases in ridership have strained Caltrain capacity during peak commute hours, with some trains running up to 139 percent of seating capacity.¹¹ According to a report from the San Francisco Bay Area Planning and Urban Research Association (SPUR), the projected population and job growth in the Caltrain Peninsula Corridor may overwhelm current Caltrain capacity in just a few years.¹²

To address ridership increases and other issues, in 1999 the Caltrain strategic plan made CalMod one of its priorities.¹³ CalMod will electrify Caltrain from San Francisco to San Jose (52 of Caltrain's 77 miles between San Francisco and Gilroy) using an overhead electric wire contact system such as that currently in use in the northeastern U.S. corridor and in many locations in Europe.

CalMod will replace most of Caltrain's diesel trains with high-performance electric trains and will upgrade associated signaling systems. Due to the electric trains' ability to start and stop more quickly, there will be an increase of one train per peak hour, in each direction (from five to

⁷ "Historic Milestones," Caltrain, accessed March 23, 2018.

<http://www.caltrain.com/about/Caltrain150/Milestones.html>.

⁸ "The Economic Impact of Caltrain Modernization," Bay Area Council Economic Institute, June, 2012, 7, accessed March 23, 2018. <http://documents.bayareacouncil.org/caltrainecon.pdf>.

⁹ "2017 Annual Passenger Counts," Caltrain, June 1, 2017, 6, accessed April 9, 2018.

http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/Board+of+Directors/Presentations/2017/2017-06-01+Annual+Passenger+Counts.pdf.

¹⁰ "Caltrain," Wikipedia contributors, *Wikipedia, The Free Encyclopedia*, accessed March 23, 2018.

<https://en.wikipedia.org/w/index.php?title=Caltrain&oldid=831892316>.

¹¹ "Caltrain 2017 Annual Passenger Count Key Findings," Caltrain, 10, accessed March 23, 2018.

http://www.caltrain.com/Assets/_Marketing/caltrain/pdf/2016/2017+Annual+Count+Key+Findings+Report.pdf.

¹² Ratna Amin, "The Caltrain Corridor Vision Plan," SPUR, February 2017, 19.

http://www.spur.org/sites/default/files/publications_pdfs/SPUR_Caltrain_Corridor_Vision_Plan_print.pdf.

¹³ "Caltrain Electrification Project Status Update," Caltrain, July 2017, accessed April 9, 2017. http://svlg.org/wp-content/uploads/2017/07/1_Caltrain_fsheets_6.2017.pdf.

six trains).¹⁴ Depending on potential High Speed Rail scheduling, capacity will exist for additional trains.¹⁵ With electrification, Caltrain will run a “mixed fleet” of 75 percent electric trains and 25 percent diesel trains (recent new funding will increase the percentage of electric trains).¹⁶ Electric train service is expected to begin in late 2021 or early 2022.¹⁷

With the passage of California’s Proposition 1A in 2008, a \$10 billion bond issue to support high-speed rail, and with the promise of funding from the California High Speed Rail Authority (CHSRA), Caltrain moved forward with CalMod planning.¹⁸ Caltrain coordinates with the CHSRA so that CalMod will support high-speed rail in a future “blended system”.¹⁹ In 2015 Caltrain received environmental clearance for the electrification project and the following year Caltrain awarded the initial contracts.^{20,21}

In 2017, Caltrain held the groundbreaking for the electrification project.²²

According to Caltrain, the electrification project is designed to:

- Improve train performance by increasing ridership capacity and service
- Increase revenue and reduce fuel cost
- Reduce engine noise emanating from trains
- Improve regional air quality and reduce greenhouse gas emissions²³

¹⁴ “Capacity Increase Background Information,” Caltrain, accessed June 7, 2018.

<http://www.caltrain.com/projectsplans/CaltrainModernization/Modernization/PeninsulaCorridorElectrificationProject/Capacity.html>.

¹⁵ Grand Jury email exchange with a Caltrain senior manager.

¹⁶ Ibid.

¹⁷ “Caltrain Electrification Frequently Asked Questions,” Caltrain, accessed March 24, 2018. http://calmod.org/wp-content/uploads/CalMod_FAQ_1.2018.pdf.

¹⁸ “News: Governor Signs Bill Ensuring CalMod Receives Prop 1A Funding,” Caltrain, October 7, 2016.

http://www.caltrain.com/about/MediaRelations/News_Archive/News_Governor_Signs_Bill_Ensuring_CalMod_Receives_Prop_1A_Funding.html.

¹⁹ “MTC Resolution No. 4056 – Memorandum of Understanding: High-Speed Rail Early Investment Strategy for a Blended System on the Peninsula Corridor,” Metropolitan Transportation Commission, March 21, 2012.

http://apps.mtc.ca.gov/meeting_packet_documents/agenda_1832/tmp-4056.pdf?utm_source=MOU+Announcement+&utm_campaign=MOU+Announcement+&utm_medium=socialshare.

²⁰ “Peninsula Corridor Electrification Project Final Environmental Impact Report (FEIR),” Caltrain, accessed March 24, 2018.

http://www.caltrain.com/projectsplans/CaltrainModernization/Modernization/PeninsulaCorridorElectrificationProject/FEIR_Release.html.

²¹ “Contract Extension Information,” Caltrain, accessed June 7, 2018.

http://www.caltrain.com/projectsplans/CaltrainModernization/Modernization/PeninsulaCorridorElectrificationProject/Contract_Extension.html.

²² “Caltrain Hosts Groundbreaking for Electrification Project,” Caltrain, accessed March 24, 2018.

http://www.caltrain.com/about/MediaRelations/news/Caltrain_Hosts_Groundbreaking_for_Electrification_Project.html.

²³ “Caltrain Electrification Project Status Update,” Caltrain, January 2018. http://calmod.org/wp-content/uploads/Caltrain_fsheets_1.2018_v3.pdf.

DISCUSSION

Caltrain's Previous Management Problems with the CBOSS PTC Project

The Grand Jury began investigating the management of CalMod, in part after noting the difficulties Caltrain was having in managing the Communications Based Overlay Signal System (CBOSS) Positive Train Control (PTC) project.^{24,25,26} The CBOSS PTC project is separate from CalMod but integral to its final functioning.²⁷

In response to a 2008 Metrolink train collision in Los Angeles that killed 25 people, Congress mandated that all passenger, commuter, and hazardous materials trains install PTC by 2015. After it became clear that railroads would be unable to comply, the hardware installation deadline was pushed back to December 2018.²⁸ In 2011, Caltrain awarded the contract for its own version of PTC, the CBOSS system. CBOSS would not only satisfy the federal requirements for PTC but would also be interoperable with all other rail systems that access the Caltrain corridor, including commuter rail, freight rail and, in the future, high-speed rail.²⁹

Caltrain contracted with Parsons Transportation Group (Parsons) for the design and installation portion of the \$231 million CBOSS PTC project. After significant problems with the project, Caltrain terminated the Parsons contract in February 2017, resulting in dueling lawsuits between Caltrain and Parsons.³⁰ Caltrain spent over \$201 million on the canceled CBOSS PTC project.³¹ While many components of the CBOSS PTC will be used by the new contractor Wabtec

²⁴ "Advanced Signal System Project - CBOSS PTC," Caltrain, accessed March 23, 2018.

<http://www.caltrain.com/projectsplans/CaltrainModernization/CBOSS-PTC-Project.html>.

²⁵ Positive Train Control is an advanced system designed to automatically stop a train before certain accidents occur. PTC is designed to prevent train-to-train collisions, derailments caused by excessive train speed, train movements through misaligned track switches, and unauthorized train entry into work zones. PTC will not prevent vehicle-train accidents at grade crossings, or those due to track and equipment failures. ("Positive Train Control," Union Pacific, accessed April 4, 2018. https://www.up.com/media/media_kit/ptc/about-ptc/.)

²⁶ "Caltrain safety work hindered by 'animosities'," Jen Nowell, *Daily Post*, August 8, 2016 ID

15EA8062155FD510, [http://nl.newsbank.com/nl-search/we/Archives?p_product=SFDB&p_theme=sfdb&p_action=search&p_maxdocs=200&s_dispstring=CBOSS%20AND%20date\(all\)&p_field_advanced-0=&p_text_advanced-0=\(CBOSS\)&xcal_numdocs=20&p_perpage=10&p_sort=YMD_date:D&xcal_useweights=no](http://nl.newsbank.com/nl-search/we/Archives?p_product=SFDB&p_theme=sfdb&p_action=search&p_maxdocs=200&s_dispstring=CBOSS%20AND%20date(all)&p_field_advanced-0=&p_text_advanced-0=(CBOSS)&xcal_numdocs=20&p_perpage=10&p_sort=YMD_date:D&xcal_useweights=no).

²⁷ Officials from Caltrain; interviews by the Grand Jury.

²⁸ Michael Balsamo and Michael Sisak, "Congress has extended deadlines to install a train safety system that could have saved 298 lives," *Chicago Tribune*, December 22, 2017. <http://www.chicagotribune.com/news/nationworld/ct-positive-train-control-20171222-story.html>.

²⁹ "Advanced Signal System Project – CBOSS PTC," Caltrain, accessed March 25, 2018.

<http://www.caltrain.com/projectsplans/CaltrainModernization/CBOSS-PTC-Project.html>.

³⁰ "Caltrain, Safety Contractor Trade Lawsuits," Matthew Renda, *Courthouse News Service*, March 6, 2017, accessed June 7, 2018. <https://www.courthousenews.com/caltrain-safety-contractor-trade-lawsuits/>.

³¹ "Quarterly Capital Program Status Report 2nd Quarter FY 2018", Caltrain, March 1, 2018, 5.

[http://www.caltrain.com/Assets/ Finance/Quarterly+Capital+Program+Status+Report/JPB/FY18+Q2+JPB+Quarterly+Report.pdf](http://www.caltrain.com/Assets/Finance/Quarterly+Capital+Program+Status+Report/JPB/FY18+Q2+JPB+Quarterly+Report.pdf).

Corporation³² and its proprietary I-ETMS³³ PTC system, the Federal Rail Administration notes that the discontinuation of the CBOSS PTC project will result in “significant onboard and back office hardware modifications from this point forward.”^{34,35}

The Wabtec system contract is designed to ensure that Caltrain meets the federal December 2018 deadline for installation of a PTC system. However, that system, which is designed for Caltrain’s diesel fleet, will not initially have the capability of controlling the CalMod electric trains. Consequently, Stadler, the electric train car (known as Electric Multiple Units or EMUs) manufacturer, will install and integrate the Wabtec PTC system within the EMUs prior to the completion of CalMod.³⁶

Prior to terminating the Parsons contract, Caltrain requested a peer review of the CBOSS PTC project from the American Public Transportation Association (APTA). The report noted problems with both Caltrain and Parsons’ management of the project. Among other findings, the APTA noted Caltrain management issues in both personnel and processes (see Appendix A for the APTA report).³⁷

Among the Caltrain management issues noted by APTA were:

- No commonly approved project schedule between Caltrain and Parsons
- Lack of a strong in-house technical team to oversee the project
- No commonly agreed upon definition of some final deliverables or how to test them
- Lack of a working escalation method to resolve issues raised between Caltrain and Parsons³⁸

Concerned that if Caltrain had difficulties in managing a \$231 million project, it may be unable to manage CalMod, a project ten times the size, the Grand Jury began its investigation into

³² Wabtec Corporation is a supplier of value-added, technology-based products and services for freight rail, passenger transit and select industrial markets. It is the owner of the proprietary I-ETMS PTC System. <http://wabtec.com/products/1454/i-etms%E2%84%A2>.

³³ Interoperable Electronic Train Management System. <http://wabtec.com/products/1454/i-etms%E2%84%A2>.

³⁴ “Caltrain PTC Program Status & Wabtec Contract Award,” Caltrain, March 1, 2018.

<http://www.caltrain.com/Assets/Agendas+and+Minutes/JPB/Board+of+Directors/Presentations/2018/2018-03-01+JPB+Wabtec+presentation.pdf>.

³⁵ “PTC Implementation Status by Railroad,” Federal Railroad Administration, accessed March 27, 2018. <https://www.fra.dot.gov/app/ptc/>.

³⁶ . Grand Jury email exchange with a Caltrain senior manager.

³⁷ “Final Report of The North American Transit Services Association Peer Review Panel on The Communications Based Overlay Signal System (CBOSS) Positive Train Control (PTC) Project Provided at Caltrain,” American Public Transportation Association, July 4, 2016.

<http://www.caltrain.com/Assets/Caltrain+Modernization+Program/CBOSS+PTC/APTA+Peer+Review+Report.pdf>.

³⁸ Escalation is a formal process to raise the issue at hand to a higher authority per the escalation method for the project. Risks or issues related to project objectives, resource and inter-group conflicts, ambiguous roles and responsibilities, scope disagreements, and third-party dependencies are some situations calling for escalations. (“A Guide to Escalation in Project Management,” Project-Management.com, accessed May 23, 2018. <https://project-management.com/a-guide-to-escalation-in-project-management/>.)

CalMod.³⁹ Specifically, the Grand Jury focused on whether these management issues had sufficiently been addressed to ensure that CalMod avoids the fate of the CBOSS PTC project.

Tendency of Large Projects to Exceed Budget and Fall Behind Schedule

At a current budget of \$1.98 billion CalMod is a “megaproject”.^{40,41} Projects of this size and complexity are well known for being over budget and behind schedule. Consultants McKinsey & Company report that:

The risks associated with megaprojects—those that cost \$1 billion or more—are well documented. In one influential study, Bent Flyvbjerg, an expert in project management at Oxford’s business school, estimated that nine out of ten go over budget. *Rail projects, for example, go over budget by an average of 44.7 percent, and their demand is overestimated by 51.4 percent.*⁴² (emphasis added)

Flyvbjerg has posited the Iron Law of Megaprojects: Over budget, over time, over and over again.⁴³

In California, recent megaprojects have followed Flyvbjerg’s “Iron Law.” According to the California High Speed Rail Authority’s new business plan, the high-speed rail project is now at least four years behind schedule and 35 percent over 2016 cost estimates.⁴⁴ In San Francisco the cost of the Transbay Transit Center Phase I has risen from \$1.9 billion in 2013 to \$2.4 billion today.^{45,46} The cost of the Bay Bridge rebuild went from an initial estimate of \$250 million to a

³⁹ “Quarterly Capital Program Status Report 2nd Quarter FY 2018,” Caltrain, March 1, 2018, 5.

http://www.caltrain.com/Assets/_Finance/Quarterly+Capital+Program+Status+Report/JPB/FY18+Q2+JPB+Quarterly+Report.pdf.

⁴⁰ “Modernization Program Peninsula Corridor Electrification Project (PCEP) December 2017 Monthly Progress Report,” Caltrain, December 31, 2017, 2-5.

<http://www.caltrain.com/Assets/Caltrain+Modernization+Program/Documents/MPR/2017-12+December+PCEP+Monthly+Progress+Report.pdf>.

⁴¹ Bent Flyvbjerg, 2014, “What You Should Know about Megaprojects and Why: An Overview,” *Project Management Journal*, vol. 45, no. 2, April-May, pp. 6-1.

https://www.academia.edu/6864004/What_You_Should_Know_about_Megaprojects_and_Why_An_Overview?auto=download.

⁴² Nicklas Garemo, Stefan Matzinger, and Robert Palter, “Megaprojects: The good, the bad, and the better,” McKinsey & Company, July 2015. <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/megaprojects-the-good-the-bad-and-the-better>.

⁴³ Bent Flyvbjerg, 2014, “What You Should Know about Megaprojects and Why: An Overview,” *Project Management Journal*, vol. 45, no. 2, April-May, pp. 6-19.

https://www.academia.edu/6864004/What_You_Should_Know_about_Megaprojects_and_Why_An_Overview?auto=download.

⁴⁴ Erin Baldassari, “High speed, high cost: Bullet train price tag reaches \$77.3 billion, four years behind schedule,” *The Mercury News*, March 12, 2018. <https://www.mercurynews.com/2018/03/09/high-speed-high-cost-bullet-train-price-tag-surges-20-35-percent/>.

⁴⁵ “Transbay Program Budgets,” Transbay Joint Powers Authority, accessed May 3, 2018. <http://tjpa.org/documents/phase-1-program-budget>.

⁴⁶ “Transbay Terminal opening date might not happen until fall of 2018, as construction delays continue,” Antoinette Siu, *San Francisco Business Times*, February 9, 2018.

<https://www.bizjournals.com/sanfrancisco/news/2018/02/09/salesforce-transit-center-opening-day-may-delay.html>.

final cost of \$6.5 billion.⁴⁷ Since 2016, the estimated cost of CalMod itself has increased by \$298 million, from \$1.7 billion to \$1.98 billion.⁴⁸

Complexity of CalMod

CalMod is highly complex and consists of many parts designed and installed by several contractors. Those contractors are (1) Balfour Beatty Infrastructure, Inc. for the overhead catenary system (poles and wires to carry electricity and associated infrastructure), (2) Stadler U.S. Inc. for the electric trains, and (3) ARINC Incorporated for the Supervisory Control and Data Acquisition System.^{49,50,51} As of this writing, contracts yet to be awarded include those for tunnel modifications (the tunnel contract is expected to be complete in late June or early July 2018) and upgrades to the Central Equipment Maintenance and Operations Facility.⁵² Adding to the complexity of the project is the need to schedule work windows in and around Caltrain's continuing operations.⁵³ The result is a design and installation plan that jumps segments and work areas.⁵⁴ The following map shows the segments and work areas involved.

⁴⁷ Eric Jaffe, "From \$250 Million to \$6.5 Billion: The Bay Bridge Cost Overrun," *City Lab*, October 13, 2015. <https://www.citylab.com/equity/2015/10/from-250-million-to-65-billion-the-bay-bridge-cost-overrun/410254/>.

⁴⁸ "Former SFMTA and VTA CEO To Lead Caltrain Modernization Program," Caltrain, February 4, 2016, accessed June 8, 2018. http://www.caltrain.com/about/MediaRelations/News_Archive/Former_SFMTA_and_VTA_CEO_To_Lead_Caltrain_Modernization_Program.html.

⁴⁹ A system of overhead wires supported by poles used to supply electricity to electric trains.

⁵⁰ Stadler U.S. Inc. is a division of a Swiss manufacturer of electric trains. "KISS Double-Decker Electric Multiple Unit EMU," Stadler, accessed March 30, 2018. https://www.stadlerrail.com/live-01e96f7.s3-eu-central-1.amazonaws.com/filer_public/21/81/21816a39-9448-4b8a-8f2f-3811c6ee8006/kcal0716us.pdf.

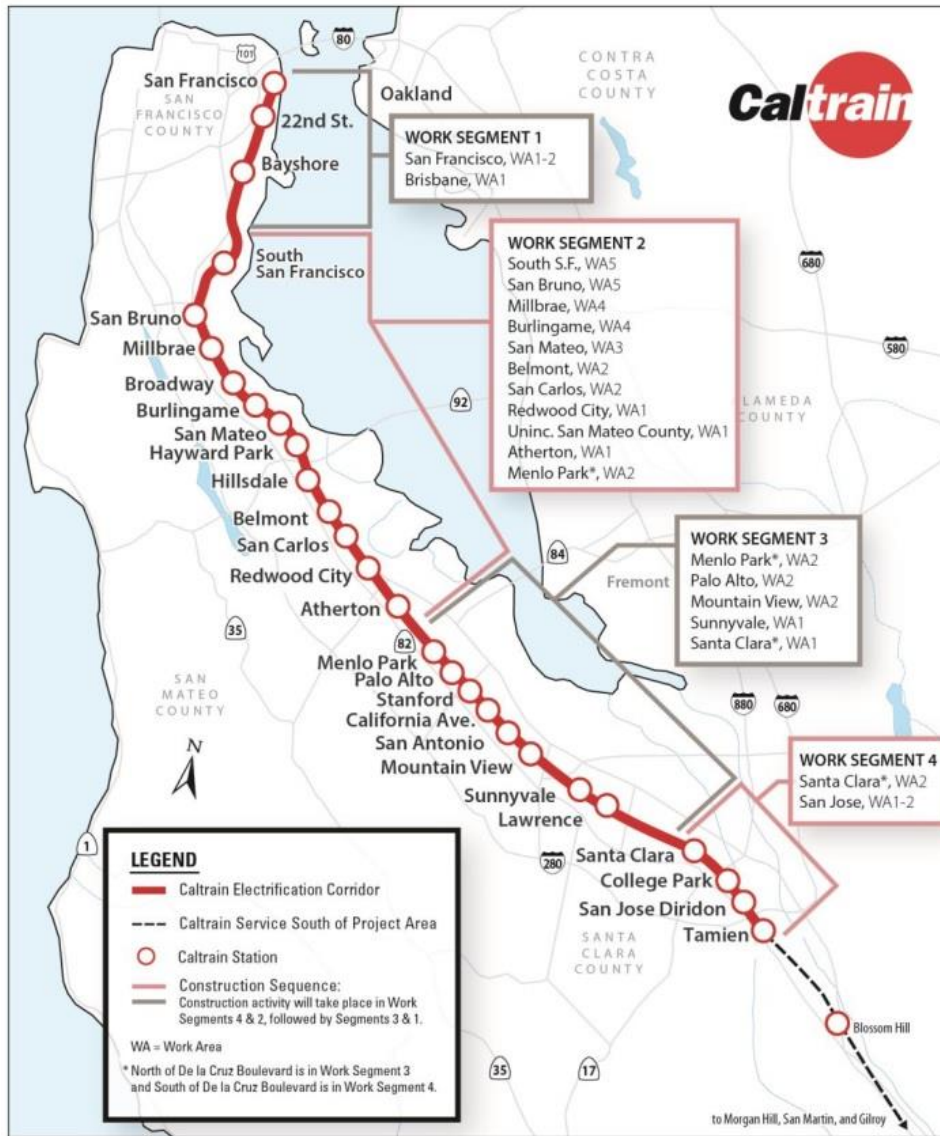
⁵¹ An industrial control system used to control infrastructure processes, facility-based processes, or industrial processes.

⁵² Grand Jury mail exchange with a Caltrain senior manager.

⁵³ Official from Caltrain; interview by the Grand Jury.

⁵⁴ "Construction Overview," Caltrain, accessed May 4, 2018. <http://calmod.org/construction>.

**Figure 1
Project Work Segments⁵⁵**



⁵⁵ March 2018 Progress Report,” Modernization Program, Peninsula Corridor Electrification Project (PCEP), Caltrain, accessed May 4, 2018. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-05-03+JPB+FINAL+MEETING+PACKET.pdf.

In recent years, few railroad electrifications have taken place in the U.S.⁵⁶ Consequently, electrification contractors with experience in the American regulatory environment are scarce. However, the current Denver electrification project (Eagle P3 Commuter Rail network) also uses Balfour Beatty as a main contractor.^{57,58} Hence, the CalMod contractor has experience in this arena. Nonetheless, the Denver project has seen delays and cost overruns and according to the Denver Post, "...has been beset with a number of performance issues, including stoppages due to lightning strikes and the ongoing problems with the timing of at-grade crossing gates."⁵⁹

When CalMod electrification is complete the Caltrain Peninsula Corridor will have a complex system of electrical wires and poles much like the Amtrak Northeast Corridor shown in Figure 2.

Figure 2
Typical Overhead Catenary System⁶⁰



Amtrak's North End Electrification

⁵⁶ "Railroad electrification in the United States," Wikipedia contributors, *Wikipedia, The Free Encyclopedia*, accessed June 3, 2018.

https://en.wikipedia.org/w/index.php?title=Railroad_electrification_in_the_United_States&oldid=840979518.

⁵⁷ Official from Caltrain: interview by the Grand Jury.

⁵⁸ "RTD Boss Explains G Line Delays, Possible R Line Schedule Cutbacks," Nathan Heffel, Colorado Public Radio, September 28, 2017. <http://www.cpr.org/news/story/rtd-boss-explains-g-line-delays-possible-r-line-schedule-cutbacks>.

⁵⁹ "G-Line commuter train testing could start in as little as week after state regulators give green light," John Aguilar, *The Denver Post*, June 7, 2017, accessed May 23, 2018. <https://www.denverpost.com/2017/06/07/rtd-contractor-regulator-certification-concerns/>.

⁶⁰ "Peninsula Corridor Electrification Project (PCEP) Final Environmental Impact Report (FEIR), January 2015," Caltrain, accessed March 28, 2018.

http://www.caltrain.com/projectsplans/CaltrainModernization/Modernization/PeninsulaCorridorElectrificationProject/PCEP_FEIR_2014.html.

Top Management Experience and Turnover on CalMod

Successful management of CalMod requires an experienced Chief Officer who can facilitate a high degree of communication and coordination among staff, contractors, and funding partners. CalMod has undergone frequent turnover in the top project position with three chief officers in the last two years, including a part-time, 18-month interim chief.⁶¹ The current Chief Officer started in February 2018. While turnover has been high, there has not been the same turnover in the senior manager positions below the Chief Officer.⁶²

Currently, two senior managers report directly to the Chief Officer with a third senior manager reporting to one of those two.⁶³ The Grand Jury's investigation has found that the new Chief Officer, his direct reports and the third senior manager all have significant experience in rail projects and management as well as engineering and other relevant educational backgrounds.⁶⁴

While the ranks of senior management have remained stable, there are some lower-level positions on the CalMod project that are not filled. Although, filling these positions is not critical for the current phase of the CalMod project, they will have to be filled as CalMod moves forward.⁶⁵

While initially concerned with Chief Officer turnover, the Grand Jury has found that the interim Chief was hired, in part, for specific skills in federal government relations and it was under his watch that the federal Full Funding Grant Agreement was completed.^{66 67}

The new Chief is a licensed civil engineer and licensed general contractor with 35 years of manager/engineer experience he holds a Bachelor of Science in civil engineering from California Polytechnic State University – San Luis Obispo. For the past 11 years he was Program Director of the San Francisco Central Subway Project, Phase 2 of the Third Street Light Rail Program.^{68,69,70}

⁶¹ Official from Caltrain: interview by the Grand Jury.

⁶² Officials from Caltrain: interviews by the Grand Jury.

⁶³ Officials from Caltrain: interviews by the Grand Jury.

⁶⁴ Officials from Caltrain: interviews by the Grand Jury.

⁶⁵ Official from Caltrain: interview by the Grand Jury.

⁶⁶ Officials from Caltrain: interviews by the Grand Jury.

⁶⁷ "Former SFMTA and VTA CEO To Lead Caltrain Modernization Program," Caltrain, February 4, 2016.

http://www.caltrain.com/about/MediaRelations/News_Archive/Former_SFMTA_and_VTA_CEO_To_Lead_Caltrain_Modernization_Program.html.

⁶⁸ Officials from Caltrain: interviews by the Grand Jury.

⁶⁹ "Caltrain Announces New Chief Officer; Caltrain Modernization Program," Caltrain, December 8, 2017, accessed June 8, 2018.

http://www.caltrain.com/about/MediaRelations/news/Caltrain_Announces_New_Chief_Officer_Caltrain_Modernization_Program.html.

⁷⁰ John Funghi, LinkedIn, accessed June 1, 2018. <https://www.linkedin.com/in/john-funghi-00841464/>.

CalMod Funding Partner Oversight and Budget Variance Analysis

Not only is CalMod a complex project, but its funding streams are as well. The budget of \$1.98 billion is funded by following nine major partners:

- Federal Transit Administration
- Caltrans
- California High Speed Rail Authority
- Bay Area Air Quality Management District
- Metropolitan Transportation Commission
- San Francisco County Transportation Authority/San Francisco Metropolitan Transportation Agency
- San Mateo County Transportation Authority
- Santa Clara Valley Transportation Authority
- City and County of San Francisco

Their relationships are governed by a seven-party agreement, another nine-party agreement, and the federal Full Funding Grant Agreement.^{71,72,73,74}

The complexity of the funding, and by extension the specific reporting to each funder, can be seen in the funding chart in Appendix B.

The funding partners, per the agreements, play a significant role in oversight of CalMod. Depending on the issue, they are involved in quarterly, monthly, and biweekly oversight meetings with CalMod management, which focus on risk assessment, change management, master schedule updates, systems integration delivery coordination, funding, and meeting federal agency requirements.⁷⁵

At its monthly meetings the PCJPB reviews CalMod progress and its budget. The monthly budget updates within the Monthly Progress Reports provided by staff to the PCJPB for these meetings (see Appendix C) include budget information for each high-level line item in the project. The Monthly Progress Reports do not, however, present a budget variance analysis that

⁷¹ “Memorandum of Understanding High Speed Rail Early Investment Strategy for A Blended System in The San Francisco To San Jose Segment Known as The Peninsula Corridor of The Statewide High-Speed Rail System” Caltrain, accessed March 26, 2018. <http://www.caltrain.com/AssetFactory.aspx?did=3897>.

⁷² “Caltrain’s Board Approves Multi-party Caltrain Modernization Funding Agreement; High Speed Rail Commits Additional \$113 Million,” Caltrain, May 5, 2016.

http://www.caltrain.com/about/MediaRelations/News_Archive/Caltrain_s_Board_Approves_Multi-party_Caltrain_Modernization_Funding_Agreement_High_Speed_Rail_Commits_Additional_113_Million.html.

⁷³ “The Following Statement is attributed to Jim Hartnett, General Manager and CEO of Caltrain,” Caltrain, May 22, 2017, accessed June 8, 2018.

http://www.caltrain.com/about/MediaRelations/News_Archive/The_Following_Statement_is_attributed_to_Jim_Hartnett_General_Manager_and_CEO_of_Caltrain.html.

⁷⁴ “Modernization Program Peninsula Corridor Electrification Project (PCEP), January 2018 Monthly Progress Report,” Caltrain, January 31, 2018, accessed June 8, 2018.

http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-03-01+JPB+packet+final+to+include+revised+date.pdf.

⁷⁵ Ibid.

shows the difference between planned and actual expenditures and reasons for any variance.⁷⁶ Consequently, it is hard for anyone reviewing these reports to easily tell what the reasons for budget deviations may be.

In early 2018 CalMod management began delivering a quarterly graph to the PCJPB showing draw down on the \$315 million contingency fund versus expected drawdown. Associated contingency fund tables show the reasons for contingency draws, but again no variance analysis or discussion is presented. Recently, management has also begun producing a quarterly graph showing actual versus baseline budget and funds currently available to the CalMod program. However, without an associated variance analysis narrative neither the public nor the PCJPB can gain a firm understanding of what is driving observed trends and gaps by reading the Monthly Progress Reports. The Grand Jury notes that neither graph was being produced when its investigation of the CalMod management process began.⁷⁷

CalMod Risk Management Processes

As with all major projects, CalMod faces several known risks, some more serious than others. Risks are detailed in the Program Risk Register (See Appendix D). The register details each identified risk, its potential effects, cost, owner, mitigation plans, and retirement date.⁷⁸ A Risk Assessment Committee (made up of representatives from funding partners and CalMod management) meets monthly to identify risks and mitigation measures.⁷⁹ Progress in mitigating risks enumerated in the Program Risk Register is reviewed at this meeting and on an ongoing basis by the person employed as Risk Management Lead.⁸⁰ As of March 31, 2018, 282 risks had been identified. Of those 190 had been retired and 92 were still active.⁸¹

⁷⁶ Variance analysis is the quantitative investigation of the difference between actual and planned behavior. It involves the investigation of these differences and an interpretation of why the variance occurred. "Variance Analysis," Accounting Tools, accessed May 16, 2018. <https://www.accountingtools.com/articles/what-is-variance-analysis.html>.

⁷⁷ "Peninsula Corridor Electrification Project, Q3 Quarterly Update #14, January 1 – March 31, 2018" Caltrain, May 3, 2018, accessed June 8, 2018. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-05-03+JPB+FINAL+MEETING+PACKET.pdf.

⁷⁸ "Program Risk Register," Caltrain, November 24, 2017.

⁷⁹ "Modernization Program Peninsula Corridor Electrification Project (PCEP), January 2018 Monthly Progress Report," Caltrain, January 31, 2018, accessed June 8, 2018. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-03-01+JPB+packet+final+to+include+revised+date.pdf.

⁸⁰ Official from Caltrain: interview by the Grand Jury.

⁸¹ "Peninsula Corridor Electrification Project, Q3 Quarterly Update #14, January 1 – March 31, 2018" Caltrain, May 3, 2018, accessed June 8, 2018. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-05-03+JPB+FINAL+MEETING+PACKET.pdf.

CalMod management reports the top risks to the PCJPB in the Monthly Progress Reports. However, some details from the Program Risk Register are left out of the publicly available Monthly Progress Reports due to confidentiality issues.^{82,83}

Risks, including unanticipated site situations, demands from local jurisdictions, and project design and scope changes, can bring about project changes and added costs to CalMod. To track and control those changes CalMod has instituted a change management program. A Change Management Board, made up of representatives from the funding partners and CalMod management, meets monthly to review and approve all changes over \$200,000. While there was some internal discussion over the make-up of the Change Management Board, which slowed full implementation of the change management process, those concerns have mostly been resolved and the board is evaluating and approving changes as they occur.^{84,85 86}

Changes under the \$200,000 Change Management Board level are approved by different managers depending on the monetary threshold. Any change over \$2 million must be approved by the PCJPB. Nonetheless, no matter the size of the change it must go through the same analysis, including its potential effect on the project schedule and budget (see Appendix E).⁸⁷

The total contingency fund is \$315 million. However, if the project were to face unanticipated problems and use up those funds, it is not clear where additional funds to cover the unanticipated costs would come from.⁸⁸

CalMod Schedule Management Processes

CalMod is a design-build project.⁸⁹ In design-build projects work on the project is begun before all the components are fully designed. As work starts on the first several tasks, the design of the

⁸² “Modernization Program Peninsula Corridor Electrification Project (PCEP), January 2018 Monthly Progress Report,” Caltrain, January 31, 2018, accessed June 8, 2018.

http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-03-01+JPB+packet+final+to+include+revised+date.pdf.

⁸³ Official from Caltrain: interview by Grand Jury.

⁸⁴ Official from Caltrain: interview by Grand Jury.

⁸⁵ “Modernization Program Peninsula Corridor Electrification Project (PCEP), January 2018 Monthly Progress Report,” Caltrain, January 31, 2018, accessed June 8, 2018.

http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-03-01+JPB+packet+final+to+include+revised+date.pdf.

⁸⁶ Caltrain is still seeking representation from both CalMod and Caltrain operations on the Change Management Board. Grand Jury email exchange with a Caltrain senior manager.

⁸⁷ Official from Caltrain: interview by Grand Jury.

⁸⁸ Official from Caltrain; interview by the Grand Jury.

⁸⁹ A method of project delivery in which a single contractor is responsible for both design and construction. “What is Design-Build,” Design-Build Institute of America, accessed March 23, 2018.

<https://www.dbia.org/about/Pages/What-is-Design-Build.aspx>.

following tasks is begun. Design-build project delivery has become the preferred method for implementation of large projects such as CalMod.^{90,91}

CalMod has an internal Master Program Schedule, a summary of which is included in the Monthly Progress Reports (Appendix F).^{92,93} CalMod management holds a monthly Master Program Schedule meeting with funding partners to review the status of major milestones and near critical paths.^{94,95}

CalMod integrates contractors and consultants' schedules using sophisticated project management software which creates the Master Program Schedule.⁹⁶ Caltrain has hired the international consulting firm of Gannett Fleming to help manage the CalMod Master Program Schedule process as well as other electrification program management services.⁹⁷

Major milestone dates in the main text of the Monthly Progress Reports are few. For example, the updated Progress Schedule milestone "Arrival of First Vehicle at JPB" ends on July 15, 2019, but the next milestone, "PG&E Provides Permanent Power," is 26 on September 9, 2021. Without more milestones in this 26 month period, it will be difficult for readers to know if CalMod is on schedule or not.⁹⁸

⁹⁰ Ibid.

⁹¹ Edward J. Pabor and Richard Pennington, "The growth (and growing pains) of design-build construction," American City & County, *Government Product News*, April 1, 2012. <http://americancityandcounty.com/contracts/growth-and-growing-pains-design-build-construction>.

⁹² Official from Caltrain: interview by the Grand Jury.

⁹³ "Modernization Program Peninsula Corridor Electrification Project (PCEP), January 2018 Monthly Progress Report," Caltrain, January 31, 2018, accessed June 8, 2018. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-03-01+JPB+packet+final+to+include+revised+date.pdf.

⁹⁴ Critical path method is a project management algorithm for scheduling a set of project activities. CPM calculates the earliest and latest that each activity can start and finish without making the project longer. The "near critical paths" of a project may have small amounts of "wiggle room," but they still must be completed on time or the overall project plan may slow. ("Critical path method," Wikipedia contributors, *Wikipedia, The Free Encyclopedia*, accessed May 17, 2018. https://en.wikipedia.org/w/index.php?title=Critical_path_method&oldid=838973945.)

⁹⁵ "Modernization Program Peninsula Corridor Electrification Project (PCEP), January 2018 Monthly Progress Report," Caltrain, January 31, 2018, accessed June 8, 2018. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-03-01+JPB+packet+final+to+include+revised+date.pdf.

⁹⁶ Official from Caltrain: interview by the Grand Jury.

⁹⁷ "Caltrain Modernization Program," Gannett Fleming, accessed March 29, 2018. <http://gannettfleming.com/Projects/2016/09/19/15/09/caltrain-modernization-and-electrification>.

⁹⁸ "Modernization Program, Peninsula Corridor Electrification Project (PCEP), April 2018 Monthly Progress Report," Caltrain, accessed June 8, 2018. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-06-07+JPB+REVISED+PACKET+REDLINE+VERSION.pdf.

While the Master Program Schedule summary provided in the appendix of the Monthly Progress Reports does provide more detail, it requires some knowledge of Gantt charts to fully understand.^{99,100}

CalMod Quality Assurance

CalMod has instituted a rigorous quality control/quality assurance program, which is necessary for a project of this size and complexity.¹⁰¹ The process follows general guidelines suggested by the International Risk Management Institute, Inc. (IRMI®).¹⁰²

For the electrification portion of CalMod, Balfour Beatty oversees quality control (the testing for quality) while CalMod management oversees quality assurance (making sure the correct process and procedures are followed). CalMod follows the ISO 9000 family of quality standards.¹⁰³

The Monthly Progress Reports to the PCJPB note the number of quality assurance audits and their status.¹⁰⁴

CalMod and Best Practices in Project Management

To evaluate the processes in place for effective and efficient management of CalMod, the Grand Jury investigated best practices in project management. The Grand Jury is aware that project management, especially of mega projects, is a highly technical and specialized field. Moreover, mega projects are by their nature unique and not amenable to cookie-cutter management

⁹⁹ “Modernization Program Peninsula Corridor Electrification Project (PCEP), January 2018 Monthly Progress Report,” Caltrain, January 31, 2018, accessed June 8, 2018.

http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-03-01+JPB+packet+final+to+include+revised+date.pdf.

¹⁰⁰ A Gantt chart is a visual view of tasks scheduled over time. Gantt charts are used for planning projects of all sizes and they are a useful way of showing what work is scheduled to be done on a specific day and provide start and end dates of a project in one view. (“The Ultimate Guide to Gantt Charts,” ProjectManager, accessed May 24, 2018. <https://www.projectmanager.com/gantt-chart>.)

¹⁰¹ Official from Caltrain: interview by the Grand Jury.

¹⁰² “Expert Commentary, Construction Quality Management,” Peter G. Furst, IRMI, accessed June 1, 2018. <https://www.irmi.com/articles/expert-commentary/construction-quality-management>.

¹⁰³ ISO 9000 is a set of international standards on quality management and quality assurance developed to help companies effectively document the quality system elements to be implemented to maintain an efficient quality system. They are not specific to any one industry and can be applied to organizations of any size. “What Is the ISO 9000 Standards Series?,” American Society for Quality, accessed May 6, 2018. <http://asq.org/learn-about-quality/iso-9000/overview/overview.html>.

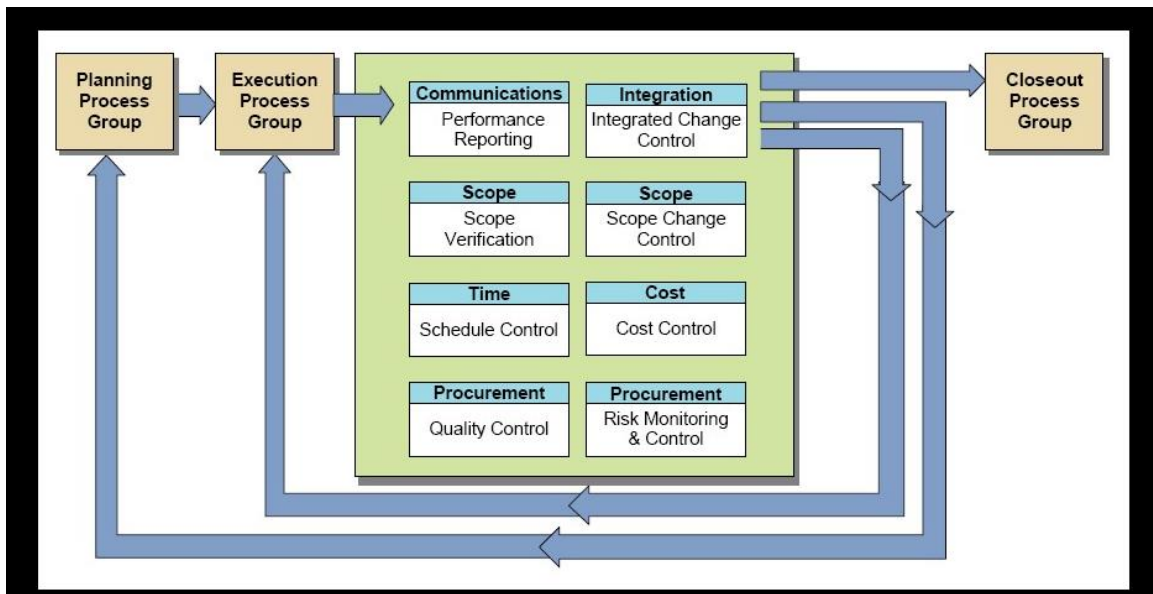
¹⁰⁴ “Modernization Program Peninsula Corridor Electrification Project (PCEP), January 2018 Monthly Progress Report,” Caltrain, January 31, 2018, accessed June 8, 2018.

http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-03-01+JPB+packet+final+to+include+revised+date.pdf.

approaches. Nonetheless, there are overall principles that good project management follows.^{105,106} The Grand Jury investigated whether CalMod is following those principles.

The following chart shows those monitoring and controlling processes required for successful project management, according to a project management guide published by the federal government.¹⁰⁷

Figure 3
Monitoring and Controlling Processes¹⁰⁸



¹⁰⁵ “The process of project management,” William R. Duncan, *Project Management Journal*, 24(3), 1993, 5–10. <https://www.pmi.org/learning/library/basic-process-project-management-2114>.

¹⁰⁶ “Project Management,” *Wikipedia, The Free Encyclopedia*, accessed May 6, 2018. https://en.wikipedia.org/wiki/Project_management.

¹⁰⁷ *Department of Veterans Affairs, Office of Information and Technology, Project Management Guide Version 2.0*, United States Department of Veterans Affairs, March 3, 2005, page 12, accessed May 24, 2018. https://web.archive.org/web/20090114104001/http://www.ppoe.oit.va.gov/docs/VA_IT_PM_Guide.pdf.

¹⁰⁸ *Ibid.*

The Grand Jury’s investigation found that CalMod has in place the processes and personnel to address each area of monitoring and controlling listed below.

Areas of Monitoring and Controlling

<u>Area</u>	<u>CalMod Response</u>
Performance Reporting	Monthly and Quarterly Progress Reports to PCJPB
Scope Verification	Electrification-Engineering Weekly Meetings
Schedule Control	Master Program Schedule Monthly Meeting, Consultant Support
Quality Control	Quality Assurance Audits
Integrated Change Control	Change Management Board and Process
Scope Change Control	Change Management Board and Process
Cost Control	Change Management Board and Process, Monthly and Quarterly Progress Reports to PCJPB
Risk Monitoring and Control	Risk Register and Risk Assessment Monthly Meetings

The Project Management Institute (PMI)¹⁰⁹, the world’s leading project management organization, explains that basic project management consists of five main process interactions with sub-tasks for each. These main processes are initiating, planning, execution, controlling, and closing. Sub-tasks include such items as scope definition, project definition, task definition, task sequencing, cost estimating, cost budgeting, risk identification, and risk assessment.¹¹⁰ In the Grand Jury’s estimation CalMod management processes have addressed each of these areas.

The Grand Jury has found no evidence to suggest that any of the four Caltrain management issues described above with respect to the CBOSS PTC project are present on the CalMod project. This investigation has shown that the CalMod project has:

- A commonly approved project schedule
- An apparently strong in-house technical team in place,
- Commonly agreed-upon definitions of deliverables
- A method in place for escalating work issues¹¹¹

¹⁰⁹ “PMI, Project Management Institute,” Project Management Institute, accessed May 24, 2018. <https://www.pmi.org/>.

¹¹⁰ “The process of project management,” William R. Duncan, *Project Management Journal*, 24(3), 1993, 5–10. <https://www.pmi.org/learning/library/basic-process-project-management-2114>.

¹¹¹ Officials from Caltrain: interviews by Grand Jury.

To help remedy the CBOSS PTC shortcoming, CalMod has instituted closer partnering with its contractors. The location of the Balfour Beatty project office in the same building just a few floors above the CalMod office is one example of this effort.

CalMod Transparency and Public Communication

Through its new CalMod website and community outreach meetings, Caltrain communicates directly to the public about CalMod issues raised by bicycle riders and residents living near the tracks, such as the availability of bike racks or which trees will be cut.¹¹² However, it does not communicate directly with the public about more complicated project issues concerning project budget, schedule, and deliverables.

For example, a local resident or a member of the press may want to find out if CalMod is on budget and on schedule. A logical first stop would be the CalMod website. However, neither the homepage nor the resources page provides links or references to the project's budget or schedule.¹¹³ Moreover, using the search box provided, a search for Caltrain Modernization or CalMod Budget yields no relevant results. The same is true for a search on Caltrain Modernization or CalMod Schedule. Substituting PCEP for CalMod again yields no relevant results.

If that resident now turned to the main Caltrain website, the homepage provides a link to the Caltrain Modernization Program, which points back to the CalMod site.¹¹⁴ A search on CalMod budget or schedule again yields no relevant results but substituting PCEP for CalMod does produce some Monthly Progress Report links.

The only way to view documents related to CalMod budget, schedule, and deliverables is to know exactly where they are on the Caltrain website, or to know to use PCEP rather than CalMod in some searches. Using CalMod, a visitor must first go to the Caltrain (not CalMod) website, click on the Board of Directors link, then the Agendas/Minutes link, then the Agenda link for a specific month's meeting, and finally scroll through hundreds of pages of the board report to attempt to find the information sought.¹¹⁵ And, as noted above, some of the budget and schedule information is unclear, incomplete, or buried in large amounts of data.

In contrast, other transportation agencies easily and cleanly present project information to the public through an interactive project status website dashboard. Such interactive dashboards are

¹¹² "Program Overview," CalMod, accessed March 29, 2018. <http://calmod.org/>.

¹¹³ Ibid.

¹¹⁴ "Caltrain," Caltrain, accessed May 5, 2018. <http://www.caltrain.com>.

¹¹⁵ "Agenda Peninsula Joint Powers Board (April 5, 2018)," Caltrain, accessed April 2, 2018. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-04-05+JPB+Agenda+Final.pdf.

used by the LetsGoCT! Transportation Ramp Up, the Virginia Department of Transportation (VDOT), and the Federal Rail Administration’s Positive Train Control Safety Plan.^{116,117,118}

Figure 4 is a screen capture of the VDOT website home dashboard. This interactive dashboard allows visitors to click on the dials, which link to more detailed information.

Figure 4
VDOT Dashboard



While not as descriptive as the VDOT dashboard, the LetsGoCT! Transportation Ramp Up dashboard provides more detailed interactive information once the various graphic links are clicked.

The importance of such transparency can be seen in a paper published in *Construction Management and Economics*, where the authors note that improved stakeholder engagement can reduce “negative actions or reactions that have potential impact upon project success.”¹¹⁹

¹¹⁶ “Transportation Ramp Up Dashboard,” LetsGoCT!, accessed May 7, 2018.

<http://www.transformct.info/RampUpDashboard.html>.

¹¹⁷ “Dashboard,” Virginia Department of Transportation, accessed May 7, 2018.

<http://dashboard.virginiadot.org/default.aspx>.

¹¹⁸ “PTC Implementation Status By Railroad,” Federal Railroad Administration, accessed March 27, 2018.

<https://www.fra.dot.gov/app/ptc/>.

¹¹⁹ “Editorial: stakeholder management in construction,” Brian Atkin and Martin Skitmore, *Construction Management and Economics* (2008), 26:6, 549-552, accessed May 21, 2018.

<https://www.tandfonline.com/doi/full/10.1080/01446190802142405?scroll=top&needAccess=true>.

The Boston Big Dig project with its multiple challenges and failures provides a laboratory for investigating issues such as public participation in the project process.¹²⁰ In one such investigation, Virginia A. Greiman writes in *Megaproject Management: Lessons on Risk and Project Management from the Big Dig* that, "...transparency measures must be instituted that will enable the public to be informed and engaged throughout the term of the infrastructure project."¹²¹

Or as Justice Louis Brandeis said, "Publicity is justly commended as a remedy for social and industrial diseases. Sunlight is said to be the best of disinfectants; electric light the most efficient policeman."¹²²

Conclusion

The Grand Jury began its investigation into whether Caltrain had put in place the processes necessary for effective and efficient management of the almost \$2 billion CalMod program based in part on the reported Caltrain management issues in the CBOSS PTC project. The Grand Jury wanted to know if those issues might also be present in CalMod. It also examined the management processes put in place implement a project of this scale.

The Grand Jury also explored the extent to which interested members of the public could easily determine the status of the CalMod project, including whether the project is on time and on budget.

In the Grand Jury's view, Caltrain has hired a Chief Officer and senior managers with the education and experience necessary to manage the program. The Grand Jury also believes that reasonable processes and procedures are in place to properly manage this mega project. However, the Grand Jury is not auditing the project or speculating on its success.

The Grand Jury is aware that a 140-page Monthly Progress Report and Quarterly Update within an almost 300-page agenda packet and others like it presented to the PCJPB leaves readers, especially the public, drowning in data but starving for information.¹²³ Moreover, Monthly Progress Reports are difficult for the public to find because they are not prominently highlighted on either the Caltrain or CalMod websites.

¹²⁰ "It all comes down to transparency," Frederick P. Salvucci, *Boston Globe*, October 3, 2010. http://archive.boston.com/bostonglobe/editorial_opinion/oped/articles/2010/10/03/it_all_comes_down_to_transparency/.

¹²¹ Virginia A. Greiman, *Megaproject Management: Lessons on Risk and Project Management from the Big Dig*, Project Management Institute (Hoboken, New Jersey: John Wiley & Sons Inc, 2013), chapter 3. <https://books.google.com/books?id=zZrw3wXT8TEC&printsec=frontcover#v=onepage&q&f=false>.

¹²² "Justice Louis D. Brandeis," Louis D. Brandeis Legacy Fund for Social Justice, Brandeis University, accessed May 22, 2018. <https://www.brandeis.edu/legacyfund/bio.html>.

¹²³ "Agenda Peninsula Joint Powers Board (May 3, 2018)," Caltrain, accessed June 1, 2018. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2018/2018-05-03+JPB+FINAL+MEETING+PACKET.pdf.

FINDINGS

- F1. The CBOSS PTC project had several management failings as noted by the American Public Transportation Association (APTA) report. Among the Caltrain management issues noted by APTA were:
- No commonly approved project schedule between Caltrain and Parsons
 - Lack of a strong in-house technical team to oversee the project
 - No commonly agreed upon definition of some final deliverables or how to test them
 - Lack of a working escalation method to resolve issues raised between Caltrain and Parsons
- F3. The CalMod project schedule process appears coordinated and integrated among the main contractors, consultants, and CalMod. The duties of the consulting firm of Gannett Fleming include schedule coordination.
- F4. While membership in the Change Management Board is not completely settled, the board is evaluating and approving changes as they occur.
- F5. CalMod's Risk Assessment Committee (made up of representatives from funding partners and CalMod management) meets monthly to identify risks and mitigation measures. Progress in mitigating risks enumerated in the Program Risk Register is reviewed at this meeting and on an ongoing basis by the person employed as Risk Management Lead.
- F6. CalMod appears to have an experienced Chief Officer and senior managers in place.
- F7. Quality control and quality assurance processes appear to be functioning as designed.
- F8. Caltrain has adequate management processes in place to implement a project of this scale.
- F9. Most CalMod project information is available to the public, but it is not readily accessible to members of the public who do not know exactly where to look for it. It is difficult for the public to understand if the CalMod project is on budget and schedule without access to easily decipherable summary reports.
- F10. Transportation agencies such as the Virginia Department of Transportation and LetsGoCT! use interactive project status dashboards to keep the public informed about their large and complex projects and budgets.
- F11. The Monthly Progress Reports delivered to the PCJPB show total current expenditures compared to the overall budget. In particular, they show "Cost this Month" and "Cost to Date." but do not show a budget timeline of current expenditures to planned expenditures on a monthly basis. Graphs showing draw downs on CalMod's \$315 million contingency fund that are provided to the PCJPB do not include a narrative explanation. Without a variance analysis and narrative, it is difficult for members of the public to understand why a deviation from the budgeted amount occurred.

F12. The summary information provided to the public regarding scheduling milestones in the body of Monthly Progress Reports is insufficient. The public cannot tell from that summary if CalMod is on schedule when the published milestone chart and the critical path charts in that summary have entries that have gaps as long as two years. The appendix to each Monthly Progress Report does contain more detailed schedule information in the form of a summary Master Program Schedule, but understanding it requires some knowledge of Gantt charts to fully understand the information.

RECOMMENDATIONS

The 2017-2018 San Mateo County Civil Grand Jury recommends that the Peninsula Corridor Joint Powers Board implement the following recommendations.

- R1. Caltrain should publish an interactive dashboard focusing on overall project schedule, budget, and deliverables that is readily visible on the CalMod homepage (calmod.org). The dashboard should include links to the supporting data in the Monthly Progress Reports and other places. This recommendation should be implemented by June 30, 2019.
- R2. CalMod should publish an explanation of how total project spending is tracked against the planned budget. Spending more or less than budgeted should be explained and a brief explanation of how the budget will be returned to plan (if possible) should be included. This information should be appended to the Monthly Progress Reports. This recommendation should be implemented by December 31, 2018.
- R3. A high-level CalMod project schedule should be published every month showing the progress of the project against the planned timeline. The schedule should have quarterly milestones so that the public can determine if the overall project is on schedule. This schedule should be included in the Executive Summary and Schedule sections of the Monthly Progress Reports. This recommendation should be implemented by December 31, 2018.

REQUEST FOR RESPONSES

Pursuant to Penal Code Section 933.05, the Grand Jury requests responses as follows: From the following governing bodies:

- Peninsula Corridor Joint Powers Board to respond to the foregoing Findings and Recommendations referring in each instance to the number thereof no later than 90 days after the date of this Grand Jury Report.

The governing bodies shown above should be aware that the comments or responses of the governing body must be conducted subject to the notice, agenda, and open meeting requirements of the Brown Act.

METHODOLOGY

In investigating CalMod the Grand Jury conducted interviews of Caltrain employees and other transportation experts, reviewed Caltrain documents and website, consulted online resources and other documents, and made several site visits.

Site Tours

The Grand Jury attended PCJPB meetings, CalMod community outreach meetings, visited the CalMod Project Outreach Office, rode Caltrain, and observed CalMod work areas.

Interviews

The Grand Jury interviewed seven current Caltrain staff members and others involved in CalMod or assessments thereof.

Documents

See the Bibliography for a comprehensive list of resources consulted by the Grand Jury.

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http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/Board+of+Directors/Presentations/2017/2017-06-01+Annual+Passenger+Counts.pdf.

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APPENDIX A

AMERICAN PUBLIC TRANSPORTATION ASSOCIATION

PEER REVIEW

FOR

Caltrain

San Carlos, California

JULY 4, 2016



A Service of the American Public Transportation Association
performed by the

**North American Transit Services
Association a wholly owned subsidiary of
APTA**

FINAL REPORT
OF THE
NORTH AMERICAN TRANSIT SERVICES ASSOCIATION
PEER REVIEW PANEL
ON THE
COMMUNICATIONS BASED OVERLAY SIGNAL
SYSTEM (CBOSS) POSITIVE TRAIN CONTROL
(PTC) PROJECT
PROVIDED AT
CALTRAIN

PANEL MEMBERS:

Jack Collins Keith Holt Michael Hursh Kay Neuenhofen Tim Shirk
Greg Hull

Published by the
North American Transit Services
Association 1300 I Street, NW, 12th Floor
South Washington, DC 20005

Richard White, Interim President and CEO

TABLE OF CONTENTS

INTRODUCTION	1
Background	2
Methodology	2
Scope of Report	2
OBSERVATIONS AND RECOMMENDATIONS.....	3
Opening Comments	3
Other Observations.....	5
CONCLUDING REMARKS.....	7
APPENDIX	8
Appendix A - Letter of Request	9
Appendix B - Peer Review Agenda	10
Appendix C - Document List	11

INTRODUCTION

In April 2016, James Hartnett, Executive Director, Caltrain, contacted the American Public Transportation Association (APTA) to request a peer review of the agency's Communications Based Overlay Signal System (CBOSS) Positive Train Control (PTC) Project. APTA, through its wholly owned subsidiary the North American Transit Services Association (NATSA) and through discussions between NATSA and Caltrain staff, determined the review would be conducted May 31 – June 3, 2016. This final report was completed July 4, 2016.

A panel of industry and related industry peers was assembled and was comprised of individuals with experience in the implementation of PTC system technology and other complex signal system train control projects as well as experience in large technology and software-based projects. The onsite peer review panel consisted of the following individuals and the organizations from which they were selected:

MR. MICHAEL HURSH

General Manager
AC Transit
Oakland, CA

MR. KEITH HOLT

Deputy Chief Engineer, Communications & Signals
AMTRAK
Philadelphia, PA

MR. TIMOTHY SHIRK

Director of Communications and Signal Engineering
SEPTA
Philadelphia, PA

MR. JACK COLLINS

Chief Capital Officer (retired)
Metrolinx/GO Transit
Toronto, Canada

MR. KAY NEUENHOFEN

Software Engineer
Davis, California

MR. GREG HULL

Peer Review Facilitator
APTA, Washington, DC

The panel convened in San Carlos on Tuesday, May 31st. Panel coordination and logistical support was provided by NATSA Peer Review Facilitator, Greg Hull. Mr. Hull also coordinated panel member input in the drafting of this peer review report.

BACKGROUND

The Communication Based Overlay Signal System (CBOSS) Positive Train Control (PTC) solution is an overlay component to the existing fixed wayside signal system and integrated into the existing CTC mainline tracks. The purpose of the system is to prevent train to train collisions, enforce civil speed, prevent intrusion into work zones, prevent train movement over misaligned switches, reduce gate down time, enforce adherence to the schedule and to accommodate capacity for future high speed rail. This state of the art system will improve safety for passengers, workers, the general public and highway traffic crossing the tracks.

METHODOLOGY

The APTA Peer Review process is well established as a valuable resource to the public transit industry. Highly experienced and respected professionals voluntarily provide their time and support to address the review scope identified to assist the transit system and in turn assist the transit industry as a whole.

The panel conducted this peer review through documentation review, field observations, briefings, as well as listening sessions and interviews with Caltrain staff and contracted support.

SCOPE OF THE REPORT

The purpose of the review was to have the panel assist Caltrain in reviewing the progress of the project and project team organization. The review focused on two particular areas:

Programmatic:

- Performance of contractor relative to contract
- Engagement and oversight of contractor
- Engagement of Joint Powers Board (JPB) executive oversight and issue escalation/ process for decision making

Technological:

- Interoperability design viability
- Effectiveness of design
- Technical team resources

OBSERVATIONS AND RECOMMENDATIONS

OPENING COMMENTS

The peer review panel found Caltrain's community outreach efforts on the project to be extensive and commendable. The PTC design is robust and appears to meet industry standards.

However, in the view of the panel, the probability of meeting the October implementation schedule is doubtful. A definition of "*interoperability*" and how to test "*interoperability*" needs to be agreed upon by the parties. However, at this juncture, activation of PTC on Caltrain property should not be delayed and should be regarded as a priority.

Caltrain oversight and TASI engagement needs to be strengthened, and operational training needs to be expedited. Additionally, a long term operations and maintenance strategy need to be determined. In the view of the panel in order to effectively address these operations and maintenance issues the decision to re-bid or extend the TASI contract needs to be addressed as soon as possible.

1. **PROGRAMMATIC: CONTRACTOR PERFORMANCE RELATIVE TO CONTRACT**

In the view of the panel, friction between the owners' project team and PTG has impacted responsiveness and transparency by PTG in PTG communicating cost and schedule progress. PTG also regards the scope of the project to have changed due to changes by Class 1 railroads which then impacts the interoperability of CBOSS. Additionally, both the owner and contracted parties do not appear to be working on a commonly approved schedule, so it is unlikely that the PTG Revenue Service Demonstration (RSD) date of October 2016 will be achieved. The panel also believes that project performance has also been impacted, in part, by the lack of TASI engagement, which results in harm to the project.

RECOMMENDATIONS

- Establish weekly stakeholder meetings to include Caltrain, the Program Manager, PTG and TASI
- Caltrain needs to come to terms (negotiate) with PTG to agree upon a realistic schedule for the implementation of PTC. The current moving schedule target must stop.
- Identify what specifics and to what degree PTC-related changes brought about by Class 1 railroads have impacted the scope of this project
- Caltrain needs to direct PTG to commence information/ knowledge transfer with TASI

2. **PROGRAMMATIC: ENGAGEMENT AND OVERSIGHT OF THE CONTRACTOR**

The oversight of PTG has included Caltrain and its program management consultants. In the view of the panel, in the absence of a strong technical team within Caltrain, Caltrain management has delegated decision making on the PTG contract to its program management consultant. PTG does not regard the program management consultant as the owner and this has consequently led to unresolved technical and contractual issues. Despite the recent partnering session, there continues to be a lack of commitment to resolving contractual issues such as scheduling and cost. The question remains as to where the cure or resolution presently stands.

RECOMMENDATIONS

- Caltrain needs to directly hire a project manager with requisite technical experience and provide that person with the authority to manage the interests of Caltrain
- Immediately engage TASI for revenue startup and handover with a focus on training and knowledge transfer
- Take action now to place CBOSS equipped Caltrain trains on Caltrain track into revenue service as soon as possible
- Engage with PTG to establish a clear and real plan for implementation of PTC interoperability (ability to synchronize safe train movement with all relevant parties)
- Determine common ground for resolving current outstanding contractual issues

3. **PROGRAMMATIC: ENGAGEMENT JPB EXECUTIVE OVERSIGHT AND ISSUE/ESCALATION DECISION MAKING PROCESS**

Notwithstanding Caltrain's role on behalf of JPB, it is not clear to the panel whether JPB itself has played a role in the day to day project oversight. The initial partnering session established an issue escalation process, however, this process appears to have broken down. As previously noted, despite the recent partnering session, there continues to be a lack of commitment to resolving contractual issues such as scheduling and cost.

The panel notes that the PTC CBOSS project is just one of several complex infrastructure projects that will require Caltrain to take a serious look at in-house technical management resources.

RECOMMENDATION

- Caltrain and PTG CEO's should continue their weekly phone call to discuss project status and issues

4. TECHNOLOGICAL: INTEROPERABILITY DESIGN VIABILITY

It appears that the current status of software does not support interoperability with tenant and host railroads and that configuration management of the versions of system software control is lacking. It does not appear that interoperability will be included with the October 2016 revenue service demonstration.

RECOMMENDATIONS

- A priority needs to be given to implement PTC operation on Caltrain property
- There needs to be agreement on a clear definition of interoperability as it pertains to tenant and host railroads along with a test plan and schedule
- Establish configuration management of system software version controls

5. TECHNOLOGICAL: EFFECTIVENESS OF DESIGN

The logic for the fiber optics design and distribution was well planned and can be leveraged for future revenue. The control center design incorporates state of the art technology, and is well laid out and labeled. The On Board Computer (OBC) has approximately 10,000 lines of code which is considered a small system that promotes maintainability and robustness. However, in reviewing the open software defects list, it appears that at least one of the defects is said to crash the OBC. As noted by the current defect list, there are multiple communication network issues that remain to be resolved.

The panel notes that the security layer of the software is an older application that is vulnerable to cryptographic intrusion.

RECOMMENDATIONS

- The panel encourages that the back-up Central Control facility PTC network be physically isolated from external open networks (physically disconnect VPN connections)
- Review current security layers of the software and research whether security can be hardened without incurring unintended consequences. Continue efforts to deploy planned key exchange server.
- Review the vehicle equipment installations and systems design. Include TASI in this review.
- Consider the establishment of a configuration management function within Caltrain to ensure that modifications to PTC systems are controlled

6. TECHNOLOGICAL: EFFECTIVENESS OF DESIGN

In the view of the panel, animosities between the prime contractor and project management oversight present an impediment to resolving outstanding technical issues. PTG appears to have appropriate technical resources to complete CBOSS requirements for Caltrain running on Caltrain tracks. It is apparent that TASI resources have not been fully engaged during the course of the project.

RECOMMENDATIONS

- The panel encourages Caltrain to bring PTG and the project management team together to resolve interface issues in order to be more effective in resolving outstanding technical issues
- TASI can provide additional resources to strengthen current implementation and future maintenance of the system

OTHER OBSERVATIONS AND RECOMMENDATIONS

The panel encourages that technical and commercial issues be separated and allow technical issue resolution to drive the schedule. It does not appear that training has progressed to the degree needed to meet the October deadline. It also needs to be realized that seasonal events will limit the availability of operations personnel for training. If not currently developed, establish a master test plan that is coherent, regularly updated, and is communicated to all relevant parties. Also ensure that on-going responsibilities for the rules, rulebook and bulletins are clarified and understood by all relevant parties.

CONCLUDING REMARKS

The findings and recommendations of this review are intended to assist Caltrain in implementing strategies that will assist the organization and its partners to successfully implement the CBOSS PTC project.

The panel sincerely appreciates the support and assistance extended throughout the entire peer review process by all Caltrain personnel as well as their contracted support. The panel stands available to assist with any clarification or subsequent support that may be needed.

Appendix



BOARD OF DIRECTORS 2016

PERRY WOODWARD, CHAIR
JOSÉ CISNEROS, VICE CHAIR
MALIA COHEN
JEFF GEE
ROSE GUILBAULT
RAUL PERALEZ
JOÉL RAMOS
ADRIENNE TISSIER
KEN YEAGER

JIM HARTNETT
EXECUTIVE DIRECTOR

April 5, 2016

Mr. Richard White
American Public Transportation Association
1300 I Street, NW, Suite 1200 East
Washington, DC 20005

RE: REQUEST FOR APTA PEER REVIEW – CBOSS PTC PROJECT

Dear Mr. White:

This letter will serve as our formal request for APTA to assist Caltrain with a Peer Review of our CBOSS PTC.

Attached is a briefing document that includes background on the agency, the CBOSS PTC project purpose and goals, problem statement, and requested APTA Peer Review team scope of work. This document also includes the Caltrain point of contact for coordination of the Peer Review Process and the requested schedule for Peer Review activities to begin. Also enclosed is the required executed indemnification form.

The agency is processing the APTA \$9,000.00 fee and will mail this check under separate cover to your attention. This letter will also confirm our commitment to reimburse appropriate Peer Review expenses including coach class air travel, and hotel and meal expenses. Caltrain typically reimburses meal expenses on a per diem rate under the GSA schedule for the San Francisco region. Prior to booking hotels for the Peer Review Team we would ask that these reservations be coordinated with our staff.

Please do not hesitate to contact me at 650 508-6221 if you have any questions or concerns with our request. We appreciate APTA's assistance with this important agency initiative.

Sincerely,



Jim Hartnett
Executive Director

Attachment

PENINSULA CORRIDOR JOINT POWERS BOARD
1250 San Carlos Ave. – P.O. Box 3006
San Carlos, CA 94070-1306 650.508.6269

Agenda for CBOSS PTC APTA Peer Review
May 31 - June 3, 2016
Meetings Held in 4th Floor Dining Room
1250 San Carlos Ave, San Carlos CA

May 31st:

6:00 pm Dinner at Positano - 617 Laurel Street, San Carlos –
APTA Team, Jim Hartnett, Michelle Bouchard & Gigi Harrington

June 1st:

8:15 am Kick off Confirm Objectives/Outcomes
APTA team, Jim Hartnett, Michelle Bouchard, Gigi Harrington & Sal Gilardi

9:00am-10 am Caltrain funding, governance and service overview-present and future (PCEP)
Michelle Bouchard, Gigi Harrington, Danielle Stewart, Seamus Murphy

10:00am - 12:00pm History of the Program – Karen Antion, Dave Elliot, Michelle Bouchard & Sal Gilardi
including Luis Zurinaga (SFCTA) and Jim Lawson (VTA)

12:00pm - 1:00pm Working Lunch with PTG Team. What is working and what is not?

1:15pm - 2:30pm CBOSS technology overview Karen Antion, Dave Elliot, Michelle Bouchard & Sal Gilardi
including Luis Zurinaga (SFCTA) and Jim Lawson (VTA)

2:45PM - 3:45pm Integration and Interoperability – Karen Antion, Dave Elliot, Michelle Bouchard & Sal
Gilardi including Luis Zurinaga (SFCTA) and Jim Lawson (VTA)

4:00pm – 5:00pm Stakeholder Viewpoints – Seamus Murphy, Casey Fromson, Michelle Bouchard &
Sal Gilardi

June 2nd:

8:15am - 9:30am	Follow-up from previous day, missing pieces – Gigi Harrington, Michelle Bouchard, Karen Antion, Dave Elliot & Sal Gilardi
9:30am - 11:30am	Tour BCCF and Hi-Rail and discussion of Safety Certification and Safety for the Project
12:00pm - 1:30pm	Contractor Management Gigi Harrington & Michelle Bouchard
2:00pm – 5:00pm	Peer Review Working Meeting
June 3 rd :	
8:15am - 10:30am	Project Closeout Jim Hartnett, Michelle Bouchard, Gigi Harrington, Sal Gilardi, Karen Antion & Dave Elliot

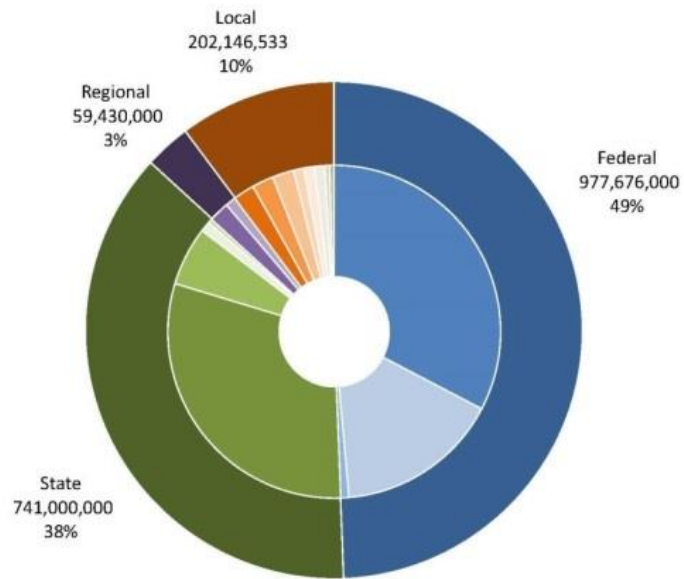
APPENDIX C

DOCUMENT LIST

1. Caltrain Positive Train Control Project- APTA Peer Review (general summary of milestones and related networks)
2. “What Is Working and What Is Not” (summary produced by Parsons Transportation Group)
3. JPB CBOSS Project Organization Structure (6/1/16)
4. Interoperability Coordination Efforts (timeline)
5. Caltrain PTC Project Training Schedule (updated May 2, 2016)
6. Table 2-1 Hazard Log Status Levels/ Table 2-4 Hazard Risk Index
7. CBOSS PTC Integration and Interoperability (presentation: June 1, 2016)
8. Advanced Signal System (CBOSS PTC) System Overview (presentation: June 1, 2016)
9. Caltrain Overview- APTA Peer Review of CBOSS PTC (presentation: May, 2016)
10. Caltrain PTC Implementation Plan (PTCIP) (September 24, 2014)
11. JPB Board Presentations (2011-2016)
12. CBOSS Weekly Executive Dashboards (2016)
13. Caltrain Monthly CBOSS PTC Progress Reports (2015-2016)
14. CBOSS PTC Project Plan to Completion Partnering Session (Rev Approach, 11-4-15)
15. Caltrain CBOSS PTC Project Partnering Session (April 29, 2015)
16. JPB/ PTG/ GE Partnering Meeting (August 31, 2015)
17. Breach of Contract/ Demand to Cure Correspondence: JPB to PTG/ PTG to JPB (2016)
18. U.S. Government Accountability Office Report: Positive Train Control / GAO-15-739 (September, 2015)

APPENDIX B

PCEP Funding Plan Modernization Program Peninsula Corridor Electrification Project (PCEP) January 2018 Monthly Progress Report



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

Notes:

*Includes necessary fund transfer with SMCTA

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

APPENDIX C

Budget and Expenditures Modernization Program Peninsula Corridor Electrification Project (PCEP) January 2018 Monthly Progress Report

Peninsula Corridor Electrification Project Monthly Progress Report

Table 8-2 EMU Budget & Expenditure Status

Description of Work	Budget	Current Budget	Cost This Month	Cost To Date	Estimate To Complete	Estimate At Completion
	(A)	(B) ¹	(C) ²	(D) ³	(E)	(F) = (D) + (E)
EMU	\$ 550,899,459	\$ 551,774,959	\$ -	\$ 60,716,941	\$ 491,058,018	\$ 551,774,959
CEMOP Modifications	\$ 1,344,000	\$ 1,344,000	\$ -	\$ -	\$ 1,344,000	\$ 1,344,000
Management Oversight ⁴	\$ 64,139,103	\$ 64,139,103	\$ 314,903	\$ 24,198,772	\$ 39,940,332	\$ 64,139,103
Executive Management	\$ 5,022,302	\$ 5,022,302	\$ 41,564	\$ 2,440,644	\$ 2,581,658	\$ 5,022,302
Community Relations	\$ 1,685,614	\$ 1,685,614	\$ 2,457	\$ 399,172	\$ 1,286,442	\$ 1,685,614
Safety & Security	\$ 556,067	\$ 556,067	\$ 10,814	\$ 290,631	\$ 265,436	\$ 556,067
Project Mgmt Services	\$ 13,275,280	\$ 13,275,280	\$ 83,883	\$ 5,823,250	\$ 7,452,031	\$ 13,275,280
Eng & Construction	\$ 89,113	\$ 89,113	\$ -	\$ 3,817	\$ 65,296	\$ 89,113
EMU Eng & Mgmt ⁵	\$ 32,082,556	\$ 32,082,556	\$ 40,411	\$ 10,905,936	\$ 21,176,621	\$ 32,082,556
IT Support	\$ 1,027,272	\$ 1,027,272	\$ 10,512	\$ 356,073	\$ 671,199	\$ 1,027,272
Operations Support	\$ 1,878,589	\$ 1,878,589	\$ -	\$ 277,200	\$ 1,601,388	\$ 1,878,589
General Support	\$ 2,599,547	\$ 2,599,547	\$ 43,903	\$ 1,008,715	\$ 1,590,832	\$ 2,599,547
Budget / Grants / Finance	\$ 712,123	\$ 712,123	\$ 11,260	\$ 348,970	\$ 363,153	\$ 712,123
Legal	\$ 1,207,500	\$ 1,207,500	\$ 34,258	\$ 907,535	\$ 299,965	\$ 1,207,500
Other Direct Costs	\$ 4,003,139	\$ 4,003,139	\$ 35,842	\$ 1,416,828	\$ 2,586,311	\$ 4,003,139
TASI Support	\$ 2,740,000	\$ 2,740,000	\$ -	\$ -	\$ 2,740,000	\$ 2,740,000
Required Projects	\$ 4,500,000	\$ 4,500,000	\$ -	\$ -	\$ 4,500,000	\$ 4,500,000
Finance Charges	\$ 1,941,800	\$ 1,941,800	\$ 131,563	\$ 820,275	\$ 1,121,525	\$ 1,941,800
Contingency	\$ 38,566,962	\$ 37,687,462	\$ -	\$ -	\$ 38,566,702	\$ 38,566,702
Forecasted Costs and Changes	\$ -	\$ -	\$ -	\$ -	\$ (879,240)	\$ (879,240)
EMU SUBTOTAL	\$ 664,127,325	\$ 664,127,325	\$ 446,466	\$ 85,735,987	\$ 578,391,338	\$ 664,127,325

Notes regarding tables above:

- ¹ "Current Budget" includes executed change orders and awarded contracts.
- ² Column C "Cost This Month" represents the cost of work performed this month.
- ³ Column D "Cost To Date" includes actuals (amount paid) and accruals (amount of work performed) to date.
- ⁴ The agency labor is actual through November 2017 and accrued for December 2017.
- ⁵ The lower accrued amount for EMU Eng & Mgmt is the result of lighter consultant support performed than was estimated in the previous reporting period.

Table 8-3 PCEP Budget & Expenditure Status

Description of Work	Budget	Current Budget	Cost This Month	Cost To Date	Estimate To Complete	Estimate At Completion
	(A)	(B) ¹	(C) ²	(D) ³	(E)	(F) = (D) + (E)
Electrification Subtotal	\$ 1,316,125,208	\$ 1,316,125,208	\$ 14,636,810	\$ 302,756,886	\$ 1,013,368,322	\$ 1,316,125,208
EMU Subtotal	\$ 664,127,325	\$ 664,127,325	\$ 446,466	\$ 85,735,987	\$ 578,391,338	\$ 664,127,325
PCEP TOTAL	\$ 1,980,252,533	\$ 1,980,252,533	\$ 15,083,276	\$ 388,492,873	\$ 1,591,759,660	\$ 1,980,252,533

Notes regarding tables above:

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


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

APPENDIX D

PCEP Risk Register
Sample Page Part I

Program Risk Register					1
Version Date: December 15, 2017 - All Risks					LOW
					< 10%
					< \$500 K
					< 1 Month
ID	RBS		RISK DESCRIPTION	EFFECT(S)	Probability
	FUNC. (P)	FUNC. (S)			
56	EMU	Interface	Lack of O&M support for testing and/or vehicle operations. Includes operational readiness and personnel hired and scheduled to be trained.	<ul style="list-style-type: none"> Testing delayed. Change order for extended vehicle acceptance. 	
64	Elect.	Stkhldr-Ext	Relocation of underground utilities must precede construction of catenary pole foundations. Potholing will identify any need for revisions to pole placement, which may result in a need for additional ROW or relocation of the utility by others.	<p>Delay in installation of catenary poles resulting in claims and schedule delay</p> <p>CBOS FOC conflicts additional costs and delays include:</p> <ol style="list-style-type: none"> Potholing Design OCS materials Encasement ROW <p>JPB Signal Cable conflicts additional costs and delays include:</p> <ol style="list-style-type: none"> Trenching Splicing Cable 	

PCEP Risk Register Sample Page Part II

		2	3	4	5		
		MEDIUM	HIGH	VERY HIGH	SIGNIFICANT		
		10% - 50%	50% - 75%	75% - 90%	> 90%		
K		\$500 K - \$2 M	\$2 M - \$10 M	\$10 M - \$20 M	\$20 M - \$50 M		
h		1 - 3 Months	3 - 6 Months	6 - 12 Months	> 12 Months		
T Y P E	I M P A C T		P R I O R I T Y		O W N E R	M I T I G A T I O N A C T I O N S	R E T I R E M E N T D A T E(S)
	P R O B A B I L I T Y	C O S T	S C H E D U L E	G R A D I N G			
T	2	1	2	6	Navarro	<ul style="list-style-type: none"> Communicate with TASI on testing requirements Language in TASI contract for what they support for EMUs and electrification Maintain ongoing communication with TASI Sufficient advance notice to be able to adjust schedule <p>Make sure requirements are provided to TASI well in advance and monitor their preparation (and all other parties as well) via the Commissioning and Operational Readiness weekly meeting.</p>	Completion of Integrated Testing
T	3	2	1	9	Hurley	<p>Based on the field verification walk the location of the CBOSS FOC may have significant impact to the OCS pole installation. Based on the location of the FOC pull boxes and field markers, their FOC follows the same path of the UPRR duct bank, which greatly limits the location where the OCS poles can be installed. The CBOSS FOC appears to be 9' to 12' from the nearest rail. OCS pole foundations are located 9'-3" from Centerline of track to OCS Pole face. OCS pole foundations are 3' in diameter. To mitigate possible delay to the contractor, the final As-Builts for CBOSS FOC need to be received and compared with current OCS pole locations for any potential conflicts.</p> <p>CBOSS FOC (parallel to track) found during potholing are treated as follows:</p> <ol style="list-style-type: none"> 1. OCS Foundations relocated further offset from track. 2. If ROW permits; offset 4 ft. 3. If ROW does not permit; offset no closer than 2 ft. <p>Encase FOC 7 ft. and place temporary steel plate between encasement and new OCS foundation location during drilling</p> <ol style="list-style-type: none"> 4. If ROW does not permit; purchase additional ROW as 	Completion of foundation construction for all segments.

PCEP Risk Register Sample Page Part III



RETIREMENT DATE(S)	NOTES	A - C	STATUS & REMARK(S)
Completion of Integrated Testing	Please update with Joe Navarro's name - Last conversations entailed the DB providing support until TASI staff is properly trained. - M. Verhoff 8/17/2016	A	Reduced state-of-good repair staffing to support all capital projects, PCEP, 25th Avenue, Los Gatos. Will hire starting October 30. Interviewing during the month of October. Training will take 1-1/2 months. - J> Navarro 10/10/2017
Completion of foundation construction for all segments.	Leeway in locating OCS poles reduces severity of this risk. For lateral crossing utilities poles can be relocated. For fiber optics and signal cables some flexibility to relocate utilities. - A. Brick-Turin 6/12/2017 Notes from Risk Assessment Committee 3/15/2017- - \$10,000 per conflict, 400 likely conflicts = \$4 million relocation costs. - Need by September 2018 for testing.	A	Potholing at proposed OCS foundation locations continues in Segment 2 & 4 Mitigation measures are underway in Segment 4. - J. Hurley 11/2/2017

APPENDIX E

Change Order Logs Modernization Program Peninsula Corridor Electrification Project (PCEP) January 2018 Monthly Progress Report

Peninsula Corridor Electrification Project Monthly Progress Report

Change Order Logs

Electrification Contract

Change Order Authority (5% of BBII Contract)		5% x \$696,610,558 = \$34,830,528		
Date	Description	CCO Amount	Percent of Authority ¹	Remaining Authority
08/31/2017	CCO 00001 – Track Access Delays for 2016, Quarter 4	\$85,472	0.25%	\$34,745,056
		Total	0.25%	\$34,745,056

Notes:

¹. When the threshold of 75% is reached, staff may return to the Board to request additional authority.

EMU Contract

Change Order Authority (5% of Stadler Contract)		5% x \$550,899,459 = \$27,544,973		
Date	Description	CCO Amount	Percent of Authority ¹	Remaining Authority
9/22/2017	CCO 00001 – Contract General Specification and Special Provision Clean-up	\$0	0.00%	\$27,544,973
10/27/2017	CCO 00002 – Prototype Seats and Special Colors	\$55,000	0.20%	\$27,489,973
11/02/2017	CCO 00003 – Car Level Water Tightness Test	\$0	0.00%	\$27,489,973
12/05/2017	CCO-00004 – Onboard Wheelchair Lift 800 Pound Capacity Provisions	\$848,000	3.08%	\$26,641,973
11/03/2017	CCO 00005 – Design Progression (multiple)	\$0	0.00%	\$26,641,973
12/12/2017	CCO 00006 – Prototype Seats and Special Colors	(\$27,500)	-0.10%	\$26,669,473
		Total	3.18%	\$26,669,473

Notes:

¹. When the threshold of 75% is reached, staff may return to the Board to request additional authority.

SCADA Contract

Change Order Authority (15% of ARINC Contract)		15% x \$3,446,917 = \$517,038		
Date	Description	CCO Amount	Percent of Authority ¹	Remaining Authority
	None to date			
		Total	0%	\$517,038

Notes:

¹. When the threshold of 75% is reached, staff may return to the Board to request additional authority.

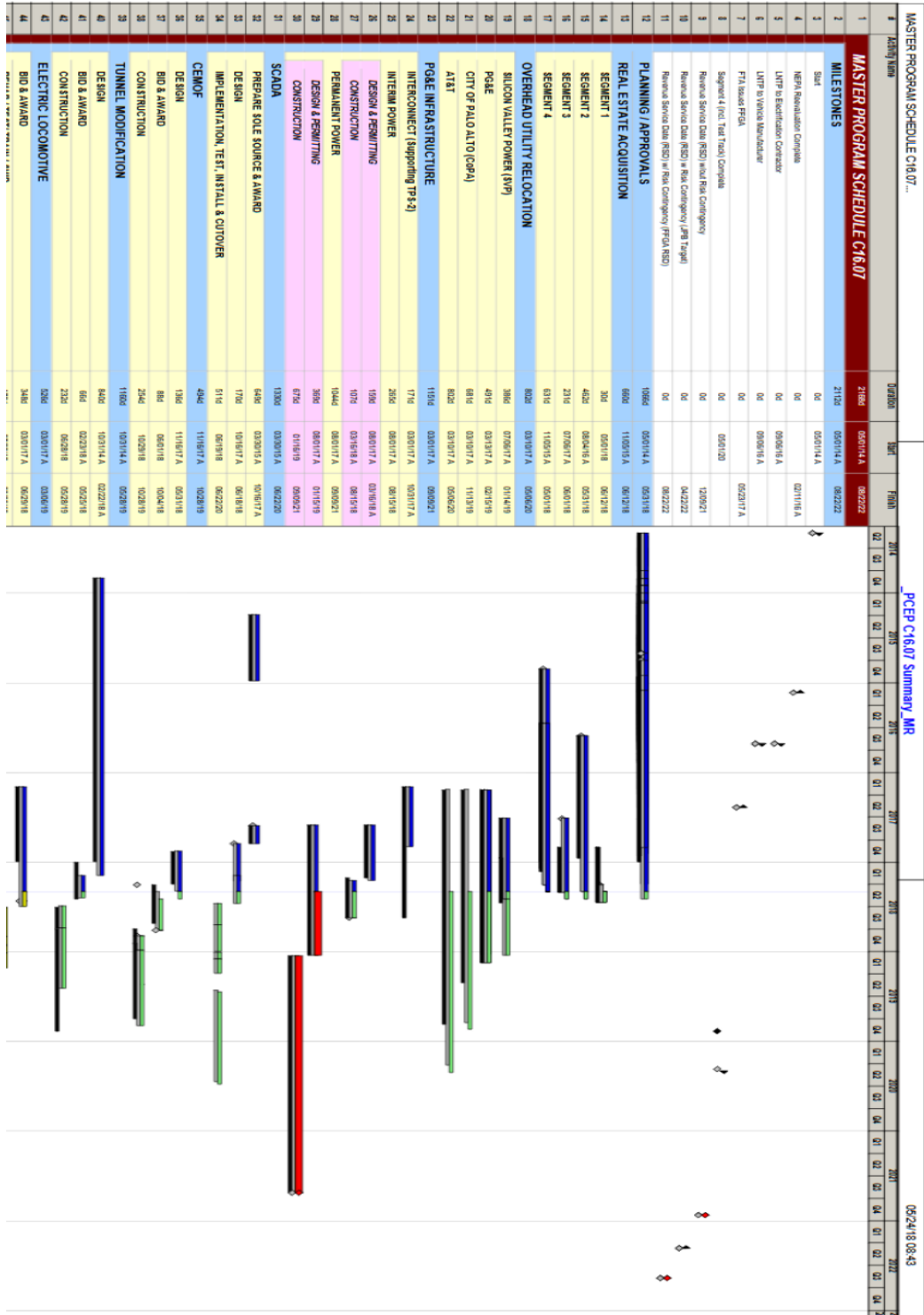
APPENDIX F

PCEP Master Program Schedule Summary

Modernization Program

Peninsula Corridor Electrification Project (PCEP)

April 2018 Monthly Progress Report



Issued: July 24, 2018



BOARD OF DIRECTORS 2018

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CHARLES STONE
MONIQUE ZMUDA

JIM HARTNETT
EXECUTIVE DIRECTOR

October 4, 2018

Honorable V. Raymond Swope
Judge of the Superior Court
Hall of Justice
400 County Center, 2nd Floor
Redwood City, CA 94063-1655

Dear Judge Swope:

I am writing on behalf of the Board of Directors of the Peninsula Corridor Joint Powers Board (JPB). This letter will serve as the JPB's formal response to the July 24, 2018 letter from the Superior Court transmitting the report from the 2017-2018 Civil Grand Jury with regard to management of the Caltrain Modernization (CalMod) Program and the relative ease with which the public can locate information on CalMod. The JPB's Board of Directors reviewed and approved (on October 4, 2018) this response to the Grand Jury report's 11 findings (numbered F1 and F3-F12) and three recommendations (R1-R3).

As the report notes, the \$1.98 billion CalMod Program includes electrification of the Caltrain right-of-way between San Jose and San Francisco and phased replacement of Caltrain's fleet of diesel rail cars with new high-performance electric-powered rail cars (known as Electric Multiple Units or "EMUs").

It is apparent, and the JPB appreciates, that the report was extensively and carefully researched, and takes appropriate notice of the numerous oversight mechanisms in place for the CalMod Program. The JPB also appreciates the opportunity to respond to the report's findings and recommendations.

Findings

The JPB agrees with all of the findings set forth in the report. Relative to findings F9, F11 and F12, and as addressed further below, the JPB has made and will continue to make improvements to information available on the Caltrain and CalMod websites, including CalMod Monthly Progress Reports, which will include more detail on the use of contingency funds, project schedules and milestones.

Recommendations

The JPB values the Grand Jury's recommendations, all of which concern the transparency of CalMod information. As the three recommendations are so intertwined, we offer the following response to all of them.

As the report notes, publicly-available CalMod budget and schedule information is updated regularly and made available through the PCEP Monthly Progress Reports. To access these reports, it is not necessary to navigate through each Board of Directors agenda link. Rather, these reports are consolidated in the online "CalMod Documents Library," which is accessible in two clicks from either the Caltrain homepage or the Calmod.org homepage. Still, it is concerning that the Civil Grand Jury was not able to navigate to this resource. In response, the JPB has changed both webpages to make this information more readily accessible, including by making updates to the sites' search functionality.

Furthermore, the CalMod Monthly Progress Reports currently include a chart that tracks CalMod's progress vis a vis its projected budget. Also, the Executive Summary of each CalMod Monthly Reports lists critical milestones, and tracks the completion of these milestones against their projected completion dates. However, Caltrain will explore strategies for elevating and expanding this information within the Monthly Progress Report and on the websites, and will focus such improvements on providing meaningful transparency for the public.

In addition, the JPB wishes to address some of the Grand Jury report's assumptions and recommendations related to the CalMod contingency. For "mega" projects like CalMod, the contingency is not simply a dollar amount added to an overall project budget. Instead, it is an essential part of the funding plan and is actively managed throughout project implementation as risks are anticipated and then retired, one by one, over time. This contingency and risk register process and progress are addressed in the CalMod Quarterly Reports, located on the same webpage as the CalMod Monthly Reports. To date, all CalMod contingency expenditures have been within the contingency budget.

In sum, the JPB believes that the completed and planned changes will fully address recommendations R2 and R3, and will address underlying needs expressed in recommendation R1. However, the JPB has determined that development of an interactive dashboard would be disproportionately costly relative to its value as all of the information that would be contained in such a resource already is available or planned through the means described above.

Thank you for the opportunity to respond to your report; I trust you will find our comments helpful.

Sincerely,



Jim Hartnett
Executive Director, Peninsula Corridor Joint Powers Board

cc: Board of Directors
via email to: grandjury@sanmateocourt.org