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Memorandum

CS Memorandum No. 2209

To: Distribution

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

Date: September 13, 2017

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

Subject: Risk Mitigation Report No. 97, Rev. 0

Attached please find Risk Mitigation Report No. 97 for meeting held on August 2, 2017.

Risk Mitigation Report No. 97, Rev 0 with attachments

Cc: Jeffrey Davis, FTA jeffrey.s.davis@dot.gov
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Mark Latch, CSP
Jane Wang, SFMTA
Sanford Pong, SFMTA
CS File No. M544.1.5.0820

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Albert Hoe, SFMTA
Eric Stassevitch, CSP
Mark Latch, CSP
Beverly Ward, CSP

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DATE: September 08, 2017

MEETING DATE: **Wednesday, August 02, 2017**

LOCATION: 530 Bush Street, 4th Floor

TIME: 2:00pm

ATTENDEES: John Funghi Albert Hoe, Eric Stassevitch, Mark Latch, Beverly Ward, Bill Byrne

COPIES TO: Attendees: Jane Wang, Luis Zurinaga, Sanford Pong, Jeffrey Davis

REFERENCE File: M544.1.5.0820
Program/Construction Management

SUBJECT: **Risk Management – Risk Mitigation Meeting**
Risk Mitigation Report No. 97

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:** The Program is continuing to monitor the waterline. Actively working with the designer of record to see what can be done, specifically related to the waterline. With the installation of the two gate valves to control the water if there is a break, the water can be shutoff. **Risk Rating 6** **Risk 205:** Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor Discussion: The CMod process has yet to present a problem. The ongoing issue to contend with - is the PCC/COR status log (F) items. Additional efforts need to be made in determining merit or generating a letter in response to the TPC's COR's. In addition the lack of COR cost associated with the declared impact being submitted by the Contractor is adding to the delay in determining merit. **Risk Rating 6** **Risk 229:** CN1300 Systems Acceptance Testing **Discussion**: A modification of the schedule for startup and testing has been done. A conversation with SFMTA MUNI Operations needs to take place. **Risk Rating 6** **Risk 230:** SFMTA Commissioning Coordination - inaccurate time for coordination or participation from SF Muni Operations **Discussion**: If CSP's schedule is in conflict with the MUNI barn sign. A	

	captive fleet (dedicated fleet) may need to be ran, to carry out operations for the CSP line. **Risk Rating 6** **Risk 234**: Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence **Discussion**: No update to this risk. **Risk Rating 7** **Risk 238**: Quality Program is ineffective in processing the nonconformance items causing schedule impacts **Discussion**: Currently there are no significant issues to report. This risk will continue to be monitored. **Risk Rating 6** **Risk 240:** Unresolved Assignment of Schedule Delay Responsibility (may lead to increase cost for the Program) **Discussion:** The next DRB meeting is scheduled to take place on August 22nd and 23rd, 2017. The Project's Partnering meeting will be held on Thursday, August 17th. **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**: During last month's meeting, the Committee proposed this risk item as a candidate for retirement from the register is an update for today's meeting; the recommendation is to continue to track it on the risk register until the permanent bracing is installed removing the temporary level 3 strut. **Risk Rating 5** **Risk 103:** Difficulty in getting required permits. **Discussion**: The last required permit package was submitted to Caltrans and has been reviewed. Currently questioned submitted by Caltrans has on the material submitted requires a response from CSP. **Risk Rating 2** **Risk: 115:** Jet grouted station end walls are installed by tunnel Contractor. Station Contractor assumes risk of possibly leakage problems due to insufficiently quality of end walls. **Discussion**: Although work in the area has been fully completed, any issues with leakage will not be known, until the dewatering system has been turned off. This risk will remain on the register and continue to be monitored. **Risk Rating 3** **Risk 100:** Procurement of long lead items delays work. (fans, rails and special track work, TPSS, Escalators, elevators, TBM) **Discussion**: An update to this risk by the CM states there are still escalators and elevators, which need to be procured. **Risk Rating 2** **Risk 232:** Behind Schedule - Inability to recover or arrest the further schedule deterioration from the 1300 Contract **Discussion**: Farther dissecting of this risk required additional risks associated with the Program's current schedule delays, to be added to the register. This general risk will no longer be tracked and will be **retired from the risk register**. See the following new schedule risk items under the category of	

	New Risk. **Risk Rating 0**	
3-	**New Risk: - Introduction**	
	The following new risk were introduced to the Committee and will be further vetted during next month's meeting. **Risk 248**: Production Rate – existing sequence at CTS (actual vs expected effort not achieved) **Discussion**: **Risk Rating TBD** **Risk 249:** Sequence of Construction (linear work) **Discussion**: **Risk Rating TBD** **Risk 250:** Identify activities of undefined scope **Discussion**: **Risk Rating TBD** **Risk 251:** Physical activities missing (not defined) in the schedule **Discussion**: Mitigation Description: 1. Confirm scope of work in the schedule **Risk Rating TBD** **Risk 252:** Inappropriate time duration defined in the schedule or not enough time to available to add activities **Discussion**: **Risk Rating TBD** **Risk 253:** Do not have adequate resources defined to do the work **Discussion**: **Risk Rating TBD**	
4-	**Other Business:**	
	Next Risk meeting will be held on September 14th, the second Thursday of the 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	09/14/17	Open

Meeting adjourned at 3:05pm

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:** 9/12/17 [Date completed].

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Meeting Agenda

Project No. M544.1, Contract No. CS-149
Program/Construction Management
Risk Mitigation Management Meeting No. 97
August 02, 2017
2:00pm – 3:00pm
Central Subway Project Office
530 Bush Street, 4th Floor

Attendees:

William Byrne		Mark Latch		Luis Zurinaga	
John Funghi		Eric Stassevitch			
Albert Hoe		Beverly Ward			

1. **Report on Risks (Rated 6 and above):**
   - **Construction Risks** (52, 205, 229, 230, 234, 238)

2. **Risks Recommended for Retirement:**
   - (**36**, **103**, **115**,**100**)

3. **Introduction of New Risk Items:**
   - 248 – Production Rate (can we make the production rate at CTS)
   - 249 - Sequence of construction methodology causing inherited delay due to linear work

4. **Schedule Risks:**
   - (240, 232) & Introduction of other Risk to the MPS

Note: **Bolded** numerals indicate that risk is recommended to be retired.

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Meeting Attendance Sheet

Project No. M544.1, Contract No. CS-149
Program/Construction Management
Risk Management Meeting No. 97
August 02, 2017
2:00 p.m. – 3:00 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	
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	
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:** A. Clifford
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.

July 2017:

1. No recent leakage has been identified. Work in the area is not fully completed.
2. Recommend retiring once the work reaches the invert.

August 2017:

1. This risk will continue to be tracked on the risk register, until the permanent bracing is installed; removing the temporary level 3 strut.

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.

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

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.

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.

May 2017:

1. Six locking gate valves were installed to control water in and around the various CTS locations.
2. Currently the waterline above is not operational. SFWD would like to activate a portion of the waterline which isn't above the box, but connected to them. Activation of this waterline would result in water above the box.

June 2017

1. A meeting with the Designer will take place to mitigate some of the utilities, specifically the water and sewer lines.
2. Recent measurements have shown the utilities have been lowered. Requiring pumping in of grout.
3. Damaged utilities have not been encountered, if at some point that is a realization it may require the City to replacement them.

July 2017:

1. Monitoring reports indicate some settlement at the waterline.
2. Two gate valves to control the water were installed, so if there is a break it can be turned off.

August 2017:

1. Monitoring of the waterline is ongoing. The CM is actively working with the DOR to see what can be done, specifically related to the waterline.

Risk Mitigation Status
Risk Reference: 103

Risk	Mitigation Strategy
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.

Initial Assessment: 1, 1.5, 2 **Risk Owner:** A. Clifford
Current Assessment: Risk Rating 2 – Construction Risk

Status Log:

December 2012:
1. Monthly meetings are being held between the 3rd Party team and design oversight managers to discuss the permitting requirements of each contract and provide a status of procurement of the required permits.
2. A Permit matrix has been developed to track the progress of the permits being sought for the program.

April 2013:
1. Permit applications are being submitted as early as possible
2. Central Subway are working with DBI to close out remaining issues for issuance of DBI Building permit prior to NTP
3. Central subway are working with DPW to obtain an 'overall excavation permit' for each work area (CTS, UMS, YBM, STS) to reduce the risk of delay to the 1300 contractor obtaining excavation permits.

October 2013:
1. Building and demolition permits have been issued
2. Outstanding permits and needed dates are being tracked weekly
3. No change to the status of this risk

June 2014:
1. General Excavation Permits were obtained for the 1300 Contract and have been issued to Tutor Perini.
2. Other remaining permits are being tracked weekly.
3. No change to the status of this risk.

November 2015:
1. There are still outstanding permits to be acquired, including Caltrans permits.

December 2015:
1. Caltrans Permit is still outstanding for items to be permanently installed for the 1256 'STS' scope of work.
    a. The project team is compiling the required documents and completing the new application.
2. The STS RE is procuring an interim encroachment permit to enable work in the field to continue.

Risk Mitigation Status
Risk Reference: 103

Risk	Mitigation Strategy
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.

January 2016:

1. Post meeting update: The RE for STS confirmed Caltrans interim encroachment permit for STS to perform work in the Caltrans yard, installing various items has yet to be acquired.

February 2016:

1. The STS RE has procured an interim encroachment permit to enable the work to continue.
2. Staff is preparing the new permanent encroachment permit application for submittal to Caltrans.

July 2016:

1. One Caltrans permit is still pending for STS.
2. The Committee performed a reassessment of the risk, rating will remain a 2.

October 2016:

1. SFMTA is working with Sustainable Streets on installation of traffic signal boxes in Caltrans right away.

November 2016:

1. The CM team continues to work with Sustainable streets to address Caltrans concerns. As requested by Caltrans drawings will be forwarded to ensure there is no violation of their requirements at the intersection of Bryant and 4th Streets.

December 2016:

1. Work is being done and not being delayed, although permit is still pending.

July 2017:

1. Project team resubmitted the Caltrans Permit Application to Caltrans in June 2017. Caltrans have provided preliminary feedback to the Project Team. A meeting has been arranged with Caltrans for 7/25/17 to review/discuss the comments, and responses to close out as many as possible. The permit is not delaying the work.

August 2017:

1. Preliminary questions received by Caltrans need to be responded to.

Risk Mitigation Status
Risk Reference: 115

Risk	Mitigation Strategy
Jet grouted station end walls are installed by tunnel Contractor. Station Contractor assumes risk of possibly leakage problems due to insufficiently quality 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 and allowance in the station contracts for end wall leakage repair. 3. Include "Clawback" provision in tunnel contract to allow station contractor to transfer costs of repair to headwall to the tunnel contractor. 4. Require tunnel contractor to be present to witness station excavation of headwalls.

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

Status Log:

September 2011:

1. Project configuration changes include headwall designs with multiple levels of redundancy.
2. Warranty "clawback" provisions added to tunnel contact language.

December 2012:

1. Risk owner changed from J. Caulfield/J. Wang to S. Wilson
2. Mitigations 1, 2 and 3 have not been implemented.
3. The 1252 contract includes a Warranty Bond of 10% of the contract value for 2 years following final acceptance. Should funds need to be obtained to remediate leakage problems, Central Subway will source these from the bond holder.
4. The forecast completion date for the portal structure is April 2015, current estimate schedule for station excavation (latest of 3 stations) is November 2015. Therefore the excavation of the station caverns and exposure of the end walls will fall within the warranty period of the 1252 contract.

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 3.

December 2015:

1. Excavation of the station boxes at YBM and UMS has commenced and is still expected to be complete within the 1252 Warranty Bond time period. See Item 3 of the December 2012 update.

Risk Mitigation Status
Risk Reference: 115

Risk	Mitigation Strategy
Jet grouted station end walls are installed by tunnel Contractor. Station Contractor assumes risk of possibly leakage problems due to insufficiently quality 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 and allowance in the station contracts for end wall leakage repair. 3. Include "Clawback" provision in tunnel contract to allow station contractor to transfer costs of repair to headwall to the tunnel contractor. 4. Require tunnel contractor to be present to witness station excavation of headwalls.

April 2016:

1. N. Headwalls at UMS showed a little water. If this is an issue TPC is responsible for addressing it.
2. CN1252 includes a warrant bond, if need these will be used to remediate leakage problems.

July 2016:

1. The Contractor has yet to reach the bottom.
2. The Committee performed a reassessment of the risk, rating will remain a 3.

May 2017:

1. No update to this risk.

July 2017:

1. YBM headwalls – YBM Invert slab has been placed.
    - 3/22/16 - TPC Letter 1544 - YBM COR#585 'Water Seeps in North Headwall' was received.
    - 5/10/16 - SFMTA Letter 1396 Denied Merit citing CN 1300 Specification Section 31 66 16.46, 3.02, 8.a 'seal … and other sources of leakage'.
    - 5/16/16 - TPC letter 1797 advised that 'Fortunately, this specific instance of leakage did not require any extra work. However, be advised that TPC will pursue compensation for any future leaks requiring repairs as the excavation proceeds'
    - No further COR's related to YBM headwall leakage/seepage have been received.
2. UMS headwalls – UMS Invert slab is scheduled to be placed by the end of July.
    - No COR's have been received claiming leakage/seepage of the UMS headwalls.
    - No leakage has been observed at the UMS headwalls.

August 2017:

1. Until the dewatering system is shutoff leakage if any, will not be known.

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.

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

April 2016:

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.

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

January 2017:

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.

May 2017:

1. The Program processed contract modifications; totaling a million dollars which included several COR's.
2. Additional staff has been brought on to assist with the preparation of CMod's.

June 2017:

1. Processing of CMods does not pose any issues. The continue issue is more of having an adequate amount of time to investigate the F items requiring merit determination and response.

July 2017:

1. Newly hired CSP staff members, are assigned the task of processing the CMods.

August 2017:

1. The ongoing issue center arounds the need to address the PCC/COR status log (F) items.
2. Additional efforts need to be made in determining merit or generating a letter in response to the TPC's COR's.
3. In addition the lack of COR cost associated with the Contractor's impact is adding to the delay in determining merit.

Risk Mitigation Status
Risk Reference: 229

Risk		Mitigation Strategy
CN1300 System Acceptance Testing		1. Identify duration 2. Identify advance activities that can be done prior to and concurrent to revenue service

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 that can be done prior to and concurrent to revenue service

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 activities prior to pre revenue service.
2. Mitigation strategy has been updated allowing for a clearer understanding of the task description.

May 2017:

1. Once the Rail Activation manager comes onboard the Program will be better equip to identifying more pre revenue task, services and commitments while coordinating with Operations.

June 2017:

1. System startup and testing activities have been refined and been incorporated into the Programs scheduled.
2. A draft of this schedule has been submitted to the FTA for review. Senior management anticipates that these new activities to be part of the overall schedule discussion during Central Subway's Program Schedule Workshop.

July 207:

1. CSP has reached out to SFMTA Operations regarding coordination activities for systems acceptance, to occur as part of the start and testing phase as a linear activity. A follow up conversation between the two parties has yet to take place.

August 2017:

1. A modification of the schedule for startup and testing has been done to the Program schedule, requiring a meeting to take place with SFMTA MUNI Operations to discussion coordination needs to take place.

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.

June 2017:

1. CSP has begun engagement with SFMTA Muni Operations inquiring with them, what are some of the key elements they required to take place in advance. CSP is working on establishing a formalize method of receipt and dissemination of information.

July 2017:

1. SFMTA Muni Operations is considering adjusting the muni barn sign up dates to accommodate CSP schedule. If this is done the cost would be incurred by CSP.

August 2017:

1. If there is a conflict with CSP's commissioning schedule and MUNI's barn sign. A captive fleet (dedicated fleet) may need to be ran, to carry out operations for the CSP line.

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
Current Assessment: Risk Rating 0 – Construction Risk

Risk Owner: E. Stassevitch

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.

May 2017:

1. The Program will conduct TPC and SFMTA is scheduled to take place today, May 4th to discuss responsibility of schedule delays to the Project.
2. Tentatively there is a recovery workshop schedule for July 18 – 19, 2017, between SFMTA/PMOC, and the Program's funding partner.

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

June 2017:

1. The Central Subway's Program Schedule Workshop will take place on July 26 and 27, 2017.
2. A draft of the Program schedule incorporating the new start up testing activities will be submitted two weeks prior to the meeting date.

July 2017:

1. CSP Program Schedule Workshop has been confirmed, July 26th and 27th, 2017. After which the Program will establish a new revenue service date for the Central Subway Project.

August 2017:

1. Following the addition of several other risk being added to the register, to farther explore the delays to the schedule. This risk will no longer be tracked.
2. By unanimous consent of the Risk Assessment Committee this risk will be closed and, retired from the register effective 08/02/17.

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.

May 2017:

1. SEM of the center drift started on Tuesday, 05/02/17 resulting in a 1/8th of an inch subsidence requiring abatement. Additional abatement may be required when work recommences on Friday around the Mandarin Tower.

June 2017:

1. Subsidence issues have been experienced at the Mandarin Tower location for the second time. Grout stabilization methods have been introduced.

July 2017:

1. Subsidence issues have been experienced at the Mandarin Tower location this month. Abatement protocols were implemented, the Contractor was able to arrest the induced subsidence.

August 2017:

1. No new update from last month's status report.

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.

May 2017:

1. No change to this risk.

June 2017:

1. No change to this risk.

July 2017:

1. No change to this risk.

August 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.

May 2017:

1. In CSP generated analysis of the schedule, CSP has conceded to 18 days of the delay, with the possibility of giving into a few more days.
2. If there is no assigned resolution during the senior partnering meeting today, May 4th, the next step will to take this issue before the DRB presenting a narrative of the schedule facts.

June 2017:

1. Senior Management Partnering meetings between CSP and TPC are taking place to try and resolved some of the schedule delays.

July 2017:

1. The most recent DRB meeting scheduled required a cancellation, due to the absence of one of the three DRB members.
2. In an attempt to resolve some of the outstanding delay responsibility issues, CSP has stated that out of the 180 days initially requested by TPC, CSP is willing to compromise, offering 35 days of compensable delay.

August 2017:

1. The Project next DRB meeting is set for August 22nd and 23rd.
2. The Senior Management Partnering meetings between CSP and TPC will be held on 08/17/17.

Risk Mitigation Status
Risk Reference: 248

Risk		Mitigation Strategy
Production Rate – existing sequence at CTS (actual vs expected effort not achieved)		1. 2.

Initial Assessment: X, X, X
Current Assessment: Risk Rating X – Construction Risk

Risk Owner: E. Stassevitch

Status Log:

August 2017:
1.

Risk Mitigation Status
Risk Reference: 249

Risk		Mitigation Strategy
Sequence of Construction (linear work)		1. 2.

Initial Assessment: X, X, X
Current Assessment: Risk Rating X – Construction Risk

Risk Owner: E. Stassevitch

Status Log:

August 2017:
1.

Risk Mitigation Status
Risk Reference: 250

Risk		Mitigation Strategy
Identify activities of undefined scope		1. 2.

Initial Assessment: X, X, X
Current Assessment: Risk Rating X – Construction Risk

Risk Owner: E. Stassevitch

Status Log:

August 2017:

1.

Risk Mitigation Status
Risk Reference: 251

Risk		Mitigation Strategy
Physical activities missing (not defined) in the schedule		1. Confirm scope of work in the schedule. 2.

Initial Assessment: X, X, X
Current Assessment: Risk Rating X – Construction Risk

Risk Owner: E. Stassevitch

Status Log:

August 2017:

1.

Risk Mitigation Status
Risk Reference: 252

Risk		Mitigation Strategy
Inappropriate time duration defined in the schedule or not enough time to available to add activities		1. 2.

Initial Assessment: X, X, X
Current Assessment: Risk Rating X – Construction Risk

Risk Owner: E. Stassevitch

Status Log:

August 2017:

1.

Risk Mitigation Status
Risk Reference: 253

Risk		**Mitigation Strategy**
Do not have adequate resources defined to do the work		1. 2.

Initial Assessment: X, X, X
Current Assessment: Risk Rating X – Construction Risk

Risk Owner: E. Stassevitch

Status Log:

August 2017:
1.

PROJECT RISK REGISTER

Central Subway Project San Francisco

REV : 70

DATE ISSUED: 08/02/17

	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	Contract I.D	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	TUN	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 and allowance in the station contracts for end wall leakage repair. 3. Include “Clawback” provision in tunnel contract to allow station contractor to transfer costs of repair to headwall to the tunnel contractor. 4. Require tunnel contractor to be present to witness station excavation of headwalls.	C	3	1	1	1	50%	3			5/26/15 UMS1295
Track Embedded													
Track: Spec Track: Special													
MOS Station													
36	UMS	Damage to buildings or utilities as a result of heave from grouting at UMS	Tangent piles combined with surface jet grouting will be utilized.	C	5	1	1	1	90%	5	10	Mitigation measures implemented in contract documents to reduce risk	4/14/15 UMS1310
37	UMS	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	CTS	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 maintain regular and open communications so Public knows construction plans and progress at all times. 2. 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. 3. Require barriers to protect pedestrians and shield them from noise and dirt from construction. 4. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed. 5. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. 6. Quickly process and resolve damage and accident claims from the Public. 7. Assumed 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

PROJECT RISK REGISTER

Central Subway Project San Francisco

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	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	Contract I.D	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
48	CTS	Incomplete drawdown of groundwater. (inside of box and inside of caverns)	1. Require additional grouting to limit leakage to permissible level. 2. Include dewatering bid item in contract. 3. Include probable grouting and dewatering work in cost & schedule estimates.	C	2	2	1	2	35%	3	6	Mitigation measures have been included in contract documents	5/1/16 CTS1140
52	CTS	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.	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	STS	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	STS	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	STA	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	STA	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. Train staff in adherence to issue resolution process	C	2	4	1	3	35%	5	10	Mitigation measures being implemented	7/27/12 FDS 1940
100	STA	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.													

PROJECT RISK REGISTER

Central Subway Project San Francisco

REV : 70

DATE ISSUED: 08/02/17

	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	Contract I.D	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
103	GEN	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
104	STS	CPUC approval at Grade Crossing for G0164d takes longer to negotiate / obtain than schedule allows	1. Grade Crossing approvals are not received until final CPUC inspection at the completion of construction. 2. Close coordination with CPUC will continue until approval is received. 3. Signal standardization issue will elevated to the appropriate SFMTA Division.	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
105	GEN	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
106	STA	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. In case of a Labor dispute, it is standard practice for the contractor to 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
Unallocated Contingency													
111	GEN	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
112	GEN	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
205	STA	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	C	4	2	1	2	80%	6	12		
217	STS	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.	
224	CTS	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		
227	GEN	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		
228	GEN	Muni union workers - barn signup (preferred runs)	1. Barn sign up - Issue the runs in the trapeze system to provide the runs for the operators to sign up 6 months in advance.	C	1	1	4	3	10%	3	5		

PROJECT RISK REGISTER

Central Subway Project San Francisco

REV : 70

DATE ISSUED: 08/02/17

	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	Contract I.D	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date
229	STA	CN1300 System Acceptance Testing	1. Identify duration 2. Identify advance activities that can be done prior to and concurrent to revenue service	C	3	1	3	2	50%	6	12		
230	STA	SFMTA Commissioning Coordination (inaccurate time for coordination or participation from Muni Ops)	1. Signage – Notifying the public 2. Create a commissioning team 3. Getting Operation's test requirement in hand	C	3	1	3	2	50%	6	12		
234	CTS	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	STA	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	STA	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	C	3	2	2	2	50%	6	12		
240	STA	Unresolved Assignment of Schedule Delay Responsibility (may lead to increase cost for the Program)	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	GEN	Contractor becomes complacent in third party insurance claims - could increase cost to the project		C	2	2	1	2	35%	3	6		
244	YBM	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	STA	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	GEN	Year 2017/2018 Funding allocation – Not receiving the needed funding	1. Find alternative funding for $246M	C	2	4	1	3	35%	5	10		
248	STA	Production Rate – existing sequence at CTS (actual vs expected effort not achieved)	1.	C									
249	STA	Sequence of Construction (linear work)	1.	C									
250	STA	Identify activities of undefined scope	1.	C									
251	STA	Physical activities missing (not defined) in the schedule	1. Confirm scope of work in the schedule. 2.	C									
252	STA	Inappropriate time duration defined in the schedule or not enough time to available to add activities	1.	C									
253	STA	Do not have adequate resources defined to do the work	1.	C									