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Memorandum

CS Memorandum No. 2176

To: Distribution

From: Beverly Ward, CMB, Risk and SSCRC Management Assistant

Date: May 02, 2017

Reference: Project No. M544.1, Contract No. CS-149
Task No. 1-4, Risk Management

Subject: Risk Mitigation Report No. 93, Rev. 0

Attached please find Risk Mitigation Report No. 93 for meeting held on April 6, 2017.

Risk Mitigation Report No. 93, Rev 0 with attachments

Cc:

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CS File No. M544.1.5.0820

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Risk Mitigation Meeting Minutes #93

DATE:	April 28, 2017
MEETING DATE:	**April 06, 2017**
LOCATION:	530 Bush Street, 4th Floor
TIME:	1:30pm
ATTENDEES:	John Funghi, Eric Stassevitch, Mark Latch, Bill Byrne, Beverly Ward
COPIES TO:	Attendees: Albert Hoe, Jane Wang, Sanford Pong, Luis Zurinaga, Jeffrey Davis,
REFERENCE	File: M544.1.5.0820 Program/Construction Management
SUBJECT:	**Risk Management – Risk Mitigation Meeting** **Risk Mitigation Report No. 93**

RECORD OF MEETING

ITEM #		ACTION BY DUE DATE
1 –	**Report (Risk rated rating ≥ 6)**	
	Risk 52: Unacceptable settlement and impact on major utilities at CTS (old sewer and others within 20ft space between top of cavern and street level) Discussion: SF water department will be installing the gate valves between April 10 and 14th, 2017, to prevent the intrusion of water. **Risk Rating 6** **Risk 205:** Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor Discussion: No issue concerning the contract modifications. Improvements still need to be made in the amount of time taken leading up to the CMods concerning the negotiation process. An additional mitigation strategy has been added, which is to increase the frequency of meetings held between the SFMTA and TPC. **Risk Rating 6** **Risk 229:** CN1300 Systems Acceptance Testing Discussion: The Program needs to continue the process of identifying pre revenue task, services and commitments. A further developed draft Rail Activation Plan (RAP) will be submitted this month to the FTA and Muni Operations for internal and external review. **Risk Rating 6** **Risk 230:** SFMTA Commissioning Coordination (inaccurate time for coordination or participation from Muni Ops) Discussion: Commissioning coordination will start with the review of the RAP by Muni Operations. **Risk Rating 6**	

ITEM #		ACTION BY DUE DATE
	Risk 232: Behind Schedule - Inability to recover or arrest the further schedule deterioration from the 1300 Contract Discussion: This risk has actual occurred, because of which, the Committee agreed to redefine the risk, but maintain previous references being tracked on the risk summary sheet. A workshop is scheduled in May, to work towards establishing a plan of action to prevent any further delays being realized. The new risk to the Program is - can we set and achieve a realistic ending. **Risk Rating 20** **Risk 233:** Acceptance of Shotcrete Substitution - leads to final product being inferior in performance Discussion: This is no longer a risk to SFMTA. The Contractor has been directed SFMTA letter to perform the work in the prescribed manner the contract dictates, using the CIP method. **Risk will be retired from register.** **Risk Rating 0** **Risk 234:** Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence Discussion: Resequencing of work has not caused subsidence beyond what was to be anticipated. **Risk Rating 7** **Risk 238**: Quality Program is ineffective in processing the nonconformance items causing schedule impacts Discussion: There is no new information to report out on this risk item. **Risk Rating 6** **Risk 240:** Unresolved Assignment of Schedule Delay Responsibility (may lead to increase cost for the Program) Discussion: Project Controls continues to review the inspectors daily reports (IDR's) to help tell a complete story for the schedule of days contained in the as built. **Risk Rating 8**	
2 -	**Report on Active Risk (Rated ≤ 6)**	
	Risk 36: Damage to buildings or utilities as a result of heave from jet grouting Discussion: Although grouting at UMS has been completed, we are still not at the bottom. Once the bottom has been reached, the risk will be considered for retirement. **Risk Rating 5** **Risk 67:** Archeological/Cultural findings during construction increases schedule and/or cost. (UMS)…LESS THAN 1%\ Discussion: We are below the area where middens would be discovered. **Risk will be retired from the register. Risk Rating 0** **Risk: 112** Major safety event halts work **Discussion**: There has been no major issues. The Project has an active safety management plan in place and is being monitored by TPC and SFMTA Safety Managers. **Risk Rating 4**	

ITEM #		ACTION BY DUE DATE
	Risk 237: Non-Conforming work is not identified by TPC's Quality Control Program Discussion: They are no issues to report on this risk item. The Committee reevaluated the risk and agreed the rating could be lowered to a rating of **2. Current Risk Rating 2** **Risk: 247** 2017/2018 funding allocation – Not receiving the needed funding Discussion: No updates were discussed. **Risk Rating 5**	
3-	**New Risk**	
	Risk 248: *Reality of the original baseline production rate to the actual production rate* Discussion: an additional evaluation by the Committee determined this risk description is not a new risk from what is already tracked under the schedule risk #232. This risk number **will not be tracked on the register and will be deleted all together.** **There were no new risk, introduced by the Risk Committee for incorporation into the Program Risk Register this month.**	

ACTION ITEMS –

ITEM #	MTG DATE	DESCRIPTION	BIC	DUE DATE	STATUS
3	05/07/15	**Risk 72** – 4th & King - Develop a test plan checklist for recertifying	S. Pong	05/04/17	Open

Meeting adjourned at 2:30pm

These meeting minutes have been prepared by B. Ward, and are the preparer's interpretation of discussions that took place. If the reader's interpretation differs, please contact the author in writing within four (4) days of receipt of these minutes.

Signed: BW [initials of preparer] **Date:** 5/1/17 [Date completed].

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Meeting Attendance Sheet

Project No. M544.1, Contract No. CS-149
Program/Construction Management
Risk Management Meeting No. 93
April 06, 2017
1:30 p.m. – 2:30 p.m.
Central Subway Project Office
530 Bush Street, 4th Floor

Deliver Meeting Attendance Sheet with original signatures/initials to Document Control.

NAME	AFFILIATION	PHONE	E-MAIL (for minutes)	INITIALS
Bill Byrne	DEA/PMOC	720-225-4669	BByrne@deainc.com	BB
Jeffrey Davis	FTA	415-744-2594	Jeffrey.s.davis@dot.gov	
John Funghi	SFMTA	415-660-5403	John.funghi@sfmta.com	
Albert Hoe	SFMTA	415-660-5385	Albert.hoe@sfmta.com	
Mark Latch	CSP	415-660-5410	Mark.latch@sfmta.com	MDC
Eric Stassevitch	CSP	415-660-5407	Eric.stassevitch@sfmta.com	
Beverly Ward	CSP	415-660-5386	Beverly.ward@sfmta.com	
Luis Zurinaga	SFCTA	415-716-6956	luis@sfcta.org	

Risk Mitigation Status
Risk Reference: 36

Risk		Mitigation Strategy
Damage to buildings or utilities as a result of heave from grouting.		Tangent piles combined with surface jet grouting will be utilized.

Initial Assessment: 1, 1.5, 2 **Risk Owner:** S. Wilson
Current Assessment: Risk Rating 5 – Construction Risk

Status Log:

April 2012:
1. Mitigation strategy change to reflect “tangent piles” rather than “secant piles”.
2. Protection of Existing Property spec requires contractor to repair damage caused by their actions.

November 2015:
1. As part of an overall evaluation of the remaining requirement and design risk, as well as the low rated active construction risk. The committee preformed a reassessment of this risk to determine if its current Risk rating is still valid. The construction Risk rating will remain a 1.
2. Heave from the jet grouting did occur in the Macy’s basement

March 2016:
1. Very little grout has entered the buildings, when discovered the Contractor has addressed the issue.

July 2016”
1. Jet grouting is complete.
2. Risk description will be change to “Damage to buildings or utilities as a result of heave from grouting”.
3. The Committee performed a reassessment of the risk, rating will remain a 5.

August 2016:
1. Damage caused by grouting has not taken place.
2. This risk is no longer an issue and will be evaluated next month for recommendation to retire.

September 2016:
1. Jet grout verification coring is has not been complete.
2. Fluid reportedly infiltrated the Macy's Men's store from the nighttime coring activities.

October 2016:
1. Verification coring is still being performed.
2. There is more than one property with damage that needs to be addressed, including Macy's, but these are likely due to compensation grouting not jet grout or jet grout coring.

Risk Mitigation Status
Risk Reference: 36

Risk		Mitigation Strategy
Damage to buildings or utilities as a result of heave from grouting.		Tangent piles combined with surface jet grouting will be utilized.

November 2016:

1. Verification coring is currently scheduled to complete on 11/11/16.

December 2016:

1. Jet grout coring has been completed, so there may be no more risk…however; if we install compensation grout at any point to offset building settlement, there will still be a risk of heave.

January 2017:

1. Although there is no work being done and no damage done to the building, Barney's floor is showing cracking. TPC will need to investigate the cause.

February 2017:

1. Jet grouting and jet grout coring are complete. Preconditioning for compensation grouting is also complete and did result in claims to the contractor's insurer. The use of compensation grouting for mitigating building settlement is a possibility during continued station excavation.

March 2017:

1. No change from last month's update.
2. Recommended to be retired at next month's meeting.

April 2017:

1. There is no change since the notes made in February. It is still possible we will inject compensation grout under buildings to mitigate settlement, but currently we have no plans to do so.

Risk Mitigation Status
Risk Reference: 52

Risk		Mitigation Strategy
Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)		1. Evaluate effect of potential settlement on utilities. 2. Slip-lined sewer by CTS contractor. 3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed. 4. Contractor to correct impact of settlements by repair. 5. Have contingency repair/restoration plan. 6. Utility contact information and procedure will be on plans. 7. Develop an allowance for utility repair. 8. Include probable costs in estimate.

Initial Assessment: 4, 2, 8 **Risk Owner:** D. Jacobson
Current Assessment: Risk Rating 6 – Construction Risk

Status Log:

December 8, 2009 Meeting:
1. R. Edwards was identified as risk owner.
2. A. Hoe will status the mitigation strategy.
3. Mitigation strategy needs to establish metrics for acceptable settlement criteria.
4. Eliminated Mitigation Strategy Item 6: “Cistern at Washington St. will be repaired at the completion of construction and damaged pavements replaced” from this risk and will make a new Risk 52a to address the risk to the cistern.(Done)

January 21, 2010 Meeting:
1. An action from the last risk mitigation meeting to “move Mitigation Strategy Item No. 6 to a new Risk 52a” was not done. R. Rocco will update the register accordingly.

November 2011:
1. Revised mitigation strategy 1 to indicate slip-lining of sewer by CTS contractor, not TBM contractor.
2. Removed mitigation strategy 2 “will pre-install tubamachettes for compensation grouting”.
3. Revised mitigation strategy 4 to eliminate use of compensation grouting to correct impact of settlement.
4. Sewers will be slip-lined prior to cavern construction.
5. Affected utilities requiring monitoring are listed in BP drawings.
6. Technical specifications address requirement for leak detection and mitigation plans to repair leaks.

January 2012 Meeting:
1. SFPUC submitted comments on the Effects of Settlement on Utilities report.
2. SFMTA will respond to comments.

February 2012:
1. Mitigation strategy added to “Develop an allowance bid item for utility repair”.
2. SFMTA responded to comments. None of the responses change the mitigation strategy for this risk.

Risk Mitigation Status
Risk Reference: 52

Risk		Mitigation Strategy
Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)		1. Evaluate effect of potential settlement on utilities. 2. Slip-lined sewer by CTS contractor. 3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed. 4. Contractor to correct impact of settlements by repair. 5. Have contingency repair/restoration plan. 6. Utility contact information and procedure will be on plans. 7. Develop an allowance for utility repair. 8. Include probable costs in estimate.

Initial Assessment: 4, 2, 8 **Risk Owner:** D. Jacobson
Current Assessment: Risk Rating 6 – Construction Risk

3. Leak detection requirements added to contract.
4. Allowance for utility repair included in contract.

September 2012 Meeting:
1. CTS has been resolved

October 2012 Meeting:
1. UMS & YBM yet to be closed out

May 2012:
1. **Recommend reducing this risk rating to 3 (2, 2, 1)** (reduce probability and cost impact)
    a. Current probability (3), >50%, recommend reduce probability to (2), 10-50%
    b. Current cost impact (3), $1m - $3m, recommend reduce cost impact to (2), $250k - $1m (CN 1300 CTS AL-8 = $250k)
    c. Current schedule impacts (1), <1 month, maintain schedule impact
2. Risk rating to remain at 6

January 2014:
1. Comments regarding UMS and YBM are still to be closed out with SFPUC.
2. A letter responding to the outstanding comments will be sent to SFPUC the week of January 13th

March 2014:
1. Letter was sent to SFPUC. Response from SFPUC is still pending.
2. SFPUC previous contact Betsey Eagon has left the division. SFMTA needs to identify the new contact person.

April 2014:
1. Response from SFPUC of outstanding comments is still pending.

Risk Mitigation Status
Risk Reference: 52

Risk		Mitigation Strategy
Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)		1. Evaluate effect of potential settlement on utilities. 2. Slip-lined sewer by CTS contractor. 3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed. 4. Contractor to correct impact of settlements by repair. 5. Have contingency repair/restoration plan. 6. Utility contact information and procedure will be on plans. 7. Develop an allowance for utility repair. 8. Include probable costs in estimate.

Initial Assessment: 4, 2, 8 **Risk Owner:** D. Jacobson
Current Assessment: Risk Rating 6 – Construction Risk

February 2015:

1. Slip lining brick sewers scheduled to begin After Chinese New Year. Prior to work commencement the risk owner is to meet with utility owner (PUC) and identify existing obstructions that are preventing slip lining work and request funding to relocate or eliminate obstructions.

2. 12 inch 100 year old water line identified as a risk. Prepare a conceptual waterline layout and present to utility owner (PUC) and request funding to upgrade their line.

March 2015

1. Slip lining between Washington and Jackson installed, backfilling on going. Determined that there would be no additional cost. Clay to Washington not yet scheduled.

2. No progress update for the 12-inch 100yr. old water line.

April 2015:

1. The 12inch/100 year old water line issue was addressed in the settlement report. No issues were found, the settlement report was not revised during the lowering of the tunnel.
2. The RE needs to drill down and investigate the issue. Are there additional precaution that need to be done?

May 2015:

1. A new valve was installed as part of the North Assess shaft 12 inch water line relocation. RE recommends that two Utility Monitoring points be installed at the junction of the old pipe and Washington St
2. RE should present his findings and recommendation to the Configuration Management Board as a proposed contract change. Or direct the Contractor to rearrange the utility monitoring points.

June 2015:

1. The 100 year old CIP 12” water line will be monitored.

Risk Mitigation Status
Risk Reference: 52

Risk		Mitigation Strategy
Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)		1. Evaluate effect of potential settlement on utilities. 2. Slip-lined sewer by CTS contractor. 3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed. 4. Contractor to correct impact of settlements by repair. 5. Have contingency repair/restoration plan. 6. Utility contact information and procedure will be on plans. 7. Develop an allowance for utility repair. 8. Include probable costs in estimate.

Initial Assessment: 4, 2, 8 **Risk Owner:** D. Jacobson
Current Assessment: Risk Rating 6 – Construction Risk

June 2016:

1. At the current time, all utilities are currently functioning. Water utility monitoring is ongoing with Data Loggers that read decibel dB levels. The system (Gutermann Instruments data loggers with antennae) used for the TBM work is also appropriate for the SEM tunnel excavations for CTS Platform Tunnels. During the utility relocation effort, some data loggers went missing. SFMTA and the Instrumentation Task Force has required TPC to replace missing data loggers.
2. The Mitigation Strategy listed above probably needs to be updated. For example, most of item 2 is completed. Is item 7 relevant as the contract for CTS is already underway?

July 2016:

1. The Committee performed a reassessment of the risk, rating will remain a 6.

August 2016:

1. TPC's subcontractor Exaro installed remaining Gutermann data loggers for total of 12 working loggers.
2. TPC installed piezometer using 4" drain pipe in the middle of the Wash/Stockton St intersection cistern on Tuesday, August 2, 2016. The cistern is filled with sand (in 1944, per as-built). Water level after pipe had been vacuumed out was 5.75' below the street. With the sand and assumed void ratio, the cistern may hold 1000+ gallons of water.
3. SFMTA staff (RE and PM Eric Stassevitch) met with SFWater engineers and gatemen to plan emergency water shut off for CTS. Valve location plan and phone tree in case of an emergency are in process.

September 2016:

1. Water shut off work is not completed for the two emergency shutoff valves. Ongoing discussion with SFWater

October 2016:

1. Meeting with SFWater to proceed with installing two emergency gate valves, one 12" GV near Sta 108+00 on 100 yr-old 12" water and one 6" GV near Sta 100+50 near Jackson/Stockton intersection on 6" water line. SFWater completed hydraulic study to see how many of the dozen redundant gate valves can be closed in case of a major shutdown of water due to surface ground movement. So far, the

Risk Mitigation Status
Risk Reference: 52

Risk		Mitigation Strategy
Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)		1. Evaluate effect of potential settlement on utilities. 2. Slip-lined sewer by CTS contractor. 3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed. 4. Contractor to correct impact of settlements by repair. 5. Have contingency repair/restoration plan. 6. Utility contact information and procedure will be on plans. 7. Develop an allowance for utility repair. 8. Include probable costs in estimate.

Initial Assessment: 4, 2, 8 **Risk Owner:** D. Jacobson

Current Assessment: Risk Rating 6 – Construction Risk

expected settlement of Stockton Street is much less than projected. Daily monitoring within the Cross-Cut Cavern is required during the Barrel Vault pipe installation.

November 2016:

1. Same as October 2016: Meeting with SFWater to proceed with installing two emergency gate valves, one 12" GV near Sta 108+00 on 100 yr-old 12" water and one 6" GV near Sta 100+50 near Jackson/Stockton intersection on 6" water line. SFWater completed hydraulic study to see how many of the dozen redundant gate valves can be closed in case of a major shutdown of water due to surface ground movement. So far, the expected settlement of Stockton Street is much less than projected. Daily monitoring within the Cross-Cut Cavern is required during the Barrel Vault pipe installation. .

December 2016:

1. Met with SFWater a second time for installing two emergency gate valves, one 12" GV near Sta 108+00 on 100 yr-old 12" water and one 6" GV near Sta 100+50 near Jackson/Stockton intersection on 6" water line. The completed SFWater hydraulic study showed that adding these two gate valves allows the closure of eight [8] gate valves located above the Platform Cavern in case of a major shutdown of water due to surface ground movement. So far, the expected settlement of Stockton Street is much less than projected. Daily monitoring within the Cross-Cut Cavern continues as well as monitoring of new survey targets within the Platform Cavern side drifts under excavation.

January 2017:

1. Utilities remain stable. Two emergency gate valves are not yet installed, pending TPC work in early January (if SFWater can meet deadline). The plan is for SF Water to fabricate and install gate valve assemble; TPC to excavate, backfill, and restore street. If early January does not work out to complete this work, TPC plans to provide crew to pothole, excavate, backfill and restore street by mid-February after Chinese New Year Moratorium.

February 2017:

1. Gate valve work is expected to be installed in mid-February after Chinese New Year.

March 2017:

1. Utilities remain stable at this time. SF Water is tasked with installing both the 6" gate valve and 12" gate valve. Monitoring is ongoing.

Risk Mitigation Status
Risk Reference: 52

Risk		Mitigation Strategy
Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)		1. Evaluate effect of potential settlement on utilities. 2. Slip-lined sewer by CTS contractor. 3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed. 4. Contractor to correct impact of settlements by repair. 5. Have contingency repair/restoration plan. 6. Utility contact information and procedure will be on plans. 7. Develop an allowance for utility repair. 8. Include probable costs in estimate.

Initial Assessment: 4, 2, 8 **Risk Owner:** D. Jacobson

Current Assessment: Risk Rating 6 – Construction Risk

April 2017

1. Utilities remain stable at this time. SF Water is planning to install 6" gate valve near Jackson and Stockton the week of April 10-14. SF Water may also begin excavation for 12" gate valve near Sacramento St on Stockton by mid-April.
2. Compensation Grouting began March 31 and continues through April 6 to mitigation slight settlement of buildings adjacent to Platform Cavern South. Instrumentation is watching utilities and buildings.

Risk Mitigation Status
Risk Reference: 67

Risk	Mitigation Strategy
Archeological/Cultural findings during construction increases schedule and/or cost. (UMS)…LESS THAN 1%	1. Provide on-call Archeologist. 2. Provide allowance and procedure in contract for Archeological/Cultural discoveries.

Initial Assessment: 1, 1.5, 2
Current Assessment: Risk Rating 0 – Construction Risk

Risk Owner: S. Wilson

Status Log:

February 2012 Meeting:
1. Mitigation measures to be implemented in contract documents.
2. Recommend this risk rating be reduced to 3.

March 2013:
1. Discuss reducing this risk rating and Transferring ownership to CM
2. Reduced cost impact to 1 (<$250k), risk rating reduced to 5

November 2015:
1. As part of an overall evaluation of the remaining requirement and design risk, as well as the low rated active construction risk. The committee preformed a reassessment of this risk to determine if its current Risk rating is still valid.
2. There was no change made to the risk rating. This current construction Risk rating will remain a 5.

July 2016:
1. The Committee performed a reassessment of the risk, rating will remain a 5.

January 2017:
1. The work being done is below the 60ft depth of archeological findings.

April 2017:
1. Risk retired by unanimous consent of the Risk Assessment Committee 04/06/17.

Risk Mitigation Status
Risk Reference: 112

Risk	Mitigation Strategy
Major safety event halts work	1. Require contractor to provide for a full-time Safety Manager.

Initial Assessment: 5, 3, 4 **Risk Owner:** E. Stassevitch
Current Assessment: Risk Rating 4 – Construction Risk

Status Log:

February 2012:

1. Contract Technical Specifications Section 01 35 29.10 – Health and Safety includes procedures and contractor requirements to prevent accidents.
2. Contracts require contractor to provide a full-time Safety Manager.
3. Central Subway Program retains a full-time Safety Manager.

July 2013:

1. Safety inspections being carried out monthly.
2. Safety inspection observations are being communicated to the contractor as required.
3. Cal OSHA mining inspections held every 2 months.
4. Executive safety meetings being held quarterly.

February 2014:

1. There have been several safety incidents recently prompting the tunnel contractor to hold a full staff stand down and remind workforce to be vigilant about personal safety
2. Safety Manager to broadcast safety incidents in real time to program management
3. Monthly safety walks, Cal OSHA, and executive safety meetings continue
4. Follow up report to be given to the risk committee on the tabulation and analysis of program safety managers daily safety observations

March 2014

1. Safety Managers daily reports were submitted for review. The Risk Manager will assist the Safety Manager with the information being tracked on the daily report by way of suggested content structure.
2. A recurring safety agenda item will be added to the weekly Program Management meeting on the 1st Monday of the month

April 2014:

1. Overall safety awareness has improved. Safety Manager is charting safety incidents, accidents and near misses. The analysis of the trends are being discussed at the Program Executive Safety meeting

Risk Mitigation Status
Risk Reference: 112

Risk		Mitigation Strategy
Major safety event halts work		1. Require contractor to provide for a full-time Safety Manager.

November 2015:

1. As part of an overall evaluation of the remaining requirement and design risk, as well as the low rated active construction risk. The committee preformed a reassessment of this risk to determine if its current Risk rating is still valid.
2. There was no change made to the risk rating. This current construction Risk rating will remain a 4.

July 2016:

1. The Committee performed a reassessment of the risk, rating will remain a 4.

April 2017:

1. No major issues have been experienced. The responsibility of safety is being closely monitored by SFMTA and TPC's Safety Managers.

Risk Mitigation Status
Risk Reference: 205

Risk		Mitigation Strategy
Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor	√ √	1. CMod Task Force - 5 Areas of Improvement identified 2. Implement areas of improvement 3. Increase Delegation of Authority 4. Increase frequency of meetings

Initial Assessment: 1, 1, 3 **Risk Owner:** E. Stassevitch
Current Assessment: Risk Rating 3 – Construction Risk

Status Log:

December Meeting 2012:

1. Identified Risk and refined risk statement together with development of mitigation strategies.

January 2013:
1. CMod Task force continues to demonstrate the process is working.
2. Task force process has slowed down submission of changes from Contractor

February 2013 Meeting:
1. Initial risk rating established
2. CMod task force improvements are working
3. The combined 1300 contract has effectively resulted in a $5m Board threshold for the entire 1300 contract (previously $5m threshold for each of the 4 contracts) – Central Subway to investigate increasing the CMod authority above $5m.

March 2013:
1. Process to increase delegation of authority to be discussed

April 2013:
1. Risk owner changed from M. Benson to R. Redmond
2. A formal recommendation to increase the delegation of authority will be prepared and presented to the CMB on 4/17.
3. A detailed White Paper will be developed for the Project Director outlining the rationale for increasing the delegation of authority.

May 2013:
1. A request to the SFMTA board to increase the Director of Transportation authority to approve changes orders of up to $5 million for each of the Contract 1300 packages (a total of $20 million) has been included in the calendar item requesting the SFMTA board to award Contract 1300.
2. The target SFMTA board meeting for this calendar item is May 21st 2013.

October 2013:
1. SFMTA board approved increase in Directors authority with award of Contract 1300 in May 2013.

Risk Mitigation Status
Risk Reference: 205

Risk		Mitigation Strategy
Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor	√ √	1. CMod Task Force - 5 Areas of Improvement identified 2. Implement areas of improvement 3. Increase Delegation of Authority 4. Increase frequency of meetings

May 2014:

1. Progress in the CMod process are continuing to be made.

July 2014:

1. Contract 1300 Partnering efforts have expanded to include the RE level, Designers, Utility companies and Department of Traffic.

December 2014:

1. No change to the status of this risk.

September 2015:

1. Executive partnering meeting on August 27, 2015 established goal to lower number of outstanding merited changes. Focused attention on completing outstanding merit evaluations, and effectively utilizing the regular weekly meeting to move changes thru the process. Program Manager and Contractor Project Manager to attend weekly change meeting to prioritize work and to meet more often if required expediting processing of changes. Progress to be monitored weekly to measure effectiveness and implement mitigations as required.

October 2015:

1. Weekly Change Management meetings are beginning to produce results; agreed to list of changes, prioritization of items to be addressed, and scheduling of change negotiations. Progress is still extremely slow in the processing of agreed to changes, but moving forward.
2. Outstanding merit determination items are being reduced.

November 2015:

1. Progress continues to be extremely slow, but still moving forward.

December 2015:

1. Three Cmod’s have been signed this month, that contained multiple COR’s.

January 2016:

1. 6 more Cmod’s have been processed since the last update, all contain multiple CORs.

February 2016:

2. Four CMods for the stations contract and Two CMods for the tunnel contract have been process since last month’s update.

April 2016:

Risk Mitigation Status
Risk Reference: 205

Risk		Mitigation Strategy
Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor	√ √	1. CMod Task Force - 5 Areas of Improvement identified 2. Implement areas of improvement 3. Increase Delegation of Authority 4. Increase frequency of meetings

1. The change order process is being examined. The Program has brought on additional help to address the issue of assessing merit determination at UMS – Union Square Garage settlements.

May 2016:

1. The change order process is being examined by SFMTA Project Manager - Contract Administration, to identify the constraints of lump sum proposals. Solutions being proposed are to process unilateral changes when cost is not negotiated.
2. The Program is looking at ways or a process to determine distinctively how to pay the Contractor.

June 2016:

1. Continued Efforts to examine the CMod process in order to identify area that require improvement to reduce the time it takes to process changes.

July 2016:

1. The Committee performed a reassessment of the risk, rating will remain a 3.

August 2016":

1. Progress is being made towards reducing the time it takes to process contract change modifications. Work still needs to be made toward increasing the time it takes to receive signature approval from all parties.

September 2016:

1. The Program processed and signed six CMod's this month. Work still needs to be done to improve the time it takes in establishing merit and quantum.

October 2016:

1. Progress in the CMod process are continuing to be made. Improvements still need to be made in the time it takes for RE's to establish merit and quantum.

November 2016:

1. CMod's continue to increase in the number of modifications being processed monthly.

December 2016:

1. Two additional CMod's were processed this month. Both parties are demonstrating a satisfaction with the process and the progress being made.

January 2017:

Risk Mitigation Status
Risk Reference: 205

Risk		Mitigation Strategy
Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor	√ √	1. CMod Task Force - 5 Areas of Improvement identified 2. Implement areas of improvement 3. Increase Delegation of Authority 4. Increase frequency of meetings

1. CMod's are being processed. There is still an issue with the amount of time it takes to complete the modifications.

February 2017:

1. Twelve CMod's were processed this month. Those CMod's included several COR's.

March 2017:

1. Currently there are no issues concerning issuing of contract modifications. The amount of time it takes to negotiate cost could be improved.

April 2017:

1. There are no issue with issuing contract modifications. The underlying issue is the amount of time it takes in negotiating the actual modification.
2. The Committee added this month a fourth strategy for mitigating this risk – Increase frequency of meetings.

Risk Mitigation Status
Risk Reference: 229

Risk		Mitigation Strategy
CN1300 System Acceptance Testing		1. Identify duration 2. Identify advance activities

Initial Assessment: 3, 1, 3 **Risk Owner:** A. Hoe
Current Assessment: Risk Rating 6 – Construction Risk

Status Log:

November 2014:
1. Risk needs to be further evaluated to gain a better understanding of what mitigation strategies need to be implemented.

August 2016:
1. Individual system components may take longer than expected.

September 2016:
1. Currently the Program is working towards putting together system schedule to identify all the key components.

October 2016:
1. The train control system schedule is being developed and will be included as part of the as built schedule.

November 2016:
1. Dates for startup and testing of systems on CSP have been developed and will be incorporated into the train control schedule.

December 2016:
1. The startup and testing schedule has been incorporated. The Program will need to perform an analysis of the various different schedule dates allowing more detail to be added to the schedule.

January 2017:
1. A second mitigation strategy was added this month to be implemented. Involving identifying activities, which should be done in advance of the systems acceptance test.

February 2017:
1. Currently the schedule identifies fifteen known systems testing items.

March 2017:
1. Schedule ask activities for systems testing continue to be developed.

Risk Mitigation Status
Risk Reference: 229

Risk		Mitigation Strategy
CN1300 System Acceptance Testing		1. Identify duration 2. Identify advance activities

April 2017:

1. The Program's draft Rail Activation Plan will be submitted to FTA and Muni Operations, this month. Input from Operations will assist the Program in identifying pre revenue activities.

Risk Mitigation Status
Risk Reference: 230

Risk		Mitigation Strategy
SFMTA Commissioning Coordination - inaccurate time for coordination or participation from SF Muni Operations		1. Signage – Notifying the public 2. Create a commissioning team 3. Getting Operation's test requirement in hand

Initial Assessment: 3, 1, 3 **Risk Owner:** A. Hoe
Current Assessment: Risk Rating 6 – Construction Risk

Status Log:

November 2014:
1. Risk needs to be further evaluated to gain a better understanding of what mitigation strategies need to be implemented.

August 2016:
1. During commissioning, test performed by TPC will need to be witness by Operations. SFMTA will need to confirm which test and the amount expected to be witnessed.

September 2016:
1. SFMTA is developing the Rail Activation Plan (RAP). The RAP will establish dates when activities need to take place and will be added to the schedule for startup and testing.

October 2016:
1. No status update for this month. The Rail Activation Plan (RAP) is continuing to be developed.

November 2016:
1. Commissioning coordination plan will be incorporated into CSP's Rail Activation Plan (RAP). Currently the RAP is still a draft document.

December 2016:
1. The Rail Activation Plan (RAP) is in development. There is a commitment to get a draft version issued during the issuance of the annual PMP in April 2017.

January 2017:
1. Risk description has been expanded to include what the actually risk that may be incurred: SFMTA Commission Coordination – Inaccurate time for coordination or participation from SF Muni Operations.

Risk Mitigation Status
Risk Reference: 230

Risk		Mitigation Strategy
SFMTA Commissioning Coordination - inaccurate time for coordination or participation from SF Muni Operations		1. Signage – Notifying the public 2. Create a commissioning team 3. Getting Operation's test requirement in hand

February 2017:

1. The Program is working on hiring a Systems Coordination Manager, to head up the coordination and testing part of the project.

March 2017:

1. Coordination meetings with Muni Operations have yet to take place.

April 2017:

1. A copy of the draft Rail Activation Plan (RAP) has been delivered to Muni Operations this month for internal review. This is the start of commission coordination.

Risk Mitigation Status
Risk Reference: 232

Risk		Mitigation Strategy
Behind Schedule – Inability to recover or arrest the further schedule deterioration from the 1300 Contract		1. Contractor implemented Schedule Recovery 2. Acceleration 3. Identify new (realistic) completion date

Initial Assessment: 4, 3, 3 **Risk Owner:** E. Stassevitch
Current Assessment: Risk Rating 20 – Construction Risk

Status Log:

January 2015:
1. Contractor's schedule update has not been submitted.

February 2015:
1. Contractor has submitted their schedule update on February 04, 2015. The update shows an approximate six month delay. A time impact analysis has not been submitted to justify this claim.
2. To pick up time, the Contractor should be put on notice that activities on the schedule which the Contractor can work two shifts, they should do so.
3. SFMTA needs to perform an in-house analysis on the schedule.

March 2015:
1. SFMTA will perform an in-house analysis of the Contractor's time impacts submitted to validate the actual durations.
2. SFMTA will meet with the PMOC to discuss activities on the Contractor's schedule for ways to gain recovery.

April 2015:
1. A draft analysis was done to compare the Contractor's baseline activities against actual work which occurred in January update.
2. Additional analyses will be ran to demonstrate a side by side comparison for each delay the Contractor is claiming.
3. A standardize document will be created for reporting the Contractor's work progress versus what is shown in the baseline schedule activity.

May 2015
1. The Program will initiate a schedule containment workshop, to better define the risk to the project, and address issues and ways to mitigate potential delays.

June 2015:
1. A schedule analysis being generated to determine the number of days the contractor is behind schedule.

July 2015:
1. Schedule analysis continues to be generated to determine precise number of days the contractor is behind
2. Partnering workshop held – mini milestones identified to increase confidence that team can attain schedule recovery.

Risk Mitigation Status
Risk Reference: 232

Risk		Mitigation Strategy
Behind Schedule – Inability to recover or arrest the further schedule deterioration from the 1300 Contract		1. Contractor implemented Schedule Recovery 2. Acceleration 3. Identify new (realistic) completion date

August 2015:

1. Schedule updates are being received from the Contractor. Once all updates are received and approved, the Program can proceed with making a determination of the amount of time the Contractor is behind schedule and begin to work on ways to mitigate the delay.

September 2015:

1. Executive Partnering meeting held August 27, 2015, established initial recovery efforts to double shift roof placement activities at UMS to recover lost time from jet grouting operations; also identify any and all work to could be performed now, and implement plan to proceed with that work. Initial ideas identified work in the tunnel. Tunnel walk thru by Contractor took place on September 2, 2015, with effected subcontractors, to develop plan for placing as much tunnel invert as possible prior to break-ins.

October 2015:

1. Work is proceeding with the extended shifts for the roof placements; goal is to complete all but two of them by the moratorium.
2. Work in the tunnel is progressing with removal of the fan line (ducts) and preparation for invert placement. Goal is to complete all invert and rail placement by April 2016 working from North to South.

November 2015:

1. Continuing with efforts to complete roof placements, will not achieve goal of all but two. Need to develop plan for after moratorium to make up lost time on roof placement efforts.
2. Work in the tunnels continues, all fan line removed. Still on track to complete goal by April 2016. Response required for shrinkage crack RFI

December 2015:

1. A schedule workshop meeting took place on 11/18 and 11/19 to see where there was opportunity to recovery.
2. A Senior Management meeting will take place to discuss ways to implement some of the schedule recovery elements.

January 2016:

1. Sr. Mgmt meeting took place Dec 4th, identified CTS as critical path and reviewed areas to potentially recover time or at a minimum not to lose more time. Identified 5 mini milestones to track to ensure progress is maintained or improved. Focus is on having all barrel vaults installed by 23rd of Feb and CDF in tunnels in place ready for break in of Cross cavern.

February 2016:

1. Modification of the mini milestones identified at CTS was done. The Contractor is still working towards the new dates.

Risk Mitigation Status
Risk Reference: 232

Risk		Mitigation Strategy
Behind Schedule – Inability to recover or arrest the further schedule deterioration from the 1300 Contract		1. Contractor implemented Schedule Recovery 2. Acceleration 3. Identify new (realistic) completion date

April 2016:

1. TPC Management is very focus on insuring that the schedule is recovered to the best of everyone's ability and identify components of work that will allow the contract to recovery time. The primary focus currently is on the Chinatown stations. As an example the audacious goals were established for all four work sites during partnering. CTS goal is to complete the cross cut cavern by June 15th, 2016. This would be a month to 1-1/2 months ahead of schedule. Additionally, short-term milestones are also being tracked.
2. SFMTA has created a progress schedule to use as a tool to help update the Contractors schedule in areas where there is a disagreement.

May 2016:

1. Correction from last month's update: *CTS goal is to complete the cross cut cavern by July12th, 2016.*
2. SFMTA and TPC continue to work towards reconciling the progress schedule.

June 2016:

1. Continue to focus on CTS goal to complete cut cavern by July 12, 2016.

July 2016

1. The Committee performed a reassessment of the risk, rating will remain a 12.

August 2016:

1. The Program is addressing the Contractor's TIA's, however have yet to received supporting documentation to justify their time impact claims.

September 2016:

1. The PCC team is working on the as built schedule. The Program anticipates having the knowledge of who owns the delay by November.

October 2016:

1. Work continues by the Project's Cost Control team towards the goal to have the as-built schedule completed by the beginning of November.

November 2016:

1. The PCC team is expected to have a completed as built schedule by November 25th.
2. A workshop will be scheduled sometime in February to include the FTA, PMOC and SFMTA to discuss what aspects of the schedule is working.
3. Mitigation strategy #3 will be changed to read "*scope reduction*" rather than adjustments, due to scope reduction no longer being a workable solution.

Risk Mitigation Status
Risk Reference: 232

Risk		Mitigation Strategy
Behind Schedule – Inability to recover or arrest the further schedule deterioration from the 1300 Contract		1. Contractor implemented Schedule Recovery 2. Acceleration 3. Identify new (realistic) completion date

December 2016:

1. The Project's control team continues to work towards developing an as built schedule.
2. The goal for completion has been pushed back and now set for the week of January 9th, 2017.

January 2017:

1. BHAG's are being addressed saving the project two weeks in the schedule from February 14 to January 30th by putting struts up to the mezzanine level.
2. The Committee performed a reassessment of the risk. This risk rating has been elevated to **20** on the risk register.
   New Risk Rating 20 (5, 4, 4)
   Probability (5), >90%
   Cost impact (4), <> $3M - $10M
   Schedule impacts (4), <>6-12 Months

February 2017:

1. Project Controls continues to work towards completing the as built schedule. Part of the as built have already been submitted for review.
2. A workshop will be held sometime in April or May 2017 between the SFMTA and the FTA to discuss the findings.

March 2017:

1. Daily reports from the inspectors are being reviewed by project controls to aid in building the as built schedule.

April 2017:

1. This risk as defined "*Unable to Recover from Delay to 1300 Contract"* has actual occurred. From a procedural standpoint there has been a failure to mitigate the risk. Because of which the Committee agreed to redefine the risk, but maintain previous references.
2. A third mitigation strategy was added this month - Identify new (realistic) completion date.
3. The Program is utilizing the Partnering meeting to identify BHAG's and monitor productivity.

Risk Mitigation Status
Risk Reference: 233

Risk	Mitigation Strategy
Acceptance of Shotcrete Substitution - leads to final product being inferior in performance and availability of shotcrete needed for the permanent liner.	1. Meet and discuss with TPC's senior management what the issues are and the status for clarification.

Initial Assessment: 3, 3, 3
Current Assessment: Risk Rating 0 **– Construction**

Risk Owner: D. Jacobson

Status Log:

December 2014:

1. SFMTA and TPC have a different interpretation of the contract specification language for where shotcrete may be used for the final lining of the Cross Cut, Platform and Crossover Cavers at CTS in the tunnel lining.

January 2015:

1. The Program received a resubmittal of the shotcrete plan. The new submittal deletes the phrase "in lieu of". Allowing the content of the submittal to be reviewed as a mix design for shotcrete.

February 2015:

1. CSDG has been authorized to review the shotcrete resubmittal.

March 2015:

1. Receipt of the Contractor's response to SFMTA letter CS CN 1300 No. 0556 requesting the Contractor demonstrate in his submittal how the performance specifications will be met for concrete by using the shotcrete is still pending.

April 2015:

1. The Contractor has yet to respond to SFMTA's request to demonstrate performance criteria will be met.

May 2015

1. The contractor has yet to respond.

June 2015

1. Contractor has yet to submit.
2. Risk title was reevaluated for accuracy of the risk. The Risk Committee agreed the title should be changed during the June 2015 meeting.

July 2015:

1. TPC announced at the Partnering meeting they are working on the submittal demonstrating the performance requirement.

Risk Mitigation Status
Risk Reference: 233

Risk	Mitigation Strategy
Acceptance of Shotcrete Substitution - leads to final product being inferior in performance and availability of shotcrete needed for the permanent liner.	1. Meet and discuss with TPC's senior management what the issues are and the status for clarification.

August 2015:

1. No submittal received, TPC has informed us that they will submit two separate submittals. One for the head house and one for the underground station, crossover and cross cut. The use of shotcrete as a final lining is over a year off

September 2015:

1. Nothing submitted yet.
2. The Contractor indicated during the Partnering meeting on 08/27/15, they are working on it.

October 2015:

1. We have not received the submittal. The issue is thought to be concerning the Contractor proposing sacrificing the waterproofing membrane in front.

November 2015:

1. The Program has expressed concern with the Contractor wanting to piecemeal approach of submitting information related to shotcreting work, which gives the false impression the Program is accepting their proposal of shotecrete in lieu of. SFMTA will send a letter to the Contractor rejecting their submittals ideals (Shotcrete in lieu of). Requesting a more comprehensive submittal package demonstrating they are meeting all of the performance requirements.

December 2015:

1. TPC submitted Letter -1166 with 5 exhibits responding to SFMTA letters 556 and 1039. The letter is under review. Shotcrete mix design has been approved and test panels are scheduled to be shot.

January 2016:

1. SFMTA has yet to respond to TPC letter No. 1166. SFMTA is in the process of responding. The letter will address the issue of deficiency. Citing directly from the contract technical specifications.

February 2016:

1. SFMTA has met with CSDG to resolve if a redesign of the final lining is required, awaiting a response from CSDG. Met with TPC and their shotcrete subcontractor Superior regarding response to Letter 556, it became clear that the 556 deals only with vertical walls in the stations. The CTS caverns will be dealt with later. Working on response.

March 2016:

1. SFMTA, Designer, Contractor and Specialty Contractor have all agreed on the configuration for vertical shotcrete of what the test panels will consist of. The panels will replicate the most congested condition which could be found on the jobsite.

Risk Mitigation Status
Risk Reference: 233

Risk	Mitigation Strategy
Acceptance of Shotcrete Substitution - leads to final product being inferior in performance and availability of shotcrete needed for the permanent liner.	1. Meet and discuss with TPC's senior management what the issues are and the status for clarification.

2. The cavern concrete issue has not been decided yet.

April 2016:

1. The four test panels were shot will soon be examine to determine if approval may be given. The panel shot is a god representation of the worse conditions that may be found.
2. CSP suggested that TPC put in writing that they are agreeable to shooting another test panel if a worse condition is presented.

May 2016

1. Vertical shotcrete appears to be working well in cases where the extent of reinforcement is less than #6 rebar and is mostly WWF.
2. Shotcrete for the cavern remains an issue to address with TPC, especially,
    a. How will TPC determine that the primary lining does not encroach into the final lining?
    b. How many layers of rebar and diameter of rebar are part of final lining?
    c. How will TPC determine that the final face of concrete is to the proper contour?
    d. TPC will need to provide a detailed description of the process of application to insure no shadowing, that rebar does not pull away from the exact position within final lining.

June 2016:

1. Shotcrete for the cavern remains an issue to address with TPC, especially,
    a. How will TPC determine that the primary lining does not encroach into the final lining?
    b. How many layers of rebar and diameter of rebar are part of final lining?
    c. How will TPC determine that the final face of concrete is to the proper contour?
    d. TPC will need to provide a detailed description of the process of application to insure no shadowing and that rebar does not pull away from the exact position within final lining.

July 2016:

1. The Committee performed a reassessment of the risk, rating will remain a 9.
2.

August 2016:

1. Review of shotcrete for Final Lining continues with RE (Doug) working with PB and DSG on proper and informed response.

September 2016:

1. RE (Doug) prepared letter to TPC informing them SFMTA has not received any further information on their proposed substitution of Shotcrete in lieu of Cast-In-Place final lining. Doug has 10 major issues that have yet to be addressed by TPC. These include redesign of waterproofing, redesign of rebar, shadowing-inadequate rebar coverage, construction joint water seal, and effect to schedule. Also, this proposed design was used in NYC by Superior Gunite and resulted in leaks through the final lining that have caused slip-and-fall injuries to passengers using the underground station.

Risk Mitigation Status
Risk Reference: 233

Risk	Mitigation Strategy
Acceptance of Shotcrete Substitution - leads to final product being inferior in performance and availability of shotcrete needed for the permanent liner.	1. Meet and discuss with TPC's senior management what the issues are and the status for clarification.

October 2016:

1. TPC sent Letter 2187 on Sept 22, 2016 discussing their plans for final shotcrete lining in lieu of Cast-in-Place (CIP). TPC made PowerPoint presentation on October 4, 2016. TPC has still not submitted thorough design elements that can be reviewed, let alone be approved. TPC continues to refuse to submit Substitution Request for their proposed change to Contract requirements. After 23 months, resolution of this issue has not moved an inch. TPC continues to refuse to submit plans for CIP formwork in case that their proposed "Substitution" is denied. This could have severe consequences to meeting Critical Path Schedule and opening of the Central Subway.
2. This RE (Doug Jacobson) considers the risk level HIGH for this issue, both in meeting schedule and meeting water-tightness of the final Platform Cavern.

November 2016:

1. Final approval of the shotcrete "substitution" issue remains an open item.
2. TPC has not provided any examples of successful projects, design details, designer assessments, owner assessments, or length of service details. SFMTA expectation of the substitution submittal from the Contractor is to demonstrate water-tightness of the final Platform Cavern.
3. All correspondence concerning this issue is sent with the notation that speaks of SFMTA reserving the right to request compensation for the time spent in providing this concession.

December 2016:

1. Final approval of the shotcrete "substitution" issue remains an open item.
2. TPC has not provided any examples of successful projects, design details, designer assessments, owner assessments, or length of service details. SFMTA expectation of the substitution submittal from the Contractor is to demonstrate water-tightness of the final Platform Cavern.
3. All correspondence concerning this issue is sent with the notation that speaks of SFMTA reserving the right to request compensation for the time spent in providing this concession.
4. This Risk will be revised to add a secondary a secondary risk element to be looked at. The availability of shotcrete needed for the permanent liner.
5. A letter was sent out to the Contractor requesting they proceed with the work per the contract, using the CIP method.

January 2017:

1. Final approval of the shotcrete "substitution" issue remains an open item with potentially significant schedule impacts without resolution to shotcrete and submission of 31 74 13 Cast-In-Place Concrete Tunnel Lining.
2. TPC has not provided any examples of successful projects, design details, designer assessments, owner assessments, or length of service details. SFMTA expectation of the substitution submittal from the Contractor is to demonstrate water-tightness of the final Platform Cavern.

Risk Mitigation Status
Risk Reference: 233

Risk	Mitigation Strategy
Acceptance of Shotcrete Substitution - leads to final product being inferior in performance and availability of shotcrete needed for the permanent liner.	1. Meet and discuss with TPC's senior management what the issues are and the status for clarification.

3. All correspondence concerning this issue is sent with the notation that speaks of SFMTA reserving the right to request compensation for the time spent in providing this concession.
4. Current attempt at resolution is through Issue Resolution Ladder (IRL) per Partnering agreement. RE (Doug) to meet with TPC (Brett) as first step.
5. The Committee performed a reassessment of the risk rating, reducing the risk from 9 to 6.

   New Risk Rating 6 (2, 3, 3)
   Probability (2), <> 10-50%
   Cost impact (3), <> $1M - $3M
   Schedule impacts (3), <> 3-6 Months

February 2017:

1. An Executive Partnering meeting between TPC and SFMTA will take place this month to discuss the outstanding issue.

March 2017:

1. An Executive Parting meeting between TPC & SFMTA took place on February 6th, 2017, to discuss the issue.
2. Issue Resolution Ladder (IRL) is currently with TPC's Jack Frost waiting for TPC's Michael Cash to respond. Anecdotal evidence indicates TPC is considering how to do the Cast-In-Place (CIP) formwork. No CIP formwork submittals (31 74 13) yet. No other new information at this time.

April 2017

1. No CIP formwork submittals (31 74 13) or CIP mix design submittals provided yet. At CTS Weekly Progress Meeting, TPC (PJ) says that the TPC Board (or someone above Jack Frost) is yet to approve CIP over Shotcrete.
2. TPC investigating cost of CIP final lining formwork. SFMTA has received NOPC 039 COR 898 Shotcrete vs. CIP at CTS Platform Cavern Final Lining on March 22, 2017 after SFMTA rejected COR 898.
3. The destructive inspection of the North Emergency Egress Tunnel Mockup (located near Ellis and Stockton within the UMS construction site) is expected later in April. The CSDG/SFMTA response to the inspection analysis may affect the outcome on this issue.
4. Due to the direction which was given to the contractor in December to proceed with CIP. The Committee agree that there is no risk associated with shotcrete substitution. This risk will be retired from the register 04/05/17

Risk Mitigation Status
Risk Reference: 234

Risk		Mitigation Strategy
Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence		1. Designers concurrence on variation of options 2. Presented four options to the Contractor for going forward

Initial Assessment: 2, 4, 3 **Risk Owner:** D. Jacobson
Current Assessment: Risk Rating 7 – Construction Risk

Status Log:

January 2015:
1. The Program is awaiting the Contractor's SEM re-submittal. Anticipating their response to SFMTA's letter providing them with 4 options to choose from to perform the work.

February 2015:
1. No new update on this risk.

March 2015:
1. Contractor has yet to submit a response to SFMTA letter providing them with alternatives for the excavation sequences.

April 2015:
1. Contractor has not responded to SFMTA's letter with alternatives
2. The Designer of record will be contracted to review the Contractor's submittal for (scope and delivery) to determine if the proposed is viable.

May 2015:
1. The designer has proposed 4 different sequences for the contractor to evaluate. Contractor is evaluating.
2. DOR was compensated to review the SEM Geometry change and offered suggestions for TPC's evaluation.

June 2015:
1. Contractor has yet to submit.
2. Risk title was reevaluated for accuracy of the risk. The Risk Committee agreed the title should be changed during the June 2015 meeting.

July 2015:
1. Contractor has yet to submit.

Risk Mitigation Status
Risk Reference: 234

Risk		Mitigation Strategy
Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence		1. Designers concurrence on variation of options 2. Presented four options to the Contractor for going forward

August 2015:

1. Contractor has yet to submit.

September 2015:

1. The Contractor has submitted the proposed method. The submittal was forwarded to the designer of record on July 29 and is now being reviewed by CSDG.

October 2015:

1. The submittal was returned revise and resubmit. The designer did not have an issue with the proposed sequences but wanted to see the stamped calculations.

November 2015:

1. The Contractor is performing the work in the approved prescribed sequence. Stamp calculations have yet to be submitted.

December 2015:

1. A contractor is performing the prep work in the approved prescribed sequence. Calculations were not required for the sequence. Calculations were required for slurrywall support between the two side drifts.

January 2016:

1. The Contractor is performing the prep work as prescribed.
2. The risk to the Program is can they perform the work in a quality manner.

February 2016:

1. TPC is performing the work as specified.

April 2016:

1. The Contractor is in the process of installing barrel vault pipes.
2. The SEM designer of record Engineer Franz Langer is now on site to ensure the contract design is being followed.

May 2016:

1. Barrel vault pipes are installed and grouted.
2. SEM support team with additional geologist and one of two QA inspectors are on site. Second QA inspector due within one week.
3. Two horizontal inclinometer are not working as of this morning.
4. Contractor (TPC – FKCI) has begun mining operation. SFMTA sent letter yesterday citing TPC for failure to comply with contract on required functioning instrumentation prior to beginning excavation.

Risk Mitigation Status
Risk Reference: 234

Risk		Mitigation Strategy
Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence		1. Designers concurrence on variation of options 2. Presented four options to the Contractor for going forward

June 2016:

1. Barrel vault pipes and grouting continues to provide support as planned
2. SFMTA's SEM Team (Dr. Sauer Group - DSG) has four men on site, Franz Langer, lead engineer for SEM; Michael Orisario, geologist engineer; Arno and Walter – day/night shift SEM inspectors.
3. All three horizontal inclinometers are now working as necessary from monitoring subsidence immediately above the tunnel excavation.
4. Wang Technologies staff continues to take surface readings above the tunnel excavation twice a week with data reviewed by both SFMTA and TPC teams.
5. Daily readings of Convergence targets (four of six sets of three) are provided as work progresses. Settlement so far for the sidedrifts has remained under 5 mm.

July 2016:

1. The Committee performed a reassessment of the risk, rating will remain a 7.

August 2016:

1. No change from June 2016 assessment.

September 2016:

1. No change to five items listed for June 2016. Frontier-Kemper continues mining on Cross Cut Cavern - Left and Right Side Drift Benches and Inverts. Final section is Center Drift Bench and Invert to complete the ring closure for the CCC. Dr. Sauer & Partners expect up to 10 mm settlement in the street once the ring is closed. Bi-weekly monitoring continues to show stability.

October 2016:

1. Basically, no change to five items for June 2016. F-K completed CCC and NEET on October 6.
2. DSP has four men working on excavation/support phase of CCC through Oct 8. Crew shrinks to three during the next 5-6 week phase of Barrel Vault drilling, installation, grouting, probably completed mid-to-late November based on discussion with DSP (FL).
3. Inclinometers worked through completion of CCC.
4. Wang Tech continues with twice-a-week measurements of surface points with no alerts or triggers yet.
5. Convergence points within the CCC indicated that the beginning and ending points (Stations TM 4.0-6.0, TM 66-68, TM 78) exhibited less than 5 mm movement. Center survey points (Sta. TM 34-36) converged or settled under 10 mm movement, less than expected.
6. Stability for the CCC is quite good. Now next phase begins of backfilling up to Springline and "crunching" temporary inner arches to begin Barrel Vault installation (59 pipes for each of the North Platform and South Platform tunnels.

November 2016:

1. Barrel Vault drilling (60' x 5" diameter) for North and South Platform Caverns is underway, more than 50% completed by Nov 1. About 35% of Barrel Vault pipes are grouted.
2. Dr Sauer & Partners (1 engineer and 2 inspectors) are on site for every day of work.

Risk Mitigation Status
Risk Reference: 234

Risk		Mitigation Strategy
Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence		1. Designers concurrence on variation of options 2. Presented four options to the Contractor for going forward

3. Other instrumentation is now relevant, surface markers, vertical inclinometers, instruments on buildings, and all these items are relevant for close monitoring of the tunnel, surface, and buildings. Contractual issue where TPC does not think that contract requires the SEM Engineer to attend Instrumentation Task Force meetings. SFMTA position is that SEM Engineer is most important Engineer at CTS during excavation under Stockton Street and that SEM Engineer must attend Task Force meeting to stay current with data. Resolution to this issue is pending.
4. Wang Tech continues with twice-a-week measurements of surface points with no alerts or triggers yet.
5. Convergence targets in Cross Cut Cavern have remained stable throughout the last month.
6. Site stability remains good for now. Once Platform Caverns (N and S) begins, then concern for potential movement also increases.

December 2016:

1. Barrel Vaults completed and grouted. Platform Cavern N and S Side Drifts are under excavation at this time for the next many months.
2. Dr Sauer & Partners (1 engineer and 2 inspectors) are on site for every day of work.
3. Other instrumentation is now relevant, surface markers, vertical inclinometers, instruments on buildings, and all these items are relevant for close monitoring of the tunnel, surface, and buildings. TPC is not having the SEM Engineer attend Instrumentation Task Force meetings. This attendance issue by the SEM Engineer is resolved.
4. Wang Tech continues with twice-a-week measurements of surface points with no alerts or triggers yet.
5. Convergence targets in Cross Cut Cavern have remained stable throughout the last month.
6. Site stability remains good for now. Once Platform Caverns (N and S) begins, then concern for potential movement also increases.

January 2017:

1. Platform Cavern N and S Side Drifts are under excavation at this time for the next many months.
2. Dr Sauer & Partners (2 engineers and 2 inspectors) are on site for every day of work.
3. Other instrumentation is now relevant, surface markers, vertical inclinometers, instruments on buildings, and all these items are relevant for close monitoring of the tunnel, surface, and buildings. TPC is ~~not having~~ now allowing the SEM Engineer to attend Instrumentation Task Force meetings. This attendance issue by the SEM Engineer is now resolved.
4. Wang Tech continues with twice-a-week measurements of surface points with no alerts or triggers yet.
5. Convergence targets in Cross Cut Cavern have remained stable throughout the last month.
6. Site stability remains good for now. Platform Caverns (N and S) excavation continues with negligible movement so far (< 3 mm).

February 2017:

1. Using the prescribed methodology no evidence of subsidence has been experienced.

March 2017:

1. Using the prescribed methodology no evidence of subsidence has been experienced.

Risk Mitigation Status
Risk Reference: 234

Risk		Mitigation Strategy
Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence		1. Designers concurrence on variation of options 2. Presented four options to the Contractor for going forward

April 2017

1. Using the prescribed methodology, no subsidence has occurred beyond what was expected. Platform Caverns and Cross Cut Cavern remain stable.
2. Strategic use of compensation grouting is being implemented.

Risk Mitigation Status
Risk Reference: 237

Risk		Mitigation Strategy
Non-Conforming work is not identified by TPC's Quality Control Program		1. Correction Action Plan from Contractor 2. Stand down meeting with Contractor 3. Augmentation of Management Staff 4. Higher Cross Check Standards 5. QA (greater surveillances) 6. Bring on additional personnel within the Smith-Emery organization

Initial Assessment: 3, 2, 2 **Risk Owner:** M. Latch
Current Assessment: Construction Risk Rating 2

Status Log:

May 2015:

1. When Work is found to be non-conforming the Contractor generates a Contractor Non Conformance Report (CNCR). To date, the Contractor has logged 58 CNCRs. The Contractor is required to complete each Block 14 "Proposed Action(s)" of the Contractor's CNCR Form. USE-AS-IS and REPAIR dispositioned CNCRs must be approved by the Resident Engineer (RE) – the approval of the RE includes acceptance of Block 14.
2. The Contractor has been asked to resume the bi-weekly Quality Task Force Meetings (after the 5May2015 C1300 Progress Meeting) which should be the proper forum, or will result in additional meetings to assure that the Work is performed to the Contract Documents and that Work is inspected as required by the approved QCP.
3. Currently the Contractor has provided personnel as required except at CTS where the QCM is also the acting AQCM. TPC QC is in the process of adding personnel, the exact date is to TBD. . In addition, the reinforcing F & I Subcontractor has recently added a Quality Control Engineer (QCE) to assure, and sign-off on the preplacement card, that the rebar has been installed to the latest approved shop drawings or Engineer approved changes to the Design Drawings (the QCE also helps facilitate the generation of RFIs when rebar Design Drawings require clarification).
4. TPC QC has made Smith Emery (SE) Reinforced Concrete Inspectors aware Design Drawing details that have been the subject of CNCRs at YBM roof placements. Additionally, the SE Inspectors have been told to use Design Drawings and approved rebar shop drawings to inspect/accept the installation of reinforcing steel in all concrete placement.
5. TBD
6. TPC QC is now having an additional SE Inspector present to allow for an dedicated inspection of placed rebar prior to each concrete placement.

June 2015:

1. No new information to report.
2. Risk title was reevaluated for accuracy of the risk. The Risk Committee agreed the title should be changed during the June 2015 meeting.

July 2015:

1. Only change is Contractor has now written 72 CNCRs
2. At the 8Jul2015 C1300 Partnering Meeting, the need for this meeting was discussed and is to occur every other week.

Risk Mitigation Status
Risk Reference: 237

Risk		Mitigation Strategy
Non-Conforming work is not identified by TPC's Quality Control Program		1. Correction Action Plan from Contractor 2. Stand down meeting with Contractor 3. Augmentation of Management Staff 4. Higher Cross Check Standards 5. QA (greater surveillances) 6. Bring on additional personnel within the Smith-Emery organization

3. There is now an Assistant CQM for each of the Contract Packages. The organization is somewhat in flux regarding the potential replacement of the current CQM due to health reasons.
4. No change
5. SFMTA QA completed Quality Assurance Audit 025 and Quality Assurance Surveillances 063-066 of TPC's implementation of their Contractor Quality Program (CQP).
6. No change
7. Risk title has been updated once more during the July 2015 meeting, to read "Non-Conforming work is not identified by TPC's Quality Control Program".

August 2015:

1. TPC has assigned a new Quality Control Manager.
2. Assessment of the risk was done and values were assigned.
3. **Recommended risk rating 6 (3 2 2)**
    a. Probability (3), >50%
    b. Cost impact (2), <>$250K - $1M
    c. Schedule impacts (2), <> 1 - 3 Months

September 2015:

1. The corrective action reports (CAR) are being received.
2. The Contractor's Quality Control Plan submittal was resubmitted after SFMTA comments were addressed.
3. Reorganization of TPC Quality Control personnel was done; TPC has hired additional personnel.

October 2015:

1. TPC QC is initiating CNCRs usually within the required 24 hours upon becoming cognizant (which at times is provided by RE Staff) of the non-conforming condition.
2. CNCRs with a Use-As-Is and Repair dispositions are being approved by SFMTA prior to repairs being performed or subsequent work being allowed to proceed.
3. TPC's CNCR Form, once again, and as originally approved, includes the CQM's approval of the disposition, root cause and steps to prevent recurrence.
4. Concrete Placement Cards now include provision for assuring that all open CNCRs are closed prior to concrete placement.
5. REs have generated no NCNs (RE requesting TPC to generate a CNCR) since mid-August.

Risk Mitigation Status
Risk Reference: 237

Risk		Mitigation Strategy
Non-Conforming work is not identified by TPC's Quality Control Program		1. Correction Action Plan from Contractor 2. Stand down meeting with Contractor 3. Augmentation of Management Staff 4. Higher Cross Check Standards 5. QA (greater surveillances) 6. Bring on additional personnel within the Smith-Emery organization

December 2015:

1. Bi weekly quality meeting are ongoing, attended by Chuck Ralston, TPC and Mark. Latch, SFMTA.

January 2016:

1. Bi weekly quality meeting continue to take place.
2. Quality issues related to welding have reached a resolution.
3. Spot surveillance related to quality issues findings require resolution.

February 2016:

1. The Quality Task Force (QTF) Meetings are conducted on a bi-weekly schedule with meeting minutes published usually within the following week. These meetings frequently include, as agenda items or ad-hoc items, discussion and suggested mitigation measures related to SFMTA's identification of potential field issues as observed by SFMTA's QA Inspectors.
2. TPC QC, with some participation by SFMTA QA, have verified that Smith Emery's CWIs have documented their acceptance of all structural steel welds performed at UMS prior to June 2015, to approved shop and design drawings and Welding Code (AWS D1.2) requirements.
3. Follow-up joint surveillance (SFMTA QA/TPC QC) of Project Record Documentation (As-Builts) indicates that repair dispositioned CNCRs are now being reflected on the Documentation

March 2016:

1. Generally, the Contractor's QP is being implemented through a collaborative effort; including RE Staff's timely participation, prior to (Preparatory and Initial Phase Meetings and SFMTA HOLD Points) and during the performance of Work, to ensure that the Contract Document requirements have been met. CNCR's are generated, also at times through the aforementioned collaborative effort, when non-conforming work is inadvertently performed/occur. Through ongoing discussions/interactions with SFMTA and TPC QC, TPC QC does not clandestinely accept Work that will require a CNCR.

April 2016:

1. Nothing new to report.

May 2016:

1. Weekly review of CNCRs at each Work Package Progress Meeting indicates that TPC, in conjunction with the Resident Engineers, is satisfactorily implementing the CNCR process of identifying/documenting non-conforming work; otherwise nothing new to report.

Risk Mitigation Status
Risk Reference: 237

Risk		Mitigation Strategy
Non-Conforming work is not identified by TPC's Quality Control Program		1. Correction Action Plan from Contractor 2. Stand down meeting with Contractor 3. Augmentation of Management Staff 4. Higher Cross Check Standards 5. QA (greater surveillances) 6. Bring on additional personnel within the Smith-Emery organization

July 2016:

1. The QCP is continuing to go well. The Contractor is writing NCR's without it being prompted by SFMTA.
2. The Committee performed a reassessment of the risk, rating will remain a 6.

September 2016:

1. Contractor is writing NCR's appropriately.

January 2017:

1. As previously reported and as would be discussed at each Contract Package Weekly Progress Meeting, the Contractor continues to satisfactorily implement their approved Quality Control Program which includes CNCR protocols (Risk Item 238).
2. The Committee performed a reassessment of the risk rating and concluded the rating as a six remains accurate.

February 2017:

1. There is no change to this risk item.

March 2017:

1. No change to this risk.

April 2017:

1. No change to this risk.
2. The Committee agreed this item could be lowered from a six to a two. (2), on the risk register.

Risk Mitigation Status
Risk Reference: 238

Risk		Mitigation Strategy
Quality Program is ineffective in processing the nonconformance items causing schedule impacts		1. Review CNCR log on a biweekly basis. 2. Greater clarity in the Log on what CNCR's are open

Initial Assessment: 3, 2, 2 **Risk Owner:** M. Latch
Current Assessment: Risk Rating 6 - Construction

Status Log:

July 2015:

1. Discussion required regarding condemning the "Quality Program" VS TPC/TPC QC's inability to; accurately log and or expedite the determination of the disposition of a CNCR, provide timely suggested repair procedures, determine root cause, provide acceptable steps to prevent recurrence, correctly close or accurately update the CNCR Log .
2. TPC QC has begun using the CM13 module for Noncompliance Notices for CNCRs. This should provide for timely submittal of CNCRs and timely/accurate updates of the CNCR Log. More to follow.

August 2015:

1. Assessment of the risk was done and values were assigned.
2. **Recommended risk rating 6 (3 2 2)**
    a. Probability (3), >50%
    b. Cost impact (2), <>$250K - $1M
    c. Schedule impacts (2), <> 1 - 3 Months

September 2015:

1. SFMTA Construction team diligently working to make sure the CNCR log is accurate and nonconformance items are being clearly addressed

October 2015:

1. As mentioned in the 6Oct2015 C1300 Progress Meeting - TPC QC has made significant progress in providing a more complete, accurate and timely CNCR Log.
2. New mitigation item added.

November 2015:

1. TPC QC, with support from TPC's Project Executive, is no longer allowing commercial issues to impede the generation of CNCRs.
    a. Additionally, at the bi-weekly Quality Task Force Meeting it was agreed that TPC's CQM and the CSP PQM will discuss CNCRs that are of a particularly contemptuous or controversial nature and in particular to make sure that each CNCR is timely and accurate and describes non-conforming work; not contractual matters. CNCRs are now identified on the CNCR Log and at each Additional Initial Phase Concrete Pre-Placement Meeting, to preclude work that is the subject of a CNCR from being inadvertently

Risk Mitigation Status
Risk Reference: 238

Risk		Mitigation Strategy
Quality Program is ineffective in processing the nonconformance items causing schedule impacts		1. Review CNCR log on a biweekly basis. 2. Greater clarity in the Log on what CNCR's are open

incorporated in to the work. TPC in general, is providing a timelier but still in need of improvement (including ensuring that sufficient information is provided to the Engineer to allow an efficient review of each CNCR) disposition of CNCRs. TPC QCM is now signing off on each CNCR form, prior to the submittal to the Engineer, attesting to the fact that the CNCR contains a reasonable/plausible root cause, suggested repair, reason for accepting a USE-AS-IS dispositioned CNCR and steps to preclude recurrence.

b. Posting all CNCRs to CM13 eliminates issues associated with the lack of CNCR file naming convention or human error. Through the use of CM13, the Initial issuances and subsequent processing of CNCRs are now timelier and much easier to retrieve for review/approval/informational purposes. Each of the four stages/phases of each CNCR are documented by posting (attaching) a separate file for (1) Initial, (2) Dispositioned, (3) Approved by SFMTA (REPAIR and USE-AS-IS dispositions) and (4) Closed CNCRs, to the associated CNCR number within CM13.

January 2016:

1. The posting of nonconformance items by the Contractor has shown notable improvements as it relates to the four stages/phases within CM13.

February 2016:

1. Timely issuance/updating of TPC's CNCR log and issuance of initial phase CNCRs has significantly improved.

March 2016:

1. Nothing new to report other than the CNCR Log is distributed, and discussed as warranted, at the weekly Contract Package Progress Meetings. And, SFMTA Quality Assurance Audit QAS 026, currently being conducted, includes CNCR Log attributes.)

April 2016:

1. Nothing new to report.

May 2016:

1. As mentioned for Risk 237, weekly review of CNCRs at each Work Package Progress Meeting indicates that TPC, in conjunction with the Resident Engineers, is satisfactorily implementing the CNCR process otherwise nothing new to report.

June 2016:

1. CNCRs continue to be processed by TPC QC as required. One item to note is that the log includes "What is Affected" – this is where each concrete Lift that is impacted/affected by a CNCR is clearly indicated such that concrete is not placed until all non-conforming conditions have been rectified.

Risk Mitigation Status
Risk Reference: 238

Risk		Mitigation Strategy
Quality Program is ineffective in processing the nonconformance items causing schedule impacts		1. Review CNCR log on a biweekly basis. 2. Greater clarity in the Log on what CNCR's are open

July 2016:

1. As reported last month; CNCRs are being logged, generated and processed as required.
2. The Committee performed a reassessment of the risk, rating will remain a 6.

August 2016:

1. No change in status since July 2016.

September 2016:

1. SFMTA and TPC continue to coordinate efforts to mitigate the risk.

October 2016:

1. TPC QC continues to generate "initial" CNCRs upon becoming aware (which often is provided by SFMTA) of a probable non-conformance. CNCRs are then logged and suitably dispositioned, approved by the appropriate entities and closed as appropriate. As has been mentioned previously, weekly progress meetings for each of the Contract Packages includes an agenda item for Quality that always includes a discussion related to CNCRs. Currently, CNCRs are usually being written in a timely manner and are processed as required.

November 2016:

1. Nothing new to add to the October 2016 update for this item.

December 2016:

1. CNCRs continue to be generated, logged and processed as required per TPC's Approved Quality Control Program in conjunction with Specification Section 01 45 00 *Quality Control.* And as such, as was reported last month, there is really nothing new to report.

January 2017:

1. Nothing new to report – suggest that this Risk Item be retired; in particular because this item has become somewhat blended/incorporated into Risk Item 237 which will continue to be reported upon.
2. The Committee addressed the recommendation by SFMTA QA by examining the risk. The decision was made to continue to track this risk on the register separately from 237.

February 2017:

1. Nothing new to report.

March 2017:

1. No change to this risk.

Risk Mitigation Status
Risk Reference: 238

Risk		Mitigation Strategy
Quality Program is ineffective in processing the nonconformance items causing schedule impacts		1. Review CNCR log on a biweekly basis. 2. Greater clarity in the Log on what CNCR's are open

April 2017:

1. No change to this risk.

Risk Mitigation Status
Risk Reference: 240

Risk		Mitigation Strategy
Unresolved Assignment of Schedule Delay Responsibility (may lead to increase cost for the Program)		1. Ask for TIA's 2. As Built Schedule (Program Analysis) 3. Perform a more refined analysis

Initial Assessment: 2, 4, 4 **Risk Owner:** E. Stassevitch
Current Assessment: Risk Rating 8 – Construction Risk

Status Log:

October 2015:

1. Risk was assessed, risk rating was applied and mitigation strategy added.
2. SFMTA requested the Contractor to submit a recover schedule to demonstrate the method to which they intend to capture the time loss. If the Contractor elects not to produce a recovery schedule. The Program should formally document the Contractor is not adhering to the contract.

November 2015:

1. SFMTA is working with Contractor to produce recovery Schedule.
2. SFMTA together with FTA PMOC have planned a schedule workshop for mid Nov. to focus on identifying recovery plans and addressing several issues with the schedule update process.

December 2015:

1. Working with TPC to provide monthly schedule progress updates to minimize impact.

January 2016:

1. Schedule letter in preparation to address issues surrounding schedule updates, need for schedule recovery plan, and other deficiencies related to contract required schedule deliverables.

February 2016:

1. SFMTA is preparing a letter to be sent out on February 5, 2016. The will address various issues:
    a. TPC's claim of TIA's, which have yet to be received by SFMTA.
    b. List of achievable goals where SFMTA can help them with.

April 2016:

1. Partnering with TPC continues. Both parties have agreed to sit down and discuss schedule comments.
2. Limiting the rhetoric, comments are required to come from management in terms of how to address the schedule mitigation.
3. The work is not being by the unresolved schedule comments. The focus now is to improve the contract operation future and to reconcile the past.
4. Two additional resources on the SFMTA's scheduling side have been brought on board help with resolutions.

Risk Mitigation Status
Risk Reference: 240

Risk		Mitigation Strategy
Unresolved Assignment of Schedule Delay Responsibility (may lead to increase cost for the Program)		1. Ask for TIA's 2. As Built Schedule (Program Analysis) 3. Perform a more refined analysis

May 2016:

1. Reconciling of the progress schedule continues.
2. The SFMTA's goal is to have the as built schedule reconciled by the end of May. Source data will be transmitted to TPC to show why schedule dates where changed by SFMTA.

June 2016

1. SFMTA continue to work on As-built schedules reconciliation,
2. Progress schedule reconciliation continues

July 2016:

1. The Committee performed a reassessment of the risk, rating will remain an 8.

August 2016:

1. SFMTA continues to work with TPC to reconcile the progress schedule. Pressing TPC to address issues related to logic and other issues.

September 2016:

1. To mitigate the delays the Contractor will work towards reducing the amount of work, which needs to be completed in the remaining amount of time.
2. The Program have buffer float of about six months.

October 2016:

1. Efforts are ongoing towards completing the as built schedule as well as reconciling the progress schedule.

November 2016:

1. Currently the critical path is being analyzed on month to month basis. Determination of who owns what delay will be sorted out once the as-built schedule is completed.

December 2016:

1. The Program is proceeding with meeting with TPC's scheduler. Negotiating discussions are taking place concerning the Chinatown pole. SFMTA will present an offer. If that offer is rejected then the SFMTA will proceed with a unilateral change. Also, the Program is beginning the process of assigning responsibility for the incurred delays.
2. The Program is also looking a claims which concern non critical path delays.

January 2017:

1. Work towards completion of the as built schedule continues. Once the gaps are filled in, it will allow the Program to accurately assign responsibility for delays.

Risk Mitigation Status
Risk Reference: 240

Risk		Mitigation Strategy
Unresolved Assignment of Schedule Delay Responsibility (may lead to increase cost for the Program)		1. Ask for TIA's 2. As Built Schedule (Program Analysis) 3. Perform a more refined analysis

February 2017:

1. Delay responsibility will be determined once the as built schedule is complete.

March 2017:

1. An adjustment was granted for non-compensable 18-days of schedule delay, under (COR 039).

April 2017:

1. The Project Control team continues to review the inspector’s daily reports, to piece together the as built schedule.

7Risk Mitigation Status
Risk Reference: 247

Risk	Mitigation Strategy
Year 2017/2018 Funding allocation – Not receiving the needed funding	1. Find alternative funding for $246M 2. Highlight the importance in the infrastructure to this project

Initial Assessment: 2, 4, 1 **Risk Owner:** A. Hoe
Current Assessment: Risk Rating 5 - Construction Risk

Status Log:

March 2017:

1. The committee preformed an assessment of this risk to determine its current Risk rating.

Recommended risk rating 5 (2 4 1)

a. Probability (2), <> 10-50%
b. Cost impact (4), <> $3M - $10M
c. Schedule impacts (1), < 1 Month

April 2017:

1. No updates were provided to this newly added risk.

PROJECT RISK REGISTER

Central Subway Project San Francisco

REV : 66

DATE ISSUED: 04/06/17

	Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	Legend
Probability	< 10%	<> 10-50%	> 50%	<> 75% & 90%	>90%	<3 Low
Cost Impact	< $250K	<>$250K - $1M	<> $1M - $3M	<> $3M - $10M	>$10M	3-9 Medium
Schedule Impact	< 1 Month	<> 1 - 3 Months	<> 3-6 Months	<> 6 - 12 Months	> 12 Months	>10 High

RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)
2

SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)

Final Risk ID	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
At Grade In Mixed Traffic												
Underground Tunnel												
115	Jet grouted station end walls are installed by Tunnel contractor. Station Contractor assumes risk of possibly leakage problems due to insufficiently qualify of end walls.	1. In the 1252 contract, have tunnel contractor set aside a pre-determined amount of money in escrow that can be used to repair any leaks encountered by the station contractors after the in the jet grout end walls are excavated. 2. Alternatively, place an allowance in the station contracts for end wall leakage repair.	C	3	1	1	1	50%	3			5/26/15 UMS1295
Track Embedded												
Track: Special												
MOS Station												
36	Damage to buildings or utilities as a result of heave from grouting at UMS	1. Utilize tangent piles combined with surface jet grouting.	C	5	1	1	1	90%	5	10	Mitigation measures implemented in contract documents to reduce risk	4/14/15 UMS1310
37	Damage to adjacent buildings at UMS due to surface construction activities.	1. Require protective barriers. 2. Have an emergency and rapid response customer focused task force to fix damaged facilities. 3. Quickly repair and reimburse resulting costs. 4. Include probable cost in estimate.	C	1	1	1	1		1	2	Mitigation measures implemented in contract documents to reduce risk	9/7/16 UMS1430
CTS Station												
46	Public complaints result in unanticipated restrictions on construction at CTS. (schedule and estimate for underground work assumes 6 day work week and 2 shifts per day)	1. Public outreach. 2. Maintain regular and open communications so Public knows construction plans and progress at all times. 3. Require Contractor to assist Public Outreach efforts, maintain access to businesses and assist with deliveries and pick-ups, control noise and vibration, continuously cleanup site, and provide pedestrian and vehicle traffic and protection plans, informational signage, ADA ramps and minimum sidewalk widths. 4. Require barriers to protect pedestrians and shield them from noise and dirt from construction. 5. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed. 6. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. 7. Quickly process and resolve damage and accident claims from the Public. 8. Include this work in cost & schedule estimates.	C	1	2	1	2	10%	2	3	Implementation of mitigation measures part of Communication/Outreach plan and certain aspects to be included in the contract documents.	10/9/17 CTS1500
48	Incomplete drawdown of groundwater. (inside of box and inside of caverns)	1. Require additional grouting to limit leakage to permissible level. 2. Include probable grouting work in cost & schedule estimates. 3. Include allowance for dewatering within cavern during construction.	C	2	2	1	2	35%	3	6	Mitigation measures have been included in contract documents	5/1/16 CTS1140

PROJECT RISK REGISTER

Central Subway Project San Francisco

REV : 66

DATE ISSUED: 04/06/17

	Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	Legend
Probability	< 10%	<> 10-50%	> 50%	<> 75% & 90%	>90%	<3 Low
Cost Impact	< $250K	<>$250K - $1M	<> $1M - $3M	<> $3M - $10M	>$10M	3-9 Medium
Schedule Impact	< 1 Month	<> 1 - 3 Months	<> 3-6 Months	<> 6 - 12 Months	> 12 Months	>10 High

RISK RATING = PROBABILITY X (COST IMPACT + SCHEDU

2

SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMP

Final Risk ID	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
52	Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)	1. Evaluate effect of potential settlement on utilities. 2. Slip-line sewer by TBM contractor. 3. Reinforce other utilities as needed, monitored during construction, and repair / replace, as needed. 4. Have contingency repair/restoration plan. 5. Utility contact information and procedure will be on plans. 6. Develop an allowance for utility repair. 7. Include probable cost in estimate. 8. Need to identify the new SFPUC contact	C	3	3	1	2	50%	6	12	Project configuration change, lowered station 25 ft. reducing the probability of this risk. Risk rating lowered.	4/22/16 N-CTS9730
General												
Demolition, Clearing , Earthwork												
Site Utilities, Utility relocations												
Hazmat, Contaminated Material												
Environmental Mitigations												
Site Structure incl. sound walls												
Auto/bus/van access ways, roads												
Train Control and Signals												
72	Interface new Signaling and Train Control system to existing at Fourth and King	1. Connect new system in parallel with existing system until the new system has been tested and safety certified for operation.	C	2	2	3	3	35%	5	10	Awaiting approval of contract plans by Muni Operations.	3/4/16 STS1045
PR78	Delays or complication by other SFMTA projects delays CSP: radio, fare collection, C3/TMC	1. Monitor other projects' developments. 2. Develop contingency plans as needed to avoid 1256 delay of revenue service.	C	2	2	2	2	35%	4	8		7/27/12 FDS 1940
Traffic signals & Crossing Protn.												
Fare Collections Systems												
Purchase or lease of Real Estate												
Reloc. of Household or Business												
Vehicles												
Preliminary Engineering												
95	Contractor default during construction impacts schedule. (key sub-contractor)	1. Assist Bonding company in transition and to maintain schedule.	C	2	2	3	3	35%	5	10		11/17/17 STS 1500
99	Breakdown in relationships between SFMTA and Contractors during construction results in increased claims and delays to the overall construction schedule.	1. Executive partnering and alternate dispute resolution. 2. Provide incentives in construction contracts in addition to penalties	C	2	4	1	3	35%	5	10	Mitigation measures being implemented	7/27/12 FDS 1940
100	Procurement of long lead items delays work. (fans, rails and special track work, TPSS, Escalators, elevators, TBM)	1. Include schedule milestones for procurement of and substantial payment for stored long lead items in contract to encourage early procurement. 2. Monitor procurement of critical items.	C	1	2	2	2	10%	2	4	Not considered a project risk.	11/17/17 STS 1500
Insurance, permits etc.												
103	Difficulty in getting required permits	1. Coordinate with permit officials and request permits as early as possible. 2. Obtain assistance obtaining permits from PM/CM & FD Consultants.	C	1	1	1	1	10%	1	2		12/18/12 FDS 1275

	A	H	I	J	K	L	M	N	O	P	Q	R	S
1	**PROJECT RISK REGISTER**					Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	Legend		
2	Central Subway Project San Francisco				Probability	< 10%	<> 10-50%	> 50%	<> 75% & 90%	>90%	<3 Low	RISK RATING = PROBABILITY X (COST IMPACT + SCHEDU	
3	REV : 66				Cost Impact	< $250K	<>$250K - $1M	<> $1M - $3M	<> $3M - $10M	>$10M	3-9 Medium	2	
4	DATE ISSUED: 04/06/17				Schedule Impact	< 1 Month	<> 1 - 3 Months	<> 3-6 Months	<> 6 - 12 Months	> 12 Months	>10 High	SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMP	
5	**Final Risk ID**	**Risk Description**	**Mitigation Description**	**Risk Category**	**Probability %**	**Cost Impact**	**Schedule Impact**	**Calc Impact**	**Calc %**	**Risk Rating**	**Score**	**Status**	**Must Complete by Date**
308	104	CPUC approval at Grade Crossing for G0164d takes longer to negotiate / obtain than schedule allows	1. Obtain Grade Crossing approvals at final CPUC inspection at the completion of construction. 2. Coordinate closely with CPUC until approval is received.	R	2	3	2	3	35%	5	10	CPUC Resolution (TED-253) for extension of our at grade crossing was granted.	7/27/12 FDS 1940
309	105	Electrical service delays startup and testing	1. Submit applications for new service as early as possible. 2. Coordinate closely with PG&E to ensure timely delivery of electrical service.	C	1	2	1	2	10%	2	3	Applications for new service have been submitted to PG&E.	11/17/17 STS 1500
310	106	Risk of Labor dispute delaying the work.	1. Enforce designated gate for employees of the contract in dispute so that the rest of the work is not delayed.	C	2	1	1	1	35%	2	4		11/17/17 STS 1500
312	Unallocated Contingency												
317	111	Major Earthquake stops work	1. Include Force Majeure clause in contracts.	C	1	5	3	4	10%	4	8	Force Majeure clause included in c	12/30/20 MS 0010
318	112	Major safety event halts work	1. Require contractor Safety plan to address this risk. 2. CM inspections to ensure that safety plan and procedures are implemented.	C	1	5	3	4	10%	4	8	Health and Safety provisions included in contracts. CS Program provides full-time Safety Manager.	12/30/20 MS 0010
320													
330	205	Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor	1. CMod Task Force - 5 Areas of Improvement 2. Implement 3. Delegation of Authority	C	4	2	1	2	80%	6	12		
342	217	Delays or complications construction by others – SF Dept. Of Technology, 3rd party utilities	1. Early engagement and coordination for agreements and plan development to avoid construction delays.	C	2	1	1	1	35%	2	4	DTIS MOU has been signed.	
349	224	CTS AWSS/Ductbank Interface - AWSS system is old and requires replacement	1. Look at alternatives to address 2. Turn off system while CSP work is being done, and then turn on later (find a bypass).	C	2	1	1	1	35%	2	4		
352	227	LRV Training - having enough trained operators (surplus)	1. Ramp up trained operators a year ahead of time 2. Ensure testing is finished 3. Completion of work at storage track location (Bryant & King)	C	1	2	1	2	10%	2	3		
353	228	Muni union workers - barn signup (preferred runs)	1. Try to get six months advance notice for annual in addition to barn sign up. 2. Trapeze (software) - enter CSP runs.	C	1	1	4	3	10%	3	5		
354	229	CN1300 System Acceptance Testing	1. Identify duration 2. Identify advance activities (before system testing)	C	3	1	3	2	50%	6	12		
355	230	SFMTA Commissioning Coordination (inaccurate time for coordination or participation from Muni Ops)	1. Fully develop rail activities 2. Identify SFMTA liaisons to perform activities 3. Have SFMTA OPS review startup and testing Plan	C	3	1	3	2	50%	6	12		
357	232	Behind Schedule - Unable to Recover from Delay to 1300 Contract	1. Contractor implemented Schedule Recovery 2. Acceleration 3.	C	5	4	4	4	90%	20	40		

PROJECT RISK REGISTER

Central Subway Project San Francisco

REV : 66

DATE ISSUED: 04/06/17

	Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	Legend
Probability	< 10%	<> 10-50%	> 50%	<> 75% & 90%	>90%	<3 Low
Cost Impact	< $250K	<>$250K - $1M	<> $1M - $3M	<> $3M - $10M	>$10M	3-9 Medium
Schedule Impact	< 1 Month	<> 1 - 3 Months	<> 3-6 Months	<> 6 - 12 Months	> 12 Months	>10 High

RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)
2

SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)

Final Risk ID	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
234	Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence	1. Designers concurrence on variation of options 2. Presented four options to the Contractor for going forward	C	2	4	3	4	35%	7	14		
237	Non-Conforming work is not identified by TPC's Quality Control Program	1. Correction Action Plan from Contractor 2. Stand down Meeting with Contractor 3. Augmentation of Management Staff 4. Higher Cross Standards 5. QA (greater surveillances) 6. Bring on additional personnel within the Smith-Emery organization	C	1	2	2	2	10%	2	4		
238	Quality Program is ineffective in processing the nonconformance items causing schedule impacts	1. Review the CNCR log on a biweekly basis at the joint TPC /SFMTA meeting. 2. Greater Clarity in the Log on what CNCR's are open	C	3	2	2	2	50%	6	12		
240	Unresolved Assignment of Schedule Delay Responsibility (may lead to increase cost)	1. Ask the Contractor for TIA's 2. As built schedule (Program analysis) 3. Perform a more refined analysis	C	2	4	4	4	35%	8	16		
243	Contractor becomes complacent in third party insurance claims - could increase cost to the project		C	2	2	1	2	35%	3	6		
244	254 Fourth Street (Olivet Bldg.) potential coordination issues	1. Maintain contact with the Developer 2. Facilitate completion of TPC work overlapping with developer access	C	2	1	1	1	35%	2	4		
246	Design changes not being captured in as-builts	1.Ensure Contractor is including all PCC design change details onto the as-builts dwgs	C	2	1	1	1	35%	2	4		
247	Year 2017/2018 Funding allocation – Not receiving the needed funding	1. Find alternative funding for $246M 2. Highlight the importance in the infrastructure to this project	C	2	4	1	3	35%	5	10		