central T subway

Connecting people. Connecting communities.

# Risk Mitigation Meeting Minutes #89

| | |
|---|---|
| DATE: | January 04, 2017 |
| MEETING DATE: | **December 08, 2016** |
| LOCATION: | 530 Bush Street, 4th Floor – Small Conference Room |
| TIME: | 2:00pm |
| ATTENDEES: | Luis Zurinaga, John Funghi, Albert Hoe, Bill Byrne |
| COPIES TO: | Attendees: Eric Stassevitch, Jane Wang, Jeffrey Davis, Mark Latch, Sanford Pong, Beverly Ward |
| REFERENCE | File: M544.1.5.0820<br>Program/Construction Management |
| SUBJECT: | **Risk Management – Risk Mitigation Meeting**<br>**Risk Mitigation Report No. 89** |

**RECORD OF MEETING**

| ITEM # | | ACTION BY DUE DATE |
|---|---|---|
| **1 –** | **Report (Risk rated rating ≥ 6)** | |
| | **Risk 46:** Public complaints result in unanticipated restrictions on construction at CTS. (schedule and estimate for underground work assumes 6 day work week and 2 shifts per day)<br>Discussion: CSP relationship with the Chinatown community has improved due to action taken to lower the fan motors of the exhaust system so they make less noise at the headhouse. Monthly meetings with the residents off Washington Street assisted living facility continue to take place. Work currently being done in the area will restrict the north egress shaft. Tightening he construction zone, making it smaller in observance of Chinese New Year being the second week in January.<br><br>**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)<br>Discussion: The construction site is not seeing any settlement of the utilities. The chief concern is the water system above the cavern; if a waterline breaks, it could potentially promote some settlement causing water to leak into the cavern. CMB has approved a contract change, authorizing work to have gate valves installed. Allowing the Contractor to be able to shut it off and isolate it above the station. **Risk Rating 6** | |

| ITEM # | | ACTION BY DUE DATE |
|---|---|---|
| | **Risk 205:** Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor<br>Discussion: Two additional CMod's were processed this month. During the Partnering meeting, the issue of CMod's was not raised by either party. Demonstrating the process is now moving well without concern. **Risk Rating 6**<br><br>**Risk 229:** CN1300 Systems Acceptance Testing<br>Discussion: The startup and testing schedule has been incorporated into the program schedule. What remains to be done is analyzing the various different schedule dates allowing more detail to be added to the schedule. **Risk Rating 6**<br><br>**Risk 230:** SFMTA Commissioning Coordination<br>Discussion: The Rail Activation Plan (RAP) is in development. There is a commitment to get a draft version issued as part of the issuance of the annual PMP in April 2017. **Risk Rating 6**<br><br>**Risk 232**: Behind Schedule - Unable to Recover from Delay to 1300 Contract<br>Discussion: The Project's control team continues to work towards completion of an as built schedule (narrative) analysis. The goal for completion has been pushed back to the week of January 9th, 2017. **Risk Rating 12**<br><br>**Risk 233:** Acceptance of Shotcrete Substitution - leads to final product being inferior in performance<br>Discussion: SFMTA has written TPC a letter stating they are delaying the job. Requesting TPC to proceed with the cast in place (CIP) method or submit a shotcrete substitution request, providing a written description, and justification for the variation. The Program is also concerned that there could be a secondary risk element which may need to be evaluated, if the use of shotcrete is granted. What is the availability and quantity of shotcrete anticipated for the permanent liner. **Risk Rating 9**<br><br>**Risk 234:** Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence<br>Discussion: There has been no indication that the methodology being performed is showing any movement. This risk will remain on open. **Risk Rating 7**<br><br>**Risk 238**: Quality Program is ineffective in processing the nonconformance items causing schedule impacts<br>Discussion: There are no issues to report. The quality program continues to progress well. **Risk Rating 6**<br><br>**Risk 240:** Unresolved Assignment of Schedule Delay Responsibility (may lead to increase cost for the Program)<br>Discussion: The Program scheduler is with meeting with TPC's scheduler. Negotiating with them on the Chinatown PG&E Power Pole claim. The Program will be drafting an offer for presentation to resolve this issue. If the offer is rejected the Program will proceed with a unilateral change. After which the process will begin in assessing the responsibility of the schedule delay. In addition, the Program is looking at non-critical path TIA items, which may be | |

| ITEM # | | ACTION BY DUE DATE |
|---|---|---|
| | rejected based on information, which was provided. **Risk Rating 8**<br><br>**Risk 243:** Contractor becomes complacent in third party insurance claims - could increase cost to the project<br>Discussion: These third party insurance claims are assigned to TPC's carrier and do not involved the Project. However, the Program has received notices concerning a suit or request for deposition related to TPC second and third tier subs. **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<br>Discussion: The coring of the jet grout is complete. There is still the possibility of risk if compensation grouting is required at any buildings. This risk will remain open. **Risk Rating 5**<br><br>**Risk 103:** Difficulty in getting required permits<br>Discussion: Captain permit is still pending. As a result, work continues and is not being delayed. **Risk Rating 2**<br><br>**Risk 214:** Micro Piles at UMS interfere with Tube-a-manchette installation (60' deep micropiles)<br>Discussion: All of the tube-a-manchettes were installed. **This risk will be retired from the register**. **Risk Rating 0**. | |
| | **New Risk** | |
| 3- | No new risk were added to the Risk Register this month. | |

**ACTION ITEMS –**

| ITEM # | MTG DATE | DESCRIPTION | BIC | DUE DATE | STATUS |
|---|---|---|---|---|---|
| 3 | 05/07/15 | **Risk 72** – 4th & King - Develop a test plan checklist for recertifying | S. Pong | 01/05/17 | Open |

Meeting adjourned at 3:00pm

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:** 1/9/17 [Date completed].

central T subway

Connecting people. Connecting communities.

# Meeting Agenda

**Project No. M544.1, Contract No. CS-149**
**Program/Construction Management**
**Risk Mitigation Management Meeting No. 89**
**December 08, 2016**
**2:00pm – 4:00pm**
Central Subway Project Office
530 Bush Street, 4th Floor
Large Conference Room

**Attendees:**

| | | | | | |
|---|---|---|---|---|---|
| William Byrne | | Mark Latch | | Beverly Ward | |
| John Funghi | | Roger Nguyen | | Luis Zurinaga | |
| Albert Hoe | | Eric Stassevitch | | | |

1. **Report on Red Risks (Rated 6 and above)**
   - **Construction Risks** (46, 52, 205, 229, 230, 232, 233, 234, 238, 240, 243)
2. **Report on Remaining Requirement Risk**
   - **Requirement Risk** (104)
3. **Report on Active Risks (Rated below 6)**
   - **Construction Risks** (**36**, 103, **214**)

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

central T subway

Connecting people. Connecting communities.

# Meeting Attendance Sheet

**Project No. M544.1, Contract No. CS-149**
**Program/Construction Management**
**Risk Management Meeting No. 89**
December 08, 2016
2:00 p.m. – 4:00 p.m.
Central Subway Project Office
530 Bush Street, 4th Floor
Large Conference Room

***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 | |
| John Lackey | DEA/PMOC | 503-499-0596 | jal@deainc.com | |
| Mark Latch | CSP | 415-660-5410 | Mark.latch@sfmta.com | |
| Roger Nguyen | SFMTA | 415-701-4312 | Roger.Nguyen@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:** S. Wilson
**Current Assessment:** Risk Rating 5 – Construction Risk

**Status Log:**

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

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

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

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

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

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

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

| Risk Mitigation Status |
|---|
| **Risk Reference: 36** |

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

November 2016:

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

December 2016:

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

| **Risk Mitigation Status** |
|---|
| **Risk Reference: 46 (CTS)** |

| Risk | Mitigation Strategy |
|---|---|
| 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.<br>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.<br>3. Require barriers to protect pedestrians and shield them from noise and dirt from construction.<br>4. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed.<br>5. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. Quickly process and resolve damage and accident claims from the Public.<br>6. Assumed this work in cost & schedule estimates. |

**Initial Assessment:** 2, 3, 6 **Risk Owner:** D. Jacobson
**Current Assessment:** Risk Rating, 6 – Construction Risk

**Status Log:**

January 2012:

1. Implementation of mitigation measures part of Communication/Outreach plan and certain aspects to be included in the contract documents.

May 2013:

1. CCDC are assisting the Central Subway outreach effort in Chinatown
2. Weekly construction updates are being uploaded to the Central Subway website, translated copies will be hand delivered through Chinatown
3. The contractor will be required to comply with the contract specifications and City ordinances for noise and dust control.
4. Discuss revising mitigation strategies
    - '4' – MOED is not involved in Chinatown, contractor is required to maintain cleanliness adjacent to site

October 2013:

1. Community meeting held in September to notify merchants and residents that construction of the Chinatown station would be commencing soon.
2. 30day and 10day construction notices have been mailed out
3. Construction updates are being communicated weekly via social media, mailings, and the Central Subway website. CCDC are also hand delivering translated construction notices to project neighbors.

| **Risk Mitigation Status** |
|---|
| **Risk Reference: 46 (CTS)** |

| Risk | Mitigation Strategy |
|---|---|
| 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.<br>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.<br>3. Require barriers to protect pedestrians and shield them from noise and dirt from construction.<br>4. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed.<br>5. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. Quickly process and resolve damage and accident claims from the Public.<br>6. Assumed this work in cost & schedule estimates. |

May 2014:

1. SFMTA has requested documentation from Tutor Perini that they are in compliance with noise readings and permit requirements.

July 2014:

1. Tutor Perini submitted the requested noise readings for a two week period and documentation to show the permit requirements.
2. The Contractor is performing continuous noise monitoring in addition to performing hand held readings once a week.

July 2016:

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

August 2016:

1. Sound from Exhaust Fans remains a huge issue, especially at night. RE (Doug) working on mitigation ideas to present to SFMTA and TPC. Need to navigate through who designs sound mitigation structure, who pays for it, and how quickly it can be installed.
2. Along east side of NEES work area, trash and debris building up along barricades has had negative impact on businesses. RE talked to TPC and they are complying with the clean up on a regular basis per General Provisions 3.19 A and Special Provisions outlined on S-9.
3. CTS Neighborhood is very upset with early morning truck traffic, which is sporadic, as well as fans through the night. TPC has made many efforts to inform their subcontractors and delivery folks, which will help a lot. There will be more truck traffic most probably because this is a major project and nearly impossible to inform every trucker who ever will come to this job to NOT show up before 7 am.

September 2016:

1. Continued efforts are being made to reduce the ventilation noise.
2. No neighborhood complaints have been received in the two weeks.

| Risk Mitigation Status |
|---|
| **Risk Reference: 46 (CTS)** |

| Risk | Mitigation Strategy |
|---|---|
| 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.<br>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.<br>3. Require barriers to protect pedestrians and shield them from noise and dirt from construction.<br>4. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed.<br>5. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. Quickly process and resolve damage and accident claims from the Public.<br>6. Assumed this work in cost & schedule estimates. |

October 2016:

1. Frontier-Kemper General Superintendent removed the inverted “hats” off the top of the fan line and secured expanded metal screen. Fan noise decreased to under 77 dBA at 50 feet and was 65 dBA at 100 feet. Fans are set at 55 – 60% for now. Once full mining of north and south platform tunnels is underway, the expanded metal screen may no longer work (because of back-pressure) and this issue may need to be addressed at that time, probably in December 2016.
2. TPC and F-K are providing personnel to clean along the NEES along the east side of Stockton Street between Sta. 101+00 to 102+00 in the early morning on a daily basis.
3. Some barriers and banners need cleaning from graffiti; brought up in weekly progress meetings.

November 2016:

1. Ventilation and equipment noise at CTS not an issue currently.
2. Public Outreach efforts continue through CCDC and lead person Jerri Diep.
3. Barriers and banners have been cleaned – ongoing effort
4. TPC personnel daily (or almost daily) clean along the North Emergency Egress Shaft work area where debris accumulates.
5. Monitoring is ongoing, communication with the community is good, TPC field crew is responsive.
6. No extra costs at this time.
7. Joint Trench along Washington Street and Chinese United Methodist (CUM) Church is beginning in the next two weeks with a 4’ walkway planned for public access to the Stockton-Washington intersection.

December 2016:

1. Ventilation and equipment noise at CTS not an issue currently.
2. Public Outreach efforts continue through CCDC and lead person Jerri Diep.
3. Barriers and banners have been cleaned – ongoing effort
4. TPC personnel daily (or almost daily) clean along the North Emergency Egress Shaft work area where debris accumulates.
5. Monitoring is ongoing, communication with the community is good, TPC field crew is responsive.

| **Risk Mitigation Status** |
|---|
| **Risk Reference: 46 (CTS)** |

| Risk | Mitigation Strategy |
|---|---|
| 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.<br>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.<br>3. Require barriers to protect pedestrians and shield them from noise and dirt from construction.<br>4. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed.<br>5. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. Quickly process and resolve damage and accident claims from the Public.<br>6. Assumed this work in cost & schedule estimates. |

6. No extra costs at this time.
7. Joint Trench along Washington Street and Chinese United Methodist (CUM) Church has not started for the 4’ walkway planned for public access to the Stockton-Washington intersection. TPC has stated they will put in the 4’ walkway before Chinese New Year. Pedestrians have walked through the site attempting to gain access to Stockton Street after walking downhill from Powell and Washington.

| **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.<br>2. Slip-lined sewer by CTS contractor.<br>3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed.<br>4. Contractor to correct impact of settlements by repair.<br>5. Have contingency repair/restoration plan.<br>6. Utility contact information and procedure will be on plans.<br>7. Develop an allowance for utility repair.<br>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.<br>2. Slip-lined sewer by CTS contractor.<br>3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed.<br>4. Contractor to correct impact of settlements by repair.<br>5. Have contingency repair/restoration plan.<br>6. Utility contact information and procedure will be on plans.<br>7. Develop an allowance for utility repair.<br>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.<br>2. Slip-lined sewer by CTS contractor.<br>3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed.<br>4. Contractor to correct impact of settlements by repair.<br>5. Have contingency repair/restoration plan.<br>6. Utility contact information and procedure will be on plans.<br>7. Develop an allowance for utility repair.<br>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.<br>2. Slip-lined sewer by CTS contractor.<br>3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed.<br>4. Contractor to correct impact of settlements by repair.<br>5. Have contingency repair/restoration plan.<br>6. Utility contact information and procedure will be on plans.<br>7. Develop an allowance for utility repair.<br>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.<br>2. Slip-lined sewer by CTS contractor.<br>3. Other utilities will be reinforced as needed, monitored during construction, and repaired / replaced as needed.<br>4. Contractor to correct impact of settlements by repair.<br>5. Have contingency repair/restoration plan.<br>6. Utility contact information and procedure will be on plans.<br>7. Develop an allowance for utility repair.<br>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.

| 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.<br>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.<br>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 4$^{th}$ Streets.

December 2016:

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

| 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 | √<br>√ | 1. CMod Task Force - 5 Areas of Improvement identified<br>2. Implement areas of improvement<br>3. Increase Delegation of Authority |

**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 | √<br>√ | 1. CMod Task Force - 5 Areas of Improvement identified<br>2. Implement areas of improvement<br>3. Increase Delegation of Authority |

May 2014:

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

July 2014:

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

December 2014:

1. No change to the status of this risk.

September 2015:

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

October 2015:

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

November 2015:

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

December 2015:

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

January 2016:

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

February 2016:

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

April 2016:

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.

| 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 | √<br>√ | 1. CMod Task Force - 5 Areas of Improvement identified<br>2. Implement areas of improvement<br>3. Increase Delegation of Authority |

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: 214** |

| Risk | | Mitigation Strategy |
|---|---|---|
| Micro Piles at UMS interfere with Tube-a-manchette installation (60' deep micropiles) | √ | 1. Provide micro-pile as-built information to contractor<br>2. Ensure tube-a-manchettes are realigned to be installed clear of micro-piles |

**Initial Assessment:** 1, 1, 3 **Risk Owner:** A. Clifford
**Current Assessment:** Risk Rating 0 - Construction Risk

**Status Log:**

February 2013:
1. Identified as a risk

March 2013:
1. Discuss risk description, mitigation strategy and risk rating
2. Central Subway has responded to Contractors RFI and provided as-built information for the micropiles
3. Contractor will work to install tube-a-manchettes to avoid micropiles
4. **Recommended risk rating 3 (3, 1, 1)**
    a. Probability (3), >50%
    b. Cost impact (1), <$250
    c. Schedule impacts (1), <1 month

April 2013:
1. Contractor is reviewing the micropile as-built information
2. An additional mitigation was added to ensure the tube-a-manchettes are realigned to be installed clear of the micro-piles
    a. A workshop will be held between the PB and BIH to resolve the required geometry to install the tube-a-manchettes clear of the micro-piles
    b. The contractor will submit a revised installation alignment plan for the tube-a-manchette installation

May 2013:
1. A workshop was held between PB and BIH in April to establish the required installation geometry
2. The contractor will install the compensation grouting tubes using a diamond drill in the event that the micro piles cannot be avoided

July 2013:
1. As of Monday 7/8/13, 9 tube-a-manchettes have been installed at the Ellis Street shaft. 1 of 9 has encountered a micropile.
2. 1252 Contractor will install tubes as per the current plan. Additional tubes will be installed as required.
3. A 3-D model of the micro piles will be provided to Tutor Perini. A workshop will also be held between PB and Tutor (similar to that held with BIH) to minimize the risk of interference with 1300 compensation grouting tubes.

| Risk Mitigation Status |
|---|
| **Risk Reference: 214** |

| Risk | | Mitigation Strategy |
|---|---|---|
| Micro Piles at UMS interfere with Tube-a-manchette installation (60' deep micropiles) | √ | 1. Provide micro-pile as-built information to contractor<br>2. Ensure tube-a-manchettes are realigned to be installed clear of micro-piles |

September 2013:

1. Risk is becoming a greater concern. Additional mitigation measures need to be identified and implemented.

December 2013:

1. Micropile as-built information was included in 1300 reference documents
2. 1300 Contractor is considering installing TAMs from within station box

June 2014:

1. 5 additional joker holes, 623 extra feet of drilling and pre-condition grouting, lowering of pipes, adjustment to the working platform
2. Contractor claiming $380k, SFMTA current estimate in the order of $210k
3. Discuss updating risk rating.
4. The Program's portion of the cost will be under the estimated $210K.

November 2014:

1. Negotiations for PCC-12 have been completed with BIH. $176k was agreed for Item 5 of PCC-12.
2. Additional costs associated with tube-a-manchette installation were included in PCC-12.
3. The Program will seek reimbursement of these costs from the designer.

December 2014:

1. A letter has been sent to the designed requesting reimbursement of increased costs associated with TAM installation due to the presence of micropiles.

January 2015:

1. Waiting for the comp grout south of headwall, which is the only remaining risk. No impact to the incline piles.

February 2015:

1. No new information from last months update When TPC drills thru the secant pile wall, they may hit the micropiles.

May 2015:

1. There is no longer a risk for the Program. A potential collision with the piles did not take place.
2. Recommend retiring this risk at the next monthly meeting.

June 2015:

1. Tube-a- manchette for the micropiles for compensation grouting at the Barney's still need to be put in.

| Risk Mitigation Status |
|---|
| **Risk Reference: 214** |

| Risk | | Mitigation Strategy |
|---|---|---|
| Micro Piles at UMS interfere with Tube-a-manchette installation (60' deep micropiles) | √ | 1. Provide micro-pile as-built information to contractor<br>2. Ensure tube-a-manchettes are realigned to be installed clear of micro-piles |

August 2015:

1. Tube-a-manchette installation has relocated to Chinatown until approx. October.
2. No change to the status of this risk.

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.
3. Compensation grouting north of the headwalls work still remains.

December 2015:

1. No Change to the status of this risk.
2. Recommend revisiting early 2016 when TAM installation recommences at UMS.

April 2016:

1. The Contractor had completed everything beyond Geary Street. Tube-a-manchette have been installed at the North concourse. There hasn't been any interface as of yet. Micopiles were not installed pass Geary Street.

May 2016:

1. No change to the status of this Risk
2. The TAM installation has not yet recommenced in the location of the micropiles.

July 2016:

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

November 2016:

1. Installation of the TAMs is complete.
2. This risk is recommended for retirement.

December 2016:

1. Work has been completed.
2. By unanimous decision this Risk has been retired 12/08/16.

| **Risk Mitigation Status** |
|---|
| **Risk Reference: 229** |

| Risk | | Mitigation Strategy |
|---|---|---|
| CN1300 System Acceptance Testing | | 1. Identify duration |

**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.

| **Risk Mitigation Status** |
|---|
| **Risk Reference: 230** |

| Risk | | Mitigation Strategy |
|---|---|---|
| SFMTA Commissioning Coordination | | 1. Signage – Notifying the public<br>2. Create a commissioning team<br>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.

| **Risk Mitigation Status** |
|---|
| **Risk Reference: 232** |

| Risk | | Mitigation Strategy |
|---|---|---|
| Behind Schedule - Unable to Recover from Delay to 1300 Contract | | 1. Contractor implemented Schedule Recovery<br>2. Acceleration |

**Initial Assessment**: 4, 3, 3 **Risk Owner:** E. Stassevitch
**Current Assessment**: Risk Rating 12 – Construction Risk

**Status Log:**

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

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

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

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

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

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

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

| Risk Mitigation Status |
|---|
| **Risk Reference: 232** |

| Risk | | Mitigation Strategy |
|---|---|---|
| Behind Schedule - Unable to Recover from Delay to 1300 Contract | | 1. Contractor implemented Schedule Recovery<br>2. Acceleration |

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 - Unable to Recover from Delay to 1300 Contract | | 1. Contractor implemented Schedule Recovery<br>2. Acceleration |

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 - Unable to Recover from Delay to 1300 Contract | | 1. Contractor implemented Schedule Recovery<br>2. Acceleration |

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.

| Risk Mitigation Status |
|---|
| **Risk Reference: 233** |

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

**Initial Assessment:** 3, 3, 3
**Current Assessment:** Risk Rating 9 **– Construction**

**Risk Owner:** D. Jacobson

**Status Log:**

December 2014:

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

January 2015:

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

February 2015:

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

March 2015:

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

April 2015:

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

May 2015

1. The contractor has yet to respond.

June 2015

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

July 2015:

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

| Risk Mitigation Status |
|---|
| **Risk Reference: 233** |

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

August 2015:

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

September 2015:

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

October 2015:

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

November 2015:

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

December 2015:

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

January 2016:

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

February 2016:

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

March 2016:

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

| Risk Mitigation Status |
|---|
| **Risk Reference: 233** |

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

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

April 2016:

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

May 2016

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

June 2016:

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

July 2016:

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

August 2016:

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

September 2016:

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

| Risk Mitigation Status |
|---|
| **Risk Reference: 233** |

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

October 2016:

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

November 2016:

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

December 2016:

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

| **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<br>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<br>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<br>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<br>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.

| **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.<br>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.<br>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.<br>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.

| 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<br>2. As Built Schedule (Program Analysis)<br>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<br>2. As Built Schedule (Program Analysis)<br>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.

| **Risk Mitigation Status** |
|---|
| **Risk Reference: 243** |

| Risk | | Mitigation Strategy |
|---|---|---|
| Contractor becomes complacent in third party insurance claims - could increase cost to the project | | 1. |

**Initial Assessment**: 5, 2, 1 **Risk Owner:** A. Hoe
**Current Assessment**: Risk Rating 8 – Construction Risk

**Status Log:**

January 2016
1. TPC has not been responsive to insurance claims from 3rd parties, so the claims are being directed to the City,
2. These claims should not be a cost to the Program, due to SFMTA being indemnified.

June 2016:
1. A lapse in time between claims being tendered could be a cost to the Program.

July 2016:
1. The Committee performed a reassessment of the risk, rating will remain an 8.

August 2016:
1. Due to TPC not directing insurance claims to their insurance carrier, SFMTA has been receiving the claims. As part of the construction contract with TPC, SFMTA is indemnified from third part insurance claims.

September 2016:
1. TPC is now being responsive to claims.

October 2016:
1. Third party claims are be addressed by the Contractor. Dollar amounts paid by the Contractor are not known by the Program.

November 2016:
1. Currently the Program is not aware of any outstanding claims. At UMS there are two issue to be addressed at Barney's and Neiman Marcus.

December 2016:
1. The Program has received at least three notice of claims concerning TPC's subconsultants.

# PROJECT RISK REGISTER

Central Subway Project San Francisco

REV : 62

DATE ISSUED: 12/08/16

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

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

SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)

| Final Risk ID | Risk Description | Mitigation Description | Risk Category | Probability % | Cost Impact | Schedule Impact | Calc Impact | Calc % | Risk Rating | Score | Status | Must Complete by Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Underground Tunnel | | | | | | | | | | | | |
| 115 | Jet grouted station end walls are installed by Tunnel contractor. Station Contractor assumes risk of possibly leakage problems due to insufficiently qualify of end walls. | 1. In the 1252 contract, have tunnel contractor set aside a pre-determined amount of money in escrow that can be used to repair any leaks encountered by the station contractors after the in the jet grout end walls are excavated.<br>2. Alternatively, place an allowance in the station contracts for end wall leakage repair. | C | 3 | 1 | 1 | 1 | 50% | 3 | | | 5/26/15 UMS1295 |
| Track Embedded | | | | | | | | | | | | |
| Track: Special | | | | | | | | | | | | |
| MOS Station | | | | | | | | | | | | |
| 34 | Loss of business results in unanticipated restrictions on construction at UMS | 1. Public outreach.<br>2. Work closely with Merchant's Association.<br>3. Maintain regular and open communications so Merchants know construction plans and progress at all times.<br>4. Advertise that Stockton Street Merchants are Open for Business.<br>5. Require Contractor to coordinate with merchants, maintain access to businesses and assist with deliveries and pick-ups, continuously cleanup site, and provide pedestrian and vehicle traffic and protection plans, informational signage, and minimum sidewalk widths.<br>6. Require barriers to protect pedestrians and shield them from noise and dirt from construction.<br>7. Work with the Union Square BID or MOED to increase cleanup of the area and assist pedestrians across streets.<br>8. Include this work in cost & schedule estimates. | C | 1 | 3 | 1 | 2 | 10% | 2 | 4 | Mitigation measures to be implemented and to the extent possible requirements will be written into contract documents to minimize disruptions to businesses. | 09/07/16 UMS1430 |
| 36 | Damage to buildings or utilities as a result of heave from grouting at UMS. | 1. Utilize tangent piles combined with surface jet grouting. | C | 5 | 1 | 1 | 1 | 90% | 5 | 10 | Mitigation measures implemented in contract documents to reduce risk | 4/14/15 UMS1310 |
| 37 | Damage to adjacent buildings at UMS due to surface construction activities. | 1. Require protective barriers.<br>2. Have an emergency and rapid response customer focused task force to fix damaged facilities.<br>3. Quickly repair and reimburse resulting costs.<br>4. Include probable cost in estimate. | C | 1 | 2 | - | 1 | 10% | 1 | 2 | Mitigation measures implemented in contract documents to reduce risk | 9/7/16 UMS1430 |
| Q | As-built drawings and UMS construction drawings do not contain enough information to produce shop drawings without significant surveying effort delaying construction north entrance. | 1. Investigate if electronic files of design can be given to the contractor.<br>2. Clearly define shop drawing criteria in the technical specifications.<br>3. Make as-built drawings available as reference drawings to the contractor | C | 3 | 1 | 1 | 1 | 50% | 3 | 6 | Specifications require contractor to survey USG in order to develop shop drawings for structural steel. | 3/24/12 UMS1280 |
| CTS Station | | | | | | | | | | | | |

| | A | H | I | J | K | L | M | N | O | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **PROJECT RISK REGISTER** | | | | | Low (1) | Medium (2) | High (3) | Very High (4) | Significant (5) | Legend | | |
| 2 | Central Subway Project San Francisco | | | | Probability | < 10% | <> 10-50% | > 50% | <> 75% & 90% | >90% | <3 Low | RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE I | |
| 3 | REV : 62 | | | | Cost Impact | < $250K | <>$250K - $1M | <> $1M - $3M | <> $3M - $10M | >$10M | 3-9 Medium | 2 | |
| 4 | DATE ISSUED: 12/08/16 | | | | Schedule Impact | < 1 Month | <> 1 - 3 Months | <> 3-6 Months | <> 6 - 12 Months | > 12 Months | >10 High | SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPAC | |
| 5 | **Final Risk ID** | **Risk Description** | **Mitigation Description** | **Risk Category** | **Probability %** | **Cost Impact** | **Schedule Impact** | **Calc Impact** | **Calc %** | **Risk Rating** | **Score** | **Status** | **Must Complete by Date** |
| 163 | 46 | Public complaints result in unanticipated restrictions on construction at CTS. (schedule and estimate for underground work assumes 6 day work week and 2 shifts per day) | 1. Public outreach.<br>2. Maintain regular and open communications so Public knows construction plans and progress at all times.<br>3. Require Contractor to assist Public Outreach efforts, maintain access to businesses and assist with deliveries and pick-ups, control noise and vibration, continuously cleanup site, and provide pedestrian and vehicle traffic and protection plans, informational signage, ADA ramps and minimum sidewalk widths.<br>4. Require barriers to protect pedestrians and shield them from noise and dirt from construction.<br>5. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed.<br>6. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements.<br>7. Quickly process and resolve damage and accident claims from the Public.<br>8. Include this work in cost & schedule estimates. | C | 2 | 5 | 1 | 3 | 35% | 6 | 12 | Implementation of mitigation measures part of Communication/Outreach plan and certain aspects to be included in the contract documents. | 10/9/17 CTS1500 |
| 167 | 48 | Incomplete drawdown of groundwater. (inside of box and inside of caverns) | 1. Require additional grouting to limit leakage to permissible level.<br>2. Include probable grouting work in cost & schedule estimates.<br>3. Include allowance for dewatering within cavern during construction. | C | 2 | 2 | 1 | 2 | 35% | 3 | 6 | Mitigation measures have been included in contract documents | 5/1/16 CTS1140 |
| 175 | 52 | Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL) | 1. Evaluate effect of potential settlement on utilities.<br>2. Slip-line sewer by TBM contractor.<br>3. Reinforce other utilities as needed, monitored during construction, and repair / replace, as needed.<br>4. Have contingency repair/restoration plan.<br>5. Utility contact information and procedure will be on plans.<br>6. Develop an allowance for utility repair.<br>7. Include probable cost in estimate.<br>8. Need to identify the new SFPUC contact | C | 3 | 3 | 1 | 2 | 50% | 6 | 12 | Project configuration change, lowered station 25 ft. reducing the probability of this risk. Risk rating lowered. | 4/22/16 N-CTS9730 |
| 216 | General | | | | | | | | | | | | |
| 218 | Demolition, Clearing , Earthwork | | | | | | | | | | | | |
| 220 | Site Utilities, Utility relocations | | | | | | | | | | | | |
| 230 | Hazmat, Contaminated Material | | | | | | | | | | | | |
| 234 | Environmental Mitigations | | | | | | | | | | | | |
| 237 | 67 | Archeological/Cultural findings during construction increases schedule and/or cost. (UMS)…LESS THAN 1% | 1. Provide on-call Archeologist.<br>2. Provide allowance and procedure in contract for Archeological/Cultural discoveries. | C | 3 | 1 | 2 | 2 | 50% | 5 | 9 | Mitigation measures to be implemented in contract documents | 8/12/15 UMS1320 |
| 240 | Site Structure incl. sound walls | | | | | | | | | | | | |
| 242 | Auto/bus/van access ways, roads | | | | | | | | | | | | |
| 247 | Train Control and Signals | | | | | | | | | | | | |
| 249 | 72 | Interface new Signaling and Train Control system to existing at Fourth and King | 1. Connect new system in parallel with existing system until the new system has been tested and safety certified for operation. | C | 2 | 2 | 3 | 3 | 35% | 5 | 10 | Awaiting approval of contract plans by Muni Operations. | 3/4/16 STS1045 |

| | A | H | I | J | K | L | M | N | O | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **PROJECT RISK REGISTER** | | | | | Low (1) | Medium (2) | High (3) | Very High (4) | Significant (5) | Legend | | |
| 2 | Central Subway Project San Francisco | | | | Probability | < 10% | <> 10-50% | > 50% | <> 75% & 90% | >90% | <3 Low | RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE I | |
| 3 | REV : 62 | | | | Cost Impact | < $250K | <>$250K - $1M | <> $1M - $3M | <> $3M - $10M | >$10M | 3-9 Medium | 2 | |
| 4 | DATE ISSUED: 12/08/16 | | | | Schedule Impact | < 1 Month | <> 1 - 3 Months | <> 3-6 Months | <> 6 - 12 Months | > 12 Months | >10 High | SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPAC | |
| 5 | **Final Risk ID** | **Risk Description** | **Mitigation Description** | **Risk Category** | **Probability %** | **Cost Impact** | **Schedule Impact** | **Calc Impact** | **Calc %** | **Risk Rating** | **Score** | **Status** | **Must Complete by Date** |
| 258 | PR78 | Delays or complication by other SFMTA projects delays CSP: radio, fare collection, C3/TMC | 1. Monitor other projects' developments.<br>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 |
| 260 | Traffic signals & Crossing Protn. | | | | | | | | | | | | |
| 262 | Fare Collections Systems | | | | | | | | | | | | |
| 265 | Purchase or lease of Real Estate | | | | | | | | | | | | |
| 273 | Reloc. of Household or Business | | | | | | | | | | | | |
| 275 | Vehicles | | | | | | | | | | | | |
| 278 | Preliminary Engineering | | | | | | | | | | | | |
| 291 | 95 | Contractor default during construction impacts schedule. (key sub-contractor) | 1. Assist Bonding company in transition and to maintain schedule. | C | 1 | 2 | 2 | 2 | 10% | 2 | 4 | | 11/17/17 STS 1500 |
| 297 | 99 | Breakdown in relationships between SFMTA and Contractors during construction results in increased claims and delays to the overall construction schedule. | 1. Executive partnering and alternate dispute resolution.<br>2. Provide incentives in construction contracts in addition to penalties | C | 2 | 4 | 1 | 3 | 35% | 5 | 10 | Mitigation measures being implemented | 7/27/12 FDS 1940 |
| 299 | 100 | Procurement of long lead items delays work. (fans, rails and special track work, TPSS, Escalators, elevators, TBM) | 1. Include schedule milestones for procurement of and substantial payment for stored long lead items in contract to encourage early procurement.<br>2. Monitor procurement of critical items. | C | 1 | 2 | 2 | 2 | 10% | 2 | 4 | Not considered a project risk. | 11/17/17 STS 1500 |
| 305 | PR37 | Temporary construction power and ability to provide permanent power feed - PGE ability to provide power requirements to the program together with their other commitment | 1. Identify temporary power requirements for station construction.<br>2. Investigate the timing of the permanent feed. | C | 2 | 1 | 2 | 2 | 35% | 3 | 6 | Cost for First and Redundant electrical services need to be included in Cost Estimate. | 5/3/18 STS1080 |
| 306 | Insurance, permits etc. | | | | | | | | | | | | |
| 307 | 103 | Difficulty in getting required permits | 1. Coordinate with permit officials and request permits as early as possible.<br>2. Obtain assistance obtaining permits from PM/CM & FD Consultants. | C | 1 | 2 | 1 | 2 | 10% | 2 | 3 | | 12/18/12 FDS 1275 |
| 308 | 104 | CPUC approval at Grade Crossing for G0164d takes longer to negotiate / obtain than schedule allows | 1. Obtain Grade Crossing approvals at final CPUC inspection at the completion of construction.<br>2. Coordinate closely with CPUC until approval is received. | R | 2 | 3 | 2 | 3 | 35% | 5 | 10 | CPUC Resolution (TED-253) for extension of our at grade crossing was granted. | 7/27/12 FDS 1940 |
| 309 | 105 | Electrical service delays startup and testing | 1. Submit applications for new service as early as possible.<br>2. Coordinate closely with PG&E to ensure timely delivery of electrical service. | C | 1 | 2 | 1 | 2 | 10% | 2 | 3 | Applications for new service have been submitted to PG&E. | 11/17/17 STS 1500 |
| 310 | 106 | Risk of Labor dispute delaying the work. | 1. Enforce designated gate for employees of the contract in dispute so that the rest of the work is not delayed. | C | 2 | 1 | 1 | 1 | 35% | 2 | 4 | | 11/17/17 STS 1500 |
| 312 | Unallocated Contingency | | | | | | | | | | | | |

| | A | H | I | J | K | L | M | N | O | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **PROJECT RISK REGISTER** | | | | | Low (1) | Medium (2) | High (3) | Very High (4) | Significant (5) | Legend | | |
| 2 | Central Subway Project San Francisco | | | | Probability | < 10% | <> 10-50% | > 50% | <> 75% & 90% | >90% | <3 Low | RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE I | |
| 3 | REV : 62 | | | | Cost Impact | < $250K | <>$250K - $1M | <> $1M - $3M | <> $3M - $10M | >$10M | 3-9 Medium | 2 | |
| 4 | DATE ISSUED: 12/08/16 | | | | Schedule Impact | < 1 Month | <> 1 - 3 Months | <> 3-6 Months | <> 6 - 12 Months | > 12 Months | >10 High | SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPAC | |

| 5 | Final Risk ID | Risk Description | Mitigation Description | Risk Category | Probability % | Cost Impact | Schedule Impact | Calc Impact | Calc % | Risk Rating | Score | Status | Must Complete by Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 317 | 111 | Major Earthquake stops work | 1. Include Force Majeure clause in contracts. | C | 1 | 5 | 3 | 4 | 10% | 4 | 8 | Force Majeure clause included in contrac | 12/30/20 MS 0010 |
| 318 | 112 | Major safety event halts work | 1. Require contractor Safety plan to address this risk.<br>2. CM inspections to ensure that safety plan and procedures are implemented. | C | 1 | 5 | 3 | 4 | 10% | 4 | 8 | Health and Safety provisions included in contracts. CS Program provides full-time Safety Manager. | 12/30/20 MS 0010 |
| 320 | | | | | | | | | | | | | |
| 330 | 205 | Prolong period of CMod's creates additional cost/causes bad blood between Resident Engineer and Contractor | 1. CMod Task Force - 5 Areas of Improvement<br>2. Implement<br>3. Delegation of Authority | C | 4 | 2 | 1 | 2 | 80% | 6 | 12 | | |
| 342 | 217 | Delays or complications construction by others – SF Dept. Of Technology, 3rd party utilities | 1. Early engagement and coordination for agreements and plan development to avoid construction delays. | C | 2 | 1 | 1 | 1 | 35% | 2 | 4 | DTIS MOU has been signed. | |
| 349 | 224 | CTS AWSS/Ductbank Interface - AWSS system is old and requires replacement | 1. Look at alternatives to address<br>2. Turn off system while CSP work is being done, and then turn on later (find a bypass). | C | 2 | 1 | 1 | 1 | 35% | 2 | 4 | | |
| 352 | 227 | LRV Training - having enough trained operators (surplus) | 1. Ramp up trained operators a year ahead of time<br>2. Ensure testing is finished<br>3. Completion of work at storage track location (Bryant & King) | C | 1 | 2 | 1 | 2 | 10% | 2 | 3 | | |
| 353 | 228 | Muni union workers - barn signup (preferred runs) | 1. Try to get six months advance notice for annual in addition to barn sign up.<br>2. Trapeze (software) - enter CSP runs. | C | 1 | 1 | 4 | 3 | 10% | 3 | 5 | | |
| 354 | 229 | CN1300 System Acceptance Testing | 1. Identify Duration | C | 3 | 1 | 3 | 2 | 50% | 6 | 12 | | |
| 355 | 230 | SFMTA Commissioning Coordination | 1. Fully develop rail activities<br>2. Identify SFMTA liaisons to perform activities<br>3. Have SFMTA OPS review startup and testing Plan | C | 3 | 1 | 3 | 2 | 50% | 6 | 12 | | |
| 357 | 232 | Behind Schedule - Unable to Recover from Delay to 1300 Contract | 1. Contractor implemented Schedule Recovery<br>2. Acceleration<br>3. Scope Reduction | C | 4 | 3 | 3 | 3 | 80% | 12 | 24 | | |
| 358 | 233 | Shotcrete Substitution - Final Finish Concrete Lining is Inferior | 1. Meet and discuss with TPC's senior management what the issues are and the status for clarification. | C | 3 | 3 | 3 | 3 | 50% | 9 | 18 | | |
| 359 | 234 | Sequential Excavation Method at CTS - Contractor's propose method will induce subsidence | 1. Designers concurrence on variation of options<br>2. Presented four options to the Contractor for going forward | C | 2 | 4 | 3 | 4 | 35% | 7 | 14 | | |
| 360 | 235 | Sewer work running up and down Stockton Street | | C | 1 | 3 | 1 | 2 | 10% | 2 | 4 | | |

# PROJECT RISK REGISTER

Central Subway Project San Francisco

REV : 62

DATE ISSUED: 12/08/16

| | 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 I
2

SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPAC

| Final Risk ID | Risk Description | Mitigation Description | Risk Category | Probability % | Cost Impact | Schedule Impact | Calc Impact | Calc % | Risk Rating | Score | Status | Must Complete by Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 237 | Non-Conforming work is not identified by TPC's Quality Control Program | 1. Correction Action Plan from Contractor<br>2. Stand down Meeting with Contractor<br>3. Augmentation of Management Staff<br>4. Higher Cross Standards<br>5. QA (greater surveillances )<br>6. Bring on additional personnel within the Smith-Emery organization | C | 2 | 3 | 2 | 3 | 35% | 5 | 10 | | |
| 238 | Quality Program is ineffective in processing the nonconformance items causing schedule impacts | 1. Review the CNCR log on a biweekly basis at the joint TPC /SFMTA meeting.<br>2. Greater Clarity in the Log on what CNCR's are open | C | 3 | 2 | 2 | 2 | 50% | 6 | 12 | | |
| 240 | Unresolved Assignment of Schedule Delay Responsibility (may lead to increase cost) | 1. Ask the Contractor for TIA's<br>2. As built schedule (Program analysis)<br>3. Perform a more refined analysis | C | 2 | 4 | 4 | 4 | 35% | 8 | 16 | | |
| 243 | Contractor becomes complacent in third party insurance claims - could increase cost to the project | | C | 5 | 2 | 1 | 2 | 90% | 8 | 15 | | |
| 244 | Olivet building - potential coordination issues | 1. Maintain contact with the Developer<br>2. Facilitate completion of TPC work overlapping with developer access | C | 2 | 1 | 1 | 1 | 35% | 2 | 4 | | |
| 246 | Design changes not being captured in as-builts | 1.Ensure Contractor is including all PCC design change details onto the as-builts dwgs | C | 2 | 1 | 1 | 1 | 35% | 2 | 4 | | |