MONTHLY REPORT
July 2015

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

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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: *14 months*

1507_PMOC

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 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 June 2015, the project was 51.1% complete based on expenditures.* There was one active construction contract: 1300 Stations and Systems/Trackwork. The 1252 Contract for construction of the twin subway tunnels achieved final completion on May 15, 2015. Financial close out of the 1252 Contract will occur in the coming months. SFMTA will no longer include the 1252 Contract in its monthly progress reports for the CSP.

The 1300 Contract was 32.1% complete at the end of June. Substantial completion is scheduled for February 2018, *but the SFMTA June Monthly Progress Report states that the seventh update of the construction schedule from the contractor continues to forecast completion six months behind schedule. That schedule update was rejected by SFMTA, so the project still does not have an accepted schedule that accurately indicates the status of the project. SFMTA did accept a revised schedule update representing progress through the first 12 months of construction at the end of July. Seven additional updates are expected to be delivered and accepted over the next few weeks.* **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.**

The PMOC notes that the planned value for the month of June was $24.09 million, while earned value was only $10.82 million, or about 45% of the planned value. In order for accumulated schedule delays to be overcome, earned value must exceed planned value on a sustained basis. **In the opinion of the PMOC, measures implemented to recover the accumulated delays to the station construction work are not yet showing results. The opportunities to recover the**

schedule delays will be more limited as time passes, so it is very important for SFMTA and the contractor to work collaboratively to identify and implement schedule containment strategies soon.

Table 1 - Core Accountability Items

Project Status:		**Original at FFGA:**	**Current Estimate:**
Cost	Cost Estimate	$1,578,300,000	$1,578,300,000
Contingency	Unallocated Contingency	$74,722,000	$9,519,456 (unchanged)
	Total Contingency (Allocated Plus Unallocated, Including Approved Contract Changes)	$185,500,000	$84,738,555 (unchanged)
Schedule	Revenue Service Date	12/26/2018	12/26/2018
Total Project Percent Complete	Based on Expenditures	*51.1%*	
	Based on Earned Value	*50.4%*	
Major Issues	**Status**	**Comments/Planned Action**	
Schedule Contingency	Project schedule contingency is currently at 4.0 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 *6.0* months (reduced by 2 months as of completion of the tunnel project). The CSP has submitted justification to decrease the minimum required, but this will not be accepted until the updated 1300 Contract schedule is incorporated into an updated schedule risk assessment and SFMTA provides a plan for recovering the accumulated delays on the project critical path.	

Major Issues	Status	Comments/Planned Action
Cost Contingency	The current Total Contingency is $84.7 million. The FTA recommends a minimum contingency level of $60 million after completion of the tunnel contract. The tunnel has reached final completion and the current recommended cost contingency level is $60 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.
Technical Capacity and Capability	All management positions in the organization are filled.	The PMOC will assess the effectiveness of the SFMTA CSP team in managing the project through routine on-site monitoring.
Date of Next Quarterly Meeting:		*November 4, 2015*

- Earned Value (EV): *$797,622,675 – an increase of $10.82 million from May and 50.4% of the budgeted project cost.*
- Planned Value: *$883,896,020 – an increase of $24.09 million from May. The PMOC notes that the earned value and actual cost continue to be well below the planned value for the month of June.*
- Actual Cost: *$806,380,867 – an increase of $9.89 million from May.*
- 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): 0.90 where SPI greater than 1 is ahead of schedule and less than 1 is behind schedule. The project SPI is now at the minimum value to be considered acceptable performance. The SPI has been trending downward over the past several months.

Contingency

Cost Contingency

The total available contingency (approved contingency plus approved contract changes) is unchanged, at $84,738,555, which is above the minimum required contingency of $60 million. No contract modifications have been executed in the last two months. It still appears that the tunnel contract will not consume its entire allocated contingency, thereby freeing additional contingency for other aspects of the project. **In the opinion of the PMOC, the available cost**

contingency is sufficient to provide reasonable assurance of on-budget completion of the project.

Schedule Contingency

The Program Master Schedule for the Central Subway project now shows 4.8 months of buffer float for the RSD. An approved, fully 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 *June* 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 after demobilization of the tunnel work is 6.0 months.* **In the opinion of the PMOC, SFMTA should work to quickly complete the update of the 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. The earned value for June continues to indicate that actual progress was much lower than planned, suggesting that the project may be falling further behind schedule. Earned value needs to exceed planned value if the accumulated schedule delays are to be recovered.**

PMOC Observations, Opinions, and Concerns

- In the opinion of the PMOC, the tunnel contractor should prepare an analysis of the cause of the failure at Cross Passage 5.
- PMOC Concern: SFMTA reported that as of *June 30, 2015* the latest 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 first of eight schedule updates due from the contractor has finally been approved. The subsequent seven updates required to bring the schedule up to the current project status are due to be completed and accepted in the coming weeks.* In the opinion of the PMOC, SFMTA should urgently work to develop an acceptable updated schedule based on the accepted contractor baseline schedule and incorporate it into the Program Master Schedule.
- *In accordance with FTA guidelines, a minimum of 6.0 months of schedule contingency is recommended at this phase of the project. The PMOC is awaiting the results of a schedule analysis based on the adopted and updated 1300 Contract baseline schedule to determine what schedule contingency remains.*
- 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. The shortfall in earned value compared to planned value indicates that efforts to recover the accumulating schedule delays are still not showing positive results. Production will have to increase substantially so that earned value exceeds the plan for an extended period of

time 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 five SFMTA monthly progress reports.

- SFMTA reported that the discussion at a recent partnering session revealed that the SFMTA and the contractor mutually agreed to work to achieve several short-term targets for completion of key elements of the work at the stations. It is hoped by both parties that achieving these shorter-term milestones will establish an effective working relationship that can be built on to address the longer-term need to accelerate progress on the work. *In the opinion of the PMOC, the contractor and CSP staff are now working cooperatively to advance progress on construction of the three CSP subway stations.* The PMOC supports the setting of short-term performance targets and encourages SFMTA to work with the contractor to define additional longer-term targets that will help to advance critical path work. These targets should be selected based on the updated approved construction schedule.
- In the opinion of the PMOC, the total cost contingency, including unallocated contingency and less identified trends, of *10.7%* of the potential remaining spending is sufficient to provide reasonable assurance of on-budget completion of the project. The available contingency is above the recommended minimum of $60 million.
- The PMOC remains concerned that the recent quality problems with the station construction may indicate a lack of sufficient quality commitment by the contractor and a potential for future problems and associated delays and increased costs (borne by the contractor) for the repair or replacement of defective work. The PMOC notes that quality issues still appear to be causing delays to the progress of work at UMS. *SFMTA initiated an audit of the contractor's Quality Control procedures and staffing, which was completed in early June. The PMOC plans to conduct a Quality Review of the project in early September. SFMTA is encouraged to assure that the SFMTA Quality staff are addressing QA actions to close out NCRs in an expeditious manner.*
- *In the opinion of the PMOC, it appears that good progress is being made toward a workable plan for the cutover of light rail transit (LRT) service at 4th Street and King Street. The appropriate Muni operations staff members are engaged in working with CSP and the contractor through frequent meetings to finalize the plan so that work can start over the Labor Day weekend.*
- *In the opinion of the PMOC, when completed, the trend and change management summary reports for the 1300 Contract will improve the accuracy of forecasts of cost at completion and should help to expedite the completion of the contract modification process for justified contract changes.*

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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. *This contract completed the construction of 1.5 miles of twin tunnels by tunnel boring machines and the tunnel portal and retrieval shaft.*

- *Final completion has been achieved and final close out will occur over the coming months.*
- **In the opinion of the PMOC, the contractor should prepare an analysis of the cause of the subsidence at Cross Passage 5 (4th and Jessie streets).**
- Approximately $16 million in allocated contingency for this contract will not be spent.

Contract 1300 (Combination of UMS, CTS, YBM, and STS). This contract is constructing three underground stations, one surface station, all surface works required for the installation of LRT between 4th and King streets and the tunnel portal, and all LRT track and systems components.

- *As of the end of June 2015, the construction of the Stations and Surface, Track and Systems contract was 32.1% complete.*
- Union Square/Market Street Station (UMS): Jet grouting to prevent water intrusion into the excavation in the areas supported by tangent piles is continuing on both sides of the station box. *As of the end of June, 121 of the planned 398 jet grout columns had been placed in the north and south concourse areas, an increase of 37 during the month. The master schedule indicates that the jet grout operation should have been completed in May 2015. With 277 jet-grout columns remaining to be placed, about seven months would be required to complete the work at the current production rate. SFMTA reported that it has worked with the contractor to set a target for completing all jet grouting and placement of the station roof deck prior to the 2015 holiday season construction moratorium, which begins at the end of November. Achieving this milestone would require a 40% increase in the production rate.* At the north concourse, work on the

existing Union Square parking garage continued with demolition to levels two and three. Some lead contamination was detected and will be removed in August. SFMTA and the contractor have set a short-term target to have all of the garage work be completed before the holiday work moratorium. The area above the north concourse between Geary and Maiden Lane *has been excavated to the roof level of the station, roof beams have been placed, and welding of the beams to the secant pile steel was completed. Quality issues with the welding were eventually addressed and the pour was scheduled to occur on August 3, about two weeks later than reported in the June PMOC monitoring report.* At the south concourse, excavation to the compensation grouting level is complete, and grout tubes are being installed. *Pre-conditioning for grout injection is continuing through mid-July, when the grout subcontractor will shift operations to CTS. Shotcrete installation for the Ellis Street Annex walls began July 15, and the first two of four lifts were completed as of the end of July.* ***The PMOC notes that quality issues still appear to be causing delays to the progress of work at UMS. The PMOC will be conducting a Quality Review of the CSP in early September.***

- Chinatown Station (CTS): *A repair plan for the cold joint in the roof slab of the headhouse was still in preparation as of the end of July. The structural capacity of the roof slab will not be a problem, but treatment of the slab to prevent water intrusion and corrosion of the reinforcing steel will be required. Installation of the level 1 struts and walers was completed at the end of July, along with excavation to the compensation grout level at the headhouse. The dewatering system for the headhouse was installed in July. The installation of compensation grout tubes will start in mid-August, after the subcontractor relocates from UMS.* In the station area, installation of instrumentation to detect ground movement *was completed in July. Installation of dewatering wells is now expected to extend to late August.* Utility conflicts were identified at the location of the north access shaft, and work was underway to resolve these conflicts. *Utility work at the north concourse is ongoing in advance of the placement of dewatering wells and construction of the north access shaft. Preparations for the installation of a temporary power station at CTS started in July and will extend until the scheduled energizing of the station by PG&E in September.*

- Yerba Buena/Moscone Station (YBM): *Work on placement of the reinforcing steel and forms was underway at the end of July for the third and final section of the eastern station roof, with the final roof deck pour scheduled for early August. At the headhouse, excavation to the first strut level was completed and placement of the struts was underway. Excavation to the second strut level and breakthrough from the headhouse into the station box is expected to occur in August.*

- Surface, Track, and Systems (STS): Muni Traction Power duct bank (MRY), water line, and sewer work continued. *Cables needed for installation by AT&T of fiber optic cables in the ducts installed by TPC were delivered and ready for installation in July.* The plan for the first stage of the cutover of service at the 4th and King intersection is being

detailed through twice weekly meetings among the contractor, SFMTA CM staff, and SFMTA operations staff. Work will begin during an extended shut-down over the Labor Day weekend. The main issue to be resolved is the operation of the new track switches while the existing control equipment is still in place. **In the opinion of the PMOC, it appears that good progress is being made toward a workable plan for the cutover of light rail transit (LRT) service at 4th Street and King Street. The appropriate Muni operations staff members are engaged in working with CSP and the contractor through frequent meetings to finalize the plan so that work can start over the Labor Day weekend.**

- ***In the opinion of the PMOC, the contractor and CSP staff are now working cooperatively to advance progress on construction of the three CSP subway stations.*** *The work continues to be impeded by utility conflicts and the processing of quality issues, and it appears that as yet there has been no recovery of the construction schedule from accumulated delays. Some activities scheduled to occur in July have slipped into August. SFMTA and the contractor established short-term performance milestones as a way to focus the combined efforts of the contractor and SFMTA project staff on advancing the work.* ***The PMOC supports this tactic and encourages SFMTA and the contractor to set additional targets based on the critical path of the updated and approved construction schedule.***

Third Party Agreements Including Utilities, Railroads, Other Agencies, Etc.

Bay Area Rapid Transit (BART)

No updates to report.

Caltrans

No updates to report.

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 November 4, 2015.

San Francisco Public Utilities Commission (SFPUC)

No updates to report.

San Francisco Department of Public Works (SFDPW)

No updates to report.

San Francisco Parks and Recreation Department

No updates to report.

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.

SFMTA reported that a court ruling regarding the contested value of a gas station property at 4th and Folsom streets that was condemned by SFMTA for the YBM station calls for SFMTA to pay an additional $700,000 to the property owner. This amount includes attorney's fees for the legal actions. The property owner appealed the original court ruling on the value of the property based on the SFMTA's offer being conditional on approval of the final price by FTA. SFMTA has the option of appealing this decision to the state supreme court. Adequate contingency is available in the right of way budget for the project to cover the additional costs if SFMTA chooses not to appeal the decision or is unsuccessful in its appeal.

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

Vehicle design is underway by Siemens Corporation for 4 LRVs for the Central Subway, 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. The vehicle design and assembly process is reported to be on schedule.

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 was terminated in May 2015.

All project commercial and residential relocations are complete.

Labor Relations and Policies

Appendix G 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.

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

The tunneling contractor did not achieve the planned level of participation in its contract by women and apprentices. SFMTA is requesting documentation from Barnard Impregilo Healy (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 latest update of the PMP was received by the PMOC in early May. This plan includes the initial draft of the Rail Activation Plan.

Environmental Assessment/Mitigation Plan/Archaeological Plans

The PMOC received the First Quarter 2015 Mitigation Monitoring Reporting Program (MMRP) update from SFMTA on April 17, 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. **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

The PMOC received the latest update of the PMP in early May 2015. This plan included the updated organization chart provided to the PMOC in March.

Agency Staff

There were no changes in agency staff in June. Total project staff levels are close to the planned values.

Contractor Staff

The contractor still has not filled the required number of safety oversight positions required by the contract. The candidate hired to fill the remaining unfilled position did not show up for work on his hire date. TPC is now re-advertising for candidates..

SFMTA initiated an audit of the contractor's Quality Management staffing and procedures. This audit was scheduled to be complete in early June. The PMOC will review the report as part of a planned comprehensive quality review in early September. The contractor assigned a new Quality Manager for the project in July.

D. PROJECT COST STATUS

Project Cost Control Systems

SFMTA continues its efforts to create a useful Trend Log for Contract 1300 using CM13. The Trend Log includes all potential changes in contract value, including items that, in the opinion of the CSP staff, are not merited and new items for which merit has not been determined. A companion contract change management log incudes items that have been determined to have merit and are progressing through negotiations toward a contract modification (CMod). SFMTA is attempting to improve the timeliness of processing determinations of merit as well as the progression of pending contract changes and completion of CMods by creating summary tables of the numbers of items that are in the various stages of processing. **In the opinion of the PMOC, when completed, the trend and change management summary reports will improve the accuracy of forecasts of cost at completion and should help to expedite the completion of the contract modification process for justified contract changes.**

Project Cost

Cost estimate: $1.5783 billion

Total contingency: *$84.74 million, no change from May 2015* (minimum contingency is $60 million)

Total net incurred costs: *$806,380,867, an increase of $9.89 million from May (51.1% of the total project budget)*

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

Earned Value (EV): *$797,622,675 – an increase of $10.82 million from May (50.4% of the total project budget)*

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.

A settlement conference for the Total Cost Claim made by the utility relocation contractor for the 1250 Contract resulted in a settlement amount of $787,000. This additional project cost will be taken from the unallocated contingency. An additional outstanding claim by the 1251 Contractor of $3.8 million is still pending resolution. SFMTA is of the opinion that the claim on the 1251 Contract has less merit than the settled claim on the 1250 Contract. Potential costs for the 1251 Contract claim 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. Extra cost items identified by the 1300 contractor that CSP management concludes have no merit are carried in the total trend amount at 50% of the contractor's estimate of extra costs. Table 2 summarizes the trends for the two active construction contracts.

Table 2 - Contract, Budget, and Trends for Active Construction Projects[1]

	1252 - Tunnel	1300 Stations, STS
Original Contract	233,584,015	839,676,396
Approved Contingency	17,484,953	20,000,000
Extra Budget for Non-Project Costs	6,173,508	
Approved Budget	251,068,968	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)	*(77,798)*	*9,993,295*
Potential Contract	*234,928,024*	*848,236,948*
Contingency Less Trends	*16,140,944*	*11,439,448*
Spent to Date	*234,616,104*	*269,197,952*
Potential Left to Spend	*311,920*	*579,038,996*
	5174.7%	*2.0%*

[1] *As reported in the June 2015 Central Subway Project Monthly Progress Report – SFMTA.*

The remaining contingency, less identified trends, represents 5174.7% of the potential left to spend for Contract 1252 and 2.0% of the potential left to spend for Contract 1300. The

combined allocated contingency for all construction work less identified trends represents about *4.9%* 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 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 *10.7%* of the potential remaining spending, which in the opinion of the PMOC, is sufficient to provide reasonable assurance of on-budget completion of the project.**

Table 3 - Budget and Contingency Status for Central Subway Project

	Total Construction	Right of Way	Vehicles	Professional Services	Unallocated Contingency	Total Program
Original Contract	$1,130,342,777	$36,511,799	$24,108,712	$310,518,041		$1,501,481,329
Approved Contingency	45,301,196	1,000,000	2,276,941	18,221,079	10,019,456	76,818,672
Extra Budget for Non – Project Costs	6,173,508					
Approved Budget (w/o Extra Launch Shaft Cost)	1,175,643,973	37,511,799	26,385,653	328,739,120	10,019,456	1,578,300,001
Approved Changes	7,145,307	(4,265,478)	(10,799,712)	-	(500,000)	(8,419,883)
Current Contract	1,137,488,084	32,246,321	13,309,000	310,518,041	9,519,456	1,493,561,446
Remaining Contingency	38,655,889	5,265,478	13,076,653	18,221,079	9,519,456	84,738,555
Potential Changes (Trends)	*9,915,497*					*9,915,497*
Potential Contract	*1,147,403,581*	*32,246,321*	*13,309,000*	*310,518,041*		*1,502,562,525*
Contingency Less Trends	*28,740,392*	*5,265,478*	*13,076,653*	*18,221,079*	*9,519,456*	*75,737,476*
Spent to Date	*561,785,502*	*29,896,775*	*2,146,905*	*211,315,749*		*796,490,668*
Potential Left to Spend	*$585,618,079*	*$2,349,546*	*$11,162,095*	*$ 99,202,292*		*$706,071,857*
Contingency Less Trends/Potential Left to Spend	*4.9%*	*224.1%*	*117.2%*	*18.4%*		*10.7%*

Change Order Control

The Contract 1252 Contract Modification/Trend Log – June 30, 2015 had the following activities:

- 49 Contract Modifications (CMods) totaling *$1,421,807* of additional CSP program costs, all of which have been certified.
- Two Pending Contract Modifications (PCMs), which do not yet have estimated values.
- *SFMTA is estimating that additional CMods with a net reduction in contract value of $77,798 will be executed as part of contract close out. Based on discussions between the PMOC and SFMTA, there are a number of potential modifications, including cost increases and cost reductions that are likely to balance out. SFMTA's worst-case estimate is a net increase of contract value of less than $300,000 when all of these items are settled.*

CMods total $7.707 million, of which $5.150 million is for the relocation of the retrieval shaft and $1.136 million is for utility betterments, which are not program costs.

The Contract 1300 Contract Modification/Trend Log included in the June SFMTA Monthly Progress Report reflects the following:

- *72 items in negotiation.*
- *25 PCCs awaiting negotiation.*
- *64 CORs awaiting negotiation.*
- *9 Pending Change Orders.*
- *6 Approved CMods.*
- *A total potential change of +$9,993,295 is being reported in June 2015, an increase of $2,347,161 in total potential changes from May.*
- *No changes were executed for this contract in June.*

The Contract Modification/Trend Log in the CSP monthly report includes 50% of the estimated value of trend items that are judged by the CSP team to not have merit. The most recent version of the complete Trend Log for the 1300 Contract dated August 5, 2015 shows a total potential increase in contract cost of $13,164,782, which is about $6 million below the allocated contingency assigned to this contract. The following trend items in excess of $250,000 in possible higher costs are identified in the Trend Log:

1. Changes to traffic signals and street lights - $298,307
2. Change to grade 50 steel from specified grade 70 steel (due to availability and Buy America issues) - $595,197
3. Extra trucking costs for contaminated soil at CTS - $3,743,672
4. *Harder rock than anticipated for CTS slurry wall excavation - $2,820,600 (reduced from previous estimate to exclude time-related cost increases)*

5. *Delays to installation of tangent piles at UMS - $1,074,229 (reduced from previous estimate to exclude time-related cost increases)*
6. Unstable rock caving into slurry wall excavation at CTS - $600,000
7. Extra concrete from tunnel construction affecting slurry wall installation at YBM - two occurrences of $335,809
8. Changes to tie-back requirements for support of UMS Garage - $300,000
9. Changes in construction sequence for UMS Garage - $500,000
10. *Obstructions to jet grout placement at UMS - $830,750 (increased from previous estimate)*
11. Addition of a 24" water main above the YBM roof slab (note that the cost of this scope change would likely be paid by third parties) - *$224,438*
12. *Additional instrumentation for detection of ground movement - $429,777*

In addition to these large potential cost increases, the Trend Log includes the following major cost savings:

1. Deletion of compensation grouting bid items at YBM - ($1,833,869)
2. Deletion of the Air Replenishment System (ARS) - ($4,689,000)
3. *Building cost savings from deletion of ARS - ($600,000)*

Funding and Expenditures

Federal, state, and local project funding and expenditures are shown in Table 4 and are unchanged from the previous reporting period.

Table 4 - Project Funding

Source	Committed ($1,000)	Awarded ($1,000)
Federal		
New Starts	942,200	*469,198*
Congestion Mitigation	41,025	*41,025*
Federal Subtotal	*983,225*	*510,223*
State		
TCRP	14,000	14,000
State RIP	88,000	12,498
Prop. 1B / PTMISEA	307,792	225,912
Prop. 1A / HSR	61,308	61,308
State Subtotal	471,100	395,598
Local		
Prop. K Sales Tax	*123,975*	*123,975*

Source	Committed ($1,000)	Awarded ($1,000)
Local Subtotal	*123,975*	*123,975*
Project Total:	**1,578,300**	**1,029,794**

E. PROJECT SCHEDULE STATUS

As of the end of June, the Project had received a seventh update to the Contract 1300 baseline schedule from the contractor, but SFMTA stated that this update has been disapproved, along with the previous updates. The June SFMTA Monthly Progress 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 delays have occurred to work in the 1300 Contract and that a recovery schedule should be prepared.** *As of July 31, SFMTA had accepted one schedule update from the contractor that represented progress through the first 12 months of the contract. SFMTA expected the contractor to produce the following seven updates needed to bring the updated schedule to the present project status over the next few weeks. An updated Master Program Schedule may be completed prior to the publication of the next CSP Monthly Progress Report.* ***In the opinion of the PMOC, the long overdue updated Program Master Schedule will be a vital tool for development of schedule recovery strategies.***

SFMTA and TPC have agreed to focus on several short-term performance targets that are crucial to the overall progress of the work. The parties are hopeful that successful completion of the identified work according to the adopted schedule will reinforce the working relationships on the team and provide confidence that the team members can work cooperatively toward important schedule objectives. SFMTA hopes that longer-term plans for schedule recovery can be developed based on the working relationships established through the focus on short-term performance targets. *Table 5 shows the current status of the identified milestones.*

Table 5 - Status of Central Subway Station Construction Milestones

Milestone	*Target Date*	*Status*
Complete submittal for Union Square Garage (UMS)	*July 13, 2015*	*Completed on time*
Complete station roof slab and related work at Geary intersection (UMS)	*14 weeks*	*On track to meet*
Complete all jet grout columns (UMS)	*November 26, 2015*	*Behind schedule*
Restore traffic on Ellis Street by Labor Day (UMS)	*September 7, 2015*	*Behind schedule*

Milestone	***Target Date***	***Status***
Open all lanes on 4th and start excavation of station box (YBM)	*September 7, 2015*	*Slightly behind schedule*
Open north side of 4th and King intersection to traffic ASAP	*August 7, 2015*	*On track to meet*

The 1252 Contract achieved Final Completion on the planned May 15, 2015 date. The completion of the 1252 Contract is not on the critical path for the overall project.

Project Schedule Data

- Earned Value (EV): $*797,622,675 – an increase of $10.82 million from May and 50.4% of the budgeted project cost*
- Planned Value: *$883,896,020 – an increase of $24.09 million from May*
- SPI: *0.90*

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.

The PMOC notes that the earned value and actual cost continued to be well below the planned value for the month of June. ***In the opinion of the PMOC, the shortfall in earned value compared to planned value indicates that efforts to recover the accumulating schedule delays are still not showing positive results.*** **Production will have to increase substantially in order to match the planned level of work completion and exceed the planned productivity 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 *six* SFMTA monthly progress reports.**

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 6 shows the status of the schedule milestones established for the project.

Table 6 - 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)

	(A = Actual Date, F= Forecast Date)
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 15, 2015 (A)
Tunneling substantial completion:	April 15, 2015 (A)
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 approved 1300 Contract baseline schedule, which has not been updated to reflect actual progress) reflects 4.8 months of buffer float. **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.**

Schedule Contingency Management criteria were developed from the FTA Risk Assessment prior to entry into Final Design (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.

On June 22, 2015, SFMTA issued "Contingency Management – Schedule 2015 Update." The 2015 update reflected the current project delivery strategy, with all stations, surface work, and systems installation included in a single contract. Risk analysis was conducted on a program schedule that included the approved baseline schedule for the 1300 Contract. SFMTA states that at the time that the tunneling work for the project was complete, based on the results of the risk assessment of the program schedule, four months of float would be sufficient to provide reasonable assurance of on-time completion of the project. This analysis did not recognize the actual progress of the 1300 Contract and the accumulated schedule delays that the contractor states will result in the station construction work being completed six months later than planned. **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 schedule into the risk assessment as soon as it is accepted so that the schedule risk assessment accurately reflects the current status of the project.**

SFMTA reported that the project partnering session held in early July concentrated on the project schedule and ways to advance the construction work. The group's opinion was that if the project team could work together to meet mutually agreed short-term targets it would increase the overall confidence of the team in its ability to advance the project. ***In the opinion of the PMOC, CSP and TPC working together on mutually-agreed short-term performance targets may***

result in an improved working relationship that will pay dividends in advancing the project and recovering the accumulated delays. **The PMOC is concerned that the selected targets were defined without the benefit of a mutually agreed updated project schedule. SFMTA is encouraged to work with the contractor to define additional longer-term key targets that will help to advance critical path work based on the approved updated construction schedule.**

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

- *Contract is complete.*

1300 Contract

UMS

- Progress I-beam, roof deck, and waterproofing installation for roof deck construction
- Install new roof on Ellis for BART station entrance to UMS station and reopen Ellis Street to traffic
- Complete placement of shotcrete walls within BART station entrance
- Continue Union Square Garage (USG) temporary support and demolition for north concourse entrance, including demolition of the garage roof deck
- 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

- *Complete installation of level 1 struts in the headhouse*

- Excavate to elevation where compensation grouting can occur, install compensation grout tubes, pre grout in the headhouse
- *Initiate dewatering in the headhouse area*
- Continue to drill dewatering wells on Stockton Street
- Relocate PG&E and Comcast infrastructure around North Access Shaft *and start construction of the shaft*
- *Install temporary power for station construction*

YBM

- Continue east side station box roof slab excavation and concrete placement
- Continue utility installation above east side station box roof slab
- Restore all traffic lanes on 4th Street
- Continue headhouse excavation, install excavation temporary bracing
- *Breakthrough from the headhouse into the station box*

STS

- Sewer installation and repair
- Water line installation
- Alternative Water Supply System (AWSS) installation
- Muni ductbank installation
- Installation of fiber optic cable by AT&T
- *First stage of cutover from T-line to new CSP alignment at 4th and King intersection*

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)
- Monthly CSP Risk Management Meetings (first Thursday of each month)
- CSP month-end meetings on September 1, October 6, and November 3
- FTA/QPRM scheduled for *November 4, 2015*
- *Meetings for Quality review and Schedule review to be scheduled*

F. QUALITY ASSURANCE AND QUALITY CONTROL

QA/QC Plan Implementation

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. For the stations contract, the CQM is provided by a subcontractor. 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 (CNCR) 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 (CAR) until conditions adverse to quality are corrected.

No quality concerns for the 1252 Tunnel Contract were identified in the SFMTA May monthly report, as the contract reached final completion. The contractor must complete a root cause analysis in order to close the CNCR related to the subsidence at Cross Passage 5.

The contractor's commitment to quality and the execution of the contractor's Quality Management Plan have been concerns of SFMTA for the 1300 Contract. *As of August 4, 2015, 80 CNCRs had been filed by TPC's QM, and 17 items remained open.* The following quality issues and concerns for the 1300 Stations Contract were identified in the SFMTA *June* monthly report:

- *Quality activities associated with the connection of roof beams to the piles at UMS required significant effort and resulted in no final welding being completed during June.*
- TPC's Program Executive has issued CAR #4 Revisions 3, the issue of TPC Management not honoring the QCM's authority to Stop Work remains unresolved. TPC Management did not honor a TPC CQM Stop Work Notification (SWN) during a major roof slab pour at CTS, which may have led to a cold joint in the CTS roof slab. TPC QC issued an internal Corrective Action Request (CAR #4) documenting what transpired.
- Necessity of using both Reinforcing Steel Design Drawings and approved Reinforcing Steel Shop Drawings to inspect/accept rebar placement. The requirement to use approved shop drawings was identified as a preventative measure for improper/incomplete placement of reinforcing steel. It is common practice to assure that the latest approved submittals and shop drawings are available in the field, for use by both the construction crews and the QC inspectors, to assure proper installation of all constructed elements.

- Incomplete/confusing shop drawing submittals for UMS structural steel resulting in QC and or QA stopping TPC from making welded connections upon discovery that approved details are missing.

Two significant quality shortfalls arose during the placement of concrete for the roof decks at CTS and YBM during the month of March that indicated a need for refinement of the Quality Management process for the station construction. *The issue at YBM was closed, and the CTS item related to a cold joint in the roof deck was progressing toward resolution. The structural capacity of the roof slab has been confirmed, but the contractor needs to address prevention of water intrusion and corrosion of the reinforcing steel.*

SFMTA completed an audit of the TPC Quality Control system, including staff and procedures in May. That audit was completed in early June, identifying six corrective actions to be taken by the contractor. SFMTA states that senior management attention is being given to quality by TPC. Construction crew attention to quality remains an issue. **In the opinion of the PMOC, the 1300 contractor's increased management support for the project quality program is a positive development that should reduce the instances of non-conforming work being installed, with attendant delays and potential added costs. The PMOC *remains concerned* that the quality issues revealed *on past construction work could* result in further delays to the project and increased costs for the repair or replacement of defective work by the station contractor.** *Extra time is now being taken to assure that all Quality-related actions are completed and the necessary documentation is in place prior to follow-on construction work. This process is impacting the progress of structural welding at UMS.* ***SFMTA is encouraged to assure that the SFMTA Quality staff members are addressing QA actions to close out NCRs in an expeditious manner.*** *The PMOC will conduct a Quality Review of the CSP beginning in early September.*

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 (RAP), the System Integration Test Plan, the Safety and Security Certification Plan (SSCP), and the Pre-Revenue Operations and Start-up Plan. SFMTA has completed the SSCP, which is being used to guide safety certification activities. The initial draft of the RAP was completed with the latest update of the PMP. The System Integration Test Plan and the Pre-Revenue Operations and Start-up Plan have not been completed *and are expected to be provided with the next PMP update.*

Fire and Life Safety/Safety and Security Issues

The Construction Specification Conformance Checklists have been completed and approved for all construction packages. *SFMTA expects to complete certification of the tunnel construction items on the checklist in August. At that time the certification work will begin to address the*

station construction items. 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 determined that the Air Replenishment System can be eliminated in both the tunnels and the stations, resulting in a significant cost savings to the project.

Construction Safety

The project is maintaining an excellent safety record, with no recordable and lost time incidents and performance metrics well below the OSHA goals for the type of construction. No incidents occurred on either of the active construction contracts in May. The current accident records for the 1300 Contract are shown in Table 6.

Table 7 - Construction Safety Data – Through May 2015

	No. of Incidents	Incident Rate	Goal
1300 Contract			
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	*593,299*		

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. SFMTA provided a further update of the schedule risk assessment in June 2015 that recommended a reduction of the minimum schedule contingency after demobilization of the tunnel work from 8.0 months to 4.0 months. The updated risk assessment was conducted on the approved baseline schedule for the 1300 Contract without updates to reflect the current status of the construction work and the accumulated construction delays.

The PMOC cannot recommend any reduction in the minimum schedule contingency because the SFMTA's risk assessment update was not based on the actual current status of

the 1300 Contract construction work. The PMOC recommends that the CSP incorporate the updated Contract 1300 baseline schedule into an updated risk assessment as soon as it is approved. The PMOC recommends that the CSP incorporate the remaining high level schedule risks on the Project Risk Register into the updated risk assessment. The Contract 1300 baseline schedule was adopted in early December 2014. *Seven* schedule updates have been completed by the contractor and are yet to be approved by SFMTA and incorporated into the Master Program Schedule. *The schedule risk assessment update is now expected from the CSP after an updated Master Program Schedule is produced in September 2015.*

At the August CSP Risk Management Meeting the committee reviewed the status of the highest ranked risks in the risk register. No risks were closed and no new risks were identified. *Two new risks were rated:*

- *237 – Non-conforming work not identified by the TPC QC Process: rated 5 (moderate)*
- *238 – CSP Quality Program is ineffective in processing non-conformances, resulting in schedule impacts: rated 5 (moderate)*

In the opinion of the PMOC, the CSP management team has not identified 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 in sufficient detail to plan for their implementation or to estimate the potential time savings. Without the active involvement of the contractor, it will be challenging to implement schedule recovery strategies. As discussed in the Schedule section of this report, SFMTA and TPC have agreed to focus on the achievement of short-term construction progress targets as a means of building confidence in the combined ability of SFMTA and TPC to advance the construction work. **In the opinion of the PMOC, until such confidence is in place, there is a significant risk that further schedule delays could occur.** At FTA's request, schedule containment workshops will be scheduled with SFMTA once the updated construction schedule has been accepted. A list of the top risks discussed at the latest Risk Mitigation Meeting 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
(Note: All closed items are removed a month after being closed. Changes to open items since last update are indicated in BLUE.)

Category	NO.	ACTION	DATE OPENED	DUE DATE	DATE CLOSED	COMMENTS
S, RA	**159**	Once the Contract 1300 Baseline Schedule has been approved, incorporate remaining high level schedule risks into a new risk assessment.	4/21/14	TBD		Revised draft delivered 6/22/15. PMOC concludes that the update needs to be revised to reflect actual progress on the project.
S	**163**	Hold Schedule Containment Workshop for Stations Construction and Follow-on Work to RSD	5/6/15	TBD		Requested by FTA at May QPRM
QA	**164**	Support PMOC Quality Review	7/30/15	8/1/15		Supply TPC QC Plan and Related Procedures

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
ARS	Air Replenishment System
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
CAR	Corrective Action Request
CFR	Code of Federal Regulations
CLIN	Contract Line Item Number
CM	Construction Management
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
EV	Earned Value
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
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
QCM	Quality Control Manager
QPRM	Quarterly Progress Review Meeting
QTR	Quarter
RAMP	Real Estate Acquisition Management Plan
RAP	Rail Activation Plan
RCMP	Risk and Contingency Management Plan
ROD	Record of Decision
RSD	Revenue Service Date
SBE	Small Business Enterprise
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
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

SWN	Stop Work Notification
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
USG	Union Square Garage
YBM	Yerba Buena/Moscone Center Station
YOE	Year of Expenditure

APPENDIX B. SAFETY AND SECURITY CHECKLIST

Central Subway Project Overview			
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		
Project Plans	*Version*	*Review by FTA/FRA*	**Status**
Safety and Security Management Plan	**2014**	**2011**	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)	**2011**		SSCP was revised 10/2011. Revision 1 was developed in November 2011. Not submitted to FRA.
System Safety Program Plan (SSPP)	**2009**	**2009**	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)	**2009**		Not submitted to FTA. Not submitted to FRA.
Construction Safety and Security Plan	**2012**		Health and Safety. Construction Safety Standards Revision 3, June 27, 2012.
Safety and Security Authority	*Y/N*		**Notes/Status**
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

Central Subway Project Overview			
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		
Project Plans	*Version*	*Review by FTA/FRA*	**Status**
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 was submitted to the CPUC and was approved.
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.
SSMP Monitoring			
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.

Central Subway Project Overview			
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		
Project Plans	*Version*	*Review by FTA/FRA*	**Status**
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		Safety and security certification status and 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.

Central Subway Project Overview			
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		
Project Plans	*Version*	*Review by FTA/FRA*	**Status**
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 through monthly meetings.
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.

Central Subway Project Overview			
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		
Project Plans	*Version*	*Review by FTA/FRA*	**Status**
Has the grantee verified conformance with safety and security requirements during testing, inspection, and start-up phases?	N		Project is in construction, with RSD more than three years in the future.
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: ☐ Activation Plan and Procedures ☐ Integrated Test Plan and Procedures ☐ Operations and Maintenance Plan ☐ Emergency Operations Plan	N/A		Currently being developed. An Integration Matrix has been implemented for all disciplines including safety and security concerns. *Initial draft of the Rail Activation Plan has been completed.*
Has the grantee issued final safety and security certification?	N		Project is in the construction phase.
Has the grantee issued the final safety and security verification report?	N		Project is in the construction phase.
Construction Safety			
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.

Central Subway Project Overview			
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		
Project Plans	*Version*	*Review by FTA/FRA*	**Status**
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		*The remaining active contractor has a plan.* 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		
Federal Railroad Administration			
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		

Central Subway Project Overview			
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		
Project Plans	*Version*	*Review by FTA/FRA*	**Status**
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

Date:	*August 10, 2015*
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 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		

50.4% *Percent Complete Based on Earned Value* Construction (*June 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
$806.4 million	Amount of Expenditures at date of this report from Total Project Budget of $1,578 million
51.1%	Percent Complete based on Expenditures at date of this report
$9.52 million	Unallocated Contingency remaining
$84.73 million	Total Project Contingency (allocated and unallocated contingency as reported by CSP)
$60 million	Minimum Total Project Contingency revised on September 5, 2012 PMOC review of Contingency Management Plan

	AT HOLD POINTS	QTR	Minimum Contingency Levels	Revised Levels
1A	Hold Point 1a – Tunnels 100% designed February 2011 (Actual)	1Q11	280	280
1B	Hold Point 1b – CTS 100% designed June 2012 (Actual)	4Q11	250	240
1C	Hold Point 1c – 40% Bid (Tunnel and CTS)	2Q12	225	200
1D	Hold Point 1d – FFGA Award. October 2012 (Actual)	3Q12	-	180
2	Hold Point 2 – Commence CTS / UMS construction. (Actual June 17, 2013)	2Q13	160	160
3	Hold Point 3 – Demobilize Tunnels *(Actual April 15, 2015)*	*2Q15*	140	140
4	Hold Point 4 – Stations to platform levels (CTS/MOS) November 2016	4Q16	60	60
5	Hold Point 5 – Complete CTS / Tunnels systems inst. April 2018	2Q18	25	25
RSD	PMOC / FTA RSD	4Q18		
CURRENT TOTAL CONTINGENCY $84.73 Million				


central T subway
Lombard St.
COIT TOWER
Columbus Ave.
Washington Square Park
Union St.
TUNNEL ONLY - NO SERVICE
Broadway
Broadway Tunnel
The Embarcadero
Washington St.
Ferry Building
T CHINATOWN
Stockton St.
Kearny St.
Montgomery St.
Battery St.
EMBARCADERO
California St.
Leavenworth St.
Bush St.
Post St.
FUTURE TRANSBAY TERMINAL
FOLSOM
MONTGOMERY
UNION SQUARE/ MARKET STREET
J K L M N T
Market St.
Mission St.
1st St.
N
POWELL
Howard St.
Folsom St.
2nd St.
Harrison St.
BRANNAN
Golden Gate St.
4th St.
I-80
YERBA BUENA/ MOSCONE
5th St.
3rd St.
2ND ST. AND KING
CIVIC CENTER
7th St.
6th St.
4TH ST. AND BRANNAN
AT&T BALLPARK
King St.
4TH AND KING/BERRY N T
Bryant St.
Brannan St.
Townsend St.
Caltrain
MISSION ROCK
UCSF
UCSF MISSION BAY
LEGEND
T Third Phase 2
T Third Phase 1
Muni Metro
Caltrain
BART

APPENDIX D. TOP PROJECT RISKS

The Project Risk Register was updated in early 2015. The following risks were discussed at the July Risk Management Meeting.

Top Risks discussed in the previous month:

- Risks of delays or quality issues due to problems in transfer of settlement monitoring data, equipment, and software from 1252 to 1300 Contract. Data is still being transmitted.
- Risks associated with the cutover work at 4th and King Streets. Detailed planning of construction and SFMTA operations during the cutover is underway. Work is on target to begin over the Labor Day weekend.
- Risk of TPC-proposed use of shotcrete for final station wall surfaces may result in quality shortfall. TPC is still preparing the submittal for use of shotcrete. Risks associated with TPC-proposed SEM mining at CTS using two headings. TPC is still preparing its submittal in response to SFMTA comments on the initial submittal.
- *Risk of delay in obtaining easements for the tunnel right of way. SFMTA has been granted the right to take the easement by eminent domain. However, there is a risk that the cost of the easement will be higher than budgeted. A trial date for the valuation has been set.*
- Risks that signaling and train control will not work properly during cutover and intermediate operating stages at 4th and King. This risk has been partially mitigated by the replacement of the H&K switches proposed by the contractor with Irwin switches, which match the existing equipment. *The risk has been further reduced by decreasing the number of stages in which interim operations would need to be safety certified.*
- *Risk of a breakdown in relations between SFMTA and the contractor. Executive partnering sessions are planned. Routine partnering is ongoing. Mini-milestones for schedule achievement have been established to demonstrate cooperative work approach.*
- *Risk that station licenses will cost more than budgeted. A court judgment was finalized. This risk was realized and the cost is known - $355,000.*
- Delays in AT&T completion of cable installation in the surface section of the project. The ductbanks are ready for AT&T to start work *and the cables are on hand. A 12 month window for AT&T to complete the work started in April 2015.*
- Risk of extra costs due to differing site condition claim by BIH at the site of the CP5 subsidence. BIH has not submitted a Change Order Request for any additional cost. Risk is minor.

- *Risk that micro-piles supporting adjacent buildings will interfere with compensation grouting at UMS. This risk remains, although the compensation grouting scope may be reduced or eliminated. The compensation grout operation has shifted to CTS.*
- Delays from construction/demolition work at the Olivet Building site. Demolition is now scheduled to start in August 2015. SFMTA is coordinating to develop a plan to support the demolition work while allowing YBM construction to proceed. *Demolition is not likely to begin until 4th Street is fully restored to traffic at which time interference between the station construction and site demolition will be minimal.*
- *Risk that the current design is insufficient to support preparation of shop drawings for the Union Square Garage demolition and support for construction of the north UMS station entrance. The contractor has been submitting RFIs and the designer has been responding. The garage work has been delayed as a result of this risk being realized. Further delays are expected to be minor.*
- Risk that non-conforming work is not identified by the contractor's QC program. SFMTA has been conducting audits and surveillances of TPC's QC program. CNCRs are reported to have slowed – current total is 72 CNCRs.
- *Risk that ineffective processing of CNCRs by the CSP QA Team results in delays to construction. This risk is evident by the extended time that has been required to assemble complete documentation of repairs or other corrective actions. The QA Team has been made aware of the need to expedite resolution of CNCRs. Biweekly reviews of CNCR logs by management will identify lagging responses.*
- Risk of delay to the Revenue Service Date. General mitigation strategies have been identified. More specific mitigation plans need to be prepared and adopted by the contractor.

APPENDIX E. ROADMAP TO REVENUE OPERATIONS

To be prepared upon review of rail activation plan by SFMTA.

APPENDIX F. LESSONS LEARNED

LL#	Date	Phase	Category	Subject	Lesson Learned
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 Independent Review Panel (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.

LL#	Date	Phase	Category	Subject	Lesson Learned
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	Const.	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.

LL#	Date	Phase	Category	Subject	Lesson Learned
19	5-11-15	Const.	Quality Control	Use of latest design information for field inspection	After two roof pours were completed, it was discovered that required reinforcing steel was missing. Changes to the arrangement of the reinforcing steels were made as part of the submittal review and response process. Notes from the designer were included on the approved shop drawings but not in the contract design drawings. Field inspectors were using only the design drawings to confirm the proper installation of reinforcing steel prior to concrete placement. In the future the latest design information, including submittals and related designer notes, will be used to inspect reinforcing steel prior to concrete placement.

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.

Contract No.	**1250**	
Contract Description:	**UR #1 (YBM)**	
Status:	Completed June 2011.	
Cost:	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%
Schedule:	NTP issued January 2010. Substantial completion in June 2011.	
Issues or Concerns:	Final total cost claim by contractor has not been resolved.	

Contract No.	**1251**	
Contract Description:	**UR #2 (UMS)**	
Status:	Work is complete.	
Cost:	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%
Schedule:	NTP issued January 2011. Substantial completion in August 2012.	
Issues or Concerns:	Final total cost claim by contractor has not been resolved.	

Contract No.	**1252**	
Contract Description:	**Tunnels**	
Status:	*Substantial completion achieved. Punch list work underway.*	
Cost:	Original Contract Value	$233.58 million
	Approved Change Orders	$7.71 million
	Current Contract Value	$241.29 million
	Expended to Date	$238.75 million; $6.2 million is paid from non-project funds
	% Expended	98.9%
	SBE Participation	5.8%
Schedule:	Final completion scheduled May 15, 2015.	
Issues or Concerns:	None.	

Contract No.	**1277**	
Contract Description:	**Pagoda Palace Demolition**	
Status:	*Construction is complete; contract is in close out.*	
Cost:	Original Contract Value	$498,995
	Approved Change Orders	$179,139
	Current Contract Value	$678,134
	Expended to Date	$638,278
	% Expended	94.1%
	SBE Participation	100%
Schedule:		
Issues or Concerns:	None.	

Contract No.	**1300**	
Contract Description:	**Three subway stations (YBM, UMS, and CTS) and STS**	
Status:	*Support of excavation work is complete. Placement of roof slabs is underway. Preparations underway for mass excavation.*	
Cost:	Original Contract Value	$839.68 million
	Approved Change Orders	-$1.42 million
	Current Contract Value	$838.24 million
	Expended to Date	$242.37 million
	% Expended	28.9%
	SBE Participation	11.1%
Schedule:	NTP issued June 17, 2013. Substantial Completion: February 10, 2018.	
Issues or Concerns:	The work on this contract is behind schedule.	

Contract No.	**CS-155-1**	
Contract Description:	**Design Package 1 for Contracts 1250, 1251, and 1252. PB/Telemon**	
Status:	Design is complete. Construction support is ongoing for Contract 1252.	
Cost:	Original Contract Value	$5,795,000 (includes exercised options)
	Approved Change Orders	$1,697,245
	Current Contract Value	$7,492,245
	Expended to Date	*$7,719,958*
	% Expended	103%
	SBE Participation	29.8%
Schedule:		
Issues or Concerns:		

Contract No.	**CS-155-2**	
Contract Description:	**Design Package 2 for UMS, CTS, and YBM. CSDG prime**	
Status:	Designs are complete for all of the station contracts. Construction support of Contract 1300 is underway.	
Cost:	Original Contract Value	$35,059,252
	Approved Change Orders	$1,460,360
	Current Contract Value	$36,519,612
	Expended to Date	$28,847,529
	% Expended	79.0%
	SBE Participation	43.0%
Schedule:		
Issues or Concerns:		

Contract No.	**CS-155-3**	
Contract Description:	**Design Package 3 for STS. HNTB-B&C Prime**	
Status:	Design is complete. Construction support of Contract 1300 is underway.	
Cost:	Original Contract Value	$16,822,238
	Approved Change Orders	$312,814
	Current Contract Value	$17,232,252
	Expended to Date	$12,203,626
	% Expended	70.8%
	SBE Participation	28.6%
Schedule:		
Issues or Concerns:		

Contract No.	**CS-149**	
Contract Description:	**Central Subway Partnership (Project Manager/Construction Manager).**	
Status:	On-going.	
Cost:	Original Contract Value	$85,139,092
	Approved Change Orders	$0
	Current Contract Value	$85,139,092
	Expended to Date	$49,735,730
	% Expended	58.4%
	SBE Participation	35.8%
Schedule:		
Issues or Concerns:		

Contract No.	**CS 156**	
Contract Description:	**Project Controls Consultant.**	
Status:	On-going.	
Cost:	Base Contract Value	$17,112,873
	Approved Change Orders	$0
	Current Contract Value	$17,112,873
	Expended to Date	$8,105,085
	% Expended	47.4%
	SBE Participation	21.8%
Schedule:		
Issues or Concerns:		