

**MONTHLY REPORT**  
*March 2015*

**Central Subway Project**  
San Francisco Municipal Transportation Agency (SFMTA)  
San Francisco, CA

Draft Report delivered to FTA on *April 10, 2015*  
Final Report delivered to FTA on *May 11, 2015*

*PMOC Contract No.: DTFT6014D00010*

*Task Order No. 5*

*Project No.: FTA-13-0294*

*Work Order Number: 001*

*OPs Referenced: 01 and 25*

*CLIN 0002B*

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Time on project: *10 months*

## EXECUTIVE SUMMARY

### Project Description

The Central Subway Project (CSP) is constructing a 1.7-mile extension of Muni's T Third Line along 4th Street and Sacramento Street in downtown San Francisco. The CSP is Phase 2 of the San Francisco Municipal Transportation Agency's (SFMTA) Third Street Light Rail Transit Project. Phase 1 of the project constructed a 5.1-mile light rail line along the densely populated 3rd Street corridor. It began revenue service in April 2007. The CSP will extend the T Third Line from the 4th Street Caltrain station to Chinatown, providing a direct, rapid transit link from the Bayshore and Mission Bay areas to South of Market (SoMa), Union Square, and downtown.

Four new stations are being constructed as part of the project—an at-grade station at 4th and Brannan streets and three underground stations at Yerba Buena/Moscone Center (YBM), Union Square/Market Street (UMS), and Chinatown (CTS). Four light rail vehicles (LRVs) will be procured for the CSP as part of a larger procurement that will replace the entire LRV fleet. Average Weekday Boardings are projected at 43,521 in 2030.

### Project Status

The Full Funding Grant Agreement (FFGA) was signed on October 11, 2012. Design is complete, and the project has been under construction since February 2010. *At the end of February 2015, the project was 48.3% complete based on expenditures.* There are two active construction contracts: 1252 Tunnel Construction and 1300 Stations and Systems/Trackwork. *The 1252 contract was 98.2% complete at the end of February 2015 and was expected to be substantially complete April 15, 2015.*

*The 1300 Contract was 28.1% complete at the end of February. Substantial completion is scheduled for February 2018, but the SFMTA February Monthly Progress Report states that the second update of the construction schedule from the contractor continues to forecast completion six months behind schedule. The schedule update has been rejected by SFMTA, so the project still does not have an accepted schedule that accurately indicates the status of the project. SFMTA reported on March 31, 2015 that the contractor was very close to being able to submit an acceptable update of its schedule. **The Revenue Service Date (RSD) is still scheduled for December 2018, although, in the opinion of the PMOC, if the construction of the stations is six months behind schedule, the available float in the schedule has been consumed.** SFMTA is working with the contractor to create an acceptable schedule update and to identify actions to recover the accumulated schedule delay. SFMTA reported on March 31, 2015 that there were good opportunities to recover the delays at the Union Square-Market Street (UMS) station and the Yerba Buena-Moscone (YBM) station but that schedule recovery for the Chinatown Station (CTS) would be more challenging due to the planned Sequential Excavation Method (SEM) for mining the cavern connecting the headhouse to the platforms.*

**Table 1 - Core Accountability Items**

<b>Project Status:</b>		<b>Original at FFGA:</b>	<b>Current Estimate:</b>
<b>Cost</b>	Cost Estimate	\$1,578,300,000	\$1,578,300,000
<b>Contingency</b>	Unallocated Contingency	\$74,722,000	\$10,019,456
	Total Contingency (Allocated plus Unallocated)	\$185,500,000	\$80,973,077
<b>Schedule</b>	Revenue Service Date	12/26/2018	12/26/2018
<b>Total Project Percent Complete</b>	Based on Expenditures	48.3%	
	Based on Earned Value	47.9%	
<b>Major Issues</b>	<b>Status</b>	<b>Comments/Planned Action</b>	
Schedule Contingency	Project schedule contingency is currently at 4.8 months. Based on progress of the stations contract, much of this contingency may have been consumed by delays.	The minimum schedule contingency agreed to at this stage of the project is 8.0 months. The CSP has submitted justification to decrease the minimum required, but this will not be accepted until the updated 1300 schedule is incorporated into an updated schedule risk assessment and SFMTA provides a plan for recovering the accumulated delays on the project critical path.	
Cost Contingency	The current Total Project Contingency is \$81.0 million. The FTA recommends a minimum contingency level of \$140 million.	On April 26, 2011, SFMTA obtained a commitment from the Metropolitan Transportation Commission (MTC) for \$150 million of (State) Regional Improvement Program funds to the project to be accessed in the event project costs increase above \$1.5783 billion.	

<p>Technical Capacity and Capability</p>	<p><i>Three of the senior management staff members on the project have new roles and one senior manager has left the project.</i></p>	<p><i>The PMOC will monitor the effectiveness of the assigned management staff in their new roles, especially the preparation of accurate and consistent reporting data.</i></p>
<p><b>Date of Next Quarterly Meeting:</b></p>		<p>May 6, 2015</p>

- *Earned Value (EV): \$757,722,130 – an increase of \$20.92 million from January and 47.9 % of the budgeted project cost.*
- *Planned Value: \$802,910,533 – an increase of \$20.43 million from January.*
- *Actual Cost: \$762,451,695 – an increase of \$14.8 million from January.*
- *Cost Performance Index (CPI): 0.99, where greater than 1 means that value of the work completed is more than the cost of the work (under budget) and less than 1 means that the value of the work is less than the cost of the work (over budget).*
- *Schedule Performance Index (SPI): 0.94 where SPI greater than 1 is ahead of schedule and less than 1 is behind schedule.*

*The PMOC notes that earned value was essentially the same as the planned value for February, continuing a trend where earned value is meeting or exceeding the planned value. **In the opinion of the PMOC, the continued positive performance of earned value relative to planned value indicates that the project is not falling further behind schedule each month. However, production will have to increase substantially in order to overcome the contractor’s reported estimate of six months of accumulated delay to the critical path of the 1300 Contract that has now been reported in the last two SFMTA monthly progress reports.***

**Contingency**

Cost Contingency

*The total available contingency is \$80.97 million, which is below the minimum required contingency of \$140 million. It still appears that the tunnel contract likely will not consume its entire allocated contingency, potentially freeing some contingency for other aspects of the project. Based on the favorable contract price for the supply of light rail vehicles, the base project cost for the vehicles was reduced by \$10.8 million and the allocated contingency for vehicles was increased by the same amount. As a result, total project contingency was increased by 15%. **In the opinion of the PMOC, the project will likely have cost contingency above the required minimum at the next milestone – Tunnel Demobilization Complete.***

### Schedule Contingency

The Program Master Schedule for the Central Subway continues to show 4.8 months of buffer float for the RSD. *An approved, updated 1300 Contract schedule still is not available to be incorporated into the master schedule. SFMTA reports that the contractor's unapproved schedule update supports an estimate of six months of delay to the 1300 Contract. Based on the contractor's schedule update and comments in the February SFMTA progress report, the program master schedule may now have negative buffer float for the planned RSD of late December 2018. The agreed level of schedule contingency at this phase of the project is 8.0 months.* **In the opinion of the PMOC, SFMTA should work to quickly adopt the updated 1300 Contract schedule and incorporate it into the Program Master Schedule. Strategies to recover the accumulated delays should be aggressively pursued by both SFMTA and the contractor.**

### **PMOC Observations, Opinions, and Concerns**

- *PMOC Concern: SFMTA reported that as of February 28, 2015 the second version of the updated schedule for the 1300 Contract shows a six month delay in the completion date. Such a delay would leave only four months between the completion of the stations work and the Revenue Service Date. SFMTA reports that the updated schedule still has not been accepted and that it may not be accurate. In the opinion of the PMOC, SFMTA should urgently work to develop an acceptable schedule and incorporate it into the Program Master Schedule.*
- *In the opinion of the PMOC, SFMTA should urgently confirm whether any float is available in the schedule and prepare a plan for recovering the accumulated delays. In the opinion of the PMOC, the CSP management team has not yet given the problem of accumulated delays to the station contract the necessary attention to identify possible measures to recover the delay or mitigate the impact of the delay on the scheduled Revenue Service Date. Once identified, the effectiveness of strategies to recover the delays should be carefully monitored over the coming months.*
- *In the opinion of the PMOC, although the 1300 Contract is stated to be six months behind schedule, it is a positive sign that the earned value for the 1300 Contract equaled or exceeded the planned value for January and February 2015. It appears that the trend of actual progress lagging behind planned progress has been overcome.*
- *In the opinion of the PMOC, the total contingency, including unallocated contingency and less identified trends of 10.3% of the potential remaining spending, is probably sufficient to assure on-budget completion of the project. In the opinion of the PMOC, the project will likely have cost contingency above the required minimum at the next milestone – Tunnel Demobilization Complete due to favorable cost performance of the tunnel contract and the LRV procurement.*

- The PMOC notes that the trend log for the 1300 Contract does not allow tracking of contract changes that will be paid outside of the CSP program separate from changes that will be covered by the program budget. Although the trend log includes notes as to the funding sources for each change, the PMOC suggests that the ability to do separate tracking of program costs would be useful to both SFMTA and FTA.
- In the opinion of the PMOC, until the claims from completed contracts are officially settled, there is a risk that some of the claimed cost may be incurred. These costs are not being tracked in the trend log.
- In the opinion of the PMOC, the unexpected subsidence that occurred above the excavation site for Cross Passage (CP) 5 was responded to in an appropriate manner with due consideration for both schedule and quality of the resulting constructed facilities. The PMOC notes that at present the required repairs are expected to be completed before the scheduled substantial completion date for the contract. In the opinion of the PMOC, the contractor should prepare an analysis of the cause of the leak.
- *Recent events on two major roof slab concrete placements indicate that the Quality Control (QC) and Quality Assurance (QA) processes for the project are not effective in assuring that the installed work at the stations is in conformance with the contract. One of the events also showed that the station contractor is violating provisions of its adopted Quality Management Plan. The PMOC is concerned that the quality issues revealed by recent events will result in further delays to the project and increased costs for the repair or replacement of defective work by the station contractor. SFMTA should urgently uncover the underlying causes that resulted in non-conforming work being installed even though the QC and QA documentation indicated that the work conformed to the contract requirements. SFMTA also should urgently address the contractor's failures to follow its own Quality Management Plan and stop the practice of the contractor's Project Manager from overruling the project Quality Manager's direction in regard to quality issues.*
- *The PMOC is concerned that the station contractor has been unable to present a sufficient work plan for the 4th and King Streets intersection that would allow work to begin over the Memorial Day weekend. SFMTA has stated that it intends to form a "swat team" to develop the necessary work plans to complete the complex work needed to tie the CSP into the existing T-line at 4th and King. SFMTA should mobilize the team in the very near future, as it is evident that the contractor is not adequately planning all of the necessary elements of the work on its own. Since the contractor has stated that the work cannot be accomplished according to the requirements of the contract, the first task of the team should be to confirm whether the contract requirements for the work can be implemented.*

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## A. PROJECT STATUS

### Full Funding Grant Agreement (FFGA)

The FFGA was signed on October 11, 2012.

### Design

All designs are complete.

### Construction

*Contract 1250 (UR #1).* This contract relocated utilities within the footprint of the proposed YBM, and work is complete.

*Contract 1251 (UR #2).* This contract relocated utility lines within the footprint of the proposed UMS and temporarily rerouted existing trolley coach lines around the construction zone and work is complete.

### *Contract 1252 Tunnel.*

- *At the end of February 2015, work on the tunnel contract was 98.2% complete.*
- *As of the end of March 2015, all work at the retrieval shaft was completed and the contractor had demobilized from the site. All restoration work in the North Beach area was also complete.*
- *Cleaning and repairs of the tunnel liner segments continued.*
- *Work to address the localized failure of the ground treatment at Cross Passage 5 was nearing completion at the end of March 2015. Structural concrete was placed, the decommissioning of the freeze plant was complete, and the freeze pipes had been filled with grout. Final repairs and tunnel cleaning were scheduled to be completed in the first week of April. Utility repairs and restoration of the street pavement above the CP 5 location were scheduled to extend to April 15. San Francisco Water Department (SFWD) requested some additional rehabilitation and repair work to water connections to adjacent property that is not related to the ground subsidence. This additional utility work will extend the completion of street restoration beyond the April 15 substantial completion date for the contract. **In the opinion of the PMOC, the unexpected subsidence that occurred above the excavation site for Cross Passage 5 was responded to in an appropriate manner with due consideration for both schedule and quality of the resulting constructed facilities. The PMOC notes that the required repairs and installation of the Cross Passage structure are nearly finished and all contract work should be completed before the scheduled substantial completion date. In the opinion of the PMOC, the contractor should prepare an analysis of the cause of the leak.***



- *Construction of the tunnel portal structure was very near completion at the end of March 2015. Only the installation of final seals at the headwalls, the installation of form-savers on the slab, and installation of security gates at the portal remained to be completed.*
- *Utility restoration in the portal area was scheduled to be completed in the first few days of April, with street and sidewalk finishing extending to the planned substantial completion date of April 15, 2015.*
- *Substantial completion is expected to be achieved on April 15, 2015. Work will be ongoing at the CP 5 site due to requested water line upgrades, but this work is not to be considered in the determination of substantial completion.*

***Contract 1300 (Combination of UMS, CTS, YBM, and STS).***

- *As of the end of February 2015, the construction of the Stations and Surface, Track and Systems contract was 28.1% complete.*
- *Union Square/Market Street Station (UMS): The installation of all piles for support of excavation was completed for UMS. Jet grouting to prevent water intrusion into the excavation is underway. There have been some problems with the jet grout program, including water intrusion into Macy's basement and some utility conflicts with the planned locations for jet grout placement. The contractor has ordered a second jet grout rig to increase production. Excavation of the Ellis Street area was nearly completed. At the north concourse, work to stabilize the existing Union Square parking garage started. Underground tanks and unanticipated utilities were encountered in the north concourse excavation area, slowing the preparations for excavation and placement of the roof slab in this area. At the south concourse, excavation is nearing the level where compensation grouting is to be injected into the soil to prevent settlement of adjacent buildings.*
- *Chinatown Station (CTS): The first section of the roof slab for the headhouse was poured on March 18. Problems with this pour resulted in a delay in the pour for the second section of roof from March 27 into early April. During the pour for the first section of roof, the TPC Quality Control (QC) manager called for a halt to concrete placement due to the potential for a cold joint as a result of delayed concrete delivery. The TCP project manager overruled the QC Manager's order and directed the work to proceed. This action was in violation of TPC's Quality Management Plan (QMP) for the contract. SFMTA is considering how to respond to this breach of the QMP. In addition to the cold joint issue, both pours have issues with form-savers (devices that allow the placement of dowels to structurally connect the two pours while avoiding damage to the concrete forms). In the station area, preparations for installation of dewatering wells and instrumentation to detect ground movement continued. Utility conflicts were identified at the location of the north access shaft, and SFMTA is identifying how to resolve these conflicts.*

- Yerba Buena/Moscone Station (YBM): *Demobilization of the slurry wall operation was completed and preparations were made for the excavation of the headhouse area. Construction of the roof of the western portion of the station box continued. The first portion of the structural roof was poured in early March, and utilities were placed above the deck in preparation for backfilling the area, which is scheduled for early April. The second section of the roof deck was excavated, formed, and poured in late March, and waterproofing was installed. After placement of the concrete on March 20, it was discovered that substantial amounts of reinforcing steel were not in place, despite the fact that the Quality Control (QC) and Quality Assurance (QA) forms for the pour were completed and signed off indicating that all work was in conformance with the contract. A significant repair will be required to provide the structural support that would have been provided by the missing steel. The designer, contractor and SFMTA are developing a plan for the required repairs. SFMTA is conducting an evaluation of how the Quality Program failed to prevent the installation of non-conforming work. Utilities will be installed above this section of the deck in April. The last section of the western roof deck was scheduled to be poured at the end of March, with waterproofing, utility placements, and backfilling to follow. This pour will likely be delayed in order to affect the necessary repairs to the second pour. At the headhouse, preparations were made to pour the roof slab starting at the Clementina end of the structure. The initial pour for the roof slab is scheduled to occur in early April.*
- Surface, Track, and Systems (STS): *Installation of the drilled piles supporting the station platforms was completed. Muni Traction Power duct bank (MRY), AWSS, AT&T, and sewer work continued. The contractor submitted a plan for starting the construction of the 4th and King improvements in May 2015. Complete information on planned work requiring a closure of the intersection must be received 90 days in advance of the planned closure. The submittal was incomplete and the proposed work was disapproved. **In the opinion of the PMOC, TPC has yet to demonstrate that it has the necessary planning and coordination capabilities to effectively plan and execute the complex work to tie the CSP into the existing T-line while maintaining traffic and transit operations.***

*The PMOC's concerns regarding the quality management issues noted above are documented in Section F of this report.*

**The PMOC is concerned that the station contractor has been unable to present a sufficient work plan for the 4th and King Streets intersection that would allow work to begin over the Memorial Day weekend. SFMTA has stated that it intends to form a "swat team" to develop the necessary work plans to complete the complex work needed to tie the CSP into the existing T-line at 4th and King. SFMTA should mobilize the team in the very near future, as it is evident that the contractor is not completing the planning for all of the necessary elements of the work on its own. Since the contractor has stated that the work cannot be accomplished**

*according to the requirements of the contract, the first task of the team should be to confirm whether the contract requirements for the work can be implemented.*

### **Third party Agreements Including Utilities, Railroads, Other Agencies, Etc.**

#### ***Bay Area Rapid Transit (BART)***

*No updates to report.*

#### ***Caltrans***

SFMTA needs to extend the Caltrans encroachment permit for STS work. There appears to be some concern regarding the ability to demonstrate conformance of the design of the traffic control devices with Caltrans standards. *The contract drawings need to be provided to Caltrans in a format matching Caltrans standards. SFMTA is identifying how to make the necessary changes to the drawings. SFMTA is identifying the relevant office at Caltrans for the coordination of the work at 4th and King, which may require the temporary closure of the I-280 freeway terminus connecting to King Street.*

#### ***CPUC Communications***

The California Public Utilities Commission (CPUC) was invited to, and is, participating in the various safety meetings, including the Safety and Security Certification Review Committee (SSCRC) and Fire and Life Safety Committee (FLSC) meetings. Representatives of the CPUC also regularly attend the SFMTA/FTA Quarterly Progress Review Meetings (QPRMs). The next QPRM is scheduled for May 6, 2015.

#### ***San Francisco Public Utilities Commission (SFPUC)***

No updates to report.

#### ***San Francisco Department of Public Works (SFDPW)***

Sidewalk Legislation Permit for the STS work was expected to be approved in October 2014. *SFMTA reported that modeling of the effects of a 100-year storm needs to be completed to support the approval for this permit.*

#### ***San Francisco Parks and Recreation Department***

The Memorandum of Understanding (MOU) for the Union Square Garage with the Parks and Recreation Department has been completed.

#### ***Private Property Owners***

For 19 Stockton Street (Armani Exchange Building), condemnation was filed in February 2013. Pre-judgment possession was granted October 3, 2013, allowing the City access to install monitoring equipment and compensation grout tubes at the property. A settlement conference

was held in November 2014 in advance of the compensation trial, which was held as scheduled in December. The judgment regarding the value of the license for the property is pending.

For 790 Market Street/2 Stockton Street (Forever 21 Store), SFMTA has been communicating with the property owner regarding engineering issues and restrictions imposed by the easement for the property.

Notice of the pending termination of the lease agreement has been given to the property owner at the retrieval shaft. The lease is expected to be terminated in May 2015. *SFMTA is also preparing for the termination of the lease from Caltrans of the land for tunnel contractor's offices and storage yard. The yard should be vacated by the tunnel contractor by the May 15 final completion date for the contract.*

The Project has installed settlement monitoring equipment at sensitive buildings adjacent to the project. There are now 370 total licenses for monitoring equipment (ten were added to address the potential Pagoda retrieval shaft) and property agreements. *The monitoring equipment is in the process of being removed or transferred to the station contractor, as the need for ongoing monitoring during station construction dictates.*

### **Vehicle Status of Design, Procurement, Approvals by State Safety Board, Testing and Integration**

On September 19, 2014, the mayor of San Francisco announced that SFMTA had awarded a contract to supply 175 LRVs to the Siemens Corporation for \$648 million, or \$3.7 million per vehicle. The initial order includes four LRVs for the Central Subway and 20 LRVs for near term fleet expansion and 151 LRVs for fleet replacement. Options for up to 85 additional vehicles are available for fleet expansion. At the contracted price, the cost to the CSP of the four vehicles allocated to the project will be \$14.81 million. This compares to a budgeted cost of \$26,385,653 for Standard Cost Category (SCC) 70, including spare parts and contingency, and represents an \$11.5 million savings. This savings partially offsets the trend of higher than estimated costs on the construction components of the project.

### **Real Estate**

The CSP is in possession of all three subsurface easements required to construct the tunnels and both fee acquisitions required to construct the YBM and CTS stations. The CSP leased property at the former Pagoda Theater site for the retrieval shaft. That lease is expected to be terminated in May 2015 after the shaft is covered.

All project commercial and residential relocations are complete.

### **Labor Relations and Policies**

Appendix E of the Project Monthly Report details the Small Business Enterprise (SBE) goals and actual participation on each contract. SFMTA contract goals range from 6 percent to 30 percent

on each of the contracts. The majority of the contracts have met these goals to date. See Appendix G.

### **Compliance with Applicable Statutes, Regulations, Guidance, and FTA Agreements**

The tunneling contractor has not achieved the level of participation in its contract by women and apprentices. SFMTA is requesting documentation from BIH of its good faith efforts in regard to hiring women and apprentices for its work.

## **B. PROJECT MANAGEMENT PLAN AND SUB-PLAN IMPLEMENTATION**

### **Project Management Plan (PMP)**

The next update of the PMP is scheduled to be provided by SFMTA on March 31, 2015.

### **Environmental Assessment/Mitigation Plan/Archaeological Plans**

The PMOC received the Fourth Quarter 2014 Mitigation Monitoring Reporting Program (MMRP) update from SFMTA on January 23, 2015. SFMTA has provided evidence of contractor submittals and Inspector Daily Reports to verify that the Mitigation Measures identified in the MMRP are being carried out during construction. Furthermore, the Fourth Quarter report incorporates refinements suggested by the PMOC in October 2014. **It is the PMOC's opinion that the grantee is sufficiently managing to ensure that the mitigation measures identified in the MMRP will be carried out during the course of the project.**

### **Real Estate Acquisition Management Plan (RAMP)**

The RAMP Revision 5, dated September 26, 2013, was submitted to FTA on November 19, 2013. All required real estate for the project has been acquired in accordance with the RAMP.

### **Quality Assurance/Quality Control (QA/QC) Program Plan**

See section F.

### **Safety and Security Management Plan (SSMP)**

See section G.

### **Risk and Contingency Management Plan (RCMP)**

See section H.

## **C. PROJECT MANAGEMENT CAPABILITY AND CAPACITY**

### **Project Staff**

- *An organization chart was provided to the PMOC by SFMTA on March 13, 2015, along with an announcement of changes in three senior management positions on the CSP*

project team. Albert Hoe will assume the role of Deputy Program Director Project Services, which supervises Contract Administration, Document Control, Project Controls (scheduling and cost), Financial Management and Configuration Management and Risk Management. Eric Stassevitch will assume the role of Program Manager-Project Delivery in an acting status. This position supervises the Resident Engineering functions for all active construction. Rich Redmond, the former Program Manager-Project Construction, has left the project. Alex Clifford, the Construction Manager for the tunnel contract and the 3rd Party Coordination manager, will take on the role of CM Support, which appears to be a support role for the Program Manager-Project Delivery. The changes reflect significant changes in the functional roles of Messrs. Hoe and Stassevitch. The PMOC will be monitoring the effectiveness of the transition of the Project Controls functions, since Mr. Stassevitch was very actively involved in the oversight of the scheduling and cost control functions for the project. The PMOC noted that the Station Contract Progress Meeting held March 31 was more effective under Mr. Stassevitch's leadership than previous meetings attended by the PMOC.

- SFMTA confirmed that a cost engineer started working for the project on March 16, 2015. The new organization chart indicates an open position for Senior Construction Support (Change Order) Dispute Resolution Claims.
- The February SFMTA Progress Report continues to state that the 1300 contractor's management and administration of the subcontractors is a concern. The contractor is not evaluating the adequacy of the subcontractors' submittals, and there is evidence that the contractor is not actively engaged in managing and coordinating the ongoing work of the subs. At the February PMOC status meeting, SFMTA reported that the contractor had added senior staff to the contract team, including a scheduler and a construction operations expert. SFMTA reported that the added staff members appeared to be taking a proactive approach to assembling the required submittals and quality control documentation for upcoming work. **In the opinion of the PMOC, lack of contractor control and management of its subcontractors has been a significant concern for the project. Additional resources and focus by TPC's management team is a positive development for the project. However, the contractor's continuing inability to prepare a sufficient work plan for the 4th and King tie-in work indicates that additional resources are likely needed.**
- The SFMTA's February 2015 staffing analysis shows that there is much less of a shortage of consultant staff in design support for construction for the 1300 Contract (6.43 staff FTEs planned and 5.8 FTEs actual). At the end of December, most of the long overdue responses had been closed. SFMTA management developed a simplified tool for quick review of submittals and RFIs that are past due and reviews the information at the weekly project management meeting. At the most recent CSP Management Meeting the PMOC observed that there were very few overdue submittal and RFI responses. **In the**



**opinion of the PMOC, SFMTA has taken aggressive action to clear the backlog of critical RFIs that represented a risk of delays to the project and claims by the contractor, and this attention has resulted in the problem being significantly reduced. SFMTA should continue to focus on timely responses to contractor submittals and RFIs to avoid future buildup of a backlog of overdue responses.**

## **D. PROJECT COST STATUS**

### **Project Cost Control Systems**

SFMTA implemented a new Capital Program Control System in an effort to integrate existing systems with new software modules. The new system is comprised of Primavera P6, EcoSys Enterprise Planning and Controls (EPC), Contract Management 13 (CM13), and SharePoint. The system went live on December 13, 2012. CSP staff determined that the cost reporting information coming from the EcoSys EPC database was not working for this project and abandoned the use of this information in mid-2013. This increased the level of effort needed to provide accurate cost reporting and caused the staff to need to manually input data. FTA performed a review of the EcoSys module component of Capital Programs Control System. A draft report was provided to SFMTA for their technical review. Comments from SFMTA are pending. After receiving SFMTA's comment, FTA will issue a final report with recommendations.

In November 2014 the Office of the Controller, City Services Auditor published a report documenting the results of an independent review of the CSP cost accounting and management systems. The audit found that despite the various challenges faced by the CSP Office with respect to reporting project costs to the FTA, current reported costs are supported by reliable source data and past variances have been resolved. Specifically, the audit noted:

- Current schedule and cost predictions suggest that the project will not exceed its baseline budget and will open to the public as planned;
- Schedule and cost performance expectations compare to industry practices;
- Remaining significant project expenses related to construction are accounted for and contingency levels are closely monitored;
- Several levels of review and approval within various SFMTA entities must occur before a project expense is paid;
- City's Accounting System serves as the basis for reporting costs to the FTA;
- Excel-based cost reporting tool used to replace the Capital Program Control System is functional; and
- Explanations for past reporting errors have been accepted by the FTA.

The report included two recommendations:

- Continue working on fine tuning the cost workbook and associated written procedures.
- Work with SFMTA Accounting and the Controller's Office to formally "close" Financial Accounting Management Information System (FAMIS) index codes no longer used, such as those related to the already completed preliminary engineering phase, to minimize erroneous posting of current costs to past phases and activities.

SFMTA has been working to create a useful Trend Log for Contract 1300 using CM13. The trend log was finalized in July and is up and running. **The PMOC recognizes the significant accomplishment of creating the trend log for the 1300 Contract.** The PMOC notes that the trend log does not allow tracking of contract changes that will be paid outside of the CSP program separate from changes that will be covered by the program budget. Programming of the CM13 module would be needed to provide separate tracking of program and non-program costs. **Although the 1300 Contract trend log includes notes as to the funding sources for each change, the PMOC suggests that the ability to do separate tracking of program costs from non-program work would be useful to both SFMTA and FTA.**

### Project Cost

Cost estimate: \$1.5783 billion

Total contingency: \$80.97 million, a decrease of \$0.25 million from January 2014 (minimum contingency is \$140 million)

Total net incurred costs: \$762,451,695 (48.31 % of the total project budget)

Current funding level: \$1,029,794, 000 (65.3 percent of the total project budget)

Earned Value (EV): \$757,722,130 – an increase of \$20.92 million from January, and 48.01% of the budgeted project cost

Actual Cost: \$762,451,695 – an increase of \$14.80 million from January

CPI: 0.99

CPI is a measure of cost efficiency on a project. It is the ratio of EV to actual cost value. A CPI equal to or greater than one indicates a cost under run and a value of less than one indicates a cost overrun. A value of 0.9 or greater is considered acceptable, considering the margin of error in estimating the value of completed work.

Two large claims have been made by the utility contractors for work on Contracts 1250 (\$3.6 million) and 1251 (\$3.8 million). SFMTA has stated that these total cost claims are not valid, since California law provides for total cost claims only if a contractor can demonstrate that it lost money on the contract. Audits of both contracts indicate that the contractors earned profits on both contracts, which suggests that the total cost claims will be invalidated. **In the opinion of the PMOC, until the claims are officially settled, there is a risk that some of the claimed cost may be incurred.** These potential costs are not being carried in the project trend log.



## Project Cost Trends

SFMTA tracks potential changes in project cost, calling these potential changes “trends.” Trends include all potential changes in the contract value. As the status of an identified trend changes, it may become a contract modification, it may become an item that is paid on a force account basis, or it may be denied/closed with no impact to the project cost. Table 2 summarizes the trends for the two active construction contracts.

**Table 2 - Contract, Budget, and Trends for Active Construction Projects<sup>1</sup>**

	1252 - Tunnel	1300 Stations, STS
Original Contract	233,584,015	839,676,396
Approved Contingency	17,484,956	20,000,000
Extra Budget for Non-Project Costs	6,173,508	
Approved Budget	244,895,463	859,676,396
Approved Changes	1,421,807	(1,432,743)
Current Contract (1252 does not include non-project costs)	235,005,822	838,243,653
Remaining Contingency	16,063,146	21,432,743
Potential Changes (Trends)	85,842	4,583,703
Potential Contract	235,091,304	842,827,356
Contingency Less Trends	15,977,664	16,849,040
Spent to Date	230,878,495	235,614,773
Potential Left to Spend	4,212,809	607,212,583

<sup>1</sup> As reported in the February 2015 Central Subway Project Monthly Progress Report – SFMTA.

The remaining contingency, less identified trends, represents 379% of the potential left to spend for Contract 1252 and 2.8% of the potential left to spend for Contract 1300. The combined allocated contingency for all construction work less identified trends represents about 5.5% of the potential remaining construction expenditure. **In the opinion of the PMOC, the allocated contingency for the 1252 Contract is greater than the amount required to assure completion of the contract within the budget. The allocated contingency for the 1300 Contract may not be sufficient to complete the contract, and the overall allocated contingency may be low for the percentage completion level of construction. However, there likely is sufficient unallocated contingency and excess allocated contingency from other program components, such as vehicles, for successful completion of the program.**

Table 3 shows the overall budget, trends, and contingency status for the entire Central Subway program. **As shown, the total contingency, including unallocated contingency and less identified trends, represents 10.3% of the potential remaining spending, which in the opinion of the PMOC, is probably sufficient to assure on-budget completion of the project.**

**Table 3 - Budget and Contingency Status for Central Subway Project**

	<b>Total Construction</b>	<b>Right of Way</b>	<b>Vehicles</b>	<b>Professional Services</b>	<b>Unallocated Contingency</b>	<b>Total Program</b>
<b>Original Contract</b>	1,130,342,777	36,511,799	24,108,712	310,518,041		1,501,481,329
<b>Approved Contingency</b>	45,301,196	1,000,000	2,276,941	18,221,079	10,019,456	76,818,672
<b>Extra Budget for Non – Project Costs</b>	6,173,508					
<b>Approved Budget (w/o Extra Launch Shaft Cost)</b>	1,175,643,973	37,511,799	26,385,653	328,739,120	10,019,456	1,578,300,000
<b>Approved Changes</b>	6,645,307	-	(10,799,712)	-		(4,154,405)
<b>Current Contract</b>	1,136,988,084	36,511,799	13,309,000	310,518,041		1,497,326,924
<b>Remaining Contingency</b>	38,655,889	1,000,000	13,076,653	18,221,079	10,019,456	80,973,077
<b>Potential Changes (Trends)</b>	4,669,185	-	-	-		4,669,185
<b>Potential Contract</b>	1,141,657,269	36,511,799	13,309,000	310,518,041		1,501,996,109
<b>Contingency Less Trends</b>	33,986,704	1,000,000	13,076,653	18,221,079	10,019,456	76,303,892
<b>Spent to Date</b>	523,860,402	29,723,380	2,145,579	206,722,334		762,451,695
<b>Potential Left to Spend</b>	617,796,867	6,788,419	11,163,421	103,795,707		739,544,414
<b>Contingency Less Trends/Potential Left to Spend</b>	5.5%	14.7%	117.1%	17.6%		10.3%

### Change Order Control

*The Contract 1252 Contract Modification/Trend Log – March 25, 2015 had the following activities:*

- 49 Contract Modifications (CMods) totaling \$1,533,909 of additional CSP program costs, all of which have been certified.
- Two Pending Contract Modifications (PCMs), which do not yet have estimated values.
- One change order was executed for this contract in February (and two additional changes were executed after February).

CMods total \$7.707 million, of which \$5,150,000 is for the relocation of the retrieval shaft and \$1.0 million is for utility work, which are not program costs.

*The Contract 1300 Tend Log included in the February SFMTA Monthly Progress Report reflects the following:*

- 11 trend items that may lead to changes.
- 15 Proposed Contract Changes (PCCs).
- 22 Change Order Requests (CORs).

- 1 Pending Change Order.
- 6 Approved CMods.
- A total potential change of +\$3,150,960 is being reported in February 2015, a decrease of \$3,153,305 in total potential changes from January.
- Two changes were executed for this contract in February, including the deletion of the Air Replenishment System, which is a major cost reduction.

The trend log in the monthly report does not include several large recent trend items that, if decided in favor of the contractor, would result in significant cost increases. The most recent version of the complete Trend Log for the 1300 Contract dated April 1, 2015 shows a total potential increase in contract cost of \$13,847,592, which is still below the allocated contingency assigned to this contract. The following trend items in excess of \$500,000 in possible higher costs are identified in the trend log:

1. Change to grade 50 steel from specified grade 70 steel (due to availability and Buy America issues) - \$626,780
2. Extra trucking costs for contaminated soil at CTS - \$3,743,672
3. Harder rock than anticipated for CTS slurry wall excavation - \$5,971,414
4. Delays to installation of tangent piles at UMS - \$4,279,000
5. Unstable rock caving into slurry wall excavation at CTS - \$600,000

In addition to these large potential cost increases, the trend log includes the following major cost savings:

1. Deletion of bid items at YBM - (\$1,833,869)
2. Deletion of the Air Replenishment System - (\$4,689,000)

## Funding and Expenditures

Federal, state, and local project funding and expenditures are shown in Table 4.

**Table 4 - Project Funding**

Source	Committed (\$1,000)	Awarded (\$1,000)
<b><u>Federal</u></b>		
New Starts	942,200	469,198
Congestion Mitigation	41,025	41,025
<i>Federal Subtotal</i>	983,225	510,223
<b><u>State</u></b>		
TCRP	14,000	14,000
State RIP	88,000	12,498
Prop. 1B / PTMISEA	307,792	225,912

Source	Committed (\$1,000)	Awarded (\$1,000)
Prop. 1A / HSR	61,308	61,308
<i>State Subtotal</i>	471,100	395,598
<b>Local</b>		
Prop. K Sales Tax	123,975	123,975
<i>Local Subtotal</i>	123,975	123,975
<b>Project Total:</b>	<b>1,578,300</b>	<b>1,029,794</b>

## E. PROJECT SCHEDULE STATUS

As of the end of February, the Project had received a second update to the Contract 1300 baseline schedule, but SFMTA stated that this update has been disapproved, along with the first update. The February SFMTA Monthly Report states that the update to the schedule provided by the contractor continues to indicate that the completion of the contract would be six months late if delays are not recovered. **In the opinion of the PMOC, if this estimate of the accumulated delay is accurate, the available buffer float in the Program Master Schedule has been consumed by accumulated delays to the 1300 Contract. A revised schedule update is needed to confirm whether buffer float remains in the Master Program Schedule. In any event, it is apparent that some delays in the 1300 Contract have occurred and that a recovery schedule should be prepared.** SFMTA has indicated that it is focusing on the work to achieve the placement of the invert slabs in each of the stations to identify opportunities for reduced durations, parallel work, and elimination of unnecessary tasks in order to recover from the accumulated delays to the schedule. The planned revenue service date remains unchanged at December 26, 2018.

The 1252 Contract is currently on track to be substantially complete on the planned April 15, 2015 date. The substantial completion of the 1252 Contract is not on the critical path for the overall project.

- *Earned Value (EV): \$757,722,130 – an increase of \$20.92 million from January and 47.9 % of the budgeted project cost.*
- *Planned Value: \$802,910,533 – an increase of \$20.43 million from January.*
- SPI: 0.94

SPI is a measure of schedule efficiency on a project. It is the ratio of earned value to planned value. An SPI equal to or greater than one indicates more work was completed than planned and a value of less than one indicates less work was completed than planned. A value of equal to or greater than 0.9 reflects satisfactory performance, considering the margin of error in estimating both earned value and planned value.

Earned value was approximately \$20.9 million compared to the planned value of \$20.4 million for the month of February. With earned value exceeding planned value, a trend of completed work matching or exceeding planned work was continued from January. **In the opinion of the PMOC, the continued positive performance of earned value relative to planned value indicates that the project is not falling further behind schedule each month. However, production will have to increase substantially in order to overcome the contractor's reported estimate of six months of accumulated delay to the critical path of the 1300 Contract that has now been reported in the last two SFMTA monthly progress reports.**

Based on the reported EV and planned value, the project has earned about \$45 million less than planned. SFMTA stated that the methods of calculating earned value and planned value measures were revised in October 2014 to correct long-standing errors in the calculation. However, the planned value and earned value calculations are not yet based on an updated baseline schedule for the 1300 Contract. SFMTA has agreed to provide a detailed description of how the calculation of these performance indicators was changed and corrected. **In the opinion of the PMOC, the accuracy of the cost and schedule performance indicators can only be assured with the incorporation of the updated 1300 Contract baseline schedule into the performance measurement process.**

Table 5 shows the status of the schedule milestones established for the project.

**Table 5 - Schedule Milestones**

(A = Actual Date, F= Forecast Date)	
PE:	Authorized in July 2002 (A)
Record of Decision:	Issued November 26, 2008 (A)
Final Design (FD):	Authorized in January 2010 (A)
FFGA Request:	Submitted September 2011 (A)
FFGA Executed:	October 11, 2012 (A)
Ground Breaking: (Utility Relocation Contract)	February 9, 2010 (A)
Tunnel excavation complete (hole through):	June 2, 2014 (SB); June 11, 2014 (NB) (A)
Cross passages complete:	December 20, 2014; April 7, 2015 (F)
Tunneling substantial completion:	April 12, 2015; April 15, 2015 (F)
Station construction Notice to Proceed (NTP):	June 17, 2013 (A)
Station construction substantial completion:	February 24, 2018
RSD:	December 26, 2018

The current master schedule (incorporating the unapproved 1300 Contract schedule) reflects 4.8 months of buffer float. *Based on statements in the February 2015 CSP Progress Report, the 1300 Contract may be six months behind schedule for tasks on the critical path.* **In the opinion of the PMOC, much of the available schedule float appears to have been consumed by delays to the critical path activities in the 1300 Contract schedule.** SFMTA and TPC are working to identify actions that could recover the accumulated delays. **In the opinion of the PMOC, The effectiveness of strategies to recover the accumulated delays should be carefully monitored over the coming months.**

Schedule Contingency Management criteria were developed from the FTA Risk Assessment prior to entry into FD. Minimum schedule contingency levels at various project milestones or “Hold Points” were agreed to with SFMTA at Risk Workshop #4, held on February 24 through 27, 2009. The FTA recommended schedule contingency at this time of the project is 8.0 months. As noted above, the current schedule reflects only 4.8 months of buffer float.

In October 2013, the CSP submitted the Draft Contingency Management – Schedule Update, which proposed changes to the schedule contingency minimum levels based on a recent risk assessment performed by the CSP team. The team used risk-based software, which employs the Monte Carlo method, to perform a probability analysis on the Project’s Summary Schedule.

At this time, the PMOC cannot recommend that FTA accept any modification to schedule contingency minimum levels. The PMOC recommends that the CSP incorporate the updated Contract 1300 baseline schedule as soon as it is completed. At that time, the PMOC recommends that the CSP incorporate the remaining high level schedule risks on the Project Risk Register into a new risk assessment.

**PMOC Concern: In accordance with FTA guidelines, a minimum of 8.0 months of schedule contingency is recommended at this phase of the project. We are awaiting the results of a schedule analysis based on the adopted and updated 1300 Contract baseline schedule to determine what schedule contingency remains.**

### **Critical Path Summary**

- CTS Install Guidewalls, Slurry Walls, and Install Surface Deck
- CTS Excavate Headhouse and Bracing
- CTS Sequential Excavation Method and Install Supports
- CTS Headhouse Structural Concrete/Remove Bracing
- CTS Install Mechanical, Electrical, and Plumbing (M/E/P) Equipment
- CTS Start Up and Testing
- CTS P-1254R Commissioning of Station Complete
- Safety and Security Certification / Pre-Revenue Activities
- RSD on December 26, 2018

### Three Month Look-ahead

The following activities are planned over the next three months:

#### *1252 Contract*

- *Achieve substantial completion of the contract and turn over the tunnels to SFMTA*
- *Complete punch list items and achieve final completion on May 15, 2015*

#### *1300 Contract*

##### *UMS*

- *Progress I-beam, roof deck, and waterproofing installation for roof deck construction*
- *Complete demolition operations at Ellis Street on existing BART structure*
- *Install new roof on Ellis for BART Station entrance to UMS station*
- *Continue working on Union Square Garage tieback installation, micro-pile installation, and demolition*
- *Continue jet grouting operations on Stockton Street between Geary and O'Farrell streets*
- *Install new roof on station between Maiden Lane and Geary Street*

##### *CTS*

- *Form, reinforce, and pour surface level deck*
- *Continue excavation under deck to the level where compensation grouting can occur*
- *Pre-grout soil prior to continuing with the headhouse excavation*
- *Install dewatering wells and monitoring equipment*

##### *YBM*

- *Complete excavation and placement of the roof slab on the west side of station box*
- *Place utilities above the west side roof and restore the street above*
- *Switch traffic to the west side of 4th Street and begin excavation of the east half of the station roof*
- *Excavate to the first strut level in headhouse, including disposal of Class 1 contaminated soil from the top layer*
- *Install struts at level one in headhouse*

##### *STS*

- *AT&T Ductbank installation*
- *Sewer installation*
- *Streetlight conduit installation*
- *Waterline installation*
- *Alternative Water Supply System (AWSS) installation*
- *Muni ductbank installation*



The PMOC expects to attend the following meetings:

- Weekly Management (first Monday of each month)
- Weekly Contract 1300 Construction Progress (first Tuesday of each month)
- Weekly Configuration Management Board (CMB) (first Wednesday of each month)
- Weekly Tunnel Construction Progress (first Thursday of May)
- *Monthly CSP Risk Management Meetings (first Thursday of each month)*
- CSP month-end meetings on May 5, June 2, and July 7
- FTA/QPRM scheduled for May 6, 2015

## **F. QUALITY ASSURANCE AND QUALITY CONTROL**

### **QA/QC Plan Implementation**

Since the beginning of this project, Project QA has logged, tracked, addressed, and closed out each recommendation/finding made by the PMOC, identifying them as a Corrective Action item, and then using the overall project Corrective Action Log. The Project Quality Manager continues to conduct training for all new members of the project team as they are mobilized.

Contractor QC, as detailed in the Contract Technical Specification, is the means by which the contractor ensures that construction complies with the requirements of the contract. The contractor conducts at least three phases of control (Preparatory Phase, Initial Phase, and Follow-up Phase) to ensure that all work is carried out per the contract.

For each of the construction contracts, the contractor's staff includes a Contractor's Quality Manager (CQM), who reports to the Contractor's Management at an organization level superior to the contractor's Project Manager. The reporting structure is to provide the CQM with direct access to the contractor's Principal Officers. For each of the construction contracts, a Contractor Non-Conformance Report Log for identifying, correcting, documenting, and controlling non-conformances is maintained by the contractor. Subsequent work may not progress for work that is the subject of a Corrective Action Request until conditions adverse to quality are corrected.

Based on observations of the weekly progress meetings for each of the active construction contracts and the weekly CSP management meeting, the project team is actively engaged in quality assurance to monitor the contractors' compliance with the requirements of the Contractor QC process for each contract.

The following quality concerns for the 1252 Tunnel Contract were identified in the SFMTA February monthly report:

- Contractor's field repairs of tunnel liner segments per approved procedures
- Open Contractor Non-Conformance Reports (CNCRs) that await closing as a function of required liner repairs
- Completion of the index of final BIH JV Quality Documentation required for contract close-out



**In the opinion of the PMOC, these are fairly routine procedural issues that should be able to be resolved as part of the contractor's tunnel repair and contract close-out processes.**

The following quality issues for the 1300 Stations Contract were identified in the SFMTA February monthly report:

- TPC's management and administration of their subcontractors. TPC's Project Engineers in particular are not apparently involved with the actual on-going work as well as not scrutinizing and evaluating the adequacy of subcontractor's submittals.
- TPC's Project Manager's, Project Engineer's, and Field Supervision's support of the implementation of TPC's Quality Control Program.
- Implementation of the approved waterproofing, waterstop, and construction joint details for the UMS Station Roof pile caps.
- Test columns results and subsequent performance of UMS jet grouting.
- TPC's honoring of RE Hold Points. *In particular, TPC's Electrical Subcontractor has failed to honor TPC and SFMTA Hold Points – corrective action determination is ongoing.*

*Two significant quality shortfalls arose during the placement of concrete for the roof decks at CTS and YBM during the month of March that indicate a need for refinement of the Quality Management process for the station construction.*

- *At YBM, after placement of the concrete for the second section of the western roof deck on March 20, it was discovered that substantial amounts of reinforcing steel were not in place, despite the fact that the Quality Control (QC) and Quality Assurance (QA) forms for the pour were completed and signed off indicating that all work was in conformance with the contract. The required repair work will delay the subsequent pour for the third section of the roof deck. SFMTA is conducting an evaluation of how the Quality Program failed to prevent the installation of non-conforming work.*
- *At CTS, the first section of the roof slab for the headhouse was poured on March 18. During the pour, the TPC Quality Control (QC) manager called for a halt to concrete placement due to the potential for a cold joint as a result of delayed concrete delivery. The TCP project manager overruled the QC Manager's order and directed the work to proceed. This action was in violation of TPC's Quality Management Plan (QMP) for the contract. SFMTA is considering how to respond to this breach of the QMP.*

***In the opinion of the PMOC, the 1300 Contractor's management and administration of subcontractor work and lack of management support for the project quality program is a long-standing concern that has now resulted in two instances of non-conforming work being installed, with attendant delays and potential added costs. The PMOC is concerned that the quality issues on two major roof slab concrete placements are evidence that the Quality***

*Control (QC) and Quality Assurance (QA) processes for the project are not fully effective in assuring that the installed work at the stations is in conformance with the contract. One of the events also showed that the station contractor is violating provisions of its adopted QMP. The PMOC is concerned that the quality issues revealed by recent events will result in further delays to the project and increased costs for the repair or replacement of defective work by the station contractor. SFMTA is urgently working to uncover the underlying causes that resulted in non-conforming work being installed even though the QC and QA documentation indicated that the work conformed to the contract requirements. SFMTA also is considering how to address the contractor's failures to follow its own QMP and stop the practice of the contractor's Project Manager overruling the project Quality Manager's direction in regard to quality issues. The PMOC urges SFMTA to place top priority on the implementation of improvements to the Quality Program to prevent reoccurrence of similar quality issues.*

*Effective coordination and control of subcontractor work will continue to be critical to the timely completion of quality work on the stations. Many critical aspects of the contract will be constructed by subcontractors, including the 4th and King intersection improvements and the LRT track and systems. TPC's assignment of additional staff for preparation of submittals and quality documentation for upcoming work is a positive step, but the contractor has yet to demonstrate sufficient control of its subcontractors or the ability to effectively plan upcoming work. Smoothing the process of preparing for planned construction activities will contribute to recovering from accumulated delays in the schedule. The PMOC will continue to closely monitor the effectiveness of the contractor's management processes in the coming months.*

## **G. SAFETY AND SECURITY**

### **Safety and Security Management Plan (SSMP)**

An updated SSMP Revision 2, dated February 2, 2014, was submitted to FTA on May 2, 2014. The outgoing PMOC did not review the SSMP at that time. The SSMP outlines the plans needed prior to revenue operations. These plans include the Rail Activation Plan, the System Integration Test Plan, the Safety and Security Certification Plan (SSCP), and the Pre-Revenue Operations and Start-up Plan. These last three plans have not been developed by SFMTA at this time, although SFMTA is working on the initial Rail Activation Plan.

### **Fire and Life Safety/Safety and Security Issues**

The Construction Specification Conformance Checklists have been completed and approved for all construction packages. In September 2013, the California Public Utilities Commission (CPUC) staff began attending monthly as-built meetings to review the completed items. The San Francisco Fire Department (SFFD) regularly attends the now combined Fire and Life Safety Committee (FLSC) and Safety and Security Certification Review Committee (SSCRC) meetings. The SFFD will continue to coordinate with the Tunnel and Stations projects to identify issues of

importance during construction. The Project has been working with the SFFD to try and eliminate the Air Replenishment System in both the tunnels and the stations.

### Construction Safety

The project is maintaining an excellent safety record, with recordable and lost time incidents well below the OSHA goals for the type of construction. No incidents occurred on either of the active construction contracts in February. The current accident records are shown in Table 6.

**Table 6 - Construction Safety Data - Project to Date**

	No. of Incidents	Incident Rate	Goal
<b>1252 Tunnel Contract</b>			
OSHA Recordable Accidents	10	2.44	<3.4
Job Transfer/Restricted Duty Incidents	7	1.71	NA
Lost Time Incidents	1	0.24	<1.6
Total Incidents	18	4.39	NA
Hours Worked	820,739		
<b>1300 Contract</b>			
OSHA Recordable Accidents	0	0	<3.4
Job Transfer/Restricted Duty Incidents	0	0	NA
Lost Time Incidents	0	0	<1.6
Total Incidents	0	0	NA
Hours Worked	458,039		

## H. PROJECT RISK, RISK MANAGEMENT, AND RISK MITIGATION

RCMP Revision 3 was received by the PMOC on April 30, 2013. The outgoing PMOC provided its final Spot Report to FTA on July 19, 2013. SFMTA submitted a CSP “Contingency Management – Schedule 2012 Update” on May 22, 2013. On October 11, 2013, the CSP provided an updated report with new schedule modeling and a recommendation to reduce the current FTA minimum schedule contingency of 8.0 months. The PMOC provided a review of this document to FTA on November 21, 2013, and could not recommend at that time that FTA accept any modification to schedule contingency minimum levels based on the current documentation provided.

The PMOC recommends that the CSP incorporate the updated Contract 1300 baseline schedule as soon as it is approved. At that time, the PMOC recommends that the CSP incorporate the remaining high level schedule risks on the Project Risk Register into a new risk assessment. The Contract 1300 baseline schedule was adopted in early December. Schedule updates are underway and are yet to be approved by SFMTA and incorporated into the Master Program Schedule. The schedule risk assessment is now expected from the CSP in early 2015.

*At the April CSP Risk Management Meeting the committee reviewed the status of the highest ranked risks in the risk register. The following highly ranked risks are able to be closed within the next month:*

- *Utility conflicts in the Ellis Street area (UMS) – the excavation has reached the invert level so no further unanticipated utilities should be encountered. It was noted that asbestos material was encountered in the past few days, which will require mitigation.*
- *Delays due to conflicts with an unanticipated AT&T vault for the utility work in 4th Street, south of Bryant Street – can be retired after April 10.*
- *Risk of neighborhood complaints causing a change in the construction sequence for the Portal – the street closure at Stillman and Perry has ended and the Portal is nearing completion.*

*Other utility and 3rd party conflicts continue to represent risks to the schedule for the station work:*

- *Water line conflicts at the northern end of the CTS station site.*
- *Several utility conflicts at the North Concourse of the UMS excavation.*
- *Coordination with the possible start of building demolition at the site of the former Olivet University on the west side of the YBM station site.*

*New risks were identified, including potential cost increases and schedule delays due to the installation of non-conforming work due to issues with the Quality Management process for the project, as exemplified by the recent quality shortfalls on roof slab pours (see section F).*

*The committee discussed the possible late completion of the station construction due to accumulated delays. This possibility is being treated as a new risk, although it is a consequence of the impact of several of the previously identified risks as well as other factors. The PMOC noted that the Risk Mitigation Committee focused its discussion on responses to delay claims by the station contractor regarding material hardness and extended time for installation of the slurry walls at CTS and delays to the start of installation of the large, battered tangent piles for the station box at UMS. These mitigation measures would address the potential for extra direct construction costs and for costs due to compensable delay to the contractor (extended construction overhead costs). However, these mitigation measures would not result in acceleration of the remaining construction and recovery of the accumulated delay. **In the opinion of the PMOC, the CSP management team has not yet given the problem of accumulated delays to the station contract the necessary attention to identify possible measures to recover the delay or mitigate the impact of the delay on the ability of SFMTA to achieve the scheduled Revenue Service Date.** SFMTA's current risk register is included in Appendix D.*

**In the opinion of the PMOC, the risk meetings are an effective forum for the evaluation of risks and the identification of mitigation measures.** The PMOC will continue to monitor the Risk Mitigation meetings to assess the SFMTA's risk mitigation activities.

## **I. ACTION ITEMS**

Table 7 on the following page shows the current action items for SFMTA.

**Table 7 - The PMOC's Central Subway Points of Action for SFMTA**

Category	NO.	ACTION	DATE OPENED	DUE DATE	DATE CLOSED	COMMENTS
<b>S, RA</b>	<b>159</b>	Once the Contract 1300 Baseline Schedule has been approved, incorporate remaining high level schedule risks into a new risk assessment	4/21/14	<del>1/13/15</del> Revised to 4/1/15		PMOC recommendation from the Contingency Management – Schedule 2012 Update, Revision 1, October 2013
<b>S, T</b>	<b>160</b>	Initial draft of the Rail Activation Plan	12/2/14	3/31/15		A sub-plan of the Project Management Plan
<b>PMP</b>	<b>161</b>	Annual update of PMP	12/2/14	3/31/15		Regular annual update
<b>C, S</b>	<b>162</b>	Documentation of changes in Earned Value and Planned Value estimation	1/14/15	<del>1/28/15</del> Revised to 3/31/15		As promised in December 2014

(Note: All closed items are removed a month after being closed. Changes to open items since last update are indicated in BLUE.)

Category Key: C – Cost  
 FMP – Fleet Management Plan  
 IRP – Independent Review Panel  
 PMP –Project Management Plan

QA – Quality Assurance  
 RA – Risk  
 RE – Real Estate

S – Schedule  
 SC – Scope  
 SS – Safety

T – Tech. Cap. & Cap.  
 CH – Change Mgmt.

**APPENDIX A. LIST OF ACRONYMS**

APTA	American Public Transportation Association
AWSS	Alternative Water Supply System
BART	Bay Area Rapid Transit
BCE	Baseline Cost Estimate
BIH	Barnard Impregilo Healy
BRT	Bus Rapid Transit
Caltrans	California Department of Transportation
CFR	Code of Federal Regulations
CLIN	Contract Line Item Number
CM13	Contract Management 13
CMB	Configuration Management Board
CMod	Contract Modification
CNCR	Contractor Non-Conformance Report
COR	Change Order Request
CP	Cross Passage
CPI	Cost Performance Index
CPUC	California Public Utilities Commission
CQM	Contractor's Quality Manager
CSP	Central Subway Project
CTS	Chinatown Station
DF	Designated Function
EPC	Enterprise Planning and Controls
EV	Earned Value
FAMIS	Financial Accounting Management Information System
FD	Final Design
FEIS	Final Environmental Impact Statement
FEIR	Final Environmental Impact Report
FFGA	Full Funding Grant Agreement
FLSC	Fire and Life Safety Committee
FMP	Fleet Management Plan
FTA	Federal Transit Administration
IRP	Independent Review Panel
LONP	Letter of No Prejudice
LRT	Light Rail Transit
LRV	Light Rail Vehicle
M/E/P	Mechanical, Electrical, and Plumbing
MMRP	Mitigation Monitoring Reporting Program
MOU	Memorandum of Understanding
MPS	Master Project Schedule

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MRY	Muni Traction Power System
MTC	Metropolitan Transportation Commission
Muni	Common Public Reference to SFMTA
NEPA	National Environmental Policy Act
NTP	Notice to Proceed
OP	Oversight Procedure
PCC	Proposed Contract Change
PCM	Pending Contract Modification
PE	Preliminary Engineering
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
PTMISEA	Public Transportation Modernization, Improvement, and Service Enhancement Account
QA/QC	Quality Assurance/Quality Control
QMP	Quality Management Plan
QPRM	Quarterly Progress Review Meeting
QTR	Quarter
RAMP	Real Estate Acquisition Management Plan
RCMP	Risk and Contingency Management Plan
RE	Real Estate
RFI	Request for Information
ROD	Record of Decision
RSD	Revenue Service Date
SBE	Small Business Enterprise
SCC	Standard Cost Category
SCP	Safety Certification Plan
SEIS	Supplemental Environmental Impact Statement
SEM	Sequential Excavation Method
SEPP	Security and Emergency Preparedness Plan
SFDPW	San Francisco Department of Public Works
SFFD	San Francisco Fire Department
SFMTA	San Francisco Municipal Transportation Agency
SFPUC	San Francisco Public Utilities Commission
SFWD	San Francisco Water Department
SoMa	South of Market (Street)
SPI	Schedule Performance Index
SSCP	Safety and Security Certification Plan
SSCRC	Safety and Security Certification Review Committee
SSMP	Safety and Security Management Plan
SSP	System Security Plan



SSPP	System Safety Program Plan
STS	Surface, Track, and Systems
TBM	Tunnel Boring Machine
TPC	Tutor Perini Corporation
TSA	Transportation Security Administration
UMS	Union Square/Market Street Station
UR	Utility Relocation
U.S.C.	United States Code
YBM	Yerba Buena/Moscone Center Station
YOE	Year of Expenditure

**APPENDIX B. SAFETY AND SECURITY CHECKLIST**

<b>Central Subway Project Overview</b>			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/ Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
<b>Project Plans</b>	<i>Version</i>	<i>Review by FTA/FRA</i>	<b>Status</b>
Safety and Security Management Plan	<b>2014</b>	<b>2011</b>	Revision 1 Update submitted to FTA 02/25/2011. Not submitted to FRA. Revision 2 submitted to FTA on May 2, 2014.
Safety and Security Certification Plan (SSCP)	<b>2011</b>		SSCP was revised 10/2011. Revision 1 was developed in November 2011. Not submitted to FRA.
System Safety Program Plan (SSPP)	<b>2009</b>	<b>2009</b>	SSPP dated 03/13/2009 submitted to FTA 07/31/2009. Not submitted to FRA.
System Security Plan (SSP) or Security and Emergency Preparedness Plan (SEPP)	<b>2009</b>		Not submitted to FTA. Not submitted to FRA.
Construction Safety and Security Plan	<b>2012</b>		Health and Safety. Construction Safety Standards Revision 3, June 27, 2012.
<b>Safety and Security Authority</b>	<i>Y/N</i>		<b>Notes/Status</b>
Is the grantee subject to 49 CFR Part 659 state safety oversight requirements?	Y		
Has the state designated an oversight agency as per Part 659.9?	Y		California Public Utilities Commission (CPUC) Consumer Protection & Safety Division 505 Van Ness Avenue San Francisco, CA 94102 (415) 703-1017 phone (415) 703-1758 fax Point of contact: Arun Mehta

<b>Central Subway Project Overview</b>			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
<b>Project Plans</b>	<i>Version</i>	<i>Review by FTA/FRA</i>	<b>Status</b>
Has the oversight agency reviewed and approved the grantee's SSPP as per Part 659.17?	Y		SFMTA currently operates its LRT system in compliance with an SSPP approved by the CPUC. These plans will be revised, as required, to incorporate the addition of the CSP during the late construction and early testing phase and submitted to the CPUC for approval prior to the planned start of revenue operations.
Has the oversight agency reviewed and approved the grantee's Security Plan or SEPP as per Part 659.21?	Y		See above.
Did the oversight agency participate in the last Quarterly Program Review Meeting?	Y		
Has the grantee submitted its safety certification plan (SCP) to the oversight agency?	Y		SFMTA submitted the SSCP to CPUC staff for review and Commission approval during the preliminary engineering phase. The plan was approved in March 2009. The SSCP revised in November 2011 will be submitted to the CPUC for approval.
Has the grantee implemented security directives issues by the Department Homeland Security, Transportation Security Administration?	N/A		Currently, there are no TSA directives or programs applicable to the project. If any arise during the course of the project, the activities to comply will be developed and shown on a revision of the project safety and security activities schedule.
<b>SSMP Monitoring</b>			
Is the SSMP project-specific, clearly demonstrating the scope of safety and security activities for this project?	Y		The PMOC reviewed the CSP SSMP and provided a spot report to FTA in May 2011. FTA approved the CSP SSMP on May 16, 2011. A follow-up Adherence Audit was conducted September 14-16, 2011. The audit found that CSP is conducting its activities in accordance with the SSMP.

<b>Central Subway Project Overview</b>			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
<b>Project Plans</b>	<i>Version</i>	<i>Review by FTA/FRA</i>	<b>Status</b>
Grantee reviews the SSMP and related project plans to determine if updates are necessary?	Y		SSMP Revision 2 was submitted to FTA on May 2, 2014.
Does the grantee implement a process through which the Designated Function (DF) for Safety and DF for Security are integrated into the overall project management team? Please specify.	Y		Safety and security are under the direction of the SFMTA Safety and Security Manager and supplemented by Project Management / Construction Management consultant staff, including a Safety and Security Certification professional who has been dedicated to supervise project Safety and Security Certification.
Does the grantee maintain a regularly scheduled report on the status of safety and security activities?	Y		Construction activities are reported in the weekly construction progress meetings and the CSP Monthly Progress Report.
Has the grantee established staffing requirements, procedures, and authority for safety and security activities throughout all project phases?	Y		
Does the grantee update the safety and security responsibility matrix/organizational chart as necessary?	Y		The PMOC found the revised matrix in the SSMP, rev. 1, 02/08/11, to be compliant.
Has the grantee allocated sufficient resources to oversee or carry out safety and security activities?	Y		
Has the grantee developed hazard and vulnerability analysis techniques, including specific types of analysis to be performed during different project phases?	Y		CSP has prepared a Preliminary Hazard Analysis Report, Rev. 0, April 23, 2009. Corrective actions and analysis for different project phases have been identified in the report.

<b>Central Subway Project Overview</b>			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
<b>Project Plans</b>	<i>Version</i>	<i>Review by FTA/FRA</i>	<b>Status</b>
Does the grantee implement regularly scheduled meetings to track to resolution any identified hazards and/or vulnerabilities?	Y		
Does the grantee monitor the progress of safety and security activities throughout all project phases? Please describe briefly.	Y		Safety and Security is an ongoing agenda item on the current construction contracts (1252 and 1300).
Does the grantee ensure the conduct of preliminary hazard and vulnerability analyses? Please specify analyses conducted.	Y		
Has the grantee ensured the development of safety design criteria?	Y		
Has the grantee ensured the development of security design criteria?	Y		
Has the grantee ensured conformance with safety and security requirements in design?	Y		Certification checklists are developed and certified.
Has the grantee verified conformance with safety and security requirements in equipment and materials procurement?	Y		Safety and Security Conformance checklists have been prepared for each of the construction contracts.
Has the grantee verified construction specification conformance?	Y		This is on-going as construction progresses.
Has the grantee identified safety and security critical tests to be performed prior to passenger operations?	N		Currently being developed.

<b>Central Subway Project Overview</b>			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
<b>Project Plans</b>	<i>Version</i>	<i>Review by FTA/FRA</i>	<b>Status</b>
Has the grantee verified conformance with safety and security requirements during testing, inspection, and start-up phases?	N		Project is in early stages of construction.
Does the grantee evaluate change orders, design waivers, or test variances for potential hazards and /or vulnerabilities?	Y		
Has the grantee ensured the performance of safety and security analyses for proposed work-arounds?	N/A		
Has the grantee demonstrated through meetings or other methods, the integration of safety and security in the following?: <input type="checkbox"/> Activation Plan and Procedures <input type="checkbox"/> Integrated Test Plan and Procedures <input type="checkbox"/> Operations and Maintenance Plan <input type="checkbox"/> Emergency Operations Plan	N/A		Currently being developed. An Integration Matrix has been implemented for all disciplines including safety and security concerns.
Has the grantee issued final safety and security certification?	N		Project is in the early construction phase.
Has the grantee issued the final safety and security verification report?	N		Project is in the early construction phase.
<b>Construction Safety</b>			
Does the grantee have a documented/ implemented Contractor Safety Program with which it expects contractors to comply?	Y		Health and Safety Construction Safety Standards Revision 3, June 27, 2012.

<b>Central Subway Project Overview</b>			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
<b>Project Plans</b>	<i>Version</i>	<i>Review by FTA/FRA</i>	<b>Status</b>
Does the grantee’s contractor(s) have a documented companywide safety and security program plan?	Y		
Does the grantee’s contractor(s) have a site-specific safety and security program plan?	Y		There are currently two contractors that have plans. Contract documents require that the contractor develops an Environmental Health and Safety Program, specific to the contract work.
Provide the grantee’s OSHA statistics compared to the national average for the same type of work?	Y		Provided in the Central Subway Monthly Progress Report.
If the comparison is not favorable, what actions are being taken by the grantee to improve its safety record?	N/A		Statistics are favorable. No action is needed.
Does the grantee conduct site audits of the contractor’s performance versus required safety/security procedures?	Y		
<b>Federal Railroad Administration</b>			
If shared track: has grantee submitted its waiver request application to FRA? (Please identify specific regulations for which waivers are being requested.)	N/A		No shared track. No waivers are anticipated.
If shared corridor: has grantee specified specific measures to address shared corridor safety concerns?	N/A		
Is the CHA underway?	N/A		
Other FRA required Hazard Analysis – Fencing, etc.?	N/A		

<b>Central Subway Project Overview</b>			
Project mode (Rail, Bus, BRT, Multimode)	Light Rail Transit		
Project phase (Preliminary Engineering, Design, Construction, or Start-up)	Construction		
Project Delivery Method (Design/Build, Design/Build/Operate/Maintain, CM/GC, etc.)	Design-Bid-Build		
<b>Project Plans</b>	<i>Version</i>	<i>Review by FTA/FRA</i>	<b>Status</b>
Does the project have Quiet Zones?	N		
Does FRA attend the Quarterly Review Meetings?	N		

N/A = Not applicable.



## APPENDIX C. PROJECT MAP AND OVERVIEW

### CENTRAL SUBWAY PROJECT: Project Overview and Map

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<b>Date:</b>	<i>April 9, 2015</i>
Project Name:	Central Subway Project (CSP) New Starts Light Rail Transit
Grantee:	San Francisco Municipal Transportation Agency (SFMTA)
FTA Regional contact:	Mr. Jeffrey S. Davis
FTA Headquarters contact:	Ms. Kim Nguyen

#### Scope

Description:	The CSP will extend the Third Street Light Rail line from the Caltrain station at Fourth and King streets to Chinatown. It was incorporated in the FEIS/FEIR on the Third Street Light Rail project published in December 1998, but FTA did not include the CSP in the Record of Decision (ROD) issued in March 1999. A ROD for the CSP, however, was issued by FTA on November 26, 2008, and the U.S. Department of Transportation and FTA determined that the requirements of the National Environmental Policy Act (NEPA) of 1969 were satisfied for the CSP. The environmental record for the CSP is included in the Final Supplemental Environmental Impact Statement (SEIS), Volume II, dated July 11, 2008 and the Final SEIS, Volume I, dated September 23, 2008. These documents present the detailed statement required by NEPA and U.S.C. 5324 (b). SFMTA requested authority to enter Preliminary Engineering (PE) in March 2002 and submitted a Project Management Plan (PMP) in June 2002. FTA approved entry into PE in July 2002. Approval to enter Final Design (FD) was granted by FTA on January 7, 2010. The Full Funding Grant Agreement (FFGA) was signed on October 11, 2012.
Guideway:	The length of the CSP will be 1.7 miles of double-tracked line.
Stations:	The CSP includes three subway stations and one surface station.
Additional Facilities:	The CSP does not include any ancillary facilities.
Vehicles:	The CSP Service Plan dated October 2009 clarified that approximately four vehicles will be required.
Ridership:	43,521 Average Weekday Boardings are projected in 2030.

**Schedule**

07/02	Approval Entry to PE	2016	Estimated Rev Ops at Entry to PE
01/10	Approval Entry to FD	2018	Estimated Rev Ops at Entry to FD
10/11/12	FFGA	2018	Estimated Rev Ops at FFGA
12/2018	Revenue Operations Date at date of this report		

47.9% *Percent Complete Construction (February 2015 data)*

**Cost**

\$764 million	Total Project Cost (\$YOE) at Approval Entry to PE
\$1,578 million	Total Project Cost (\$YOE) at Approval Entry to FD
\$1,578 million	Total Project Cost (\$YOE) at FFGA signed
\$TBD million	Total Project Cost (\$YOE) at Revenue Operations
\$1,578 million	Total Project Cost (\$YOE) at date of this report including \$0.00 in Finance Charges
\$762.5 million	Amount of Expenditures at date of this report from Total Project Budget of \$1,578 million
48.3%	Percent Complete based on Expenditures at date of this report
\$10.02 million	Unallocated Contingency remaining
\$80.97 million	Total Project Contingency (allocated and unallocated contingency as reported by CSP)
\$140 million	Minimum Total Project Contingency revised on September 5, 2012 PMOC review of Contingency Management Plan

	<b>AT HOLD POINTS</b>	<b>QTR</b>	<b>Minimum Contingency Levels</b>	<b>Revised Levels</b>
<b>1A</b>	Hold Point 1a – Tunnels 100% designed February 2011 (Actual)	1Q11	280	280
<b>1B</b>	Hold Point 1b – CTS 100% designed June 2012 (Actual)	4Q11	250	240
<b>1C</b>	Hold Point 1c – 40% Bid (Tunnel and CTS)	2Q12	225	200
<b>1D</b>	Hold Point 1d – FFGA Award. October 2012 (Actual)	3Q12	-	180
<b>2</b>	Hold Point 2 – Commence CTS / UMS construction. (Actual June 17, 2013)	2Q13	160	160
<b>3</b>	Hold Point 3 – Demobilize Tunnels <i>Expected April 2015</i>	<i>2Q15</i>	140	140
<b>4</b>	Hold Point 4 – Stations to platform levels (CTS/MOS) November 2016	4Q16	60	60
<b>5</b>	Hold Point 5 – Complete CTS / Tunnels systems inst. April 2018	2Q18	25	25
<b>RSD</b>	PMOC / FTA RSD	4Q18		
<b>CURRENT TOTAL CONTINGENCY \$80.97 Million</b>				



**APPENDIX D. TOP PROJECT RISKS**

The project risk register was updated in early 2015. The following risks were discussed at the April Risk Management Meeting.

**Top Risks discussed in the previous month:**

- *Ellis Street Utilities (unknown underground utilities)*
- *4th and King Street - Potential time for planned work shutdown - Contractor not able to perform the work in the manner prescribed*
- *Underground obstructions stations (UMS)*
- *Underground obstructions stations (MOS)*
- *Underground obstructions stations (CTS)*

**APPENDIX E. ROADMAP TO REVENUE OPERATIONS**

Awaiting rail activation plan from SFMTA.

**APPENDIX F. LESSONS LEARNED**

<b>LL#</b>	<b>Date</b>	<b>Phase</b>	<b>Category</b>	<b>Subject</b>	<b>Lesson Learned</b>
1	09-30-10	FD	Management	Consultant Contracts	The Project must have a full understanding of the agency and other approving governmental authorities to avoid delay of contract approval and consequential delay of the Master Project Schedule (MPS).
2	09-30-10	FD	Cost	Staffing Plan	The project staffing plan needs to be formulated during PE and updated at least quarterly during FD to manage Standard Cost Category 80 costs and monitor design production.
3	09-30-10	FD	Scope	Letter of No Prejudice (LONPs)	A defined scope of grantee and PMOC responsibilities needs to be provided for content and acceptability of LONP requests.
4	09-30-10	FD	Management	SSMP	FD consultants should be trained, shortly after mobilization, in the format and their responsibility regarding the System Safety Consultant.
5	10-30-10	FD	Cost	Baseline Cost Estimate (BCE) Update	The BCE should be updated with current costs as soon as they are known by the Project to allow mitigation of cost contingency usage.
6	02-21-12	FD	Management	Program Controls	Program Controls system/software selected for use for the duration of the project should be in place and functional prior to approval to enter FD. Doing so will avoid a transition during FD that could create a lag in timely reporting of cost and schedule status.
7	02-21-12	FD	Management	Risk Mitigation	Oversight Procedure (OP) 40 needs to be revised to establish minimum requirements for secondary mitigation at different phases of the project, similar to those for cost and schedule contingency. The PMOC recommends five percent of project cost at Entry into FD and three percent at execution of an FFGA.

LL#	Date	Phase	Category	Subject	Lesson Learned
8	02-21-12	FD	Scope	Third Party Agreements	All third party agreements need to be identified as soon as possible, but no later than 65% design completion. This includes leases, both temporary and permanent; MOUs; and licenses, specifically for preconstruction property surveys and settlement monitoring instruments (especially important for underground construction). These third party agreements need to be secured no later than the advertisement date of the construction that they affect. Third party agreements need to be tracked by the Project continuously, reported monthly, and updated in a third party agreement matrix submitted quarterly to FTA.
9	02-21-12	FD	Cost	Cost Estimating Procedures	During the preliminary design phase, the Project should establish the cost estimating procedures, format, and software to be used by all estimating entities for the entire duration of the project.
10	02-21-12	FD	Cost	Allocated Cost Contingency	In the BCE submitted to FTA for Entry into FD, the Project should identify percentages of allocated cost contingency contained in the BCE that are apportioned for design risk, market risk, and construction risk.
11	02-28-12	FD	QA	Design Management Action Log	Design Management should develop a matrix as a tracking tool to document, track, and close out known elements that are missing from design submission packages.
12	08-15-12	FD	Environmental Mitigations	MMRP	Numerous mitigations identified in the MMRP are to be handled by incorporating specific design details and/or statements in the contract drawings and technical specifications. The grantee should note on the MMRP the relevant drawings and/or technical specifications.



LL#	Date	Phase	Category	Subject	Lesson Learned
13	08-31-12	FD	Management	Risk Contingency Levels and Hold Points	It became apparent, during the monitoring of the cost contingency drawdown curve for the Project that the contingency levels and hold points no longer represented the current stage of project development and risk reduction/contingency usage related to project development. The project advanced through 100 percent project design; however, the project did not receive credit for the cost contingency usage established by the risk model. The PMOC recognized this deficiency and participated with the grantee in developing a cost contingency drawdown that reflects current project development and reduced risk.
14	06-30-13	Const.	Management	Change Order Process	Perform an audit of the Project's procedures related to Change Orders and processing. The Project should train staff and inform contractor of their obligations in the process.
15	1-30-14	Const.	Management	Independent Review Panel (IRP) Decision-makers	At the request of SFMTA, the American Public Transportation Association (APTA) formed a panel of geotechnical and tunnel experts to perform a peer review of the BART Undercrossing. Prior to crossing under the BART tunnels, the IRP, contractor, SFMTA, and BART representatives convened at predetermined TBM locations to discuss the TBM progress and determine whether the tunneling should proceed. It is critical that decision makers from each organization attend these meetings. It was noted that BART Senior Management did not attend and instead deferred decisions to lower level staff.
16	6-30-14	Const.	Bid documents	Pre-Classification for Soil and Groundwater Disposal	Soils and groundwater generated from construction activities should be pre-classified with appropriate sampling and testing required by potential disposal facilities. Coordinate with the disposal facilities to get materials accepted.

<b>LL#</b>	<b>Date</b>	<b>Phase</b>	<b>Category</b>	<b>Subject</b>	<b>Lesson Learned</b>
17	4-10-15	Const.	Quality Control/Safety	Monitoring of soil conditions during underground construction	There was a breach of the excavation of frozen ground during construction of a cross passage between the twin bored tunnels followed by water and soil flowing into the tunnels, resulting in subsidence of the ground above and damage to underground utilities. Apparently the flow of materials into the tunnels went on for quite some time before the problem was detected and actions could be taken to arrest the flow. The construction site was not staffed when the breach started and there was no external warning system in place to notify the contractor or the agency of the condition. When the safety and structural integrity of a construction site depends on maintain soil conditions with the use a mechanical systems, the site should be continuously staffed or monitoring devices at the site should be continuously monitored from a remote location to assure that the expected soil conditions are maintained.
18	4-10-15	Cont.	Environmental	Archeological data recovery protocols	Sensitive archeological materials were uncovered during the excavation of the roof area at YBM. The Program Manager took immediate action to notify the appropriate state officials and implemented protocols for protection of the materials. The most likely descendent of the remains was quickly identified and a representative was engaged and brought to the site to supervise the ongoing excavation. The quick action to involve the appropriate parties resulted in satisfactory handling of the artifacts with minimal delays to the construction schedule.

### APPENDIX G. CONTRACT STATUS

The following sections provide the status of ongoing contracts associated with the CSP. Note that the DBE participation percentages are updated by SFMTA on a quarterly basis.

<b>Contract No.</b>	<b>1250</b>	
<b>Contract Description:</b>	<b>UR #1 (YBM)</b>	
<b>Status:</b>	Completed June 2011.	
<b>Cost:</b>	Original Contract Value	\$9,273,939
	Approved Change Orders	\$2,694,211
	Current Contract Value	\$11,968,150
	Expended to Date	\$11,968,150
	% Expended	100%
	SBE Participation	87%
<b>Schedule:</b>	NTP issued January 2010. Substantial completion in June 2011.	
<b>Issues or Concerns:</b>	Final total cost claim by contractor has not been resolved.	

<b>Contract No.</b>	<b>1251</b>	
<b>Contract Description:</b>	<b>UR #2 (UMS)</b>	
<b>Status:</b>	Work is complete.	
<b>Cost:</b>	Original Contract Value	\$16,832,550
	Approved Change Orders	\$3,962,031
	Current Contract Value	\$20,794,581
	Expended to Date	\$20,794,581
	% Expended	100%
	SBE Participation	97%
<b>Schedule:</b>	NTP issued January 2011. Substantial completion in August 2012.	
<b>Issues or Concerns:</b>	Final total cost claim by contractor has not been resolved.	

<b>Contract No.</b>	<b>1252</b>	
<b>Contract Description:</b>	<b>Tunnels</b>	
<b>Status:</b>	<i>Final cross passage is complete. Tunnel portal is complete. Final utility work and street restoration is underway.</i>	
<b>Cost:</b>	Original Contract Value	\$233.58 million
	Approved Change Orders	\$7.50 million
	Current Contract Value	\$241.08 million
	Expended to Date	<i>\$230.88 million; \$6.2 million is paid from non-project funds</i>
	% Expended	96%
	SBE Participation	5.8%
<b>Schedule:</b>	Substantial completion expected April 2015. Total contract days are 1,150.	
<b>Issues or Concerns:</b>	None.	

<b>Contract No.</b>	<b>1300</b>	
<b>Contract Description:</b>	<b>Three subway stations (YBM, UMS, and CTS) and STS</b>	
<b>Status:</b>	<i>Support of excavation work is complete. Placement of roof slabs is underway. Preparations underway for mass excavation.</i>	
<b>Cost:</b>	Original Contract Value	\$839.68 million
	Approved Change Orders	-\$1.59 million
	Current Contract Value	\$838.09 million
	Expended to Date	\$235.61 million
	% Expended	28%
	SBE Participation	7.2%
<b>Schedule:</b>	NTP issued June 17, 2013. Substantial Completion: Feb 10, 2018.	
<b>Issues or Concerns:</b>	The work on this contract is behind schedule.	

<b>Contract No.</b>	<b>CS-155-1</b>	
<b>Contract Description:</b>	<b>Design Package 1 for Contracts 1250, 1251, and 1252. PB/Telemon</b>	
<b>Status:</b>	Design is complete. Construction support is ongoing for Contract 1252.	
<b>Cost:</b>	Original Contract Value	\$5,795,000 (includes exercised options)
	Approved Change Orders	\$1,697,245
	Current Contract Value	\$7,492,245
	Expended to Date	\$7,649,628
	% Expended	102.1%
	SBE Participation	30.4%
<b>Schedule:</b>		
<b>Issues or Concerns:</b>		

<b>Contract No.</b>	<b>CS-155-2</b>	
<b>Contract Description:</b>	<b>Design Package 2 for UMS, CTS, and YBM. CSDG prime</b>	
<b>Status:</b>	Designs are complete for all of the station contracts. Construction support of Contract 1300 is underway.	
<b>Cost:</b>	Original Contract Value	\$35,059,252
	Approved Change Orders	\$1,460,360
	Current Contract Value	\$36,519,612
	Expended to Date	\$28,399,550
	% Expended	77.8%
	SBE Participation	43.6%
<b>Schedule:</b>		
<b>Issues or Concerns:</b>		

<b>Contract No.</b>	<b>CS-155-3</b>	
<b>Contract Description:</b>	<b>Design Package 3 for STS. HNTB-B&amp;C Prime</b>	
<b>Status:</b>	Design is complete. Construction support of Contract 1300 is underway.	
<b>Cost:</b>	Original Contract Value	\$16,822,238
	Approved Change Orders	\$312,814
	Current Contract Value	\$17,232,252
	Expended to Date	\$12,039,032
	% Expended	69.9%
	SBE Participation	29.1%
<b>Schedule:</b>		
<b>Issues or Concerns:</b>		

<b>Contract No.</b>	<b>CS-149</b>	
<b>Contract Description:</b>	<b>Central Subway Partnership (Project Manager/Construction Manager).</b>	
<b>Status:</b>	On-going	
<b>Cost:</b>	Original Contract Value	\$85,139,092
	Approved Change Orders	\$0
	Current Contract Value	\$85,139,092
	Expended to Date	\$46,300,000
	% Expended	54.4%
	SBE Participation	36.0%
<b>Schedule:</b>		
<b>Issues or Concerns:</b>		

<b>Contract No.</b>	<b>CS 156</b>	
<b>Contract Description:</b>	<b>Project Controls Consultant.</b>	
<b>Status:</b>	On-going.	
<b>Cost:</b>	Base Contract Value	\$17,112,873
	Approved Change Orders	\$0
	Current Contract Value	\$17,112,873
	Expended to Date	\$7,865,085
	% Expended	46%
	SBE Participation	21.8%
<b>Schedule:</b>		
<b>Issues or Concerns:</b>		