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# **Transmittal**

CS Tr	ansmittal No. 2237					
То:	Jeff Davis FTA 201 Mission Street, Suit San Francisco, CA 9410		ct No.:	John Funghi M544.1, CS-149 1-4.02 Contingen	ncy Management	
Date: Refere	May 21, 2013 ence:	Subject:		Contingency Man	nagement – Schedule	e 2012 Update
Sent v	ria:	□ overnight		nessenger mail – <b>Address:</b>	hand-delivered	
☐ co	ollowing: opy of letter/memo inutes/agenda port esentation I / dvd ecifications elf-size drawings etches/maps/layouts ference material her	□ estimate □ schedule □ deliverable □ review comment form □ no review comments □ review comments □ response to comments □ concurrence with respondurence verification of incorporational	se	For your:  information/us action review/comme response to co concurrence incorporation verification signature acceptance/ap other	ent omment of comments	<i>Due date:</i> N/A
Item N		on ncy Management – Schedule 20	012 Upc	date (DRAFT)	Rev. No	Date May 2013
	rks: Attached please	If enclosures are not as noted, find revised draft of Cont			– Schedule 2012	Update.
John F Progra JF:sml	m Director					
cc:	David Kuehn, STV (	w/attachments) <u>david.kue</u> (w/attachments) <u>bradley.le</u> P (w/attachments)				

CS File No. M544.1.5.0810

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 schedule 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 final design submittals, changes is construction contracts packaging strategy, delay to FFGA, improved risk profiles for tunnel and station contracts as well as interfaces with station to tunnel and stations to systems contracts.

#### SCHEDULE ASSESSMENT AND RISK MODELING

A review of schedule risk was performed as part of the May 2011 Risk Refresh prior to the FFGA. The review included basic schedule logic, durations, and critical paths. The proposed changes to the schedule contingency that follow are based on elements of the 2011 Schedule Review to assess and compare current project schedule risk and sensitivity to project delivery to those schedule risks.

As part of the 2011 Schedule Review, an independent assessment of the most optimistic activity durations was utilized to develop a stripped project schedule. These minimal activity durations resulted in a shortest project path, which provided input to a program used to simulate the magnitude of project schedule risk, and may be used to establish the potential responses to manage the risk. The project risk simulation program stochastically modeled sufficient iterations of random activity durations to adequately represent the risk associated with the project's schedule outcomes.

FTA has established parameters for schedule contingency based upon TCRP Report 31. The time between "Entry into Final Design" and Revenue Service Date (RSD), stripped of all contingency, has nationally and historically averaged a 20 percent overrun in time. It is, therefore, prudent to allow for this time in the schedule and is recommended by FTA. The result is referred to as the "Federal Date" and is calculated below. For ease of calculation, all data is converted to calendar days (CD).

A. Entry into Final Design	01/07/2010	
B. SFMTA Revenue Date	12/26/2018	
C. Duration	3325 CD	B-A
D. Latent Contingency	0	
E. Buffer Float (259 workdays)	360 CD	
F. Stripped Schedule Duration	2965 CD	C - E
G. Stripped Schedule RSD	12/31/2017	A + F
H. FTA Float (20%)	593 CD	F x 20%

May 2013 Page **1** of **6** 

I. Recommended Duration	3558 CD	F + H
J. Federal Date	8/16/2019	A + I
K. Difference	233 CD	J - B

The Federal Date is a point of anticipated completion taking into consideration industry experienced delays and difficulties. It is not a binding date on the project but provides a comparison point so that judgments can be made. The modeling of the project schedule is compared to the Federal Date for the purpose of determining extra costs for extended performance times. Any indication that the project completion will go beyond the Federal Date requires an adjustment to cost contingency to cover the extra performance time. The 2011 analysis for the CSP did not indicate that additional costs would be needed.

SFMTA continues to produce a Critical Path Method Schedule that consolidates the work of design, Real Estate, administrative, construction, and other elements into a work plan that indicates an RSD of December 26, 2018. That Schedule also includes strategically placed quantities of "reserve time" referred to as buffer float. The intent of the buffer float is to isolate risk events and provide for a mitigating contingency so that subsequent work activities are minimally affected. This is a useful strategy in development of the risk models **but has the inherent difficulty in that it affects the intercontract relationships and timing.** In addition, **embedding buffer float can affect the determination of the critical path of the project,** which in fact happened on the SFMTA Schedule. It is, therefore, important to be cautious in how the schedule is structured.

The RA process requires that all contingency time be eliminated from the schedule. In 2011 Schedule Review, investigations by the PMOC and by the Grantee did not identify any latent contingency time beyond the buffer float explicitly shown in the schedule. The amount of buffer float embedded on the critical path totaled 12 months, and there was other buffer float attached to portions of the schedule. The elimination of the buffer float throughout the schedule revealed that the project could be shortened by a year to late December 2017. This was the basis for the start of the 2011 schedule RA process.

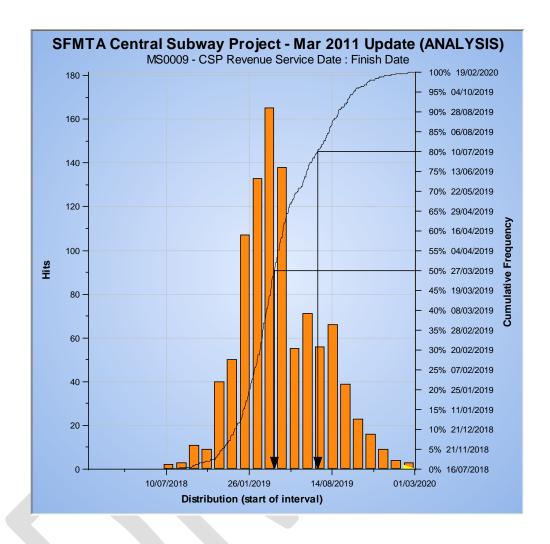
The PMOC analyzed activity durations and determined the optimistic, pessimistic, and realistic durations that may be expected. The risk ranging of activity durations were combined with discrete risks surviving on the Risk Register to form a comprehensive look at the risk profile and schedule performance.

The histogram in Figure 1 compares the total retained risks identified (168) in the Risk Register to the discrete high level risks (36) modeled in the analysis.

The analysis of the stripped schedule determined that 15 months of risk are present in the schedule, and the RSD could be March 27, 2019 at the 50th percentile (recommended as the appropriate evaluative hold point at FFGA). This is a full three months beyond the planned RSD of December 26, 2018, but less than the SFMTA CSP completion date of August 2019. The following histogram illustrates the results of the analysis.

May 2013 Page **2** of **6** 

Figure 1 Histogram



May 2013 Page **3** of **6** 

Table 1 exhibits the existing agreed to Milestones and Hold points 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 Schedule Contingency** 

	Hold Points	QTR	Minimum Contingency Level (Months)	Proposed Contingency Levels (months)
1	Tunnels 100% Designed	1Q11	14	14
2	UMS-CTS100% Designed June 2011	4Q11	13	13
3	<del>FFGA Award and</del> NTP Tunnels	4Q11	12	12
3a	FFGA Award	4Q12	12	10
4	CTS/UMS Commence Bid October 2012	4Q12	10	6
5	Demobilize Tunnels October 2014	4Q14	8	5
6	Complete Station to Platform Levels October January 2017 (CTS/YBM)	1Q17	6	4
7	Complete CTS/Tunnels Systems Installation July 2018	3Q18	4	2
	Revenue Service	4Q18	0	0

Close examination of Contingency levels and rational utilized for minimum levels reveals that the original plan has a minimum of 12 month at the time of FFGA. Expectations would have been that the tunnel was bid and physical work would be completed or in progress on the Advance Utility Relocations contracts. The importance of these expectations put in context with the schedule is that the major risk is associated with the inter dependencies of the station contract and tunnel completion. The Program maintained a schedule contingency balance of 14 months up until August of 2012.

In August 2012, although the station designs were complete and two stations (UMS and CTS) had been bid but not yet awarded, the original relationship between tunneling and commencement of the station construction had significantly been altered to the point that the risk to the Program regarding the inherent interdependency had been reduced but not completely eliminated. Reexamining the recommendation to combine all the station contracts and systems contract for cost and schedule benefits, the Program would also transfer the risks of the interdependency of the station to track work

May 2013 Page **4** of **6** 

to the Contractor, who would be in the best position to control the successful outcome of these risks. Not only would the Program be relieved of the administrative burden and risk of coordinating four individual contracts, the risk of not completing dependent activities within the specified timeframes would be transferred completely under the control of one Contractor.

Attachments 1 thru 5 illustrate graphically the effect of combining the contracts. Listed below are explanations of the graphical depictions.

Attachment 1 – Illustrates how combining the contracts further delays the NTP dates of the station contracts providing more time for tunneling to complete prior to the required station tunnel interdependency. The 5 month delay to NTP does not impact the planned Revenue Service Date.

Attachment 2 – Illustrates the August 2012 Program critical path and the buffer float on the critical path totaling 14.4 months.

Attachment 3 – Illustrates the September 2012 Program critical path after combining the four remaining contracts into one and the buffer float on the critical path. Note buffer float previously on the critical path no longer exists and new buffer float has been added.

Attachment 4 – Illustrates the November 2012 Program critical path, adjusted by making changes to the CTS tunnel break-in activity buffer float; providing more overall buffer float on critical path.

Attachment 5 – Illustrates in one graphic, the effect of buffer float changes and how what is on the critical path has changed. The buffer float still exists in the schedule.

The importance of attachment 4 is to demonstrate the effect of computing minimum schedule contingency, it only accounts for buffer float that is on the critical path.

The Program advocates that the risk profile has changed with the delay in commencement of the stations contracts and with the combining of the four remaining contracts into one. This significant change in the Program risk profile justifies the adjustments to the minimum contingencies and the Hold Points definitions.

Contributing factor to adjust milestones	Resulting justification for use of contingency
Delays to stations NTPs	Extends time to complete tunnel and reduce risk of
	delay to station break-in activity
Combining of contract package into one	Transfers high risk cost items to contractor
procurement	
Delay to FFGA	Allows use of contingency for intended purpose
Improved risk profiles for tunnel and station	Allows use of contingency for intended purpose
contracts	

Implementation of the recommended changes to milestones and hold points, the Program still has embedded float in the schedule to account for the identified risks, but will not be credited for it against the minimum contingency because of the shift in the critical activities. Commencement of the underground stations is important, however, UMS becomes the critical path for the majority of the

May 2013 Page **5** of **6** 

remaining time. 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 station construction relative to tunnel construction, and combining the remaining four contracts into one 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.

The justification for these changes can be augmented by examining the rational 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.

In addition to these adjustments, the single contract for combining the four remaining contracts is including a schedule component in the bid package. The bid evaluation allows the bidder to insert number of bid days, not to exceed 1700 days, as part of the competitive bidding process. The Program has added this component as an additional mitigation measure to preserve schedule contingency.

The Program will develop a revised histogram to validate the proposed changes to ensure that the new risk profile falls within acceptable limits of time and cost. The Program will analyze activity durations and determined the optimistic, pessimistic, and realistic durations that may be expected, based on real data from tunnel contractor experiences. The risk ranging of activity durations will be combined with discrete risks surviving on the Risk Register to form a comprehensive look at the risk profile and schedule performance.

May 2013 Page **6** of **6** 

Attachment 1

26-Mar-13 10:17 SMTA Central Subway Project - March 2012 Update... Activity Name Activity ID 2012 Org Dur Total Float Oct Nov Dec Jan Feb Mar Apr May Jun Jul SMTA Central Subway Project - March 2012 Update 0 23-Oct-12 CN 1253 NTP - UMS 0 23-Oct-12 17 ◆ CN 1253 NTP - UMS UMS NTP had 1 day of float on August Update and 0 20-Nov-12 SFMTA Central Subway Project - August 2012 Update slipped over 5 months in the September Update. UMS CN 1253 NTP FDS1700 0 20-Nov-12 ♦ UMS CN 1253 NTP SFMTA Central Subway Project - September 2012 Update 0 01-May-13 NTP CN 1300- UMS, CTS, YBM, & STS FDS2320 0 01-May-13 ◆ NTP CN 1300- UMS, CTS, YBM, & STS FDS1700 UMS Start 0 01-May-13 UMS Start TASK filter: UMS NTPs. Page 1 of 1

Activity ID	Activity Name	Org Start	Finish	Total	2013 2014 2015 2016 2017 2018 2019
_		Dur		Float	ASINDIFMAMJJASINDIFMA JJJASPNDIFMA JJJASPNDJEMAMJJASPNDJEMAMJJASPNDJEMAMJJAS NDIJEMAMJJAS
SFMTA C	Central Subway Project - August 2012 Update	2404 30-Jan-12 A	26-Dec-18	0	
CENTRA	L SUBWAY PROJECT	2404 30-Jan-12 A	26-Dec-18	0	
	Level Milestones	0 26-Dec-18	26-Dec-18	0	
MS0019	Baseline Finish Date: 12-26-2018	0	26-Dec-18*	0	♦ Baseline Finish Da
CONSTRU	JCTION PHASE	2404 30-Jan-12 A	26-Dec-18	0	
	tion Tunnels CN-1252	969 30-Jan-12 A	21-Jan-15	0	
TUN9860	TUN Submittals, Permits & Design	13 30-Jan-12 A	27-Nov-12	-31	TUN Submittals, Permits & Design
TUN9870	TUN Launch Box Facilities Site Set Up	40 01-Apr-12 A	10-Sep-12	-30	TUN Launch Box Facilities Site \$et Up
TUN1080	TUN Launch Box Guide Walls, Jet Grout, Slurry Walls	130 11-Apr-12 A	17-Nov-12	-35	TUN Launch Box Guide Walls, Jet Grout, Slurry Walls
TUN9710	TUN Launch Box Excavation, Support, and Equipement Installation	83 07-Jan-13	02-May-13	-24	TUN Launch Box Excavation, Support, and Equipement Installation
TUN-07-1000	Tunneling - Assemble Southbound TBM & Launch Frame	30 03-May-13	14-Jun-13	-24	Tunneling - Assemble Southbound TBM & Launch Frame
TUN-07-1010	Tunneling - Test and Commission Southbound TBM	5 17-Jun-13	21-Jun-13	-24	I Tunneling - Test and Commission Southbound TBM
TUN-07-1020	Tunneling - Launch Southbound TBM (163+52 - 160+00)	15 24-Jun-13	15-Jul-13	-24	Tunneling - Laurich Southbound TBM (163+52 - 160+00)
TUN-06-1000	Tunneling - Assemble Northbound TBM & Launch Frame	30 16-Jul-13	26-Aug-13	-24	Tunneling - Assemble Northbound TBM & Launch Frame
TUN-06-1010	Tunneling - Test and Commission Northbound TBM	5 27-Aug-13	03-Sep-13	-24	■ Tunne ling - Test and Commission Northbound TBM
TUN-06-1020	Tunneling - Launch Northbound TBM (163+52 - 160+00)	15 04-Sep-13	24-Sep-13	-24	■ Tunneling - Launch Northbound TBM (163+52 - 160+00)
TUN-07-1030	Tunneling - Install Tunnel Ventilation Ducts	1 25-Sep-13	25-Sep-13	-24	I Tunneling - Install Tunnel Ventilation Ducts
TUN-07-1050	Tunneling - Tunnel Southbound (160+00 - 156+50)	6 26-Sep-13	03-Oct-13	-24	■ Tunneling - Tunnel Southbound (160+00 - 156+50)
TUN-06-1040	Tunneling - Tunnel Northbound (160+00 - 156+50)	6 04-Oct-13	11-Oct-13	-24	Tunneling - Tunnel Northbound (160+00 - 156+50)  August Critical Path and Buffer Float
TUN-06-1050	Tunneling - Tunnel Northbound (156+50 - 142+30)	23 14-Oct-13	13-Nov-13	-24	Tunneling - Tunnel Northbound (156+50 - 142+30) 96+170+44+3= 313 working days
TUN-06-1060	Tunneling - Tunnel Northbound (142+30 - 140+50)	3 14-Nov-13	18-Nov-13	-24	Tunneling - Tunnel Northbound (142+30 - 140+50) (313*7)/30.4= 14.4 months
TUN-06-1070	Tunneling - Tunnel Northbound (140+50 - 135+00)	9 19-Nov-13	03-Dec-13	-24	Tunneling - Tunnel Northbound (†40+50 - 135+00)
TUN-06-1080	Tunneling - Tunnel Under Existing Bart Tunnels	0 25-Nov-13		-24	◆ Tunneling - Tunnel Under Existing Bart Tunnels
TUN-06-1130	Tunneling - Tunnel Northbound (135+00 - 128+00)	11 04-Dec-13	18-Dec-13	-24	■ Tunneling - Tunnel Northbound (135+00 - 128+00)
TUN-06-1150	Tunneling - Tunnel Northbound (128+00 - 103+00)	39 19-Dec-13	18-Feb-14	-24	Tunneling - Tunnel Northbound (128+00 - 103+00)
TUN-06-1140	Tunneling - Tunnel Northbound (103+00 - 88+00)	23 19-Feb-14	21-Mar-14	-24	■ Tunneling - Tunnel Northbound (103+00 - 88+00)
TUN-06-1090	Tunneling - Tunnel Northbound (88+00 - 85+50)	5 24-Mar-14	28-Mar-14	-24	■ Tunneling - Tunnel Northbound (88+00 - 85+50)
TUN-06-1100	Tunneling - Tunnel Northbound (85+50 - 81+20)	7 31-Mar-14	08-Apr-14	-24	■ Tunneling - Tunnel Northbound (85+50 - 81+20)
TUN1205	TUN Excavate/Support/Line - X-Passage #2 (CTS)	37 09-Apr-14	30-May-14	-24	TUN Excavate/Support/Line - X-Passage #2 (CTS)
TUN1215	TUN Excavate/Support/Line - X-Passage #4 (UMS)	52 02-Jun-14	13-Aug-14	-24	TUN Excavate/Support/Line - X-Passage #4 (UMS)
TUN1125	TUN Excavate/Support/Line - X-Passage #5	43 23-Jun-14	21-Aug-14	-24	TUN Excavate/Support/Line - X-Passage #5
BUF1047	TUN Buffer Float No. 7.75 to Stations MOS (120)	96 29-Aug-14	21-Jan-15	0	TUN Buffer Float No. 7.75 to Stations MO\$ (120)
	tion MOS Station CN-1255	685 21-Jan-15	06-Dec-16	0	
N-MOS9910	MOS Tunnel Interface Finish Cross Passages 1-5	0	21-Jan-15	0	◆ MOS Tunnel Interface Finish Cross Passages 1-5
N-MOS9740	MOS Shore/Fill Existing Tunnel for Stability	28 22-Jan-15	03-Mar-15	0	MOS Shore/Fill Existing Tunnel for Stability
N-MOS10150	MOS Excavate to bottom of Concourse Slab	15 04-Mar-15	24-Mar-15	0	■ MOS Excavate to bottom of Concourse Slab
MOS1140	MOS Construct Station Concourse Level Slab & Remove Temp Struts at Station Site	25 25-Mar-15		0	MOS Construct Station Concourse Level Slab & Remove Temp Struts at Station Site
MOS1110	MOS Excavate & Install Temp Struts to Station Invert	85 29-Apr-15	27-Aug-15	0	MOS Excavate & Install Temp Struts to Station Invert
MOS1160	MOS Construct Station Invert Slab & Remove Struts to level 6	25 28-Aug-15	02-Oct-15	0	MO\$ Construct Station Invert \$lab & Remove Struts to level 6
MOS1180	MOS Construct Station Platform	25 05-Oct-15	06-Nov-15	0	■ MOS Construct Station Platform
N-MOS1180	MOS Install Station Platform Lvl Columns & Perimter Walls	50 09-Nov-15	25-Jan-16	0	MOS Install Station Platform LvI Columns & Perinter Walls
N-MOS9745	MOS Construct Headhouse Concourse Level Slab & Remove Temp Struts	50 26-Jan-16	05-Apr-16	0	MOS Construct Headhouse Concourse Level Slab & Remove Temp Struts
N-MOS10120	MOS Track Interface to STS	0	05-Apr-16	0	◆ MOS Track Interface to STS
BUF0016	Buffer Float No. 16 to Trackwork (170)	170 06-Apr-16	06-Dec-16	0	Buffer Float No. 16 to Trackwork (170)
	tion STS CN-1256	611 03-Nov-16	06-Jul-18	0	
STS3030	STS TUN Port->CTS Construct Plinths	30 03-Nov-16		0	STS TUN Port->CTS Construct Plinths
STS9720	STS Track MOS Interface	0	06-Dec-16	0	◆ STS Track MOS Interface
STS3040	STS TUN Port->CTS Install MEPA (Lighting, Power, Plumbing)	90 19-Dec-16		0	STS TUN Port->CTS Install MEPA (Lighting, Power, Plumbing
STS3070	STS TUN Track Installation	90 27-Apr-17	01-Sep-17	0	STS TUN Track Installation
STS3080	STS TUN Systems Installation	147 24-Jul-17	21-Feb-18	0	STS TUN Systems Installation
STS3090	STS S&S Certification-Startup & Commissioning	50 22-Feb-18	02-May-18	0	STS S&S Certification Startup & Co
STS1500	STS CN 1256 Substantial Completion	0	02-May-18	0	◆ STS CN 1256 Substantial Completion
BUF1017	STS Bufferr Float- CP-1256 (44)	44 03-May-18	06-Jul-18	0	STS Bufferr Float- CP-1256 (4
Project St		118 09-Jul-18	26-Dec-18	0	
	1000 0 100 11 / D D A 11 10	145 00 1140	10 Dec 10		S&S Certification /
STU1010 BUF0018	S&S Certification / Pre-Revenue Activities  Muni Float (116)	115 09-Jul-18 3 20-Dec-18	19-Dec-18 26-Dec-18	- 0	Munt Float (116)

Activity ID	Activity Name	Org Start Dur	Finish	Total	2013	1 1 2 1 2	2014	201 		201		20		2018	2019
OFMEA	Partial Outron Paris of Contember 2010 Hadeta	2278 03-Sep-12 /	26-Dec-18	1 loat	SOUDIFMAMJJASOUD		HMITIMATI		าโฟล่วไฟล่า		<u>ILANALAI</u>		11431	DJFAMJJASJVDJF	
	Central Subway Project - September 2012 Update			0											
CENTRA	AL SUBWAY PROJECT	2278 03-Sep-12 /		0											
	Level Milestones	0 26-Dec-18		0											
S0019	Baseline Finish Date: 12-26-2018	0	26-Dec-18*	0										♦ Bas	seline Finish D
	SIGN PHASE	35 03-Sep-12 /		7									ļ		
	nstruction Docs CN-1300	35 03-Sep-12 /	_	7			(4000() () GENTAL I	LAC OTO	VDM 0 OTO						
DS1540	GP's, SP's, and Division 1 Pre Final (100%) (by SFMTA) - UMS, CTS, YBM, & STS	35 03-Sep-12 /		7	GP's, SP's, and Division 1 Pr	1 :		JMS, CTS,	YBM, & S15						
DS2340	CD Drawing Reproduction - UMS, CTS, YBM, & STS	2 18-Oct-12 191 22-Oct-12		7	I CD Drawing Reproduction - I	UIVIS, C	15, YBIVI, & 515								
	EMENT PHASE d CP-1300	191 22-Oct-12	01-May-13	0											
)S2290	Advertise Milestone- UMS, CTS, YBM, & STS	0 22-Oct-12	01-May-13	7	◆ Advertise Milestone- UMS, C	TC VD	M & QTQ						¦		
0S2290 0S2270	Advertise Milestoffer OMS, CTS, YBM, & STS (Calendar Days)	93 22-Oct-12	22-Jan-13	0	Advertise Milestone- Givis, C	1 1	i ' i i	londar Day	(C)						
DS2270	Bid Opening- UMS, CTS, YBM, & STS	1 23-Jan-13	23-Jan-13	7	I Bid Opening- UMS, C	1 '		ienuai Day	3)						
DS2300	Bid Opening Milestone- UMS, CTS, YBM, & STS	0	23-Jan-13	7	◆ Bid Opening Milestone										
DS2300 DS2280	Bid Review- UMS, CTS, YBM, & STS	20 24-Jan-13	21-Feb-13	7	Bid Review- UMS, C	1 7	1 1 1								
DS2240	SFMTA Board Award- UMS, CTS, YBM, & STS	1 05-Mar-13	05-Mar-13	,	SFMTA Board Awa								} <del> </del>		
S2310	SFMTA Board Award Milestone- UMS, CTS, YBM, & STS	0	05-Mar-13	0			tone- UMS, CTS, YBM	& STS				0 111	<del>  </del>		
)S2260	Approve/Execute/Certify- UMS, CTS, YBM, & STS	40 06-Mar-13	30-Apr-13	0			ify- UMS, CTS, YBM, &	1 1						and Buffer Float	
DS2320	NTP CN 1300- UMS. CTS. YBM. & STS	0 01-May-13	00 / tpi 10	0	◆ NTP CN 1300-		The state of the s			44	+68= 112	work work	ing dav	/S	
	UCTION PHASE	2066 01-May-13	26-Dec-18	0	•	O.V.O,	510, 1511, 4,010				12*7)/30.4				
	ction CN-1300	1799 01-May-13		0	- <mark> </mark>   <del> </del>	·					.2 1 )/ 00.	0.2	1110114		
	ction UMS Station P-1253	1646 01-May-13		0											
S1700	UMS Start	0 01-May-13	011100 17	0	◆ UMS Start										
UMS1067	UMS Garage Design, Submittals, and Reviews	20 01-May-13	29-May-13	0	1 1 1	Design	n, Submittals, and Revie	ewe			i I	i	i i		
UMS10000	UMS Garage Install Temp Shoring, Bracing, and Utilities	40 30-May-13	25-Jul-13	0		"	stall Temp Shoring, Bra	i i	It lities						
UMS10010	UMS Garage Demo and Install Structural Elements to Garage Permanent Operations	175 26-Jul-13	19-May-14	0	- t - sine da	ago III	UMS Garage Der			lements to	Garage Permar	ent Opera	ations		
UMS9990	UMS Garage Turn Over Garage	0	19-May-14	0			◆ UMS Garage Tur	1 1			darago i omiai	ioni opore	1		
UMS10060	UMS Garage Floor/Column Demo and Column/Roof Support and Seismic Bracing	125 20-May-14	13-Nov-14	0				1 1	- :	emo and Co	lumn/Roof Sup	oort and S	eismic Brad	eina	
UMS1013	UMS Excavate/Roof/Pave North Concourse (128+91 to 130+82)	85 14-Nov-14	13-Apr-15	0				1 1		1 1	h Concourse (		1 1	79	
-UMS1160	UMS Excavate & Install Permanent Struts Platform Box Concourse to Mezzanine Level	115 13-Feb-15	29-Jun-15	0				- 0	i	i i	i   '	i	i i'	ourse to Mezzanine Level	
MS1170	UMS Excavate Install Permanent Struts North Concourse	65 14-Apr-15	29-Jun-15	0	- <mark> </mark> <del> </del> <del> </del>	·				1 _ 1	manent Struts				
UMS1295	UMS Excavate & Install Permanent Struts Mezzanine Level to Platform	115 30-Jun-15	13-Nov-15	0						1 1		1	1 1	e Level to Platform	
MS1330	UMS Place Invert	62 31-Oct-15	21-Jan-16	0				1 [	i I	UMS Place	1 1				
MS1315	UMS Install Platform Level Parameter Walls & Encase Wales	71 22-Jan-16	14-Apr-16	0						1 1	1 1	Level Pa	rameter W	alls & Encase Wales	
MS1340	UMS Construct Platform Structure	11 15-Apr-16	27-Apr-16	0						1 1	S Construct Pla	1	i i		
UMS1222	UMS Install Mezzanine Level Deck & Encase Wales	61 28-Apr-16	25-Jul-16	0								!	ļ	k & Encase Wales	
UMS10030	UMS Install Mezzanine Level Parameter Walls	15 26-Jul-16	15-Aug-16	0								- 1		rameter Walls	
MS1200	UMS Install Intermediate Strut Level Deck & Encase Wales	60 16-Aug-16	08-Nov-16	0							_ ;	- 1	: :	Strut Level Deck & Encase Wales	s
UMS1040	UMS Install Intermediate Strut Level Parameter Walls	20 09-Nov-16		0							1	1	1 1	e Strut Level Parameter Walls	
//S1180	UMS Place Concourse Level Deck & Encase Wales	50 09-Dec-16		0							i			urse Level Deck & Encase Wales	es
//S1210	UMS Internal Walls Concourse Level	25 22-Feb-17	22-Mar-17	0										alls Concourse Level	
//S1230	UMS Rough-In M/E/P/A Concourse Level	45 23-Mar-17	13-May-17	0								1	1	-In M/E/P/A Concourse Leve	
MS1440	UMS Finish M/E/P/A Concourse and Inter Strut Levels	90 15-May-17		0										Finish M/E/P/A Concourse and I	Inter Strut Lev
/IS1450	UMS Commissioning	45 30-Aug-17	01-Nov-17	0									1 1	UMS Commissioning	
/IS1500	UMS P-1253 Commissioning Completion	0	01-Nov-17	0									i i	UMS P-1253 Commissioning Con	mpletion
Constru	ction STS P-1256	153 02-Nov-17	03-Apr-18	0									}		
S9990	STS CS Commissioning	60 02-Nov-17	<u> </u>	0										STS CS Commissioning	
S1500	CN 1300 Substantial Completion	0	30-Jan-18	0									:	◆ CN 1300 Substantial Comp	pletion
JF1017)	STS Buffer Float- (44)	44 31-Jan-18		0									1 1	STS Buffer Float- (44)	
Project S		183 04-Apr-18	26-Dec-18	0											
ΓU1010	S&S Certification / Pre-Revenue Activities	115 04-Apr-18		0										S&S Certif	ification / Pre-R
JF0018	Muni Float	68 18-Sep-18		0										Mu	i i
	1	30 .0 COP 10					1 1	1 i	1	, i			1	, , <del>, livid</del>	

Activity ID	Activity Name	Org Start	Finish	Total	2013	2014	2015		2	2016		2017	20	18 I	2019	)
		Dur		Float		JF AMJJASONDJF		BOAD			NDJFM					
SFMTA C	entral Subway Project - November 2012 Update	2257 22-Oct-12 A	26-Dec-18	0												
CENTRA	L SUBWAY PROJECT	2257 22-Oct-12 A	26-Dec-18	0												1
	Level Milestones	0 26-Dec-18	26-Dec-18	0												!
MS0019	Baseline Finish Date: 12-26-2018	0	26-Dec-18*	0										♦ Bas	seline Finis	sh Date: 12
PROCURI	EMENT PHASE	206 22-Oct-12 A	15-May-13	0												1
Bid/Award	I CP-1300	206 22-Oct-12 A	15-May-13	0						-1						<del>-</del>
FDS2270	Advertise/Prepare Bid- UMS, CTS, YBM, & STS (Calendar Days)	148 22-Oct-12 A	18-Mar-13	0	Advertise/Prepare	Bid- UMS, CTS, YBM, & STS (	Calendar Da	/s)								
FDS2250	Bid Opening- UMS, CTS, YBM, & STS	1 19-Mar-13	19-Mar-13	0	I Bid Opening- UMS	1 1 1										-
FDS2300	Bid Opening Milestone- UMS, CTS, YBM, & STS	0	19-Mar-13	0		one- UMS, CTS, YBM, & STS										
FDS2280	Bid Review- UMS, CTS, YBM, & STS	19 20-Mar-13	15-Apr-13	0	Bid Review- UMS					<u>-</u> -						<del> </del>
FDS2240	SFMTA Board Award- UMS, CTS, YBM, & STS	1 16-Apr-13	16-Apr-13	0	i i i	vard- UMS, CTS, YBM, & STS				1	lovem	ber Critic	al Path an	d Buffer Fl	oat	
FDS2310	SFMTA Board Award Milestone- UMS, CTS, YBM, & STS	0	16-Apr-13	0		vard Milestone- UMS, CTS, YB	1 1			4	4+83=	= 127 wo	rking days			
FDS2260	Approve/Execute/Certify- UMS, CTS, YBM, & STS	21 17-Apr-13	15-May-13	0	1 1 1	tte/Certify- UMS, CTS, YBM, &	SIS		į				.8 months			
FDS2320	NTP CN 1300- UMS, CTS, YBM, & STS	0 2051 16-May-13	15-May-13 26-Dec-18	0	▼ NTP CN 1300	UMS, CTS, YBM, & STS					121 1)	// JU. +	.o momins			
	ICTION PHASE ion CN-1300	1763 16-May-13		0												
	ction UMS Station P-1253	1610 16-May-13		0												
FDS1700	UMS Start	0 16-May-13	11 001 17	0	◆ UMS Start					L		! !		!	1 1	l
N-UMS1000	UMS Submittals and Mobilize	30 16-May-13	27-Jun-13	0		ttals and Mobilize										1
N-UMS1001	UMS 61 Piles (West) - North Concourse	46 28-Jun-13	03-Sep-13	0		61 Piles (West) - North Concou	rse									1
N-UMS9900	UMS 99 Piles Stockton (East) - Station Box (2 Drills)	110 04-Sep-13	01-Mar-14	0		UMS 99 Piles Stockton (		n Box (2 D	rills)							
N-UMS1003	UMS 99 Piles Stockton (West) Station Box (2 Drills)	110 03-Mar-14	11-Jul-14	0		UMS 99 Piles S	i i i	,	* i	ills)						
N-UMS1016	UMS Excavate/Jet Grout/ Roof/ Pave Box Station Box	155 12-Jul-14	02-Mar-15	0			UMS Exca	- 1	i i	11	Station Box	(				
N-UMS1160	UMS Excavate & Install Permanent Struts Platform Box Concourse to Mezzanine Level	100 03-Mar-15	27-Jun-15	0			UI UI	/IS Excavat	te & İnstal	l Permaner	t Struts Pl	atform Box Con	course to Mezzar	ine Leγel		1
N-UMS1295	UMS Excavate & Install Permanent Struts Mezzanine Level to Platform	100 29-Jun-15	26-Oct-15	0				ums	S Excavate	e & Install F	ermanent \$	Struts Mezzanii	ne Level to Platfor	m		
UMS1330	UMS Place Invert	62 13-Oct-15	30-Dec-15	0					UMS Plac	e Invert					-	<del>-</del>
UMS1315	UMS Install Platform Level Parameter Walls & Encase Wales	71 04-Jan-16	26-Mar-16	0				_	UM	S Install Pl	atform Lev	el Parameter W	'alls & Encase Wa	les		
UMS1340	UMS Construct Platform Structure	10 28-Mar-16	07-Apr-16	0					i UN	/I\$ Constru	ct Platform	Structure				!
N-UMS1222	UMS Install Mezzanine Level Deck & Encase Wales	60 08-Apr-16	01-Jul-16	0						1 1	1 1	1 1	k & Encase Wale	s		
N-UMS10030	UMS Install Mezzanine Level Parameter Walls	15 05-Jul-16	25-Jul-16	0							1		arameter Walls			
UMS1200	UMS Install Intermediate Strut Level Deck & Encase Wales	60 26-Jul-16	18-Oct-16	0					į		1	1 1	Strut Level Deck			
N-UMS1040	UMS Install Intermediate Strut Level Parameter Walls	20 19-Oct-16	15-Nov-16	0						•		1 1	e Strut Level Para	1		
UMS1180	UMS Place Concourse Level Deck & Encase Wales	50 16-Nov-16	30-Jan-17	0								T T	ourse Level Deck			:
UMS1210	UMS Internal Walls Concourse Level	25 31-Jan-17	01-Mar-17	0							1 1	i i	alls Concourse L	i		
UMS1230	UMS Rough-In M/E/P/A Concourse Level	45 02-Mar-17	·	0 -								UMS Rougi	n-In M/E/P/A Cond	ourse Level Concourse and In		
UMS1440	UMS Finish M/E/P/A Concourse and Inter Strut Levels	90 24-Apr-17		0								1 1	UMS Commissio	1	er StrutiLe	eves
UMS1450 UMS1500	UMS Commissioning UMS P-1253 Commissioning Completion	45 09-Aug-17 0	11-Oct-17	0								! !	1 :	nmissioning Comp	lation	
	ction STS P-1256	153 12-Oct-17	13-Mar-18	0									UNIS F-1255 COI	innissibning Comp	letion	
STS9990	STS CS Commissioning	60 12-Oct-17	09-Jan-18	0								_	ST\$ CS C	ommissioning		
STS1500	CN 1300 Substantial Completion	0 12-00:17	09-Jan-18	<u> </u>										Substantial Comple	tion	<del> </del>
BUF1017	STS Buffer Float- (44)	44 10-Jan-18	13-Mar-18	0								1 1 1 1 1 1	1 1	Buffer Float- (44)		1
Project St				0												!
STU1010	S&S Certification / Pre-Revenue Activities	115 14-Mar-18		0										\$&S Certific	ation / Pre	-Revenue A
			26-Dec-18				1	i .	i	i i	1	i i	i i	<u> </u>	ni Float	i i

