


Memorandum

CS Memorandum No. 1292

To: Distribution
From: Susan MacKenzie, Document Control Manager 
Date: November 19, 2012
Reference: Project No. M544.1, Contract No. CS-149
Task No. 1-4, Risk Management
Subject: Risk Mitigation Report No. 39

Attached please find Risk Mitigation Report No. 39 for meeting held on November 8, 2012. Please click on the "Bookmark" tab on the left side of Adobe file to navigate to report sections.

Attachments:

Risk Mitigation Report No. 39 with attachments

Cc: James Sampson, STV (w/attachments) james.sampson@stvinc.com
David Kuehn, STV (w/attachments) david.kuehn@stvinc.com
Luis Zurinaga, SFCTA (w/attachments) luis.zurinaga@sfcta.org
Matt Lee, SFCTA (matt@sfcta.org)
Albert Hoe, SFMTA (w/attachments)
Arthur Wong, SFMTA (w/attachments)
Richard Redmond, CSP (w/attachments)
Mark Latch, CSP (w/attachments)
Jane Wang, SFMTA (w/attachments)
Quon Chin, CSP (w/attachments)
Chuck Morganson, HNTB/B&C (w/attachments)
Aileen Read, CSDG (w/attachments)
CS File No. M544.1.5.0820

Distribution:

Brad Lebovitz, STV bradley.lebovitz@stvinc.com
John Funghi, SFMTA
Ross Edwards, CSP
Eric Stassevitch, CSP
Mark Benson, CSP
Carlos Campillo, CSP
Alex Clifford, CSP
Beverly Ward, CSP
Tom Tolentino, HNTB/B&C
David Coury, HNTB/B&C

Risk Mitigation Meeting Minutes #39

DATE: November 10, 2012

MEETING DATE: **November 08, 2012**

LOCATION: 821 Howard Street, 2nd Floor – Main Conference Room

TIME: 2:00pm

ATTENDEES: John Funghi, Ross Edwards, Mark Benson, Eric Stassevitch, Alex Clifford, Beverly Ward, Tom Tolentino, David Curry, Carlos Campillo, Brad Lebovitz

COPIES TO: Attendees: Albert Hoe, Arthur Wong, Richard Redmond, Mark Latch, Jane Wang, Quon Chin, Carlos Campillo, Chuck Morganson, Aileen Read, James Sampson, Luis Zurinaga, Matt Lee, , David Kuehn
File: M544.1.5.0820

REFERENCE Project No. M544.1, Contract No. 149 Task 1-4.01
Program/Construction Management

SUBJECT: **Risk Management – Risk Mitigation Meeting
Risk Mitigation Report No. 39**

RECORD OF MEETING

ITEM #	DISCUSSION	ACTION BY DUE DATE
1 -	Report on Red Risk and – (Risk rating ≥ 6)	
	<p>Risk 83: Cost of vehicles may be more than estimated due to sole source and small order <u>Discussion:</u> No new update to report, further information is being pursued. An update the schedule for future submittals is listed on the summary status sheet for this risk. Risk Rating 4, 4, 16</p> <p>Risk 7: Potential for excessive settlement of BART tunnels - Significant Compensation Grout Required over Estimate Allowances. <u>Discussion:</u> Work is still being done and coordination with BART. Reporting requirements to the Risk Committee should be heighthen. Risk Rating 3, 2.5, 7.5</p>	
2 -	Report on Requirement & Design Risks (Risk rating ≤ 6)	
	A list of Requirement Risks and Design Risks with a rating below 6 which are actively been tracked were included on the agenda for information, but were not discussed at this meeting, however an updated Risk Mitigation Status report is included with these meeting minutes. Risks which were discussed are listed below:	

ITEM #	DISCUSSION	ACTION BY DUE DATE
	<p>Risk 74: Insufficient time in schedule for testing and commissioning S&C <u>Discussion</u> There is enough time for commissioning activities; 60 plus 44 days of float between Commissioning and pre Revenue. A copy of the exhibit of the combined CN1300 September schedule was presented showing the amount of time for commissioning and testing. Risk Rating 0, 0, 0. This Risk will be retired.</p> <p>Risk 72: Interface new Signaling and Train Control system to existing at Fourth and King <u>Discussion:</u> As a requested by the Risk Assessment Committee, Tom Tolentino, DP3 Design Package Manager for Systems clarified the design has taken into account the existing connection to the new controls. Spec section 34 11 01 which is part of the CN1300 (see attached) partially addresses this issue and they have demonstrated to themselves they can do this. A meeting will be held on 11/16/12 with Operations to refresh and get their sign off. Material will be provided to show evidence of the sequence of the shutdown along with a future demonstration to the Risk Committee for closure of the Risk. Risk Rating 2, 2, 5</p> <p>Risk 32: Delay in advanced utility relocation delays ground treatment and start of construction. (Uty 2) <u>Discussion:</u> This Risk will not be retired as originally recommended. A notation will be made on the status log to refer to Retired Risk #60 which is similar in mitigation measures to this Risk.</p>	R. Edwards
3-	<p>Report on Market and Construction Risks (Risk rating ≤6)</p>	
	<p>A list of Active Market and Construction Risks which are being tracked were included on the agenda for information, but were not discussed at this meeting, however an updated Risk Mitigation Status report for each risk is included with these meeting minutes.</p> <p>In addition there were several Risks on the agenda for retirement and, after further review from the Risk Committee it was agreed these Risks will not be retired this month, and will be revisited in December for additional evaluation that the Risk item has been thoroughly mitigated. Market and Construction Risk which will be retired this month from the Risk Register are Risk PR79 and Risk 23. Status logs for each risk are included with these meeting minutes.</p>	
4-	<p>Other Business –</p>	
	<p>Risk Management Brief – E. Stassevitch presented a review of the Risk Management efforts of the Program since inception in March 2009; illustrating where we are at this point by providing a brief overview of the status for the current remaining risks by category in the October 2012 Risk Register, Rev.14,; and putting it in context with where efforts began in March 2009 with the first Risk Register being developed out of the FTA sponsored Risk Workshop #1 thru #4. Contingency management for both cost and schedule have been revised as a part of the mitigation efforts as defined in the Risk and Contingency Management Plan which is the basis for CSP’s Risk Management Program.</p>	
	<p>Contingency Management Plan – E. Stassevitch reviewed the Contingency Management Plan showing cost & schedule charts of the contingency drawdown as of September 2012.</p>	

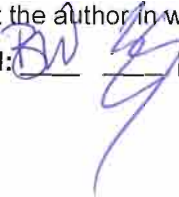
ITEM #	DISCUSSION	ACTION BY DUE DATE
	<p>New Risks Items associated with New Contracting Strategy - The following list represents potential new Risks which were identified at the Risk meeting:</p> <ol style="list-style-type: none"> 1. Outreach efforts to get more bidders 2. Lack of response from potential bidders who attended "meet and greet" 3. Potential delays in dealing with larger contracting groups 4. Possible Bid Protest 5. Ship America requirement 6. Headwalls interface with new 1300 Contract 7. AT&T Vault – new sewer work 8. Prolong period of CMods causes "bad blood" between RE and Contractor <p>Risk Mitigation Status sheets will be developed for each of the above identified risks, an owner will be assigned and mitigation measures identified for discussion at the next Risk Meeting.</p>	

ACTION ITEMS -

ITEM #	MTG DATE	Task #	DESCRIPTION	BIC	DUE DATE	STATUS
2	09/13/12		Risk PR 73 – Status of the MOU memo	R. Edwards	10/11/12	Open
2	10/18/12		Risk 72 – Demonstration from the Designer/Risk Owner of signaling logic plan	C. Campillo	11/08/12	Closed

Meeting adjourned at 3:45pm

These meeting minutes have been prepared by B. Ward and reviewed by E. Stassevitch, 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:  [initials of preparer & reviewer] Date: 10/11/12 [Date review completed.]

Meeting Agenda

Project No. M544.1, Contract No. CS-149
Program/Construction Management
Risk Mitigation Management Meeting No. 39
November 8, 2012
2:00pm – 4:00pm
 Central Subway Project Office
 821 Howard St. 2nd Floor
 Main Conference Room

Attendees:

Mark Benson		David Kuehn		Beverly Ward	
Alex Clifford		Mark Latch		Art Wong	
Ross Edwards		Brad Lebovitz		Luis Zurinaga	
John Funghi		Richard Redmond			
Albert Hoe		Eric Stassevitch			

1. Report on Red Risks (Risk Rating 6 and above)

- **Requirement Risks** (83)
- **Design Risks** (All outstanding Design - None)
- **Market Risks** (All outstanding Market - None)
- **Construction Risks** (7)

2. Report on Remaining Requirement and Design Risks

- **Requirement Risks** (32, 74, 79, 104, 196, T)
- **Design Risks** (72, 89, PR73, V)

3. Active Risks – New risks to be discussed

- **Market Risks** (56, PR79, 94)
- **Construction Risks** (16, 23, 38, 65, 71, 75, 111, J)

4. Other Business – Identify New risk items associated with New Contracting Strategy

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

Meeting Attendance Sheet

Project No. M544.1, Contract No. CS-149
Program/Construction Management
Risk Management Meeting No. 39
November 8, 2012
2:00 p.m. – 4:00 p.m.
 Central Subway Project Office
 821 Howard Street, 2nd Floor
 Main Conference Room

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

NAME	AFFILIATION	PHONE	E-MAIL (for minutes)	INITIALS
Mark Benson	CSP	415-701-5295	Mark.Benson@sfmta.com	MB
Alex Clifford	CSP	415 701- 5275	Alex.clifford@sfmta.com	A
Ross Edwards	CSP	415-581-5165	ross.edwards@sfmta.com	RE
John Funghi	SFMTA	415-701-4299	john.funghi@sfmta.com	JF
Albert Hoe	SFMTA	415-701-4289	albert.hoe@sfmta.com	
David Kuehn	STV/PMOC	510-464-8053	david.kuehn@stvinc.com	
Mark Latch	CSP	415-701-5294	mark.latch@sfmta.com	
Brad Lebovitz	STV/PMOC	510-464-8052	Bradley.lebovitz@stvinc.com	BL
Matt Lee	SFCTA	415 522-4813	matt@sfcta.org	
Richard Redmond	CSP	415-701-4288	Richard.redmond@sfmta.com	
Eric Stassevitch	CSP	415-701-4426	Eric.stassevitch@sfmta.com	ES
Beverly Ward	CSP	415-701-5291	Beverly.ward@sfmta.com	BW
Arthur Wong	SFMTA	415-701-4305	arthur.wong@sfmta.com	
Luis Zurinaga	SFCTA	415-716-6956	luis@sfcta.org	

central **T** subway

NAME	AFFILIATION	PHONE	E-MAIL (for minutes)	INITIALS
Tom Tolentino	CSP- DP3	(516) 435-4824	htolent@comcast.net	HT
David Coury	CSP- DP3	(707) 704-6912	dcoury@bncctransit.com	DC
Carlos Campillo	PMCM	(786) 556-3324	Carlos.Campillo@DFWTA.com	CC

Risk Register

PROJECT RISK REGISTER																																																																	
Central Subway Project San Francisco																																																																	
REV : 15																																																																	
DATE ISSUED : 11/08/12																																																																	
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Underground Tunnel																																																																	
1	TUN	10.07.1	Guideway Tunnels	Additional night shift work required at portal launch box due to bus storage facility relocation delay	Work with TJPA to coordinate construction schedules and GGB to coordinate Traffic Routing.	C	2	1	-	1	35%	1	2	No longer considered a risk. GGB not scheduled to be utilizing site until 2014	3/20/15 TUN1160																																																		
2a	TUN	10.07.2	Guideway Tunnels	42"/48" sewer line relocated as part Utility 1 package is damaged by subsequent construction of the launch box.	1. Make follow-on contractor responsible for repairs to any existing utility lines. 2. Properly as built actual location as part of Utility 1 package and provide to Contract 3 Contractor	C	1	1	2	2	10%	2	3	Sewer Installation complete, awaiting as built drawing. Sewer installed according to contract drawings. Contract 1252 provisions for protection of existing utilities puts all cost and schedule risk on Contractor.	10/24/12 TUN1080																																																		
5	TUN	10.07.13	Guideway Tunnels	Possibility that lowest level of tie-backs extending out from Moscone Center could be within the tunnel alignment.	1. Lower tunnel alignment 5' below the lowest expected tieback. 2. Include obstruction clause and allowance in contract documents.	C	1	1	1	1	10%	1	2	Contract Documents issued for bid, contain location of tiebacks from as built drawings, do not intersect tunnel alignment.	7/2/13 TUN1118																																																		
7	TUN	10.07.14	Guideway Tunnels	Potential for excessive settlement of BART tunnels - SIGNIFICANT COMPENSATION GROUT REQUIRED OVER ESTIMATE ALLOWANCES	1. Early and extensive co-ordination with BART. 2. Survey BART tunnels to determine exact locations. 3. Checking effect of maximum expected settlement on tunnels. 4. Require EPBM TBM, Contractor to demonstrate effective control of ground settlements and correction of settlements by compensation grouting, and pre-installation of compensation grout piping under BART tunnels prior to tunneling reaching Market St. Require repair/adjustment plan. 5. Develop contingency plan to provide bus bridge, if needed. 6. Require non-stop weekend excavation beneath BART tunnels. 7. Monitor movement of BART tunnels in real-time. 8. Repair/adjust as needed. 9. Include probable cost in estimate.	C	3	4	1	2.5	50%	7.5	15	Risk is considered active, with mitigation measures fully developed with the exception of Bus Bridge. Adjusted cost impact lower resulting in Risk rating increasing to 2 but still remains a low risk.	8/28/13 TUN1120																																																		
8	TUN	10.07.15	Guideway Tunnels	Flowing groundwater in vicinity of UMS Station could make adequate annulus grouting difficult.	1. Use appropriate additives such as accelerators in primary annulus backfill grouting, if needed. 2. Use secondary grouting as needed.	C	1	1	1	1	10%	1	2	Plans issued for bid contain mitigation measures	8/28/13 TUN1120																																																		
E	TUN		Guideway Tunnels	Underground obstructions tunnel and retrieval shaft	Include differing site conditions in GPs as well as DRB to adjudicate conflicts and minimize costs	C	2	2	3	3	35%	5	10	Mitigation measures have been implemented. Maintain adequate contingency throughout tunnel construction	2/5/14 TUN1124																																																		
PR1	TUN		Guideway Tunnels	Actual TBM production rate may be slower than forecasted.	Assign significant liquidated damages for not meeting specific schedule dates.	C	1	1	3	2	10%	2	4	Considered Risk inherent in the work and reflected in the Current Cost Estimate. Risk will be reflected in Contractor's Bid. LDs included in contract.	2/5/14 TUN1124																																																		
13	TUN		Guideway Tunnels	Damage / settlement 3x 5' to old brick sewer running parallel to tunnel alignment	Slip Line 3'x5' brick sewer before TBM reaches CTS.	C	1	1	-	1	10%	1	1	Tunnel profile has been lowered 25 ft and plans developed for replacement of at risk utilities in advance of tunnel drive.	12/16/13 TUN1121																																																		
15	TUN		Guideway Tunnels	Major TBM machine failure	Closely monitor condition and maintenance of the machines.	C	1	2	2	2	10%	2	4	Contractor has indicated that they plan to use a newly manufactured TBM for this project.	2/5/14 TUN1124																																																		
16	TUN		Guideway Tunnels	TBM loss and / or damaged in Transit	Provide provisions for insurance for TBM in transit to jobsite	C	1	5	4	5	10%	5	9	Costs covered by Contractor's insurance.	5/20/13 TUN1095																																																		
114	TUN		Guideway Tunnel	Grout pipes for BART underpinning are too long and cannot be installed accurately from small shaft.	1. "Belling out" the bottom of the grout shaft on Ellis Street so that a larger directional drill rig can be utilized to more accurately install these grout pipes. 2. In addition, investigate the possibility of using the basement of the old Virgin Records Store (Block 328 Lot 002) for installation of grout pipes. 3. Investigate possibility of grouting from BART tunnel.	C	-	2	2	2	0%	-	-	Test program to be conducted by tunnel contractor. Investigation of grouting program on previous contracts to be conducted by tunnel contractor.	8/28/13 TUN1120																																																		
115	TUN		Guideway Tunnel	Jet grouted station end walls are installed by Tunnel contractor. Station Contractor assumes risk of possibly leakage problems due to insufficiently qualify of end walls.	1. In the 1252 contract, have tunnel contractor set aside a pre-determined amount of money in escrow that can be used to repair any leaks encountered by the station contractors after the in the jet grout end walls are excavated. 2. Alternatively, place an allowance in the station contracts for end wall leakage repair.	C	3	1	1	1	50%	3	6	Project configuration changes include headwall designs with multiple levels of redundancy. Warranty provisions added to contract language.	5/26/15 UMS1295																																																		
116	TUN		Guideway Tunnel	TBM procurement, delivery and assembly takes longer than assumed in schedule.	Accommodate delay to TBM procurement and delivery, on the order of 2 or 3 months, with current float shown on the construction schedule.	C	2	2	2	2	35%	4	8	Mitigation measures are being implemented	5/20/13 TUN1095																																																		
B	TUN		Guideway Tunnel	Storage and testing of excavated soils from tunnel limits advance rate of tunneling.	1. Provide adequate storage and handling facility to accommodate testing activity. 2. Work with SAR to develop acceptance criteria, to minimize or eliminate testing requirements. 3. Require the contractor to provide a detailed workplan for testing, sorting and stockpile prior to hauling.	C	2	3	3	3	35%	6	9	Contractor is attempting to obtain the use of additional Caltrans parcel between Fourth & Fifth and Harrison & Bryant to help facilitate this work and provide additional storage area. .	2/5/14 TUN1124																																																		

MOS Station

Risk Register

PROJECT RISK REGISTER														Risk Profile		Severity Score		Legend		RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)									
Central Subway Project San Francisco														Likelihood Score		1 2 3 4 5		Low (1)		Medium (2)		High (3)		Very High (4)		Significant (5)		Legend	
REV : 15														5		4		< 10%		> 10% - 50%		> 50%		> 75% - 90%		> 90%		< 3 Low	
DATE ISSUED : 11/08/12														3		2		< \$250K		> \$250K - \$1M		> \$1M - \$3M		> \$3M - \$10M		> \$10M		3 - 9 Medium	
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Final Risk ID	Contract I.D	Muni Risk REF. I.D	Type	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date														
21	MOS	20.03.01.2	Moscone Station	Incomplete cutoff of groundwater at MOS	1. Require additional grouting to limit leakage to permissible level. 2. Include probable grouting work in cost & schedule estimates.	C	1	1	-	1	10%	1	1	Mitigation measure to be made part of the contract documents	4/28/15 MOS1150														
22	MOS	20.03.01.5	Moscone Station	Public complaints result in unanticipated restrictions on construction at MOS.	1. Public outreach. 2. Maintain regular and open communications so Public knows construction plans and progress at all times. 3. Require Contractor to assist Public Outreach efforts, maintain access to businesses and assist with deliveries and pick-ups, control noise and vibration, continuously cleanup site, and provide pedestrian and vehicle traffic and protection plans, informational signage, ADA ramps and minimum sidewalk widths. 4. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed. 5. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. 6. Quickly process and resolve damage and accident claims from the Public. 7. Assumed this work in cost & schedule estimates.	C	1	1	-	1	10%	1	1	Implementation of mitigation measures part of Communication/Outreach plan and certain aspects to be included in the contract documents.	9/16/16 MOS1230														
F	MOS		Moscone Station	Underground obstructions Stations (MOS)	1. Provide adequate allowance for differing site conditions to address unknown underground obstructions. 2. Show field verified obstructions discovered during previous contracts on contract drawings. 3. Make as-built drawings of structures adjacent to the work available to the contractor as reference drawings.	C	4	2	2	2	80%	8	16	Mitigation measures have been implemented.	4/28/15 MOS1150														
27	MOS		Moscone Station	Loss of business results in unanticipated restrictions on construction at MOS.	1. Public outreach. 2. Maintain regular and open communications so Merchants know construction plans and progress at all times. 3. 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. 4. Require barriers to protect pedestrians and shield them from noise and dirt from construction. 5. Work with MOEWD to increase cleanup of the area and assist pedestrians across streets. 6. Include this work in cost & schedule estimates.	C	1	2	1	2	10%	2	3	Mitigation measures to be implemented and to the extent possible requirements will be written into contract documents to minimize disruptions to businesses.	4/28/15 MOS1150														
UMS Station																													
F	UMS		Union Square market Street Station	Underground obstructions Stations (UMS)	1. Provide adequate allowance for differing site conditions to address unknown underground obstructions. 2. Show field verified obstructions discovered during previous contracts on contract drawings. 3. Make as-built drawings of structures adjacent to the work available to the contractor as reference drawings.	C	4	2	2	2	80%	8		Mitigation measures have been implemented.	8/12/15 UMS 1320														
28	UMS	20.03.02.2	Union Square market Street Station	Incomplete cutoff of groundwater at UMS.	1. If needed, perform grouting to mitigate the intrusion of groundwater. 2. Include in cost & schedule estimates.	C	8	2	1	2	0%	12	24	Mitigation measures in the form of consolidation grouting to be included in contract documents	8/12/15 UMS1320														
32	UMS	20.03.02.9	Union Square Market Street Station	Delay in advanced utility relocation delays ground treatment and start of construction. (Uty 2)	1. Intensive coordination with and commitment from utility owners. 2. Early completion incentive for utility relocation contract. 3. Enforce franchise agreements.	R	1	1	1	1	10%	1	2	Advance utility relocation contract (1251) is underway with a projected completion date in advance of advertising UMS construction contract, reducing this risk of cost and schedule impacts	7/31/12 N-ATT00100														
33	UMS	20.03.02.10	Union Square market Street Station	Damage to utilities at UMS causes delay to construction and/or consequential cost. (very close to walls adjacent to relocated utility trenches)	1. Intensive utility coordination and investigation. 2. Relocate utilities out of the way of construction wherever possible. 3. Show utilities on reference plans. 4. Have utility contact information and procedure on plans. 5. Have contingency repair/restoration plans. 6. Include probable impacts to schedule & cost in estimates.	C	2	1	1	1	35%	2	4	Although mitigation measure have been fully implemented, Increased probability due to proximity of new pile design to existing relocated utilities.	7/19/16 UMS1410														

Risk Register

PROJECT RISK REGISTER														Risk Profile		Severity Score		Legend		RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)									
Central Subway Project San Francisco														Likelihood Score		1 2 3 4 5		Low (1)		Medium (2)		High (3)		Very High (4)		Significant (5)		Legend	
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DATE ISSUED : 11/08/12														3		2		< \$250K		<> \$250K - \$1M		<> \$1M - \$3M		<> \$3M - \$10M		> \$10M		3 - 9 Medium	
														1		1		< 1 Month		<> 1 - 3 Months		<> 3 - 6 Months		<> 6 - 12 Months		> 12 Months		> 10 High	
														1		1		LOW		MEDIUM		HIGH							
Final Risk ID	Contract I.D	Muni Risk REF. I.D	Type	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date														
34	UMS	20.03.02.11	Union Square market Street Station	Loss of business results in unanticipated restrictions on construction at UMS.	1. Public outreach. 2. Work closely with Merchant's Association. 3. Maintain regular and open communications so Merchants know construction plans and progress at all times. 4. Advertise that Stockton Street Merchants are Open for Business. 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. 6. Require barriers to protect pedestrians and shield them from noise and dirt from construction. 7. Work with the Union Square BID or MOED to increase cleanup of the area and assist pedestrians across streets. 8. Include this work in cost & schedule estimates.	C	2	3	2	3	35%	5	10	Mitigation measures to be implemented and to the extent possible requirements will be written into contract documents to minimize disruptions to businesses.	9/7/16 UMS1430														
35	UMS	20.03.02.14	Union Square Market Street Station	Ground support structure causes groundwater table to rise which results in leakage into adjacent structures. (new structure might create a dam that results into leaks into new and existing structures)	1. Perform detailed hydrogeologic modeling and analysis. 2. Monitor groundwater table at multiple locations and passive measures as necessary to mitigate. 3. Reference the Tech memo in contract documents. 4. Include probable costs in estimate.	C	1	2	-	1	10%	1	2	Mitigation measures incorporated in design based on updated Hydrogeologic analysis and report	9/7/16 UMS1430														
36	UMS	20.03.02.15	Union Square Market Street Station	Damage to buildings or utilities as a result of heave from jet grouting at UMS.	Utilize tangent piles combined with surface jet grouting.	C	1	1	-	1	10%	1	1	Mitigation measures implemented in contract documents to reduce risk	4/14/15 UMS1310														
37	UMS	20.03.02.16	Union Square market Street Station	Damage to adjacent buildings at UMS due to surface construction activities.	1. Require protective barriers. 2. Have an emergency and rapid response customer focused task force to fix damaged facilities. 3. Quickly repair and reimburse resulting costs. 4. Include probable cost in estimate.	C	1	2	-	1	10%	1	2	Mitigation measures implemented in contract documents to reduce risk	9/7/16 UMS1430														
38	UMS	20.03.02.17	Union Square market Street Station	Tiebacks in Stockton Street mislocated (in path of walls and would have to be dug out within 20ft of surface level)	1. Direct contractor to dig out the tiebacks on the plans. 2. Include allowance and differing site conditions clause in contract. 3. Include this work in the cost and schedule estimates.	C	2	2	1	2	35%	3	6	Mitigation measures fully implemented, Advance utility relocation contract (1251) confirmed location of tiebacks. Risk rating has been reduced due to a lowering of the probability of event occurring	5/6/14 UMS1170														
J	UMS		ROW	Macy's entrance conflict with new piles	1. Show known obstructions shown on as-built drawings on contract drawings. 2. Make as-built drawings available to contractor as reference drawings. 3. Have contractor field verify obstruction shown on as-built drawings and contract drawings	C	3	1	1	1	50%	3	6	Known obstructions are shown on the ES drawings. Allowance for differing site conditions added to UMS Station contract.	1/23/14 UMS1060														
Q	UMS		Union Square market Street Station	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. 2. Clearly define shop drawing criteria in the technical specifications. 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																													
46	CTS	20.03.03.2	Chinatown Station and crossover cavern	Public complaints result in unanticipated restrictions on construction at CTS. (schedule and estimate for underground work assumes 6 day work week and 2 shifts per day)	1. Public outreach. 2. Maintain regular and open communications so Public knows construction plans and progress at all times. 3. Require Contractor to assist Public Outreach efforts, maintain access to businesses and assist with deliveries and pick-ups, control noise and vibration, continuously cleanup site, and provide pedestrian and vehicle traffic and protection plans, informational signage, ADA ramps and minimum sidewalk widths. 4. Require barriers to protect pedestrians and shield them from noise and dirt from construction. 5. Work with MOED to increase cleanup of the area and assist pedestrians across streets, as needed. 6. Monitor and enforce noise, vibration, ADA, traffic, and cleanup requirements. 7. Quickly process and resolve damage and accident claims from the Public. 8. Include this work in cost & schedule estimates.	C	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														

Risk Register

PROJECT RISK REGISTER														Risk Profile		Legend		RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)											
Central Subway Project San Francisco														Likelihood Score		Severity Score		Low (1)		Medium (2)		High (3)		Very High (4)		Significant (5)		Legend	
REV : 15														5		4		< 10%		<= \$250K - \$1M		> 50%		<= 75% - 90%		> 90%		< 3 Low	
DATE ISSUED : 11/08/12														4		3		< \$250K		<= \$250K - \$1M		> 75%		<= 75% - 90%		3 - 9 Medium			
														3		2		< \$250K		<= \$250K - \$1M		> 75%		<= 75% - 90%		> 90%		> 10 High	
														2		1		< 1 Month		<= 1 - 3 Months		> 75%		<= 75% - 90%		> 90%		SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)	
Final Risk ID	Contract I.D	Muni Risk REF. I.D	Type	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date														
47	CTS	20.03.03.5	Chinatown Station and crossover cavern	Revisions to the SEM sequence during construction at CTS, which differ from the plan, could lead to significant delays if not sufficiently pre-planned.	1. Revisit sequence strategy during FD. 2. Address change through flexible bid schedule. 3. Utilize contractor pre-qualification: 4. Require experienced SEM Contractor, approved SEM procedures, and continuous SEM inspection. 5. Provide attractive T + C's (e.g. differing site conditions) Conduct peer review for FD 6. Provide performance incentives including crew incentives for production. 7. Require shotcrete, as needed. Include shotcrete & inspection costs in estimate. 8. Include language on drawing or in specification that allocates all risk to the contractor for change in sequence.	D	-	5	3	4	0%	-	-	Language to transfer risk to contractor in case of proposed changes to sequence have been included in the updated contract specifications to 01 25 00 Substitution, 1.02C. This risk to be retired.	4/22/16 N-CTS9730														
48	CTS	20.03.03.6	Chinatown Station and crossover cavern	Incomplete drawdown of groundwater. (inside of box and inside of caverns)	1. Require additional grouting to limit leakage to permissible level. 2. Include probable grouting work in cost & schedule estimates. 3. Include allowance for dewatering within cavern during construction.	C	2	2	1	2	35%	3	6	Mitigation measures have been included in contract documents	5/1/16 CTS1140														
50	CTS	20.03.03.11	Chinatown Station and crossover cavern	CTS station contractor delayed by tunnel contractor since station platform construction cannot start until tunnels have been finished.	1. Include provisions in CTS contract identifying the potential waiting period for tunnel contractor. 2. Actively monitor progress towards schedule milestones	C	2	1	2	2	35%	3	6	Constraints on CTS contractor added to specification "Work Sequence and Constraints"	12/16/13 TUN1122														
52	CTS	20.03.03.12	Chinatown Station and crossover cavern	Unacceptable settlement and impact on major utilities at CTS. (OLD SEWERS AND OTHERS WITHIN 20FT SPACE BETWEEN TOP OF CAVERN AND STREET LEVEL)	1. Evaluate effect of potential settlement on utilities. 2. Slip-line sewer by TBM contractor. 3. Reinforce other utilities as needed, monitored during construction, and repair / replace, as needed. 4. Have contingency repair/restoration plan. 5. Utility contact information and procedure will be on plans. 6. Develop an allowance for utility repair. 7. Include probable cost in estimate.	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														
F	CTS		Chinatown Station and crossover cavern	Underground obstructions stations (CTS)	1. Provide adequate allowance for differing site conditions to address unknown underground obstructions. 2. Make as-built drawings of structures adjacent to the work available to the contractor as reference drawings	C	4	2	2	2	80%	8		Mitigation measures have been implemented.	10/9/17 CTS1500														
U	CTS		Chinatown Station and crossover cavern	Proximity at junction of head house boundary wall and school yard may result in relocation of school yard during wall construction		C	1	1	1	1	10%	1	2	Project configuration changed to eliminate encroachment. Risk converted to Construction risk from Risk 55.	8/16/13 CTS1010														
General																													
56	GEN	40.00.1	Unallocated Contingency	Escalation more / less than expected (Increase in bid prices to hedge possible increases in cost of volatile commodities.)	1. In the current economic environment, escalation is just as likely to be less as more than anticipated. 2. For volatile materials and equipment, provide substantial payment for stored materials and equipment to encourage early procurement and an escalation clause for volatile commodities in contracts.	M	2	3	-	2	35%	3	6	Current projected escalation rates remain below those reflected in Program budget.	1/10/18 STS1042														
Demolition, Clearing , Earthwork																													
Site Utilities, Utility relocations																													
60	UTL	40.02.6	Utilities	Utility companies do not complete relocations in timely manner. (UTY 1 and UTY 2)	1. Continue negotiations with utility owners. 2. PM/CM will assist utilities with access and to schedule their work. 3. Require Utility Relocation contractor to provide assistance to utilities. 4. Include in contract allowance for Contractor to assist Utilities and incentive for early completion. 5. Enforce franchise requirements.	C	2	1	1	2	35%	4	4	Work is complete on one advanced contract and underway on the other.	6/31/12 N-ATT00100														
61	UTL	40.02.7	Utilities	Utility relocation is delayed due to non-standard materials not being available. (UTY 1 and UTY 2) AWSS special material ?	Work with utilities and contractor to identify and acquire non-standard materials well in advance of time that they are needed.	C	1	1	3	2	10%	2	4	Mitigations measures being implemented to manage risk	6/7/12 PC 00-020														
A	STS		Utilities	Timely resolution of Sewer lines south of portal.	1. Develop alternatives that do not require creation of a new sewer line. 2. Work together with SFPUC to find mutually beneficial solutions. . 3. Provide evidence of solutions developed for similar situations from existing SFMTA and/or other transit agencies. 4. Develop detailed schedule of activities required for resolution including milestones for go - no go actions which will not impact the overall MPS.	R	1	2	1	2	10%	2	3	\$ 2.1 million in budget. Could be as high as \$8 million. Continuing to work with SFPUC to find solution.	5/13/12 PDS 1870														

Risk Register

PROJECT RISK REGISTER														Risk Profile		Legend		RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)											
Central Subway Project San Francisco														Likelihood Score		Severity Score		Low (1)		Medium (2)		High (3)		Very High (4)		Significant (5)		Legend	
REV : 15														5		4		< 10%		> 10% - 50%		> 50%		> 75% - 90%		> 90%		< 3 Low	
DATE ISSUED : 11/08/12														3		2		< \$250K		> \$250K - \$1M		> \$1M - \$3M		> \$3M - \$10M		> \$10M		3 - 9 Medium	
														2		1		< 1 Month		> 1 - 3 Months		> 3 - 6 Months		> 6 - 12 Months		> 12 Months		> 10 High	
														1															
Final Risk ID	Contract I.D	Muni Risk REF. I.D	Type	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date														
Environmental Mitigations																													
65	TUN	40.04.1	Environmental	Archeological/Cultural findings during construction increases schedule and/or cost. (Portal) AROUND 10%	1. Provide on-call Archeologist. 2. Provide allowance and procedure in contract for Archeological/Cultural discoveries.	C	1	2	1	2	10%	2	3	Additional boring taken in vicinity of portal indicated no evidence of Archeological/Cultural resources.	10/24/12 TUN1080														
66	MOS		Environmental	Archeological/Cultural findings during construction increases schedule and/or cost.(Moscone) AROUND 10%	1. Provide on-call Archeologist. 2. Provide allowance and procedure in contract for Archeological/Cultural discoveries.	C	3	2	1	2	50%	5	9	Mitigated - Current exposure only to those amount above those currently identified	4/28/15 TUN1150														
67	UMS		Environmental	Archeological/Cultural findings during construction increases schedule and/or cost. (UMS)...LESS THAN 1%	1. Provide on-call Archeologist. 2. Provide allowance and procedure in contract for Archeological/Cultural discoveries.	C	3	2	2	2	50%	6	12	Mitigation measures to be implemented in contract documents	8/12/15 UMS1320														
68	CTS		Environmental	Archeological/Cultural findings during construction increases schedule and/or cost. (CHINA TOWN) ...AROUND 10%	1. Provide on-call Archeologist. 2. Provide allowance and procedure in contract for Archeological/Cultural discoveries.	C	3	2	2	2	50%	6	12	Mitigation measures to be implemented in contract documents	10/9/17 CTS1500														
Auto/bus/van access ways, roads																													
70	GEN	40.08.1	Vehicle access	Change in traffic control requirements after bid.	1. Provide unit bid items to reimburse contractor for traffic management costs outside their control. 2. Include allowance in construction contracts for PCOs.	C	3	4	1	3	50%	8	15	Mitigation measures implemented.	5/22/17 STS1020														
71	TUN	40.08.2	Vehicle access	Power supply interruptions to TBM's (no dual power feed currently planned)	Obtain TBM power directly from PG&E substation.	C	1	2	-	1	10%	1	2		2/5/14 TUN1124														
Train Control and Signals																													
72	STS	50.01.1	Train Control and Signals	Interface new Signaling and Train Control system to existing at Fourth and King	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														
75	STS	50.01.1	Train Control and Signals	Signals and Comms equipment may need to be stored off site	Require contractor to store equipment offsite or at the factory until it is needed.	C	3	1	-	1	50%	2	3	Special Provisions address offsite storage.	11/6/17 STS1070														
PR73	STS	50.01.1	Train Control and Signals	Delays or complications of design & construction by others – SF Dept. Of Technology, 3rd party utilities	Early engagement and coordination for agreements and plan development to avoid construction delays.	D	2	1	1	1	35%	2	4		5/30/12 DP3C530														
PR74	STS	50.01.1	Train Control and Signals	Incomplete design by City staff – not prioritized to complete 1256 work on time	Monitor development of design and recommend exercise of contract options to supplement City staff.	D	3	1	1	1	50%	3	6	Options have been exercised to avoid impacts.	5/30/12 DP3C530														
PR78	STS	50.01.1	Train Control and Signals	Delays or complication by other SFMTA projects delays CSP: radio, fare collection, C3/TMC	1. Monitor other projects' developments. 2. Develop contingency plans as needed to avoid 1256 delay of revenue service.	C	2	1	1	1		2	4		7/27/12 FDS 1940														
Traffic signals & Crossing Protn.																													
76	GEN	50.05.2	Traffic Signals & Crossing Protection	CS system may need re-design to new system (not yet identified - Coordinating with SFMTA Accessible Services on the wayfinding system for the visually impaired.)	Include new Landmarking/Wayfinding system requirements into stations.	D	1	2	-	1	10%	1	2	DP3 preparing proposal to implement "Landmarking/Wayfinding" system	7/27/12 FDS 1940														
Purchase or lease of Real Estate																													
79	TUN	60.01.1	ROW	Delay in obtaining tunnel easements (3 #) (goes to condemnation) - Costs of ROW may cost more than expected	1. Engage Owners in negotiations as soon as possible. 2. PM/CM to provide real estate specialists to facilitate.	R	1	1	-	1	10%	1	1	Right of possession obtained on all three parcels. Cost agreement reached with 1455 Stockton & 801 Market.	9/7/2012														
80	MOS	60.01.2	ROW	Delay in obtaining access to Moscone station sites (goes to condemnation).	1. Assure that adequate float is contained in the Moscone schedule for condemnation. 2. Engage Owners in negotiations as soon as possible. 3. PM/CM to provide real estate specialists to facilitate.	R	1	3	3	3	10%	3	6	Continuing to negotiate cost with owner in parallel with condemnation proceedings.	7/1/12 FDS 1240														
Vehicles																													
83	GEN	70.00.01	Vehicles	Cost of vehicles may be more than estimated due to sole source and small order	Time the procurement of the vehicles to be part of the procurement of the existing Breda LRVs.	R	4	4	4	4	80%	16	32	CSP vehicles to be included in overall SFMTA vehicle procurement contract.	11/17/17 STS 1500														
4																													
89	GEN	80.02.2	Final Design	3rd Party reviews of Design documents delays completion of Final Design.	Provide assistance to 3rd Parties to facilitate their reviews and obtain concurrent partial approval for underground work.	D	1	2	2	2	10%	2	4	3rd Party coordination meeting ongoing.	5/23/12 FDS 1930														
90	GEN	80.01.3	Final Design	Multiple outside design consultants & mix of SFMTA / City could result in delays and additional costs due to complexities in design coordination	Conduct regular coordination meeting, integration meetings, interdisciplinary meeting, design oversight reviews and partnering to encourage and promote a positive work environment.	D	2	2	2	2	35%	4	8	Consultant Design Manager and Design Oversight personnel are responsible for design coordination.	5/23/12 FDS 1930														
Project Management for Design and Construction																													

Risk Register

PROJECT RISK REGISTER														Risk Profile		Severity Score					Legend	RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)				
Central Subway Project San Francisco														Likelihood Score	1	2	3	4	5	Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	<3 Low	2
REV : 15														5	4	3	2	1	< \$250K	> \$250K - \$1M	> \$1M - \$3M	> \$3M - \$10M	> \$10M	3 - 9 Medium	SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)	
DATE ISSUED : 11/08/12														5	4	3	2	1	< 1 Month	> 1 - 3 Months	> 3 - 6 Months	> 6 - 12 Months	> 12 Months	>10 High		
Final Risk ID	Contract I.D	Muni Risk REF. I.D	Type	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date											
94	GEN	80.04.3	Project Management	Bid protests delay award and NTP for construction contracts	Strictly adhere to Procurement Best Practices and Protest Procedures.	M	1	2	2	2	10%	2	4	Mitigation measures being implemented	2/19/13 FDS 1900											
95	GEN	80.04.4	Project Management	Contractor default during construction impacts schedule. (key sub-contractor)	Assist Bonding company in transition and to maintain schedule.	C	1	2	2	2	10%	2	4		11/17/17 STS 1500											
97	GEN	80.04.6	Project Management	Conflicts arising from Contractors working concurrently in the same work space results in delays and claims for additional costs (systems / civil interface)	Limit the number of contractors working in the same workspace by scheduling contracts appropriately and demobilizing contractors upon substantial completion.	C	2	3	2	3	35%	5	10	Mitigation measures being implemented	11/17/17 STS 1500											
PR82	GEN		General	Confined work spaces along alignment can impact productivity and result in significant cost and schedule impacts.	Account for cost and schedule impacts in estimate and schedule for contract packages	C	1	1	1	1	10%	1	2		11/17/17 STS 1500											
99	GEN	80.04.8	Project Management	Breakdown in relationships between SFMTA and Contractors during construction results in increased claims and delays to the overall construction schedule.	1. Executive partnering and alternate dispute resolution. 2. Provide incentives in construction contracts in addition to penalties	C	2	5	3	4	35%	8	16	Mitigation measures being implemented	7/27/12 FDS 1940											
100	GEN	80.04.9	Project Management	Procurement of long lead items delays work. (fans, rails and special track work, TPSS, Escalators, elevators, TBM)	1. Include schedule milestones for procurement of and substantial payment for stored long lead items in contract to encourage early procurement. 2. Monitor procurement of critical items.	M	1	2	2	2	10%	2	4	Not considered a project risk.	11/17/17 STS 1500											
102	GEN	80.04.11	Project Management	Late finish of early contract delays later contracts and extends PM / CM and incurs additional costs	1. Actively manage contracts and include incentive provisions for early completion in critical contracts. 2. Add buffer float to critical path to actively manage schedule contingency	C	2	1	2	2	35%	3	6	LONP 1 & 2 initiated to reduce this risk. See Risk 86. The mitigation of risks associated with early contracts will address this risk. Risk rating reduced due to mitigation measures implemented	12/30/20 MS 0010											
107	GEN	80.04.12	Testing and startup	Market risk in achieving 100% bonding capacity (cost and reduction in contractors able to get bonding)	Structure construction contracts not to exceed \$250 million	M	2	5	-	3	35%	5	10	All contracts expected not to exceed \$250 million	7/27/12 FDS 1940											
T	GEN	80.04.12	Testing and startup	Delay on station emergency ventilation approval	1. Work with SFFD to develop a plan acceptable to each party. 2. Incorporate SFFD requirements into construction documents.	R	2	5	-	2	35%	4	10	SFFD agreed to the proposed plan by SFMTA	7/27/12 FDS 1940											
V	GEN		MOS & CTS Stations	Incorporation of revised Planning Zoning/ development criteria for Moscone Station TOD impact MOS and CTS construction contract.	1. Participate and provide input of CSP constraints to SFMTA Real Estate during process of initial task to define best use. 2. Integrate work with SFMTA Real Estate into CSP.	D	3	2	2	2	50%	6		12/13/16 N-CTS1225												
PR37	GEN		Testing and startup	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. 2. Investigate the timing of the permanent feed.	C	2	1	2	2		3	6	Cost for First and Redundant electrical services need to be included in Cost Estimate.	5/3/18 STS1080											
Insurance, permits etc																										
103	GEN	80.06.1	Permits	Difficulty in getting required permits.	1. Coordinate with permit officials and request permits as early as possible. 2. Obtain assistance obtaining permits from PM/CM & FD Consultants.	C	1	2	1	2	10%	2	3		12/18/12 FDS 1275											
104	STS	80.06.2	Approvals	CPUC approval at Grade Crossing for G0164d takes longer to negotiate / obtain than schedule allows	1. Obtain Grade Crossing approvals at final CPUC inspection at the completion of construction. 2. Coordinate closely with CPUC until approval is received.	R	2	3	2	3	35%	5	10	Providing preview of 90% submittal to CPUC and will resolve comments/issues from PE before finalizing design documents	7/27/12 FDS 1940											
105	GEN	80.06.3	Testing and startup	Electrical service delays startup and testing.	1. Submit applications for new service as early as possible. 2. Coordinate closely with PG&E to ensure timely delivery of electrical service.	C	1	2	1	2	10%	2	3	Applications for new service have been submitted to PG&E.	11/17/17 STS 1500											
106	GEN	80.06.4	Labor relations	Risk of Labor dispute delaying the work.	Enforce designated gate for employees of the contract in dispute so that the rest of the work is not delayed.	C	3	3	2	3	50%	8	15		11/17/17 STS 1500											
Unallocated Contingency																										
111	GEN		Unallocated Contingency	Major Earthquake stops work	Include Force Majeure clause in contracts.	C	1	5	3	4	10%	4	8	Force Majeure clause included in contracts.	12/30/20 MS 0010											

Risk Register

PROJECT RISK REGISTER										Risk Profile															
Central Subway Project San Francisco REV : 15 DATE ISSUED : 11/08/12										Likelihood Score	Severity Score						Low (1)	Medium (2)	High (3)	Very High (4)	Significant (5)	Legend			
										5	1	2	3	4	5		< 10%	<> 10% - 50%	> 50%	<> 75% - 90%	> 90%	< 3 Low	RISK RATING = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)		
										4													2		
										3													3 - 9 Medium	SCORE = PROBABILITY X (COST IMPACT + SCHEDULE IMPACT)	
										2													> 10 High		
1																									
Final Risk ID	Contract I.D	Muni Risk REF. I.D	Type	Risk Description	Mitigation Description	Risk Category	Probability %	Cost Impact	Schedule Impact	Calc Impact	Calc %	Risk Rating	Score	Status	Must Complete by Date										
112	GEN		Unallocated Contingency	Major safety event halts work	1. Require contractor Safety plan to address this risk. 2. CM inspections to ensure that safety plan and procedures are implemented.	C	1	5	3	4	10%	4	8	Health and Safety provisions included in contracts. CS Program provides full-time Safety Manager.	12/30/20 MS 0010										

Risk Mitigation Status
Risk Reference: 83

Risk	Mitigation Strategy
Cost of vehicles may be more than estimated due to sole source and small order	1. Time the procurement of the vehicles to be part of the procurement of the SFMTA LRV procurement contract.

Initial Assessment: 1, 1.5, 2
Current Assessment: 1, 2, 2 – Requirement Risk

Risk Owner: L. Ames

Status Log:

April 2012 Meeting:

1. Fleet procurement plan needs to be checked with Fleet agency.
2. Lewis Ames is working at a program level with Operations to look at alternatives and options for procurement.

May 2012 Meeting:

- 1 An RFP is being developed by CH2M Hill for high-floor vehicles.
- 2 SFMTA will attempt to attach the procurement of the four CS vehicles to a procurement contract of another transit property that is currently pursuing procurement of vehicles.

June 2012 Meeting:

- 1 No status update.

September 2012 Meeting:

1. CH2M Hill is now preparing an update of the LRV Procurement Plan. CH2M Hill is working under for SFMTA Transit and led by John Haley’s staff under an on-call contract to support the update and help integrate the RFP vehicle specification process led by Elson Hao
2. Julie Kirschbaum, Manager of Service Planning/TEP is leading an effort to produce a new city-wide travel forecast as the means to support the capacity need for LRV fleet plan requirements in 2025.

The Plan is expected to be circulated, presented, approved; in 2012 etc. specific next steps in the 3rd and 4th quarters of 2012 will be provided in the next report.

3. The Procurement Plan is expected to include assessing the feasibility for SFMTA to attach the procurement of the four CS vehicles to a procurement contract of another transit property that is pursuing procurement of vehicles.

October 2012 Meeting:

1. Risk increased from (1,2, 2) to risk rating (4,4,16)
2. There is a possibility that the cost of the LRV significantly exceed the budget
3. Risk to be reviewed next meeting, status of LRV procurement plan to be advised

Risk Mitigation Status

Risk Reference: 83

- 4. SFMTA Transit Division issued a revised procurement plan to the FTA in October identifying the following actions in the near term;
 - a. Provide ROM Cost, funding schedule and cashflow drawdown November 2012
 - b. LRV Concept report December 2012
 - c. Service Demand Modeling Updates December 2012
 - d. Central Subway Service Plan Model Revisions December 2012
 - e. Finalize Fleet Strategy including Base Order Qty December 2012
 - f. Complete Acquisition Plan December 2012
 - g. Release updated Fleet Management Plan to FTA February 2013
 - h. Release updated Central Subway Service Plan to FTA February 2013
 - i. Release updated LRV Procurement Plan to FTA February 2013

November 2012 Meeting:

- 1.

Risk Mitigation Status**Risk Reference: 7**

Risk	Mitigation Strategy
Potential for excessive settlement of BART tunnels - SIGNIFICANT COMPENSATION GROUT REQUIRED OVER ESTIMATE ALLOWANCES).	<ol style="list-style-type: none"> 1. Early and extensive co-ordination with BART. 2. Survey BART tunnels to determine exact locations. 3. Checking effect of maximum expected settlement on tunnels. 4. Requiring EPBM TBM, 5. Contractor to demonstrate effective control of ground settlements and correction of settlements by compensation grouting, and pre-installation of compensation grout piping under BART tunnels prior to tunneling reaching Market St. 6. Require repair/adjustment plan. 7. Develop contingency plan to provide bus bridge, if needed. 8. Requiring non-stop weekend excavation beneath BART tunnels. 9. Monitor movement of BART tunnels in real-time. 10. Repair/adjust as needed. 11. Included probable cost in estimate.

Initial Assessment: 1, 1.5, 2**Current Assessment:** 3, 2.5, 7.5 – Construction Risk**Risk Owner:** S. Wilson**Status Log:**

February 2012:

1. Coordination with BART has been ongoing.
2. The BART tunnels have been surveyed.
3. An assessment of the effect of maximum anticipated settlement has been done.
4. Tunnel contract specifications require compensation grouting.
5. Tunnel contract specifications require the contractor to measure settlements in real time.
6. Tunnel contract specification require contractor to provide Action Level Plans that details measures to be taken if observed settlements and/or distortions exceed specified values.
7. Tunnel bid documents included bid items for Building Protection, including the BART tunnels.
8. EPBM TBM required for tunnel contract.
9. Coordinated with BART and Independent Review Panel (IRP) on specific check points for assessing effectiveness of control of the EPBM tunneling operations and related ground movements.
10. BART analysis of bus bridging concept reveals that it is not feasible due to lack of capacity in the system to handle the bridging.
11. Recommend to reduce this risk rating.

June 2012 Meeting:

1. Contractor and construction manager have gone through BART background check and security training that will allow the contractor to perform the settlement monitoring.

Risk Mitigation Status

Risk Reference: 7

November 2012 Meeting:

1. Coordination with BART and IRP ongoing

Risk Mitigation Status
Risk Reference: 32

Risk	Mitigation Strategy
Delay in advanced utility relocation delays ground treatment and start of construction. (Uty 2)	<ol style="list-style-type: none"> 1. Intensive coordination with and commitment from utility owners. 2. Early completion incentive for utility relocation contract. 3. Enforce franchise agreements.

Initial Assessment: 1, 1, 1
Current Assessment: 1, 1, 1 – Requirement Risk

Risk Owner: M. Benson

Status Log:

September 2011:
 Advance utility relocation contract (1251) is underway with a projected completion date in advance of advertising UMS construction contract.

January 2012 Meeting:

1. CN1251 is 77% complete as of end of December.
2. Utility companies are beginning cutovers to new joint trench facilities.

March 2012:

1. PG&E and AT&T coordination is ongoing. AT&T has brought on additional resources to keep schedule.

April 2012

1. PG&E and AT&T coordination is ongoing.

May 2012

1. PG&E and AT&T coordination is ongoing.
2. AT&T has brought on further additional resources to keep schedule.
3. AT&T schedule has slipped based on their current staffing levels.
4. SFMTA will request that AT&T begin night work to finish their cutover work ASAP.

June 2012

1. No status update

July 2012

1. No Status update

November 2012 Meeting:

1. Completion and close out of AT&T work to be tracked under this risk.
2. Currently expecting completion by end of November 2012.

Risk Mitigation Status**Risk Reference: 74**

Risk	Mitigation Strategy
Insufficient time in schedule for testing and commissioning S&C	<ol style="list-style-type: none"> 1. Increase duration for this task in the master schedule. 2. Add Division 1 Testing and Commissioning Specification including requirements for Plan, personnel and Committee.

Initial Assessment: 4, 2.5, 10**Current Assessment:** 0, 0, 0 – Requirement Risk**Risk Owner:** C. Campillo**Status Log:**

December 8, 2009 Meeting:

1. R. Nguyen was identified as the risk owner.
2. Risk Mitigation Strategy needs to be rewritten.
3. This risk is part of DP3 contract
4. R. Nguyen to include in the rewritten risk mitigation strategy: a Start-Up Plan, identification of a Start-Up Manager; identification of a Start-Up Committee.

January 21, 2010 Meeting:

1. R. Nguyen indicated that he interprets this risk as “systems testing.” He presented the schedule activities associated with this risk and the related durations and float changes that have occurred over the period from August 2008 to October 2009. It was agreed that more detail is needed in the schedule to define the testing.
2. R. Edwards will identify an individual to provide more detail on start up and testing requirements. Whatever the result of obtaining this input, it appears that more time will be needed to accomplish this work.
3. It may be necessary to use some Buffer Float to account for any additional time to conduct the testing. The Project can use “some” of this float now that it has permission to perform final design.
4. R. Nguyen rewrote the mitigation strategy per his action at the last risk meeting; however, as a result of comments at the meeting, he needs to revise the strategy to include “testing of train controls and signals. R. Nguyen will establish the scope of this risk and a more detailed schedule of activities and durations for presentation at the next risk mitigation meeting.

February 18, 2010 Meeting:

1. R. Edwards indicated that there is a need to evaluate the schedule to determine the full impact of this risk. He says that the Project shows 80 days for start up and testing-the LA Gold Line had greater than this. R. Edwards will break down the start up and testing into more activities, mainly to identify predecessor activities so that milestones can be set for these activities. R. Edwards will work with R. Whitwell to assist in addressing this risk.

March 11, 2010 Meeting:

1. R. Whitwell developed the schedule activities for the S&C per the action at the last risk mitigation meeting. He is working on assigning durations to these activities and will meet with Project Controls on 3/18/10 for this purpose.
2. R. Edwards will work with R. Whitwell to determine options that are reasonable, but aggressive, for starting S&C activities earlier in order to minimize or negate impact on project completion and Revenue Service.
3. R. Edwards will report on the above two activities at the next risk mitigation meeting. It was stated that S&C includes implementing the Safety Certification Checklist.

Risk Mitigation Status

Risk Reference: 74

April 27, 2010 Meeting:

1. There was not much progress made this last month on this risk mitigation. R. Whitwell is working on assigning durations to the S&C activities that have been identified and has met with Project Controls for this purpose. R. Edwards will work with R. Whitwell to determine options that are reasonable, but aggressive, for starting S&C activities earlier in order to minimize or negate impact on project completion and Revenue Service. R. Edwards stated that four months is not enough time for the S&C task, however, identification of early work could make this happen. R. Edwards will report on this activity at the next risk mitigation meeting.

June 2, 2010 Meeting:

1. R. Edwards, R. Whitwell and meeting attendees concur that the four months presently in the schedule for the testing and commission work is insufficient. Without a different approach, this would take about 12 months to complete. R. Edwards is proposing to identify systems work that can be performed early so that portions of the start up and testing can be accelerated thus relieving the tight schedule. R. Whitwell is working to identify more detail in the schedule so that these early work items can be inserted in the schedule for Project review for viability. For example, work could start at Moscone while the CTS mining is continuing. It is anticipated that all systems work could be done up to the CTS before the CTS is completed. While this approach divides the system installation, it allows for an earlier start. Systems acceptance, of course, is based on the whole system.
2. R. Edwards will provide a preliminary schedule of accelerated systems activities at the next meeting that commence defining the approach he has identified to accelerate the systems work. In addition, he will provide a list, with pros and cons, of the above items that were suggested at the meeting to facilitate accelerating the work.

July 22, 2010 Meeting:

There has not been significant progress made on mitigation actions for this risk. R. Edwards is presently working with the designer to develop more detail in the schedule so that portions of the start up and testing activities can be identified for acceleration thus relieving the tight schedule. Progress in this regard will be reported at the next risk meeting tentatively set for August 26, 2010.

October 28, 2010 Meeting:

R. Whitwell is working with the designer to develop more detail in the schedule so that portions of the start up and testing activities can be identified for acceleration thus relieving the tight schedule. Progress in this regard will be reported at the next risk meeting.

January 2012 Meeting:

1. Recommend six additional months be added for testing and commissioning.
2. Mitigation strategy added: "Add Division 1 Testing and Commissioning Specification including requirements for Plan, personnel and Committee".

June 2012 Meeting:

No status update.

July 2012 Meeting:

1. Division 1 Section 01 80 00 Systems Testing, Integration, Start Up, and Commissioning updated and included in Section Index approval due 7/16/12

Risk Mitigation Status

Risk Reference: 74

August 2012 Meeting:

1. Draft RFP prepared for Sole Source Thales Advanced Train Control Contract. Schedule will be updated as scope of work is further defined.

September 2012 Meeting:

1. The current schedule includes 6 months for startup activities, preceded by 2 months of buffer float, schedule to be reviewed next meeting.
2. RFP issued proposals due 24th October 2012.

October 2012 Meeting:

1. Candidate to retire
2. There is approximately 6 months in the schedule for startup, 2 months of buffer float prior.
3. Review updated schedule for combined contract next meeting

November 2012 Meeting:

1. 1300 combined contract schedule reviewed – demonstrating adequate times for testing and commissioning two sets of commission for each startup – are in STS prior to pre revenue service.
2. This risk was retired by unanimous consent of the Risk Assessment Committee on 11/08/12.

Risk Mitigation Status
Risk Reference: 79

Risk	Mitigation Strategy
Delay in obtaining tunnel easements (3 #) (goes to condemnation) - Costs of ROW may cost more than expected	<ol style="list-style-type: none"> 1. Engage Owners in negotiations as soon as possible. 2. PM/CM will provide real estate specialists to facilitate.

Initial Assessment: 2, 3, 6
Current Assessment: 1, 1, 1 – Requirement Risk

Risk Owner: G. Hollins

Status Log:

October 2011 Meeting:

1. All Tunnel easements have been acquired.
2. Recommend to retire this risk from the project.
3. This risk will be revisited next month since not all easements have been obtained

November 2011 Meeting:

1. Right of entry received for properties requiring easement.
2. Costs have been identified through appraisals of properties.
3. Actual value of easements needs to be negotiated with property owners.
4. Added mention of battered piles at UMS headwalls to the risk description as they will cross property lines.

December 2011:

1. Right of possession for each of the three required parcels has been obtained.

January 2012 Meeting:

1. City Attorney's Office is finalizing final easement deed language and price for all three easements.
2. To date owners of 801 Market and 1455 Stockton have agreed to purchase price of easement.
3. Awaiting cost agreement with 790 Market.
4. Recommend to reduce the risk rating.
5. Risk rating reduced to 1, 1, 1.

February 2012 Meeting:

1. SFMTA is working with City Attorneys Office to finalized easement deed indemnity language for the 790 Market easement.

March 2012 Meeting:

1. SFMTA has provided the City Attorney's Office with additional information regarding tunnel and station related settlement at 790 Market. This information will be shared with the property owner at 790 Market in order to address their concerns of settlement and requests to include certain indemnity language in the tunnel easement. Current draft of the tunnel and station grouting licenses contain the requested indemnity language; CCSF Risk Manager, SFMTA and City Attorney do not feel owner's request for indemnity is appropriate in the easement deed.

Risk Mitigation Status

Risk Reference: 79

April 2012 Meeting:

1. No update from the March report-out.

May 2012 Meeting:

1. No update from the March report-out.

June 2012 Meeting:

1. No update from the March report-out.

July 2012 Meeting:

1. No update from the March report-out.

August 2012 Meeting:

1. The SFMTA has agreed to a final purchase price for the 801 Market and 1455 Stockton easements. 801 Market will transfer title (of the easement) through a purchase and sale agreement and 1455 Stockton will transfer title through a stipulated agreement. Final purchase price negotiations for easement under 790 Market are ongoing.

September 2012 Meeting:

1. Central subway has pre-possession for all 3 easements.
2. Negotiations continue on terms and conditions for 801 Market and 1455 Stockton.
3. Negotiations continue on final purchase price for 790 Market easement.

October 2012 Meeting:

1. Central subway has pre-possession for all 3 easements.
2. The SFMTA has executed a final stipulation agreement for possession of the easement under 1455 Stockton and all remaining funds have been transferred to the property owner.
3. Negotiations continue on terms and conditions for 801 Market.
4. Negotiations continue on final purchase price for 790 Market easement.

November 2012 Meeting:

1. Central subway has pre-possession for all 3 easements.
2. The SFMTA has executed a final stipulation agreement for possession of the easement under 1455 Stockton, final transfer of funds is pending signature of the easement deed from the property owner.
3. Negotiations continue on terms and conditions for 801 and 790 Market.

Risk Mitigation Status
Risk Reference: 104

Risk	Mitigation Strategy
CPUC approval at Grade Crossing for G0164d takes longer to negotiate / obtain than schedule allows	<ol style="list-style-type: none"> Grade Crossing approvals are not received until final CPUC inspection at the completion of construction. Close coordination with CPUC will continue until approval is received.

Initial Assessment: 2, 3.5, 7
Current Assessment: 2, 3, 5 – Requirement Risk

Risk Owner: C. Campillo

Status Log:

September 2011:
 1. Providing preview of 90% submittal to CPUC and will resolve comments/issues from PE before finalizing design documents.

January 2012 Meeting:
 1. Design team conducted informal review meeting with CPUC on 12/6/11 in preparation for 1256 pre-final submittal. CPUC provided 5 comments at the meeting that will be incorporated by the designers:

- Evaluate curb extension at Portal
- Evaluate curb tapering or end treatments
- Evaluate train coming sign at 4th/Bryant and 4th/Brannan
- Evaluate black out/no left turn sign
- Evaluate guide stripping

 2. CPUC issued Resolution SX-92 granting SFMTA approval to construct the new and modified grade crossings in March 11, 2010. This approval is good for 3 years.
 3. SFMTA will need to file for an extension of SX-92 at least 30 days before March 11, 2013.
 4. SFMTA will need to file CPUC Form G within 30 days after the completion of construction.
 5. Recommend to reduce this risk rating.
 6. Risk rating reduced to 2, 2.5, 5.

April 2012 Meeting:
 1. CPUC review comments are being incorporated into the 100% contract documents.

May 2012 Meeting:
 No update.

July 2012 Meeting:
 1. CPUC reviewed and approved 11 of 12 comments noted on RCF-066. RCF-66 Comment 49 remains open with no CPUC concurrence or Verification. Comment 49 states the Muni standard Red X "Crossbuck" signal is not consistent with MUTCD standards and is strongly discouraged by the CPUC for new construction. Comment 49 will be resolved with CPUC to assure successful application of SX-92 for new and modified grade crossings due February 11, 2013.

Risk Mitigation Status

Risk Reference: 104

August 2012 Meeting:

1. Mitigation measures to be discussed with CPUC at the August 16, 2012 Safety and Security Meeting.
2. State PUC to review documents, validate and sign off.

September 2012 Meeting:

1. Meeting held with CPUC.
2. Document review ongoing.

October 2012 Meeting:

1. Requirements have been incorporated into the design documents
2. Letter to be sent to CPUC for concurrence

November 2012 Meeting:

1. Confirmation of concurrence is being sought from PUC and is expected to be received by February 2013

Risk Mitigation Status
Risk Reference: 196

Risk	Mitigation Strategy
<p>The process of acquiring station licenses: acquisition/condemnation could significantly delay schedule and cost more than that presently planned.</p>	<ol style="list-style-type: none"> 1. Continue to negotiate with building owners 2. Required Notices and Appraisals to be completed 3. Commence condemnation process with City Attorneys

Initial Assessment: new risk

Current Assessment: 1, 4, 4 – Requirement Risk

Risk Owner: A.Clifford

Status Log:

September 2012 Meeting:

1. Risk 57 retired August 2012. New Risk 196 opened.
2. To date 9/27 required Station Licenses have been signed by the respective property owners.
3. 5/27 have reached verbal agreement or have been sent to the owner for signature.
4. 13/27 Licenses are outstanding
 - a. 7 of the 13 outstanding Licenses are progressing toward agreement
 - b. The Program team is currently preparing for condemnation on the following 6 Licenses should
 - 1 Stockton (Apple) & 212 Stockton (Bvlgari) (same property manager)
 - 216 Stockton (Dior)
 - 39 Stockton (Disney)
 - 19 Stockton (Armani) – unresponsive owner
 - 250 Fourth Street (Olivet University)
5. Targeting Board of Supervisors 10/23/12
 - a. remaining Notice of Intent to Appraise mailed 8/30/12
 - b. finalize list of condemnation properties by 9/14/12
 - c. remaining appraisals to be completed by 9/20/12
 - d. meeting with board clerk 9/21/12
 - e. government code offer letters to be sent by 9/27/12

November 2012 Meeting:

1. To date;
 - a. 11/27 required station licenses have been signed by the respective property owners.
 - b. 4/27 have reached verbal agreement or final drafts have been sent to the owner to sign.

Risk Mitigation Status

Risk Reference: 196

- c. 12/27 Station licenses remain outstanding, 3 of which are being negotiated with the a single property owner (Macy's) and are expected to reach agreement.
- 2. 9/27 Remaining station licenses + 2 remaining tunnel easements (Central Subway has possession of the two tunnel easements) have been calendared for the December 11th Board of Supervisors Hearing.
 - a. Central Subway project team and the City Attorney's office submitted draft Resolutions of Necessity to the Clerk of the Boards office November 5th.
 - b. The Central Subway Project team continues to negotiate with the property owners.
 - c. The required access for compensation grouting and building monitoring is expected approximately May 10th 2013 should this need to be obtained through the eminent domain process.

Risk Mitigation Status
Risk Reference: T

Risk	Mitigation Strategy
Delay to final design submittal due to delay of emergency ventilation approval by SFFD.	<ol style="list-style-type: none"> 1. Work with SFFD to develop a plan acceptable to each party. 2. Incorporate SFFD comments into the construction documents.

Initial Assessment: 2, 2, 4
Current Assessment: 2, 2, 4 – Requirement Risk

Risk Owner: R. Edwards

Status Log:

December 2011:

1. A meeting was held on 12/15/11 with SFFD and SFMTA to discuss emergency ventilation. SFFD agreed to the proposed plan by SFMTA as long as additional signage and lighting were provided in the stations to increase the safety of emergency responders in event of an emergency.

March 2012 Meeting:

1. Required emergency ventilation requirements will be incorporated into the construction documents.
2. Recommend to retire this risk from the risk register.
3. This risk is not retired. Final approval by SFFD on 100% construction documents still needed.

May 2012 Meeting:

1. SFFD requirements are being implemented in the construction documents.
2. A variance for the under stair requirement will be sought from SFFD.

June 2012 Meeting:

1. SFFD has conditionally approved the 3-fan configuration in the stations.
2. SFFD has conditionally approved the CFD analysis for each station based on the approval of one-hour tenability using illuminated platform edge, and access/egress route signage/demarcation.
3. Final approval by SFFD will occur during the DBI pre-application review for each station.

September 2012 Meeting:

1. SES review comments addressed, revised report submitted.

October 2012 Meeting:

1. Follow up required with SES to close out remaining comments and confirm concurrence

November 2012 Meeting:

1. Central Subway continue to work with SFFD to close out the remaining comments

Risk Mitigation Status
Risk Reference: 72

Risk	Mitigation Strategy
Interface new Signaling and Train Control system to existing at Fourth and King	New system will be connected in parallel with existing system until the new system has been tested and safety certified for operation.

Initial Assessment: 2, 3, 5
Current Assessment: 2, 3, 5 – Design Risk

Risk Owner: C. Campillo

Status Log:

October 2011 Meeting:

1. Recommend to retire this risk from the project.
2. Risk not retired. Systems contract drawings need approval of Muni Operations.

November 2011:

1. Functional requirements for the interface have been approved by Muni Operations.
2. 90% design drawings for Systems contract will be forwarded to Muni Operations for their review and comment.

January 2012 Meeting:

1. Concept design with SFMTA Operations recommended safety enhancements have been approved.
2. ECP for recommended safety enhancements prepared and will be submitted to CMB for approval.

February 2012:

1. CMB approved ECP for Operational & Safety Upgrades.
2. SFMTA Muni Operations signed off on ECP.
3. ECP being implemented by design team.
4. Recommend to reduce this risk rating.

September 2012 Meeting:

1. Update to be provided next meeting.
2. New plan to be advised, mitigation strategy to be revised.

October 2012 Meeting:

1. Central Subway have sent a letter to Ops including contract specifications, temporary and permanent requirements seeking concurrence
2. Ross/Carlos to provide a briefing next meeting regarding how signaling interface design has ensured functionality at the end of each weekend shutdown.

November 2012 Meeting:

1. Technical specifications now approved.
2. A presentation is to be given at the December Risk meeting to demonstrate that the signaling design has confirmed functionality can be maintained where required, and reinstated following the 6 weekend shutdowns.

Risk Mitigation Status
Risk Reference: 89

Risk	Mitigation Strategy
3rd Party reviews of Design documents delays completion of Final Design.	Provide assistance to 3rd Parties to facilitate their reviews and obtain concurrent partial approval for underground work.

Initial Assessment: 1, 2, 2
Current Assessment: 1, 2, 2 – Design Risk

Risk Owner: R. Edwards

Status Log:

January 2012 Meeting:

1. Meetings with Third Party reviewers have been and continue to be held with Muni Operations, DBI, SFFD, BART, etc.
2. Late review comments will be handled as addendum.

May 2012 Meeting:

1. A peer review panel was convened to assist in DBI reviews.
2. SFFD has been paid to assist in review and approval of Central Subway contract documents.
3. Meetings with other third party reviewers are ongoing.

June 2012 Meeting:

1. Coordination with 3rd Party reviewers continues.

August 2012 Meeting:

1. Majority of third party reviews have been closed. Remaining reviews are in process of going through closure phase (requiring concurrence and verification of comments). Responses have been provided to each 3rd party comment. Priority was given to 3rd party reviewers with permit approval authority such as SFFD, SFPUC and DBI. Note that the design phase has been closed.

September 2012 Meeting:

1. Process of closing out PUC and DBI comments is ongoing.
2. PUC requirements as per draft MOU scope are being incorporated into 1256 by addendum.

October 2012 Meeting:

1. Process of closing out PUC and DBI comments is ongoing.
2. PUC requirements as per draft MOU have been incorporated into combined contract.

November 2012 Meeting:

1. Central Subway continue to work with PUC and DBI to close out remaining comments

Risk Mitigation Status
Risk Reference: PR73

Risk	Mitigation Strategy
Delays or complications of design & construction by others – SF Dept. Of Technology, 3rd party utilities	Early engagement and coordination for agreements and plan development to avoid construction delays.

Initial Assessment: 2, 1, 2
Current Assessment: 2, 1, 2 – Design Risk
Risk Owner: R. Edwards

Status Log:

- March 2012 Meeting:
1. Project team continues to coordinate with 3rd party utility agencies (AT&T, PG&E, SFDT) to complete construction and cutover of facilities designed under CN1250 & CN1251.
- May 2012 Meeting:
1. Met with SFDT to confirm the scope of work that they will perform for the Systems contract.
- June 2012 Meeting:
1. Agreements on scope of work with SFDT are being sought.
- August 2012 Meeting:
1. MOU written to DTIS to define scope. Awaiting concurrence. SFFD reviewing 90-100% design no comments received to date.
- September 2012 Meeting:
1. Central subway following up DTIS
- October 2012 Meeting:
1. Follow up with DTIS still required, verbal concurrence received
 2. 3rd Party Utilities
 - a. 1300 Utility relocations – status to be advised next meeting
 - b. 1256 utility relocations – confirmation and schedule required – follow up next meeting
- November 2012 Meeting:
1. Follow up with DTIS still required
 2. 3rd Party Utility
 - a. 1300 Utility relocations – High level timeframes to be obtained from utility owners
 3. 1256 Utility relocations
 - a. Confirmation and schedule to be sought from affected utilities.
 - b. AT&T to advise high level time frames should relocation of the duct bank (east side of 4th street, south of Bryant) be required.

Risk Mitigation Status
Risk Reference: V

Risk	Mitigation Strategy
Incorporation of revised Planning Zoning/ development criteria for Moscone Station TOD impact MOS and CTS construction contract.	<ol style="list-style-type: none"> 1. Participate and provide input of CSP constraints to SFMTA Real Estate during process of initial task to define best use. 2. Integrate work with SFMTA Real Estate into CSP

Initial Assessment: 3, 2, 6
Current Assessment: 3, 2, 6 – Design Risk

Risk Owner: R. Edwards

Status Log:

March 2012 Meeting:

1. SFMTA entered into agreement with development firm to maximize use of existing SFMTA real estate inventory.
2. Initial task is to develop proposed best use for the top three properties of which two of the properties are CTS and MOS headhouse locations.
3. Need to identify Program contact person to stay in touch and provide input of CSP constraints to SFMTA Real Estate.

May 2012 Meeting:

1. The Planning Department has included development criteria in the recently approved Conditional Use Permit.

June 2012 Meeting:

No status update.

August 2012 Meeting:

1. **MOS TOD** – set-aside TOD zone complied to & is based on current zoning criteria. SF Planning has plans to up-size the zoning in SOMA/Central Corridor. Potential conflict and discord with SF Planning on the IFB documents. FD has been completed.
2. **CTS TOD** – set-aside TOD zone or absence of TOD cleared SF Planning environmental (& historical) review & MMRP mitigation. ~~Next step is obtaining Conditional Use Authorization thru Sept 6, 2012 Commission contract with incorporation of Planning Dept recommendations.~~ Note: Obtaining the Conditional Use Authorization and incorporating the Planning Departments recommendations is not related to this risk

September 2012 Meeting:

1. Conditional Use permit received for CTS.

October 2012 Meeting:

1. Status of communication to SFMTA Real Estate to be provided next meeting

November 2012 Meeting:

1. Chinatown Station is compliant with current building codes and zoning requirements in effect. SFMTA Real Estate has a separate project outside of Central Subway to specifically address transit oriented development (TOD) at the site. Central Subway is not directly involved

Risk Mitigation Status

Risk Reference: V

or has ability for involvement on the TOD scope. There have been no requests received from SFMTA Real Estate in relation to changing the CTS design. Note that the design is complete, and contract is out to bid as Contract 1300.

2. Yerba Buena / Moscone Station is compliant with current building codes and zoning requirements in effect. and does not preclude future TOD in accordance to present zoning CSP received a letter from SF Planning on May 4th 2012 stating the YBM design is in general conformance with the City's General Plan. In the same letter, SF Planning raised concerns in relation to the development potential of the site in relation to 1) future zoning criteria 2) development over the YBM headhouse portion of the site. Central Subway is circulating a response to this letter.
3. SFMTA Real Estate has a separate project outside of Central Subway to specifically address TOD on the site. Central Subway is not directly involved or has the ability for involvement on the TOD scope. There have been no requests received from SFMTA Real Estate in relation to changing the YBM design.
4. Note: a correction has been made to the August update.

Risk Mitigation Status**Risk Reference: 56**

Risk	Mitigation Strategy
Escalation more / less than expected (Increase in bid prices to hedge possible increases in cost of volatile commodities).	<ol style="list-style-type: none"> 1. In the current economic environment, escalation is just as likely to be less as more than anticipated. 2. For volatile materials and equipment, provide substantial payment for stored materials and equipment to encourage early procurement 3. Include an escalation clause for volatile commodities in contracts.

Initial Assessment: 5, 2.5, 13**Current Assessment:** 2, 3, 6 – Market Risk**Risk Owner:** A. Wong**Status Log:**

September 24, 2009 Meeting:

1. Escalation varies over the duration of a project. It is favorable to the Project now, but could be a concern in the near future.
2. This risk needs to be monitored, but little can be done about it at this time.

February 2012:

1. Escalation clause will not be included in contracts because current market projections do not warrant escalation provisions.
2. Current cost estimate includes a 3.3% escalation.
3. Bid costs will be based on commodity prices at the time of bidding.
4. Contractors are likely to include potential escalation of commodities in contracts based on forecasted escalation at the time of bidding.
5. Risk rating reduced to 2, 3, 6

November 2012:

1. Various market factors have changed but overall risk remains unchanged.

Risk Mitigation Status**Risk Reference: PR79**

Risk	Mitigation Strategy
Parking Garage appraised higher than anticipated.	1. Provide adequate contingency for potential higher costs

Initial Assessment: 1, 1, 1**Current Assessment:** 0, 0, 0 – Market Risk**Risk Owner:** R. Edwards**Status Log:**

June 2012 Meeting:

1. An independent review of parking garage appraisal is being conducted by Walker.

November 2012 Meeting:

1. Walker Parking have developed an operational plan for the parking garage during and after construction.
2. David Tattersall has completed a fair market value appraisal of the acquisition and impact on the garage during construction.
3. The appraisal has been forwarded to the FTA seeking concurrence.
4. The appraised value of the UMS Garage acquisition is significantly below the RAMP allowance
5. Recommend this risk be retired
6. This risk was retired by unanimous consent of the Risk Assessment Committee on 11/08/12.

Risk Mitigation Status**Risk Reference: 94**

Risk	Mitigation Strategy
Bid protests delay award and NTP for construction contracts	Strictly adhere to Procurement Best Practices and Protest Procedures.

Initial Assessment: 1, 2, 2**Current Assessment:** 1, 2, 2**Risk Owner:** A. Wong**Status Log:**

September 2011:

Mitigation measures being implemented.

November 2012:

1. Combined contract out to bid, revisit following bid opening

Risk Mitigation Status
Risk Reference: 16

Risk	Mitigation Strategy
TBM loss and / or damaged in Transit	<ol style="list-style-type: none"> 1. Provide provisions for insurance for TBM in transit to jobsite. 2. Include insurance costs in contract cost.

Initial Assessment: 1, 5, 5
Current Assessment: 1, 5, 5 – Construction Risk

Risk Owner: M. Benson

Status Log:

February 2012:

1. Costs covered by Contractor’s insurance.
2. Payment for delivery of TBM is staged in Mobilization bid item based on performance milestones.
3. Recommend to reduce risk to 1, 3, 3

September 2012:

1. Contractor has ordered spare parts
2. 2nd TBM will be used to mitigate loss
3. Contingency plan to be developed – investigate market for 2nd hand TBM’s

October 2012:

1. Market for 2nd hand TBM’s still to be investigated

November 2012 Meeting:

1. Market for 2nd hand TBM’s will not be investigated.
2. Recommend retiring, will revisit in December 2012 Risk meeting.

Risk Mitigation Status**Risk Reference: 23**

Risk	Mitigation Strategy
Time to relocate existing utilities at Moscone Station (fiber optics - uty 1, large water main - uty 2),	<ol style="list-style-type: none">1. Intensive utility coordination and investigation.2. Relocate utilities out of the way of construction wherever possible.3. Show utilities on reference plans.4. Have utility contact information and procedure on plans.5. Have contingency repair/restoration plans.6. Assumed probable impacts to schedule & cost in estimates.

Initial Assessment: 1, 1, 1**Current Assessment:** 0, 0, 0 – Construction Risk**Risk Owner:** M. Benson**Status Log:**

September 2011:

1. Advance utility relocation contract (1250) is nearly complete, reducing this risk of cost and schedule impacts.

November 2012 Meeting:

1. 1250 Utility relocations complete
2. This risk was retired by unanimous consent of the Risk Assessment Committee on 11/08/12.

Risk Mitigation Status**Risk Reference: 38**

Risk	Mitigation Strategy
Tiebacks in Stockton Street miss located (in path of walls and would have to be dug out within 20ft of surface level)'	<ol style="list-style-type: none"> 1. Contractor has been directed on the plans to dig out the tiebacks. 2. Include allowance for differing site conditions to contract. 3. Assume this work in the cost and schedule estimates.

Initial Assessment: 3, 1.5, 5**Current Assessment:** 2, 2, 3 – Construction Risk**Risk Owner:** M. Benson**Status Log:**

February 2012:

1. Advanced utility relocation contract (1251) confirmed location of tiebacks.
2. Tiebacks are shown in contract drawings.
3. Note on ES-001 directs contractor to remove tiebacks.
4. Allowance for differing site conditions has been included in the contract.

September 2012:

1. Update to be provided next meeting

October 2012:

1. Allowance for differing site conditions has not been included into the contract. PM/CM Design Manager to review bid items for inclusion into the contract documents.

November 2012 Meeting:

1. Confirm allowance for differing site conditions has been included as bid item in 1300 contract

Risk Mitigation Status**Risk Reference: 65**

Risk	Mitigation Strategy
Archeological/Cultural findings during construction increases schedule and/or cost. (Portal) AROUND 10%	<ol style="list-style-type: none">1. Provide on-call Archeologist.2. Provide allowance and procedure in contract for Archeological/Cultural discoveries.

Initial Assessment: 1, 1.5, 2**Current Assessment:** 1, 2, 2**Risk Owner:** D. Greenaway**Status Log:**

September 2011:

Additional boring taken in vicinity of portal indicated no evidence of Archeological/Cultural resources.

November 2012:

1. Recommend retiring, will revisit in December 2012 Risk meeting.

Risk Mitigation Status**Risk Reference: 71**

Risk	Mitigation Strategy
Power supply interruptions to TBM's (no dual power feed currently planned)	Chance of power outage is miniscule.

Initial Assessment: 1, 1, 1**Current Assessment:** 1, 1, 1 – Construction Risk**Risk Owner:** S. Wilson**Status Log:**

September 2011:

November 2012 Meeting:

1. Recommend retiring, will revisit in December 2012 Risk meeting.

Risk Mitigation Status**Risk Reference: 75**

Risk	Mitigation Strategy
Signals and Comms equipment may need to be stored off site.	1. It is normal for the contractor to store equipment offsite or at the factory until it is needed.

Initial Assessment: 3, 0.5, 2**Current Assessment:** 3, 1, 2 – Construction Risk**Risk Owner:** C. Campillo**Status Log:**

December 2011:

1. This risk would only apply to Agency-Furnished Equipment or Materials.

November 2012 Meeting:

1. Recommend retiring, will revisit in December 2012 Risk meeting.

Risk Mitigation Status
Risk Reference: 111

Risk	Mitigation Strategy
Major Earthquake stops work	1. Include "Force Majeure" clause in contracts.

Initial Assessment: 1, 4, 4
Current Assessment: 1, 4, 4 – Construction Risk

Risk Owner: A. Wong

Status Log:

- February 2012:
1. General Provisions Section 702, B.1 allows for non-compensable time extension to a contract in the case of an earthquake.
- August 2012 Meeting:
1. Mitigation plan to be prepared to deal with the event of an earthquake occurring
- September 2012 Meeting:
1. Mitigation plan/emergency response plan to be prepared
- October 2012 Meeting:
1. Requirements for Central Subway mitigation/emergency response plan to be discussed next meeting
 2. 'Force Majeure' inclusion in contracts to be reviewed next meeting
- November 2012 Meeting:
1. Requirements for Central Subway mitigation/emergency response plan to be discussed next meeting
 2. Outline scope of plan to be developed if required.

Risk Mitigation Status**Risk Reference: J**

Risk	Mitigation Strategy
Macy's entrance conflict with new piles.	<ol style="list-style-type: none">1. Show known obstructions on as-built drawings on contract drawings,2. Make as-built drawings available to contractor as reference drawings.3. Include allowance for differing site conditions.4. Recover costs for removal of Macy's entrance from Macy's if it is in conflict with station construction.

Initial Assessment: 3, 1, 3**Current Assessment:** 3, 0, 0 – Construction Risk**Risk Owner:** J. Wang**Status Log:**

February 2012:

1. Known obstructions are shown on the ES drawings.
2. As-built Macy's drawings will be made available to the station contractor.
3. An allowance for differing site conditions has been added to the contract.

November 2012:

1. Recommend retiring, will revisit in December 2012 Risk meeting.

Contingency Management – 2012 Update

To date, Contingency Management has been structured on baseline documents developed from the FTA Risk Assessment performed in March 2009 prior to entry into Final Design. A FTA Risk Refresh was performed in May 2011 in preparation for entering into a FFGA. At the time, several significant changes had occurred on the Program; however, no changes were made to the Contingency Drawdown Curves for both cost and schedule. Minimum cost contingency levels established by the baseline documents in early 2009 require updating at this phase of the project to reflect current project status. The Program is advocating the need for changes to the baseline documents' milestones, hold points and minimum contingency levels for reasons stated within.

Contributing factors necessitating the need for reexamining the original milestones hold points and drawdown curves are: Changes to project configurations, delays to design submittals, re-sequencing of contract package procurement, delay to FFGA, and improved risk profiles for tunnel and station contracts.

Table 1 exhibits the existing agreed to Milestones and Hold point that are an integral part of the Program's Risk and Contingency Management Plan (RCMP), the timing of the milestone (QTR) reflects the 2012 update of the RCMP. Proposed changes are shown by in italicized Red Text and new column for proposed minimum levels.

Table 1: Minimum Cost Contingency

	Hold Points	QTR	Minimum Contingency Level (\$Millions)	Proposed Minimum Contingency Level (\$Millions)
1a	Tunnels 100% Designed	1Q11	\$280	\$280
1b	UMS <i>CTS</i> 100% Designed	4Q11	\$250	<i>\$240</i>
1c	FFGA Award and NTP Tunnels October 2011 <i>40% Bid (Tunnel and CTS)</i>	2Q12	\$225	<i>\$200</i>
1d	<i>FFGA Award</i>	<i>3Q12</i>	-	<i>\$180</i>
2	CTS/UMS Commence October 2012	4Q12	\$160	\$160
3	Demobilize Tunnels January 2014	2Q14	\$140	\$140
4	Complete Station to Platform Levels <i>January 2017</i> (CTS/MOS)	1Q17	\$60	\$60
5	Complete CTS/Tunnels Systems Installation <i>July 2018</i>	3Q18	\$25	\$25
	Revenue Service	4Q18	0	0

Contingency Management – 2012 Update

Close examination of Contingency levels and rational utilized for minimum levels reveals that the original plan has a minimum of \$225M at the time of FFGA. Expectations would have been that the tunnel bid was known and the only physical work completed or in progress would be the Advance Utility Relocations contracts. As can be seen from excerpts of the March 31, 2009 Risk Assessment Report (see below) prepared in advance of recommending entering the Final Design Phase, this rational was based on the assumption that the Tunnel bid would represent 40% of the total bid for all projects, thus addressing a significant level of risks.

Although the station designs would have been complete, the actual bid numbers would not have been known, only 100% estimates. Presumably this minimum value (\$225M) addressed two points, maintaining the recommended 15% level of contingency at the time of FFGA and having ample contingency to address market risks associated with the underground station work in the City of San Francisco.

The next Hold point is the commencement of CTS and UMS, which would indicate that the bids are in for these two high risk underground station constructions. What can be seen is an expectation for a significant use of contingency as the minimum level drops precipitously to \$160M. With the exception of some advance work being started on the TBM launch box (a low risk item) no other physical work was anticipated. This would imply an anticipated use of contingency to address the actual bid values for the two significant underground stations that were deemed extremely risky due to the use of SEM construction, the physical location of both stations, the many constraints imposed, the concern that there would be a limited number of bona fide bidders and most Contractors would be leery of doing business in the City of San Francisco because of perception of onerous requirements in City contracts and most importantly the potential for catastrophic impacts to surrounding buildings and businesses.

Implementation of the recommended changes to milestones and hold points, the program will be at the exact same minimum contingency level as shown in the table above for the same given point in time, commencement of the two underground stations. The program sees the need to adjust the hold points and minimum levels in approaching this strategic point in time due to contributing factors noted above. Specifically, the delay in design submittals, and FFGA, combined with the re-sequencing of the contract procurement; has not only changed the order in which previously identified key strategic events occur, but has necessitated the reevaluation and heightened importance of hold points as they relate specifically to contingency draw down. Examining these against the backdrop of rational utilized to establish the minimum levels as outlined above provides the necessary justification to rationalize the change in contingency draw down, milestones and hold points.

Contributing factor to adjust milestones	Resulting justification for use of contingency
Delays to design submittals	Constrains use of contingency for intended purpose
Re-sequencing of contract package procurement	Advances confirmation of high risk cost items
Delay to FFGA	Allows use of contingency for intended purpose
Improved risk profiles for tunnel and station contracts	Allows use of contingency for intended purpose

Contingency Management – 2012 Update

Changing the definition of Hold point #1b is significant in bringing forth a revised definition of the 40% of Bid. This should include the Tunnel Contract and CTS contract. Representing nearly 50% of the work, having known values, significant risk has been addressed, justifies changing this hold point definition. In addition, market risk has been incorporated in the estimates of the Stations and combined with the knowledge of the CTS bid, use of Contingency to make up the increased estimates for market risk is consistent with the original intent but comes at a different point in time. Concerns are itemized below combined with the program mitigation

Concerns that would contribute to Market Risk	Program Mitigation Measure to Address Risks
Use of SEM construction	Changes to project configurations – Lower CTS and eliminate bulb at UMS
The physical location of both stations	Special Provisions to address limitations; Additional cost included in estimates
The many constraints imposed	Included additional costs for constraints
Limited number of bona fide bidders	Successful Outreach efforts – Good Market Conditions – Large Interested Turnouts
Contractors would be leery of doing business in the City of San Francisco because of perception of onerous requirements in City contracts	Overhaul of General Provisions specific for Central Subway; – 15 Major Contractors combined for Tunnel bid – Good indication of interest
The potential for catastrophic impacts to surrounding buildings and businesses.	Extensive Building Instrumentation and Monitoring as well as compensation grouting to address potential settlement issues included in costs

The justification for these changes can be augmented by examining the rationale for the establishment of the original milestones and hold points and then addressing the contributing factors above and how they preserve the integrity of the original contingency management objects for addressing those risks, but justifiably can be refined to better address the current project circumstances and status.

Muni Central Subway Project, San Francisco Page 15 of 87 Risk and Contingency Analysis and Recommendations March 31, 2009 – Annotations address how proposed change preserves intent

Milestone #3 - 40% through Bid and Award

- The group agreed to delete the links from station contract awards because they are not a requirement for this milestone to occur. *At the time 40% bid was presumed to be the tunnel contract.*
- The only activity directly related to this activity is the award of the tunnels contract. *Current projections are that the combination of Tunnel and CTS will represent more than 40% of Bid.*
- The changes brought this milestone date back almost a year, to September 13, 2011. *The inclusion of CTS in contracts considered part of the 40% moves this milestone later in time by nine months.*
- Milestone #2 (FFGA) and #3 (40% Bid) occur at the same time. This is because SFMTA intends to award the tunnels contract to allow the procurement of the tunnel boring machines (TBM's)

Contingency Management – 2012 Update

under an LONP prior to an FFGA. *The occurrence of the two milestones still is occurring at nearly the same time, and the rationale for procuring the TBMs remains, but not as part of an LONP. Milestone #3 (40% Bid) however now occurs prior in time to Milestone #2 (FFGA) necessitating a change in numbering and minimum contingency value.*

- The tunnels contract would require a “break clause” and require identification of “compensation” in the bid to protect SFMTA in the event that FFGA is not awarded, Funds could not be sourced locally and the contract had to be terminated. *Incorporated as part of the contract documents*
- It was noted that there have been projects in the recent past that have been cancelled prior to FFGA. *Still applicable - has the same effect on both existing and proposed changes.*
- It would be likely that compensation for cancellation of the contract would be significant as costs would include the TBM’s themselves, overheads expended and loss of profit expected from the contract works. *Still applicable - has the same effect on both existing and proposed changes*
- The RFP would also likely have to include a “costs for delay” in anticipation of delivery of the TBM’s being held up awaiting construction of the launch box linked to a late award of the construction contract following the FFGA award. *Launch Box is subject of an approved LONP and scope of work associated with NTP 2, issued March 14, 2012 prior to FFGA award negating the impact of this perceived risk and “cost of delay”. This issue has been altered and work associated with NTP 3 now becomes the risk, should FFGA be delayed to a point that the MPS would be impacted.*

Milestone#4 20% Construction

- Agreed date of October 24, 2012 - *January 2013 (utilizing rationale noted below)*
- Project milestones are reflective of expected cash flow. At this stage the TBM’s have been delivered, a good proportion of utility relocations have been undertaken and there has been a significant draw down on design costs with PM/CM staffing costs weighing in on cash flow expenditure. *TBMs expected to be delivered in December 2012, advance utility relocations will be complete, Final Design costs will be known and PM/CM staffing cost are currently well below plan.*

Milestone #5 50% Construction

- Agreed date of December 31, 2013.
- The reason there is only just over one year between 50% and 75% construction is because in this period tunnel excavation through to disassembling the TBM’s is completed and the construction of all the station structures comprising mining, cavern construction and station platforms is well advanced with CTS progressed to head house excavation.

Milestone #6 75% Construction

- Agreed date of January 20, 2016.

Contingency Management – 2012 Update

Milestone #7 90% Construction

- Agreed date of May 4, 2017.

4.4.2 FTA Hold Points

“Hold” points are defined as points in time, which may be the same as project milestones but are more likely to be associated with strategic events where significant risk exposure is reduced. At “Hold” points minimum contingency amounts for project cost contingency and project float contingency are established and form ceilings below which the implementation of mitigation is believed unavoidable if the project is to be completed to the budget and agreed Revenue Operations Date.

Below are the agreed upon hold points:

- 1a. Tunnels 100% Design May 2010
- 1b. UMS Station 100% Design June 2011
- 1c. FFGA Award and NTP Tunnels October 2011
2. CTS/UMS stations commence works on site October 2012
3. Demobilize Tunnels October 2013
4. Complete Station to platform levels (CTS/MOS) October 2015
5. Complete CTS/Tunnels Systems Installation June 2017

The following discussions at Workshop #4 were pertinent to the agreement of the “Hold” points:

- The PMOC proposed at “Hold” point 1, after bid and award of the tunnels contract and following award of the FFGA– Milestone #2 and #3—a minimum level of \$250 million in contingency should be retained
- After lengthy discussion it was agreed that having the first hold point at the award of the FFGA and holding \$250 million in contingency until this time was an excessive amount to hold as a minimum through virtually all of final design and after award of the tunnels package. Two intermediate “Hold” points were agreed to recognize a gradual draw down against contingency during design. *This gradual draw down can be performed utilizing lower minimum levels and still preserve the intent of covering identified risks.*
- Hold” point 1a was taken to be when tunnel design was complete targeted for May 2010. This “Hold” point was added because there are expected to be no major changes to the design of tunnels from this major design element from this point forwards. The contingency requirement for this hold point was set at \$280 million. *This hold point was met and minimum levels maintained.*

Contingency Management – 2012 Update

- “Hold” point 1b was taken to be at the finish of UMS station design. This hold point is at the completion of all station design, after which the risk of major changes in station design is most unlikely. The contingency requirement for this hold point was set at \$250 million. *The risk of major changes is the station designs have been mitigated with the submittal of the 100%. However, significant cost increase not related to scope changes but due to costs that address perceived market risks due to special provisions and physical constraints required a greater use of contingency than originally planned at this point in time. This increase in cost was anticipated but later in time.*
- Minimum contingency at “Hold” point 1c (FFGA award) was agreed at \$225 million reflecting a gradual draw down throughout final design, preparation of bid documents, and the RFP process. The tunnels contract would also be bid and awarded at this point with the manufacturing of the TBM under way. *More information will be known about program costs to justify a lowering of the minimum at this strategic point in time, specifically, nearly 50% of the bid will be known and lower risk profiles of remaining contracts justifies not holding such an excessive amount at this point.*

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A Cost Contingency Recovery Workshop was held on May 25, 2012 in accordance with Program Procedures PCP 06 to address that cost contingency had fallen below the minimum level and to develop a plan. The results of the workshop can be found in Figure 1.

The workshop revealed that FFGA guidance does not address the contingency level calculations of programs that have large expenditure prior to FFGA hence requiring holding a higher level of contingency based on Program’s budgets, rather that percentage of cost to complete which takes into account the cost of reducing previously identified risks. The analysis indicates that the Program will have a 17% contingency at the time of FFGA as compared to the recommended 15%, when the calculations are made on the “risk” associated with the remaining work to be performed.

Taken together with the analysis of the milestones and hold points, the workshop resulted in recommending the revised levels of minimum contingency at the refined definitions of milestones and holdpoints. Figure 2 shows the current status of contingency below the established minimums. Figure 3 illustrates the new minimum contingency levels together with the refined definitions.

FIGURE 1

Analysis of Contingency Levels Based on Total Cost versus Cost to Complete as of the end of April 2012

Project Cost Elements	CCE (YOE)	Expenditures to Date	Cost to Complete	PMOC DAK/BL			CENTRAL SUBWAY		
				Recommended Contingency %	Total Contingency Dollar Calculated from CCE (YOE)	Total Contingency Dollar Calculated from Cost to Complete	Recommended Contingency %	Total Contingency Dollar Calculated from CCE (YOE)	Total Contingency Dollar Calculated from Cost to Complete
	As of April 2012	In Millions	In Millions						
Contract 1250 / UR1	11.4	11.3	0.1	1.0%	0.114	0.114	3.0%	0.342	0.342
Contract 1251 / UR2	19.4	17.1	2.3	2.0%	0.388	0.388	2.0%	0.388	0.388
Contract 1252 / Tunnel	233.5	13.2	220.3	14.0%	32.69	30.842	14.0%	32.69	30.842
Contract 1253 / UMS	210		210	15.0%	31.5	31.5	17.0%	35.7	35.7
Contract 1254 / CTS	235		235	17.0%	39.95	39.95	17.0%	39.95	39.95
Contract 1255 / MOS	129		129	16.0%	20.64	20.64	14.0%	18.06	18.06
Contract 1256 / STS	125		125	14.0%	17.5	17.5	15.0%	18.75	18.75
Other Construction	17	3	14	10.0%	1.7	1.4	10.0%	1.7	1.4
					0	0		0	0
60 ROW	36	14	22	10.0%	3.6	2.2	8.0%	2.88	1.76
70 LRV	24		24	10.0%	2.4	2.4	10.0%	2.4	2.4
80									
Preliminary Design	46.2	46.2	0	0.0%	0	0	0.0%	0	0
Final Design	76.3	51.6	24.7	10.0%	7.63	2.47	5.0%	3.815	1.235
Program Management	178.9	34.3	144.6	8.0%	14.312	11.568	8.0%	14.312	11.568
CA/CM	15.5	2.8	12.7	5.0%	0.775	0.635	5.0%	0.775	0.635
Insurance	6.8	5.7	1.1	0.0%	0	0	0.0%	0	0
Legal	6.2	0.7	5.5	20.0%	1.24	1.1	20.0%	1.24	1.1
Survey	0.3	0.2	0.1		0	0		0	0
Start Up	7	0	7	20.0%	1.4	1.4	20.0%	1.4	1.4
Subtotal Base	1377.5	200.1	1177.4		1,377.5	1,177.4		1,377.5	1,177.4
Alloc Cont	122.8				175.8	164.1		174.4	165.5
Unallocated Contingency	78				25.0	36.7		26.4	35.3
Total Current Contingency	200.8		200.8		200.8	200.8		200.8	200.8
	1578.3		1378.2		1,578.3	1,378.2		1,578.3	1,378.2
Percentage of Base					14.6%	17.1%		14.6%	17.1%

FIGURE 2

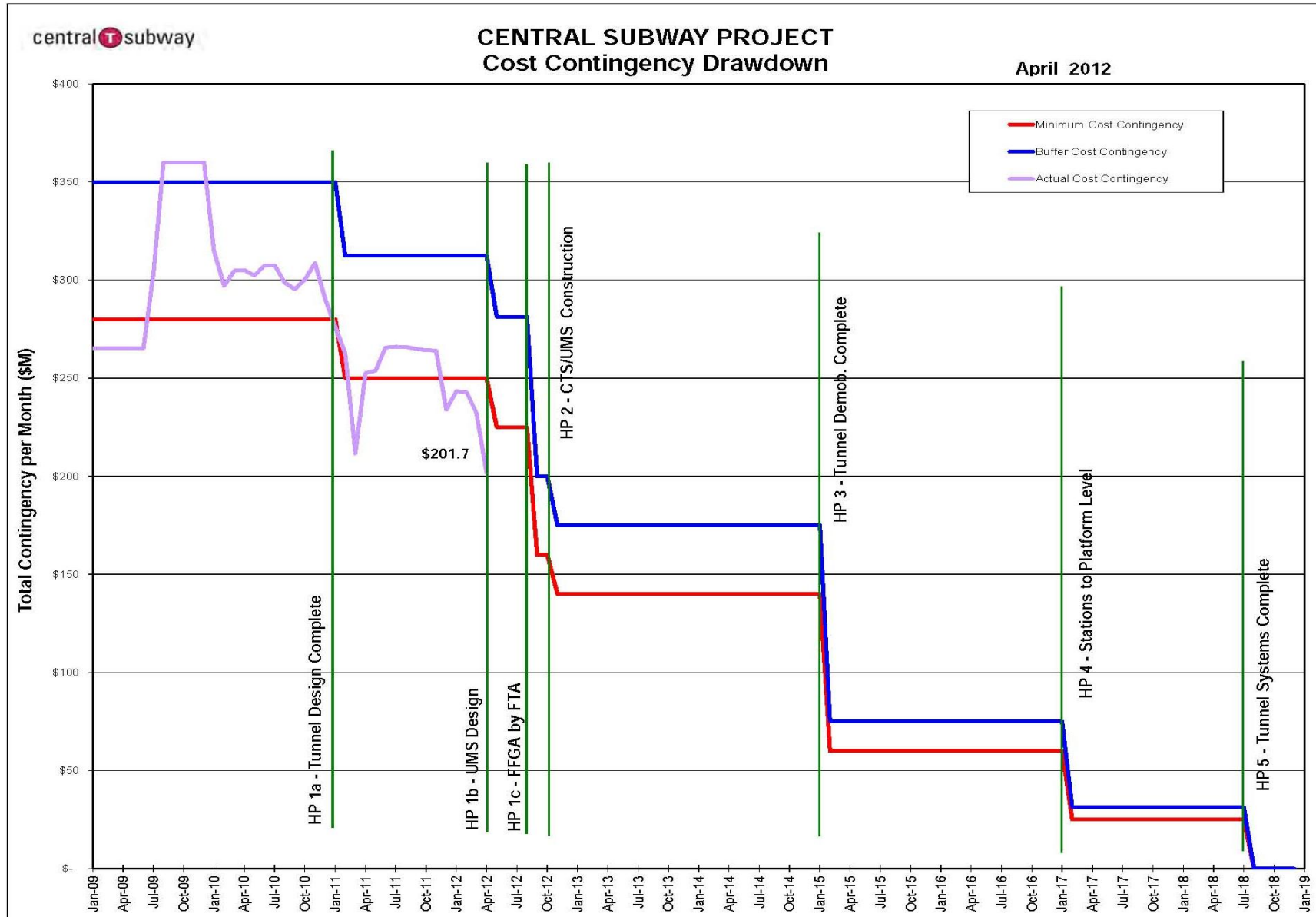
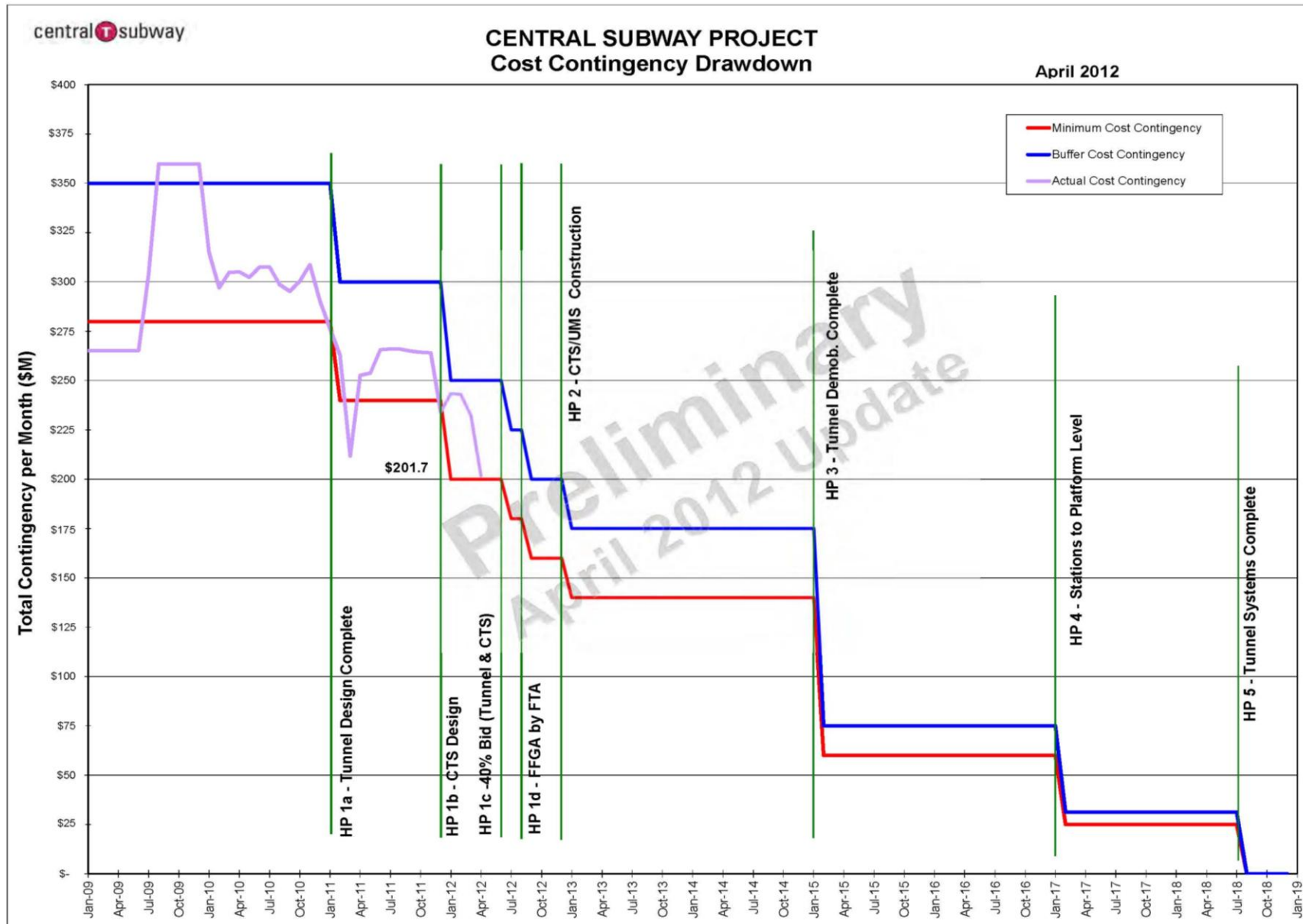
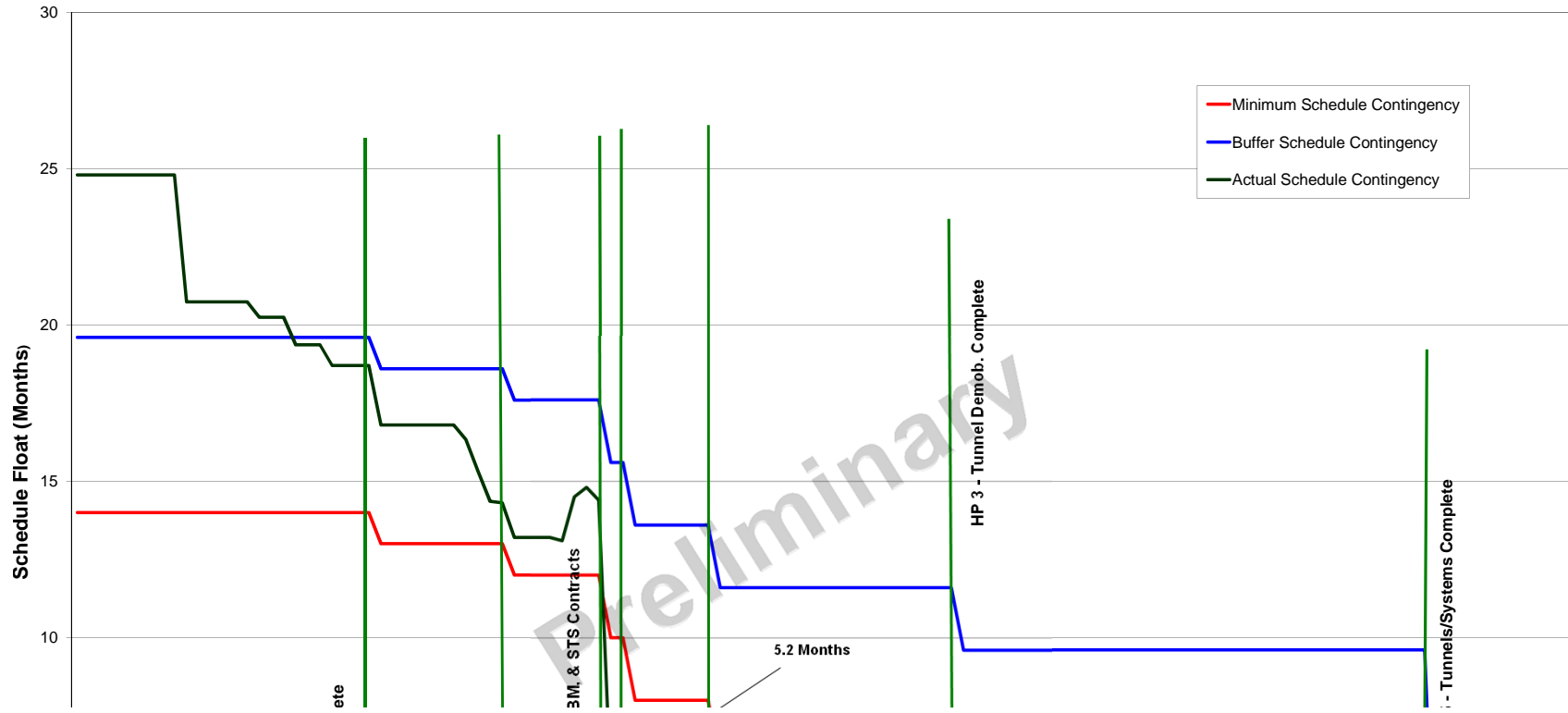


FIGURE 3



CENTRAL SUBWAY PROJECT Schedule Contingency Drawdown



Activity ID	Activity Name	Original Duration	Actual Duration	Start	Finish	Total Float	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
FDS1230	Bid Opening - Tunnel	1	1	08-Jun-11 A	08-Jun-11 A															
FDS2010	Bid Opening - Tunnel Milestone	0	0		08-Jun-11 A															
FDS1280	Bid Review - Tunnel	17	40	09-Jun-11 A	05-Aug-11 A															
FDS1235	SFMTA Board Award - Tunnel	1	0	08-Aug-11 A	08-Aug-11 A															
FDS2020	SFMTA Board Award - Tunnel Milestone	0	0		08-Aug-11 A															
FDS1388	Approve/Execute/Certify - Tunnel Contract	50	117	09-Aug-11 A	26-Jan-12 A															
Bid/Award UMS Station CP-1253		76	100	11-Apr-12 A	31-Aug-12 A															
PJD2293	SFMTA Board Notification to Advertise - UMS	1	1	11-Apr-12 A	11-Apr-12 A															
FDS1682	Advertise/Prepare Bid - UMS (Addendum No. 9)	60	97	16-Apr-12 A	31-Aug-12 A															
PJD2620	Advertise Milestone- UMS	0	0	16-Apr-12 A																
Bid/Award CTS Station CP-1254		113	128	24-Feb-12 A	24-Aug-12 A															
PJD2303	SFMTA Board Notification to Advertise - CTS	1	1	24-Feb-12 A	24-Feb-12 A															
FDS1795	Prepare Bid - CTS	55	70	27-Feb-12 A	04-Jun-12 A															
FDS1930	Advertise Milestone- CTS	0	0	27-Feb-12 A																
FDS1260	Bid Opening - CTS	1	0	12-Jun-12 A	12-Jun-12 A															
FDS2030	Bid Opening - CTS Milestone	0	0		12-Jun-12 A															
FDS1300	Bid Review and Rejected- CTS	20	51	13-Jun-12 A	24-Aug-12 A															
Bid/Award MOS Station CP-1255		1	0	30-Aug-12 A	30-Aug-12 A															
PJD2283	SFMTA Board Notification to Advertise - MOS	1	0	30-Aug-12 A	30-Aug-12 A															
Bid/Award CP-1300		195	0	18-Oct-12	01-May-13	0														
PJD2770	SFMTA Board Notification to Advertise - UMS, CTS, YBM, & STS	1	0	18-Oct-12	18-Oct-12	8														
FDS2270	Advertise/Prepare Bid- UMS, CTS, YBM, & STS (Calendar Days)	93	0	22-Oct-12	22-Jan-13	9														
FDS2290	Advertise Milestone- UMS, CTS, YBM, & STS	0	0	22-Oct-12		7														
FDS2250	Bid Opening- UMS, CTS, YBM, & STS	1	0	23-Jan-13	23-Jan-13	7														
FDS2300	Bid Opening Milestone- UMS, CTS, YBM, & STS	0	0		23-Jan-13	7														
FDS2280	Bid Review- UMS, CTS, YBM, & STS	20	0	24-Jan-13	21-Feb-13	7														
FDS2240	SFMTA Board Award- UMS, CTS, YBM, & STS	1	0	05-Mar-13	05-Mar-13	0														
FDS2310	SFMTA Board Award Milestone- UMS, CTS, YBM, & STS	0	0		05-Mar-13	0														
FDS2260	Approve/Execute/Certify- UMS, CTS, YBM, & STS	40	0	06-Mar-13	30-Apr-13	0														
FDS2320	NTP CN 1300- UMS, CTS, YBM, & STS	0	0	01-May-13		0														
LIGHT RAIL VEHICLES		1501	0	02-Jan-13	18-Dec-18	4														
COST8017	Vehicle Seed Money	501	0	02-Jan-13*	30-Dec-14	1003														
COST004	Cost Activity- Light Rail Vehicle (LOE)	668	0	27-Apr-16	18-Dec-18	4														
N-LRV1290	Vehicle Delivery Inspection at Factory	1	0	27-Apr-16*	27-Apr-16	4														
N-LRV1300	First Pilot Cars 1 & 2 Tested	130	0	06-Jun-16	08-Dec-16	4														
N-LRV1310	First Vehicles Testing / Commissioning	110	0	09-Dec-16	16-May-17	4														
N-LRV1320	SFMTA Training to enter Revenue Service	100	0	17-May-17	06-Oct-17	4														
N-LRV1330	Produce Operations Simulation to Assist Training	130	0	09-Oct-17	13-Apr-18	4														
N-LRV1340	Final Vehicles Testing/ Central Subway Testing	130	0	16-Apr-18	18-Oct-18	4														
N-LRV1350	Pre-Revenue Soft Start	40	0	19-Oct-18	17-Dec-18	4														
N-LRV1360	First Vehicles Enter Revenue Service	1	0	18-Dec-18	18-Dec-18	4														



CSP-CMPS

SFMTA Central Subway Project
Master Project Schedule
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Start On: 08-Jan-08
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Activity ID	Activity Name	Original Duration	Actual Duration	Start	Finish	Total Float	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
CONSTRUCTION PHASE							4014	1735	01-Jan-08 A	30-Dec-20	0										
Construction Support Costs							2978	1735	01-Jan-08 A	02-Nov-17	1154										
CON1010	Cost Activity- YBM Power Feed/ PG&E cn 1252	50	1197	01-Jan-08 A	01-Apr-13	1442															
UT1001	Utility CP 1 Cost Activity	352	695	04-Jan-10 A	28-Dec-12	1505															
FRMB100	Cost Activity- Form B Credits for Utility Relo 1 &2 (LOE)	1240	695	04-Jan-10 A	28-Dec-12	84															
COST046	Cost Activity Misc. Construction Contract Work- Macy's	1795	252	04-Jan-10 A	31-Dec-10 A																
CON1020	Cost Activity- Job Order Contract JOC	1795	329	12-Jan-11 A	30-Apr-12 A																
COST082	Cost Activity Utilities Relo #2 CN 1251	720	628	12-Jan-11 A	31-Dec-12	2186															
COST8027	Cost Activity- Public Agencies- Utility Coordination (LOE)	1795	436	12-Jan-11 A	15-Oct-12	134															
COST8057	Cost Activity- 1250 & 1251 Department of Technology (LOE)	1795	344	23-May-11 A	28-Dec-12	1505															
COST211	Cost Activity- Utility Relo # 1&2 Costs ***	0	362	05-Oct-11 A	15-Oct-12	197															
COST8047	Cost Activity Excessive Liability Insurance (LOE)	1273	140	14-Mar-12 A	30-Apr-13	15															
FRMB120	Cost Activity- Form B Credits for Utility Relo Tunnel(LOE)	333	82	05-Jun-12 A	24-Jul-14	162															
CON1060	Cost Activity- STS Power Feed	1	0	02-Jan-13*	02-Jan-13	2009															
COST170	Cost Activity Communication Connection (LOE)	200	0	01-May-13	18-Feb-14	317															
FRMB110	Cost Activity- Form B Credits for Utility Relo CTS (LOE)	101	0	01-May-13	23-Sep-13	-4															
COST021	Cost Activity- Public Art Program (LOE)	1058	0	16-May-13	01-Aug-17	65															
CON1040	Cost Activity- CTS Power Feed	1	0	31-Jul-13*	31-Jul-13	1862															
CON1050	Cost Activity- UMS Power Feed	1	0	14-Oct-13*	14-Oct-13	1810															
COST192	Cost Activity- ATCS- Central Control	1	0	02-Jan-14*	02-Jan-14	1758															
CON1070	Cost Activity- YBM Permanent Power Credit	1	0	02-Aug-17	02-Aug-17	124															
CON1090	Cost Activity- CTS Permanent Power Credit	1	0	27-Sep-17	27-Sep-17	85															
CON1080	Cost Activity- UMS Permanent Power Credit	1	0	02-Nov-17	02-Nov-17	59															
Construction Utility Contract #1- MOS & Portal CN-1250							463	571	04-Jan-10 A	29-Jul-11 A											
Phoenix Subcontract - (OCS & Comm Conduit)							455	504	04-Jan-10 A	23-May-11 A											
General Conditions							455	504	04-Jan-10 A	23-May-11 A											
FDS1195	CN 1250 NTP- Portal & MOS Utility Relocation	0	0	04-Jan-10 A																	
UTL1082	Project Submittals & Permits	60	61	04-Jan-10 A	05-Apr-10 A																
UTL1050	Portal & MOS Utility Relocation	319	504	04-Jan-10 A	23-May-11 A																
UTL1232	Authorize Period for Option 2	340	274	04-Jan-10 A	05-Oct-10 A																
REA1022	CN 1250 NTP- Portal & MOS Utility Relocation	0	0	04-Jan-10 A																	
REA1032	CN 1250 NTP- Portal & MOS Utility Relocation	0	0	04-Jan-10 A																	
REA1220	CN 1250 NTP- Portal & MOS Utility Relocation	0	0	04-Jan-10 A																	
REA1412	CN 1250 NTP- Portal & MOS Utility Relocation	0	0	04-Jan-10 A																	
UTL1092	Work Start Date	0	0	26-Jan-10 A																	
Welsh Street to Harrison							290	323	26-Jan-10 A	15-Dec-10 A											
UTL1102	Area 1 - East Side Sta. 172+00 to 163+00	269	196	26-Jan-10 A	10-Aug-10 A																
UTL1112	Area 1 - West Side Sta.172+00 to 163+00	109	196	26-Jan-10 A	10-Aug-10 A																
UTL1122	Area 1 - Electrical Sta. 163+00 to 165+50 & OCS Pole	26	69	11-Aug-10 A	15-Dec-10 A																
Harrison to Folsom							120	99	02-Jul-10 A	11-Jan-11 A											
UTL1192	AT&T/Third Party Re-route work	120	99	02-Jul-10 A	11-Jan-11 A																



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							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
GC-00-060	UTILITY RELOCATION & CLOSURE WALL	15	15	31-May-11 A	20-Jun-11 A															
CN -1251 Submittals		60	102	12-Jan-11 A	03-Jun-11 A															
GC-SUB-00-110	Prepare / Submit - SEWER	1	0	12-Jan-11 A	12-Jan-11 A															
GC-SUB-00-080	Prepare / Submit - BASELINE SCHEDULE	1	94	12-Jan-11 A	24-May-11 A															
GC-SUB-00-070	Prepare / Submit - SOV	1	28	12-Jan-11 A	21-Feb-11 A															
GC-SUB-00-090	Prepare / Submit - EHASP	1	0	12-Jan-11 A	12-Jan-11 A															
GC-SUB-00-100	Prepare / Submit - QUALITY CONTROL PROGRAM	1	0	12-Jan-11 A	12-Jan-11 A															
GC-SUB-00-140	Prepare / Submit - PLUMBING	40	85	12-Jan-11 A	11-May-11 A															
GC-SUB-00-160	Prepare / Submit - TRAFFIC CONTROL	1	0	12-Jan-11 A	12-Jan-11 A															
GC-SUB-00-150	Prepare / Submit - WATER	1	56	12-Jan-11 A	31-Mar-11 A															
GC-SUB-00-120	Prepare / Submit - JOINT TRENCH	1	56	12-Jan-11 A	31-Mar-11 A															
GC-SUB-00-130	Prepare / Submit - ELECTRIC (OH)	1	56	12-Jan-11 A	31-Mar-11 A															
GC-SUB-00-111	Review & Approve - SEWER	20	20	13-Jan-11 A	10-Feb-11 A															
GC-SUB-00-091	Review & Approve - EHASP	20	12	13-Jan-11 A	31-Jan-11 A															
GC-SUB-00-101	Review & Approve - QUALITY CONTROL PROGRAM	20	36	13-Jan-11 A	04-Mar-11 A															
GC-SUB-00-161	Review & Approve - TRAFFIC CONTROL	20	12	13-Jan-11 A	31-Jan-11 A															
GC-SUB-00-112	Fabrication / Materials Lead - SEWER	1	0	11-Feb-11 A	11-Feb-11 A															
GC-SUB-00-162	Fabrication / Materials Lead - TRAFFIC CONTROL	10	0	11-Feb-11 A	11-Feb-11 A															
GC-SUB-00-071	Review & Approve - SOV	20	0	22-Feb-11 A	22-Feb-11 A															
GC-SUB-00-151	Review & Approve - WATER	20	6	01-Apr-11 A	11-Apr-11 A															
GC-SUB-00-121	Review & Approve - JOINT TRENCH	20	20	01-Apr-11 A	29-Apr-11 A															
GC-SUB-00-131	Review & Approve - ELECTRIC (OH)	20	12	01-Apr-11 A	19-Apr-11 A															
GC-SUB-00-152	Fabrication / Materials Lead - WATER	10	10	12-Apr-11 A	26-Apr-11 A															
GC-SUB-00-132	Fabrication / Materials Lead - ELECTRIC (OH)	60	27	20-Apr-11 A	27-May-11 A															
GC-SUB-00-122	Fabrication / Materials Lead - JOINT TRENCH	10	12	02-May-11 A	18-May-11 A															
GC-SUB-00-141	Review & Approve - PLUMBING	20	14	12-May-11 A	01-Jun-11 A															
GC-SUB-00-081	Review & Approve - BASELINE SCHEDULE	20	2	25-May-11 A	27-May-11 A															
GC-SUB-00-142	Fabrication / Materials Lead - PLUMBING	1	1	02-Jun-11 A	03-Jun-11 A															
Phoenix Subcontract Work - (OCS & Comm Conduit)		260	478	12-Jan-11 A	04-May-12 A															
New Poles (Change Order)		35	182	13-Jul-11 A	04-May-12 A															
OHE-00-TIA6	TIA #6 - Footing delay OCS & DBI	1	70	13-Jul-11 A	20-Oct-11 A															
OHE-00-110A	Change Order to move pole to new location	10	71	13-Jul-11 A	21-Oct-11 A															
OHE-00-110A2	Deliver and Install Poles	10	9	15-Sep-11 A	28-Sep-11 A															
OHE-00-110A	5th Street and Folsom Pole and Foundation Work	10	46	01-Mar-12 A	04-May-12 A															
Building In-Beds		147	330	12-Jan-11 A	08-Dec-11 A															
BIB-00-010A	BDI - Permit Delay (Easement & Drawings)	10	196	12-Jan-11 A	20-Oct-11 A															
BIB-00-040A	Market Street Tie-in Building In-Beds	3	1	28-Oct-11 A	31-Oct-11 A															
BIB-00-020A	Stockton Tie-in Building In-Beds	3	2	09-Nov-11 A	11-Nov-11 A															
BIB-00-060A	Howard to Harrison Building In-Beds	3	3	09-Nov-11 A	14-Nov-11 A															
BIB-00-030A	Sutter to Eddy Building In-Beds	3	1	22-Nov-11 A	23-Nov-11 A															
BIB-00-050A	Market to Howard Building In-Beds	3	6	30-Nov-11 A	08-Dec-11 A															



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							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Stockton to Eddy		260	195	31-May-11 A	12-Dec-11 A														
OHE-00-010	STOCKTON TIE-IN NEW POLES	10	9	31-May-11 A	13-Jun-11 A														
OHE-00-020	SUTTER TO EDDY: NEW POLES	10	4	14-Jun-11 A	20-Jun-11 A														
OHE-00-060	STOCKTON TIE-IN TRAFFIC SIGNAL WORK	3	1	24-Oct-11 A	25-Oct-11 A														
OHE-00-070	SUTTER TO EDDY: TRAFFIC SIGNAL WORK	3	1	26-Oct-11 A	27-Oct-11 A														
OHE-00-160	STOCKTON TIE-IN INSTALL OVERHEAD	15	3	17-Nov-11 A	22-Nov-11 A														
OHE-00-170	SUTTER TO EDDY: INSTALL OVERHEAD	5	10	28-Nov-11 A	12-Dec-11 A														
Market to Howard		207	178	21-Jun-11 A	16-Dec-11 A														
OHE-00-030	MARKET STREET TIE-IN: NEW POLES	10	4	21-Jun-11 A	27-Jun-11 A														
OHE-00-040	MARKET TO HOWARD: NEW POLES	9	4	28-Jun-11 A	05-Jul-11 A														
OHE-00-180	MARKET STREET TIE-IN: INSTALL OVERHEAD	5	49	06-Oct-11 A	16-Dec-11 A														
OHE-00-080	MARKET STREET TIE-IN: TRAFFIC SIGNAL WORK	3	1	28-Oct-11 A	31-Oct-11 A														
OHE-00-090	MARKET TO HOWARD: TRAFFIC SIGNAL WORK	3	2	01-Nov-11 A	03-Nov-11 A														
OHE-00-190	MARKET TO HOWARD: INSTALL OVERHEAD	5	6	08-Dec-11 A	16-Dec-11 A														
Howard to Harrison		183	169	06-Jul-11 A	22-Dec-11 A														
OHE-00-050	HOWARD TO HARRISON: NEW POLES	9	11	06-Jul-11 A	21-Jul-11 A														
OHE-00-200	HOWARD TO HARRISON: INSTALL OVERHEAD	5	49	06-Oct-11 A	16-Dec-11 A														
OHE-00-100	HOWARD TO HARRISON: TRAFFIC SIGNAL WORK	2	2	04-Nov-11 A	08-Nov-11 A														
OHE-00-200A	TESTING	5	1	21-Dec-11 A	22-Dec-11 A														
Synergy Prime Contract Work		521	608	01-Feb-11 A	02-Oct-12	3011													
Interior Plumbing Works (All)		40	54	13-Jun-11 A	29-Aug-11 A														
IPL-00-010	INTERIOR PLUMBING - AREA 1	5	9	13-Jun-11 A	24-Jun-11 A														
IPL-00-020	INTERIOR PLUMBING - AREA 2	5	4	27-Jun-11 A	01-Jul-11 A														
IPL-00-030	INTERIOR PLUMBING - AREA 3	5	4	05-Jul-11 A	11-Jul-11 A														
IPL-00-040	INTERIOR PLUMBING - AREA 4	5	4	12-Jul-11 A	18-Jul-11 A														
IPL-00-050	INTERIOR PLUMBING - AREA 5	15	4	19-Jul-11 A	25-Jul-11 A														
IPL-00-060	INTERIOR PLUMBING - AREA 6	5	24	26-Jul-11 A	29-Aug-11 A														
O'Farrell (OFA 08+00 thru OFA 11+50)		481	550	14-Feb-11 A	16-Aug-12 A														
Sewer		343	376	14-Feb-11 A	26-Jul-12 A														
OFA-01-010	SEWER - EAST OF STOCKTON	10	9	14-Feb-11 A	25-Feb-11 A														
OFA-01-020	SEWER - STOCKTON INTERSECTION	5	4	28-Feb-11 A	04-Mar-11 A														
OFA-01-030	SEWER - WEST OF STOCKTON	10	9	04-Apr-11 A	15-Apr-11 A														
OFA-01-150	Gas Holes/ Cutover- O'Farrell Street	18	38	01-Jun-12 A	26-Jul-12 A														
Water		246	256	11-Apr-11 A	17-May-12 A														
OFA-01-080	WATER INSTALLATION EAST	15	14	11-Apr-11 A	29-Apr-11 A														
OFA-01-090	WATER - TIE-IN EAST	5	4	02-May-11 A	06-May-11 A														
OFA-01-160A	WATER INSTALLATION WEST	15	4	04-May-12 A	10-May-12 A														
OFA-01-170B	WATER - TIE-IN WEST	5	4	11-May-12 A	17-May-12 A														
AWSS		151	134	09-May-11 A	16-Nov-11 A														
OFA-01-040	AWSS - INSTALL EAST	15	10	09-May-11 A	20-May-11 A														
OFA-01-150A	Change Order for AWSS-EAST-change (follow FH Installation)	1	70	16-May-11 A	24-Aug-11 A														



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							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
OFA-01-050	AWSS - INSTALL WEST	15	60	31-May-11 A	24-Aug-11 A						■								
OFA-01-060	AWSS - TEST EAST	5	4	25-Aug-11 A	31-Aug-11 A						I								
OFA-01-070	AWSS - TEST WEST	5	2	14-Nov-11 A	16-Nov-11 A						I								
Utility Vaults		28	136	18-Apr-11 A	28-Oct-11 A														
OFA-01-110	UTILITY VAULTS - East	13	92	18-Apr-11 A	26-Aug-11 A						■								
OFA-01-100	UTILITY VAULTS - West	15	79	08-Jul-11 A	28-Oct-11 A						■								
Joint Trench		94	134	06-Sep-11 A	20-Apr-12 A														
OFA-01-120	JOINT TRENCH - EAST	15	53	06-Sep-11 A	18-Nov-11 A						■								
OFA-01-130	JOINT TRENCH - WEST	15	75	04-Jan-12 A	20-Apr-12 A						■								
Restoration		12	15	27-Jul-12 A	16-Aug-12 A														
OFA-01-140	RESTORATION	5	1	27-Jul-12 A	28-Jul-12 A						I								
STK04-03-250	DEMOBILIZATION	10	10	03-Aug-12 A	16-Aug-12 A						I								
Geary (GEA 08+05 thru 12+00)		478	543	14-Feb-11 A	09-Aug-12 A														
Sewer		36	46	14-Feb-11 A	01-Apr-11 A														
GEA-02-010	SEWER - EAST OF STOCKTON	10	9	14-Feb-11 A	25-Feb-11 A						I								
GEA-02-020	SEWER - STOCKTON INTERSECTION	5	4	28-Feb-11 A	04-Mar-11 A						I								
GEA-02-030	SEWER - WEST OF STOCKTON	10	9	21-Mar-11 A	01-Apr-11 A						I								
Water		239	250	02-May-11 A	31-May-12 A														
GEA-02-080	WATER INSTALLATION	15	14	02-May-11 A	20-May-11 A						I								
GEA-02-090	WATER - TIE-IN	5	3	29-Aug-11 A	02-Sep-11 A						I								
GEA-02-160A	WATER INSTALLATION	15	4	23-Apr-12 A	27-Apr-12 A						I								
GEA-02-170A	WATER - TIE-IN	5	22	30-Apr-12 A	31-May-12 A						I								
AWSS		368	359	04-Apr-11 A	28-Mar-12 A														
GEA-02-040	AWSS - INSTALL EAST	15	14	04-Apr-11 A	22-Apr-11 A						I								
GEA-02-150	Delay PG&E Conflict & COR to Move PG&E	15	160	04-Apr-11 A	17-Nov-11 A						■								
GEA-02-060	AWSS - TEST EAST	5	4	25-Apr-11 A	29-Apr-11 A						I								
GEA-02-050	AWSS - INSTALL WEST	15	38	16-Jan-12 A	09-Mar-12 A						■								
GEA-02-070	AWSS - TEST WEST	5	5	21-Mar-12 A	28-Mar-12 A						I								
Utility Vaults		283	295	02-May-11 A	02-Aug-12 A														
GEA-02-100	UTILITY VAULTS - EAST	15	82	02-May-11 A	26-Aug-11 A						■								
GEA-02-110	UTILITY VAULTS - WEST	15	43	27-Jun-11 A	26-Aug-11 A						■								
GEA-02-150	Final Utility and Water Work- Geary	15	33	18-Jun-12 A	02-Aug-12 A						■								
Joint Trench		90	123	29-Aug-11 A	29-Mar-12 A														
GEA-02-120	JOINT TRENCH - EAST	15	58	29-Aug-11 A	18-Nov-11 A						■								
GEA-02-130	JOINT TRENCH - WEST	10	18	24-Oct-11 A	17-Nov-11 A						I								
GEA-02-180A	PCC #5 Additional Work	10	13	12-Mar-12 A	29-Mar-12 A						I								
Restoration		5	5	03-Aug-12 A	09-Aug-12 A														
GEA-02-140	RESTORATION	5	5	03-Aug-12 A	09-Aug-12 A						I								
Ellis (ELL 137+50 thru 141+00)		288	349	14-Feb-11 A	02-Aug-12 A														
Sewer		288	349	14-Feb-11 A	02-Aug-12 A														
ELL-03-TIA5	Redesign Delay on Ellis Utility Re-Design Delay PCC#5	1	131	14-Feb-11 A	19-Aug-11 A						■								



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							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
ELL-03-150A	Delay MTA Redesign at Ellis	1	82	14-Feb-11 A	10-Jun-11 A														
ELL-03-010	SEWER - NORTH	10	9	13-Jun-11 A	24-Jun-11 A														
ELL-03-150A2	PCC#5 Sewer North	1	33	05-Jul-11 A	19-Aug-11 A														
ELL-03-020	SEWER - SOUTH	10	4	26-Jul-11 A	01-Aug-11 A														
ELL-03-160	Final Sewer Work Ellis	10	38	11-Jun-12 A	02-Aug-12 A														
Water		20	177	22-Aug-11 A	07-Jun-12 A														
ELL-03-030	WATER - NORTH	10	4	22-Aug-11 A	26-Aug-11 A														
ELL-03-040	WATER - SOUTH	10	8	29-Aug-11 A	09-Sep-11 A														
ELL-03-150	AWSS Hydrant, Sewer Work, and Restoration	10	27	30-Apr-12 A	07-Jun-12 A														
Waterproofing		5	16	26-Oct-11 A	17-Nov-11 A														
ELL-03-070	INSTALL WATERPROOFING	5	16	26-Oct-11 A	17-Nov-11 A														
Vaults		15	18	22-Aug-11 A	16-Sep-11 A														
ELL-03-150A	Demo ATT Vault	1	4	22-Aug-11 A	26-Aug-11 A														
ELL-03-050	VAULTS & ATT Trench	15	13	29-Aug-11 A	16-Sep-11 A														
Rebar		5	9	10-Oct-11 A	21-Oct-11 A														
ELL-03-080	INSTALL REBAR	5	9	10-Oct-11 A	21-Oct-11 A														
Concrete Footings & Walls		5	9	17-Oct-11 A	28-Oct-11 A														
ELL-03-090	CONCRETE FOOTINGS & WALLS	5	9	17-Oct-11 A	28-Oct-11 A														
Install Electrical In Basement		20	4	14-Nov-11 A	18-Nov-11 A														
ELL-03-100	BASEMENT WORK - NORTH	10	4	14-Nov-11 A	18-Nov-11 A														
ELL-03-110	BASEMENT WORK - SOUTH	10	4	14-Nov-11 A	18-Nov-11 A														
Joint Trench		17	43	19-Sep-11 A	17-Nov-11 A														
ELL-03-120	JOINT TRENCH - NORTH	15	43	19-Sep-11 A	17-Nov-11 A														
ELL-03-130	JOINT TRENCH - SOUTH	15	16	26-Oct-11 A	17-Nov-11 A														
Restoration		5	3	18-Nov-11 A	23-Nov-11 A														
ELL-03-140	RESTORATION	5	3	18-Nov-11 A	23-Nov-11 A														
Stockton (Geary to O'Farrell) East (CTL130+50 thru 134+00)		51	464	01-Feb-11 A	10-May-12 A														
STK01-01-010	BARRICADE MOCKUPS	5	4	01-Feb-11 A	07-Feb-11 A														
STK01-01-020	DEMO SIDEWALK	3	2	08-Feb-11 A	10-Feb-11 A														
STK01-01-030	DEMO BASEMENTS	15	14	11-Feb-11 A	03-Mar-11 A														
STK01-01-040	WATERPROOFING	5	4	04-Mar-11 A	10-Mar-11 A														
STK01-01-050	UNDERPINNING (Remove by MTA)	1	0	10-Mar-11 A	10-Mar-11 A														
STK01-01-060	REBAR	5	1	07-Apr-11 A	08-Apr-11 A														
STK01-01-070	CONCRETE FOOTING AND WALLS	10	9	14-Apr-11 A	27-Apr-11 A														
STK01-01-080	JOINT TRENCH	10	11	28-Apr-11 A	13-May-11 A														
STK01-01-100	WATER	5	21	13-May-11 A	14-Jun-11 A														
STK01-01-090	SEWER	5	4	31-May-11 A	06-Jun-11 A														
STK01-01-110	RESTORATION	5	4	15-Jun-11 A	21-Jun-11 A														
STK01-01-120	Added PGE Slurry Wall (CPR#58)	10	21	11-Apr-12 A	10-May-12 A														
Stockton (O'Farrell to Market) East (CTL 134+00 thru CTL 137+00)		133	131	16-May-11 A	18-Nov-11 A														
STK02-02-010	DEMO SIDEWALK	3	2	16-May-11 A	18-May-11 A														



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Activity ID	Activity Name	Original Duration	Actual Duration	Start	Finish	Total Float	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
STK05-03-010	SEWER	10	34	26-Sep-11 A	11-Nov-11 A						■								
STK05-03-051	ATT Vault PCC #4	1	25	26-Sep-11 A	31-Oct-11 A						■								
STK05-03-020	JOINT TRENCH - EXCAVATION	10	14	26-Oct-11 A	15-Nov-11 A						■								
STK05-03-030	JOINT TRENCH - INSTALL & BACKFILL	10	45	19-Mar-12 A	21-May-12 A						■								
STK05-03-051	PCC 5 COR	30	16	04-Apr-12 A	26-Apr-12 A						■								
STK05-03-40	Final Trench and ATT Work Stockton	3	24	02-Jul-12 A	03-Aug-12 A						■								
STK05-03-040	RESTORATION	3	3	06-Aug-12 A	08-Aug-12 A						■								
Stockton (Geary to O'Farrell) West (CTL 130+50 to CTL 134+00)		85	108	22-Jun-11 A	23-Nov-11 A														
STK06-04-011	Move Flower Stand	1	1	22-Jun-11 A	23-Jun-11 A						■								
STK06-04-111	Setup Pedestrian Control	1	1	22-Jun-11 A	23-Jun-11 A						■								
STK06-04-010	DEMO SIDEWALK	3	1	24-Jun-11 A	25-Jun-11 A						■								
STK06-04-T1A	SFMTA Re-sequencing Stockton West Geary to O'Farrell COR #32	1	54	24-Jun-11 A	12-Sep-11 A						■								
STK06-04-020	DEMO BASEMENT	5	1	27-Jun-11 A	28-Jun-11 A						■								
STK06-04-030	DEMO BASEMENT - 1ST FLOOR	15	1	27-Jun-11 A	28-Jun-11 A						■								
STK06-04-040	DEMO BASEMENT - 2ND FLOOR	15	39	29-Jun-11 A	24-Aug-11 A						■								
STK06-04-111	Macys Delay (Macys Contractor Work) "NIC 1251"	1	9	29-Jun-11 A	13-Jul-11 A						■								
STK06-04-050	DEMO BASEMENT - WALLS	15	54	14-Jul-11 A	29-Sep-11 A						■								
STK06-04-111	Install Vibration Monitoring Equipment	1	90	14-Jul-11 A	18-Nov-11 A						■								
STK06-04-111	Demo Basement Walls/Additional Conc. Left by Sub	1	29	14-Jul-11 A	24-Aug-11 A						■								
STK06-04-111	Waterproofing 2nd Floor	1	14	18-Jul-11 A	05-Aug-11 A						■								
STK06-04-111	Waterproofing 1st Floor	1	9	18-Jul-11 A	29-Jul-11 A						■								
STK06-04-111	Sawcut 2nd Floor	1	19	25-Aug-11 A	22-Sep-11 A						■								
STK06-04-111	Sawcut 1st Floor	1	10	30-Sep-11 A	14-Oct-11 A						■								
STK06-04-111	CDF 2nd Floor	1	2	05-Oct-11 A	07-Oct-11 A						■								
STK06-04-080	WATER	5	5	09-Nov-11 A	16-Nov-11 A						■								
STK06-04-060	JOINT TRENCH	10	3	17-Nov-11 A	22-Nov-11 A						■								
STK06-04-111	CDF 1st Floor	1	1	18-Nov-11 A	21-Nov-11 A						■								
STK06-04-090	RESTORATION	5	2	21-Nov-11 A	23-Nov-11 A						■								
AT&T Cutover - Stockton Street		130	199	19-Dec-11 A	21-Nov-12	182													
N-ATT00100	AT&T Cutover - Stockton Street	130	199	19-Dec-11 A	21-Nov-12	182													
PG&E Cutover - Stockton Street		85	174	25-Jan-12 A	30-Sep-12 A														
N-PGE00100	PG&E Cutover - Stockton Street	85	174	25-Jan-12 A	30-Sep-12 A														
SFMTA Re-Route Testing		10	21	21-Dec-11 A	21-Jan-12 A														
N-SFMTA00100	SFMTA Operations Testing of New OCS Overhead	10	1	21-Dec-11 A	22-Dec-11 A														
N-SFMTA00120	SFMTA Operations Training/ Notify Public/ Open Trolley Reroute	5	14	03-Jan-12 A	21-Jan-12 A														
Construction Tunnels CN-1252		1297	248	27-Jan-12 A	19-Aug-15	1960													
TUN0900	CN 1252 Tunnel Construction (LOE)	1148	248	27-Jan-12 A	17-Apr-15	-26													
TUN9700	CN 1252 Tunnel Contingency Cost Activity (LOE)	1074	208	27-Jan-12 A	15-May-15	-21													
CN-1252 Contract Milestones		1297	248	27-Jan-12 A	19-Aug-15	21													
TUN1000	CN 1252 NTP- TBM Procurement (NTP 1)	0	0	27-Jan-12 A							◆								
TUN1185	CN 1252 Requirement - CP-1 & CP-2 Completion (850 CD -> NTP1)	850	248	27-Jan-12 A	26-May-14*	0													



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							2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020											
TUN1265	CN 1252 Requirement- CP-3 & CP-4 Completion (910 CD -> NTP1)	910	248	27-Jan-12 A	25-Jul-14*	0	[Gantt bar: 27-Jan-12 to 25-Jul-14]																							
TUN9890	CN 1252 Requirement- Substantial Completion - Tunnels (1150 CD -> NTP1)	1150	248	27-Jan-12 A	22-Mar-15*	0	[Gantt bar: 27-Jan-12 to 22-Mar-15]																							
TUN9900	CN 1252 Requirement- CLOSEOUT COMPLETE - Tunnels (1180 CD -> NTP1)	1180	248	27-Jan-12 A	21-Apr-15*	0	[Gantt bar: 27-Jan-12 to 21-Apr-15]																							
TUN1025	CN 1252 NTP- TBM Launch Box & Site Preparation (NTP 2)	0	0	14-Mar-12 A			[Gantt bar: 14-Mar-12]																							
TUN9720	CN 1252 Early Release of Partial NTP3	0	0	13-Apr-12 A			[Gantt bar: 13-Apr-12]																							
TUN9840	CN 1252 Early Release of Partial NTP3 Part 2	0	0	01-Oct-12		264	[Gantt bar: 01-Oct-12]																							
TUN1050	CN 1252 NTP- Tunnel Excavation (NTP 3)	0	0	12-Oct-12		186	[Gantt bar: 12-Oct-12]																							
TUN9830	CN 1252 YBM Headwalls Complete	0	0		13-Jun-13	45	[Gantt bar: 13-Jun-13]																							
TUN9850	CN 1252 UMS Headwalls Complete	0	0		31-Jul-13	35	[Gantt bar: 31-Jul-13]																							
TUN1195	CN 1252 - Tunnel CP-1 & CP-2 Complete (850 CD -> NTP1, req'd May 26, 2014)	0	0		05-Jun-14*	-10	[Gantt bar: 05-Jun-14]																							
TUN1225	CN 1252 - Tunnel CP-3 & CP-4 Complete (910 CD -> NTP1, req'd July 25, 2014)	0	0		07-Aug-14*	-13	[Gantt bar: 07-Aug-14]																							
TUN1180	CN 1252 Substantial Completion - TUN (1150 CD -> NTP1, req'd March 22, 2015)	0	0		17-Apr-15*	-26	[Gantt bar: 17-Apr-15]																							
TUN9820	TUN Contract Close Out and Demobilization	28	0	18-Apr-15	15-May-15	-24	[Gantt bar: 18-Apr-15 to 15-May-15]																							
TUN1190	CN 1252 Closeout Complete - TUN (1180 CD -> NTP1, req'd April 21, 2015)	0	0		15-May-15*	-24	[Gantt bar: 15-May-15]																							
BUF008	TUN Buffer Float No. 8 Portal to STS (120 Calendar Days)	96	0	16-May-15	19-Aug-15	21	[Gantt bar: 16-May-15 to 19-Aug-15]																							
General Conditions		639	248	27-Jan-12 A	17-Apr-15	-28																								
Submittals & Permits		13	171	30-Jan-12 A	26-Dec-12	-27																								
TUN9860	TUN Submittals, Permits & Design	13	171	30-Jan-12 A	26-Dec-12	-27	[Gantt bar: 30-Jan-12 to 26-Dec-12]																							
Contractor's Procurement		639	248	27-Jan-12 A	16-Dec-13	-14																								
TUN9730	TUN TBM Procurement South	330	248	27-Jan-12 A	24-Jan-13	36	[Gantt bar: 27-Jan-12 to 24-Jan-13]																							
TUN1070	TUN TBM Procurement North	360	248	27-Jan-12 A	23-Feb-13	77	[Gantt bar: 27-Jan-12 to 23-Feb-13]																							
TUN9800	TUN Tunnel Segment Procurement	337	77	12-Jun-12 A	16-Dec-13	-10	[Gantt bar: 12-Jun-12 to 16-Dec-13]																							
TUN9750	TUN Deliver TBM South to sight	30	0	25-Jan-13	23-Feb-13	36	[Gantt bar: 25-Jan-13 to 23-Feb-13]																							
TUN9760	TUN Deliver TBM North to sight	30	0	24-Feb-13	25-Mar-13	77	[Gantt bar: 24-Feb-13 to 25-Mar-13]																							
Contractor's Mobilization		187	149	01-Mar-12 A	22-Feb-13	25																								
TUN9810	TUN Initial Mobilization and Site Set Up	40	143	01-Mar-12 A	21-Sep-12 A		[Gantt bar: 01-Mar-12 to 21-Sep-12]																							
TUN9870	TUN Launch Box Facilities Site Set Up	40	120	01-Apr-12 A	20-Sep-12 A		[Gantt bar: 01-Apr-12 to 20-Sep-12]																							
TUN9880	TUN Tunnel Facilities Site Set Up	103	54	16-Jul-12 A	22-Feb-13	25	[Gantt bar: 16-Jul-12 to 22-Feb-13]																							
Protection & Monitoring		60	118	13-Apr-12 A	17-Apr-15	-20																								
TUN1100	Protection - Monitor Instrumentation (LOE)	60	118	13-Apr-12 A	17-Apr-15	-20	[Gantt bar: 13-Apr-12 to 17-Apr-15]																							
4th & Bryant Street TBM Launch Box		361	185	30-Mar-12 A	26-Apr-13	83																								
TUN1151	TUN Launch Box Remove Utilities	15	59	30-Mar-12 A	22-Jun-12 A		[Gantt bar: 30-Mar-12 to 22-Jun-12]																							
TUN1080	TUN Launch Box Guide Walls, Jet Grout, Slurry Walls	130	145	11-Apr-12 A	26-Nov-12	-24	[Gantt bar: 11-Apr-12 to 26-Nov-12]																							
TUN9710	TUN Launch Box Excavation, Support, and Equipment Installation	104	0	27-Nov-12	26-Apr-13	-20	[Gantt bar: 27-Nov-12 to 26-Apr-13]																							
TUN1120	TUN Compensation Grouting 4th and Harrison- Install & Pregrout CG Pipes	45	0	04-Feb-13	08-Apr-13	71	[Gantt bar: 04-Feb-13 to 08-Apr-13]																							
YBM Headwalls		247	98	05-Jun-12 A	13-Jun-13	37																								
TUN1035	TUN Headwalls Remove Utilities and Guide Walls @ YBM	54	98	05-Jun-12 A	17-Nov-12	37	[Gantt bar: 05-Jun-12 to 17-Nov-12]																							
TUN1065	TUN Headwalls (Slurry) and Jet Grout @ YBM	133	0	07-Jan-13	13-Jun-13	37	[Gantt bar: 07-Jan-13 to 13-Jun-13]																							
UMS Station Headwalls		217	48	24-Jul-12 A	31-Jul-13	24																								
TUNCN501	TUN UMS Headwalls (North) Remove Utilities and Demo Tie Backs & Soldier pi...	28	48	24-Jul-12 A	15-Oct-12	24	[Gantt bar: 24-Jul-12 to 15-Oct-12]																							
TUNCN511	TUN UMS Headwalls (South) Remove Utilities and Demo Tie Backs & Soldier pi...	28	48	24-Jul-12 A	23-Oct-12	74	[Gantt bar: 24-Jul-12 to 23-Oct-12]																							



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							Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
UMS1230	UMS Rough-In M/E/P/A Concourse Level	45	0	23-Mar-17	13-May-17	0													
UMS1440	UMS Finish M/E/P/A Concourse and Inter Strut Levels	90	0	15-May-17	29-Aug-17	0													
UMS1450	UMS Commissioning	45	0	30-Aug-17	01-Nov-17	0													
Intermediate Strut Level		145	0	16-Aug-16	14-Mar-17	43													
UMS1200	UMS Install Intermediate Strut Level Deck & Encase Wales	60	0	16-Aug-16	08-Nov-16	0													
UMS1220	UMS Internal Walls Intermediate Strut Level	25	0	09-Nov-16	15-Dec-16	13													
N-UMS1040	UMS Install Intermediate Strut Level Parameter Walls	20	0	09-Nov-16	08-Dec-16	0													
N-UMS1460	UMS Install Emergency Ventilation Equipment	60	0	16-Dec-16	14-Mar-17	43													
N-UMS9760	UMS Rough-In M/E/P/A Intermediate Strut Level	20	0	16-Dec-16	16-Jan-17	83													
Mezzanine Level		291	0	28-Apr-16	21-Jun-17	13													
N-UMS1222	UMS Install Mezzanine Level Deck & Encase Wales	61	0	28-Apr-16	25-Jul-16	0													
N-UMS1223	UMS Internal Walls Mezzanine Level	50	0	26-Jul-16	04-Oct-16	18													
N-UMS10030	UMS Install Mezzanine Level Parameter Walls	15	0	26-Jul-16	15-Aug-16	0													
UMS1240	UMS Rough-In M/E/P/A Mezzanine Level	45	0	12-Oct-16	15-Dec-16	13													
UMS1380	UMS Finish M/E/P/A Platform and Mezzanine Levels	130	0	16-Dec-16	21-Jun-17	13													
Platform Level		367	0	30-Jun-15	30-Jun-16	189													
N-UMS1295	UMS Excavate & Install Permanent Struts Mezzanine Level to Platform	115	0	30-Jun-15	13-Nov-15	0													
UMS1330	UMS Place Invert	62	0	31-Oct-15	21-Jan-16	0													
UMS1315	UMS Install Platform Level Parameter Walls & Encase Wales	71	0	22-Jan-16	14-Apr-16	0													
UMS1340	UMS Construct Platform Structure	11	0	15-Apr-16	27-Apr-16	0													
UMS1360	UMS Rough-In M/E/P/A Platform Level	45	0	28-Apr-16	30-Jun-16	129													
Construction CTS Station P-1254R		1660	0	01-May-13	15-Nov-17	76													
CTS9700	CTS Contingency Cost Activity (LOE)	1024	0	01-May-13	15-Nov-17	25													
CTS Contract Milestones		1610	0	01-May-13	26-Sep-17	36													
FDS1800	CTS Start	0	0	01-May-13		2													
N-CTS1000	CTS Tunnel Interface Finish Cross Passages 1 & 2	0	0		12-Nov-14	76													
N-CTS9770	CTS Access through tunnels Interface to STS	0	0		12-Aug-16	40													
N-CTS1010	CTS Track Interface to STS	0	0		29-Sep-16	27													
N-CTS9760	CTS Interface for Access to Station Rooms for STS Contractor	0	0		23-Jun-17	3													
CTS1500	CTS P-1254R Commissioning Completion	0	0		26-Sep-17	36													
Headhouse / Cross Cut		1660	0	01-May-13	15-Nov-17	76													
Headhouse Exc / Structural		1380	0	01-May-13	08-Feb-17	258													
N-CTS0900	CTS Relocate Sidewalk / OCS / Install Sound Wall	25	0	01-May-13	05-Jun-13	2													
N-CTS0950	CTS AT&T Cutover; Relocate Utilities (PG&E, MUNI, Water, Sewer)	70	0	06-Jun-13	13-Sep-13	2													
CTS1000	CTS Building Demolition	30	0	16-Sep-13	28-Oct-13	2													
CTS1010	CTS Install Slurry Walls	110	0	29-Oct-13	21-Apr-14	2													
N-CTS1015	CTS Install Dewatering System	90	0	29-Oct-13	24-Mar-14	22													
CTS1005	CTS Site Setup/Form / Pour Surface Deck Slab & Support Walls	55	0	22-Apr-14	09-Jul-14	2													
N-CTS1020	CTS Install Gantry Crane	15	0	10-Jul-14	30-Jul-14	2													
CTS1020	CTS Excavate Headhouse & Bracing to El. +18 for Cross Cut Breakout	130	0	31-Jul-14	10-Feb-15	2													
N-CTS1022	CTS Backfill tunnels with CDF	19	0	13-Nov-14	11-Dec-14	47													



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Specific 34 11 01 Construction on Existing Tracks - Requirements include:

Signaling including track circuits and switch and lock movements shall be restored and tested to verify readiness for service. In the event that existing signaling for LRT and vehicular traffic is not restored at the end of the work, the Contractor shall pay SFMTA for the costs of manual traffic control required until such time as the signaling is restored.

Existing Systems Testing. Perform signal testing in accordance with the requirements in Section 34 42 13, SURFACE SIGNALING SYSTEM GENERAL REQUIREMENTS.

Final inspection by SFMTA will be required before train service can resume operations on tracks taken out of service during construction on active tracks. SFMTA will furnish staff to participate in the final inspection required to place track, signaling and OCS in service at the end of Work Windows or when otherwise required. Work shall be planned so as to allow sufficient time for inspection prior to returning track to service.

SFMTA will provide test vehicles on site for testing of the trackwork and OCS work. SFMTA staff will operate the test vehicles. The testing will consist of the passage of the vehicles over the tracks as many times as required to the satisfaction of the Engineer.