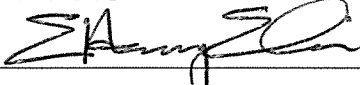


**SAN FRANCISCO PUBLIC UTILITIES COMMISSION
WATER SYSTEM IMPROVEMENT PROGRAM
CONSTRUCTION MANAGEMENT PROCEDURES**

SECTION: WSIP CONSTRUCTION MANAGEMENT	APPROVED: 
PROCEDURE NO.: 015 TITLE: CONSTRUCTION SCHEDULE MANAGEMENT	DATE: 08/14/09 REVISION NO.: 1

1.0 Policy

All construction schedules, revisions, and updates submitted by the Contractor are reviewed for compliance with the contract scope to verify they meet all the requirements of the Contract and reflect current progress of the Work.

Acceptance of schedule submittals by the Project CM is of a general nature only and shall not relieve the Contractor from responsibility to do all Work as specified by the Contract Documents. The Contractor has sole responsibility for means and methods of executing the Work.

This CM Procedure applies to all personnel working on the Water System Improvement Program (WSIP) to the extent that their work is affected by these WSIP Construction Management (CM) Procedures and does not conflict with specific San Francisco Public Utilities Commission (SFPUC) policies or the contract under which the Work is executed.

2.0 Description

This CM Procedure establishes the requirements for Construction Schedule Management including reviews, acceptance and reporting.

3.0 Definitions

3.1 Initial 60 Day Bar Chart Type Plan of Operation

The Initial 60 Day Bar Chart Type Plan of Operation is a bar chart schedule submitted by the Contractor at the Pre-construction Conference showing all activities during the first two months of the project prepared by the Contractor. It is used to monitor and status the Work until the Baseline Critical Path Method (CPM) Schedule is accepted.

3.2 Baseline CPM Schedule

The Baseline CPM Schedule is the schedule that depicts the Contractor's plan for conducting all the Work required by the Contract. When reviewed and accepted by the Project CM, this schedule becomes the Accepted Baseline CPM Schedule for the project and shall be the basis for monthly updated schedules, for progressing of the activities, for updating the Schedule of Values for Applications for Payment, and for measuring any impacts or delays to the project.

3.3 Critical Path Method (CPM)

The Critical Path Method is a network scheduling technique using activity duration and relational ties (logic) between activities to model the execution of the Work. CPM allows for prediction of project duration by analyzing which sequence of activities (which path) has the least amount of schedule flexibility (least amount of float). Early dates are calculated by means of a forward pass, using a specific start date. Late dates are calculated by means of a backward pass, starting from a specific completion date usually the forward pass, calculated early finish date.

3.4 Revised Schedule

A Revised Schedule is the revised critical path analysis and CPM schedule of the Accepted Baseline CPM Schedule submitted by the Contractor whenever an approved Change Order affects the completion date or the sequence of activities, progress of any critical activity falls two (2) or more weeks behind schedule, a delay on a non-critical activity changes the course of the critical path, or the Contractor elects to change any sequence of activities affecting the critical path, contractual milestones or project completion date. Once a Revised Schedule is accepted, all subsequent schedule submittals and analysis will be based on the Revised Schedule.

3.5 Recovery Schedule

A Recovery Schedule is a revised critical path analysis and CPM Schedule that demonstrates how the Contractor will recover the progress of any critical activity that falls two (2) or more weeks behind schedule to meet the Contract Schedule. Once a Recovery Schedule is accepted, it shall be incorporated into the Accepted Baseline CPM Schedule as a Revised Schedule. The Recovery Schedule is submitted by the Contractor when requested by the Project CM.

3.6 Monthly Schedule Update

The Monthly Schedule Update is an update of the Accepted Baseline CPM Schedule or the Accepted Revised Baseline CPM Schedule that shows all the Work activities, including those already completed, those of changed Work, and all revisions and adjustments.

3.7 Look-Ahead Schedule

The Look-Ahead Schedule is an extract from the Accepted (or Accepted Revised) Baseline CPM Schedule submitted by the Contractor for each weekly progress meeting that shows all activities for a four (4) week period (past week, current week and forthcoming two (2) weeks).

3.8 Summary Schedule

The Summary Schedule is an extract from the Accepted (or Accepted Revised) Baseline CPM Schedule submitted by the Contractor with the Monthly Schedule update that is a rollup of the current Monthly Updated Schedule of 15 to 20 summary activities including all contractual milestones, system shutdowns, Earned Value and payment status. The degree of detail depicted in the Summary Schedule shall be determined by the Project CM in consultation with the Contractor when the Baseline CPM Schedule is accepted.

4.0 Responsibilities

4.1 Construction Schedule/Cost Specialist – CM Consultant

The Construction Schedule/Cost Specialist conducts in-depth reviews and provides recommendations for acceptance to the Project CM of the Contractor's schedule submittals. The Construction Schedule / Cost Specialist prepares a monthly update of the Summary Schedule according to the Contractor's reported performance as verified by the Project CM Team's analysis, and forecast at completion projections for the Project CM's Project Construction Progress Reports.

4.1.1 The Construction Schedule / Cost Specialist conducts "what-if" schedule studies and provides time impact analysis for proposed schedule revisions, approved change orders, and claims.

4.2 Project Construction Manager (Project CM)

The Project CM, with assistance from the CM Team, is responsible for the management of the contractual requirements of the Contractor's schedule, for monitoring and verifying the progress of the Contractor, for reviewing schedule submittals from the Contractor, and reporting progress, status and forecasts of construction schedules to the Regional Construction Manager or Regional Project Manager.

4.3 Regional Project Controls Engineer

The Regional Project Controls Engineer, SFPUC Project Controls and Support Bureau (PCSB), is responsible for tracking and updating the SFPUC generated schedules.

4.4 Regional Project Manager (RPM)

The RPM manages a group of WSIP Projects, including coordination of all construction projects within an assigned region, and the management and

administration of all CM contracts assigned to the region. Provides the input for WSIP Monthly Status Updates of all assigned projects.

5.0 Implementation:

5.1 Initial 60 Day Bar Chart Type Plan of Operations, Baseline CPM Schedule, and Revised Schedule Submittals

- 5.1.1 The Contractor is required to submit the Initial 60 Day Bar Chart Type Plan of Operations as a bar chart schedule to the Project CM at the Pre-construction Conference. The 60 Day Bar Chart Type Plan of Operations will comply with Section 01310, Progress Schedules 1.2.A and will show all activities during the first two (2) months from NTP, including all submittals required during this period.
- 5.1.2 The Project CM will review the Initial 60 Day Bar Chart Schedule and provide comments to the Contractor within fourteen (14) calendar days after receipt.
- 5.1.3 Within 30 calendar days after Notice to Proceed (NTP) the Contractor is required to submit to the Project CM a complete Baseline CPM Schedule complying with the Contract Specifications Section 01310, Progress Schedules.
- 5.1.4 Upon receipt of the Contractor's Baseline Schedule the Project CM will convene a scheduling workshop on site for the Contractor to present and explain the Schedule.
- 5.1.5 Within Ten (10) working days of the schedule workshop the Construction Schedule/Cost Specialist and the Project CM will review the Baseline Schedule submittal and submit comments or acceptance to the Contractor. The Baseline Schedule is reviewed for compliance with the Contract requirements and to verify that the logic is acceptable, durations are reasonable, milestones and constraints are defined and acceptable, resources and cost loading are reasonable, and that the schedule represents a complete, clear and accurate representation of the Contractor's Work Plan.

Comparisons between like activities are made to verify uniform application of resources and to avoid front-end loading. Reviews consider the adequacy of detail in each discipline, system shutdowns, testing activities and start-up. Resource histograms are evaluated to determine that manpower leveling has been considered. Activities related to milestones are reviewed to verify that they are tied to appropriate milestones. Observations regarding any work that appears to have been omitted, scheduled out of sequence, or loaded with insufficient resources are noted for the Contractor's response.

- 5.1.6 The Contractor is required to resubmit the Baseline CPM Schedule and Submittal Log within five (5) working days after receiving review comments from the Project CM.
- 5.1.7 The Construction Schedule Review/Acceptance Form (Attachment 015-1) is used to document the review of all initial schedule submittals and revised schedules. The completed form is prepared by the Construction Schedule/Cost Specialist, reviewed and transmitted by the Project CM to the Contractor.

5.2 Monthly Schedule Updates

- 5.2.1 The Contractor is required to submit updates to the Accepted Baseline CPM Schedule and the Summary Schedule after the 25th day of each month with, and as a condition of acceptance, of the Application for Payment. The Monthly Schedule Update is reviewed by the Project CM and Construction Schedule/Cost Specialist for accurate representation of progress of each activity, out of sequence work performed or planned, incorporation of approved changes, and recovery schedules, if necessary.
- 5.2.2 The Contractor's monthly evaluation of the Critical Path Analysis shall comply with Section 01310, Paragraph 1.5.E.
- 5.2.3 If at any time the Contractor falls behind the accepted Schedule and cannot prosecute the Work as planned within the established time-frames, or if the accepted Schedule no longer represents the actual prosecution of the Work, the Contractor must, at the request of the Project CM, submit a Recovery Schedule to revise the approved Baseline Schedule supported by a narrative explaining the Work Plan intended to recover the lost time within the contract performance period or interim milestone period.

The Recovery Schedule must show the schedule impact before and after revision. If a Recovery Schedule is accepted by the Project CM, the Contractor must incorporate the revisions into the Accepted Baseline CPM Schedule.

5.3 Look-Ahead Schedules

- 5.3.1 Look-Ahead Schedules are required to be submitted each week by the Contractor to the project CM one (1) full working day before the Weekly Progress Meeting. Look-Ahead Schedules must be extracted from the Accepted Baseline CPM Schedule and include all activities from the past week, current week and forthcoming two (2) weeks. Look-Ahead Schedules are reviewed by the Construction Schedule/Cost Specialist to ensure they match the approved Schedule and include all the necessary work activities from the approved Schedule.

The Look-Ahead Schedule is discussed at the Weekly Progress Meeting to ensure that the project CM Team and the Contractor

have the same expectations regarding the Work underway and planned Work for the upcoming period and to determine if any habitat or species preconstruction surveys are required in advance of the Work that is scheduled.

5.4 Summary Schedules

- 5.4.1 The Contractor is required to submit a Summary Schedule with the Monthly Schedule Update. Summary Schedules must be extracted from the Accepted Baseline CPM Schedule as updated by the Contractor for the reporting period.
- 5.4.2 Summary Schedules are reviewed and verified by the Construction Schedule/Cost Specialist and revised to reflect the independent assessment of the Project CM Team as to the progress made and forecast at completion.
- 5.4.3 The Project CM incorporates the revised Summary Schedule into the Monthly Construction Progress Report that is submitted to the Regional Construction Manager or the Regional Project Manager.
- 5.4.4 The RPM transmits the Summary Schedule to the SFPUC-PCSB Regional Project Controls Engineer for WSIP Monthly Status Updating and reporting of overall project status to WSIP Management.

5.5 Time Impact Analysis for Change Orders

- 5.5.1 The Contractor is required to submit to the Project CM, as part of each Claim, Change Order Request, or Proposed Change Order, for which the Contractor is requesting an adjustment in the Contract Schedule, a written time impact analysis and a sub-network (“fragnet”) of the Accepted Baseline CPM Schedule showing logic revisions and duration changes for the work in question and its relationship to other activities on the construction schedule.
- 5.5.2 The Construction Schedule/Cost Specialist will review the Contractor’s proposal and provide an Independent Time Impact Analysis to the Project CM.
- 5.5.3 The Project CM uses the Construction Schedule/Cost Specialist’s Time Impact Analysis to negotiate any impacts with the Contractor for a Change Order or settlement of Claim.

6.0 Other Procedural Requirements

None

7.0 References

7.1 Technical Specifications

No. 01310 Progress Schedules.

7.2 CM Procedures

No. 009 Change Management Process

No. 010 Applications for Payment

No. 020 Project Construction Progress Reports

8.0 Attachments

015 – 1 Construction Schedule Review/Acceptance Form

015 – 2 Revision Control Log

Attachment 015 – 1
Page 1 of 3
Construction Schedule Review/Acceptance Form

CONTRACT NO. and TITLE: _____

<p>TPE OF REVIEW:</p> <p><input type="checkbox"/> INITIAL BASELINE SUBMITTAL</p> <p><input type="checkbox"/> INITIAL BASELINE RE-SUBMITTAL</p> <p><input type="checkbox"/> MONTHLY UPDATE (MONTH: _____)</p> <p><input type="checkbox"/> UPDATE RE-SUBMITTAL (MONTH: _____)</p> <p><input type="checkbox"/> CHANGE ORDER INCORPORATION/BASELINE (MONTH: _____)</p> <p><input type="checkbox"/> SCHEDULE OF VALUES INITIAL: _____ RE-SUBMITTAL: _____</p>	<p>DATE RECEIVED: _____</p> <p>DATE RETURNED: _____</p> <p>Review Action Code</p> <p><input type="checkbox"/> No Exceptions Taken</p> <p><input type="checkbox"/> Make Corrections Noted</p> <p><input type="checkbox"/> Amend - Resubmit</p> <p><input type="checkbox"/> Rejected - Resubmit</p> <p><input type="checkbox"/> No Action – Record Only</p> <p><small>Note: Review and acceptance by the SFPUC of the Contractor's CPM Construction Schedule does not relieve the Contractor of any of its responsibility whatsoever for the accuracy or feasibility of the CPM Construction Schedule.</small></p> <p>See Correction/Rejection Criteria Pg 3</p>
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SUBMITTAL INCLUDES:	<u>Required</u>	<u>Received</u>	<u>Remarks (Use additional sheet if needed)</u>
Basis of Schedule (Narrative)	<input type="checkbox"/>	<input type="checkbox"/>	_____
Plot(s)	<input type="checkbox"/>	<input type="checkbox"/>	_____
Tabular Report(s)	<input type="checkbox"/>	<input type="checkbox"/>	_____
Project File (File: _____)	<input type="checkbox"/>	<input type="checkbox"/>	_____
Cost Loading	<input type="checkbox"/>	<input type="checkbox"/>	_____
Equipment Loading	<input type="checkbox"/>	<input type="checkbox"/>	_____
Manpower Loading	<input type="checkbox"/>	<input type="checkbox"/>	_____
Material Loading	<input type="checkbox"/>	<input type="checkbox"/>	_____
Materials Resource Curves	<input type="checkbox"/>	<input type="checkbox"/>	_____
Equipment & Manpower Resource Curve	<input type="checkbox"/>	<input type="checkbox"/>	_____

PROGRESS ASSESSMENT:	<u>Physical Progress</u>	ATTACHMENTS: (As Applicable)	<u>Included</u>
Planned		A. Schedule Analysis	<input type="checkbox"/>
Actual		B. Summary Schedule	<input type="checkbox"/>
Variance		C. Physical Progress Curve (\$)	<input type="checkbox"/>
		D. Overall Cash Flow (\$)	<input type="checkbox"/>
		E. Resource/Matls/Equip. Curves	<input type="checkbox"/>
		F. Milestone Comparison	<input type="checkbox"/>
		G. Critical Path	<input type="checkbox"/>
		H. Diagnostics/Changes Reports	<input type="checkbox"/>
		I. Contractor's Narrative	<input type="checkbox"/>
		J. Progress Photos	<input type="checkbox"/>
		K. Other	<input type="checkbox"/>
Variance Compared to Last Month (Actual vs. Planned – Physical Progress)			
	Variance Last Month		
	Variance This Month		

Reviewer: _____ Construction Manager: _____

cc: _____

Attachment 015 – 1
Page 2 of 3
Construction Schedule Review/Acceptance Form

CONTRACT NO. and TITLE: _____

REVIEW COMMENTS:

END

MILESTONE ANALYSIS: Contractual Milestone Dates are correct Yes No

#	Milestone Description	Contract Date	Date Per This Submittal	Variance (Calendar Days)

SCHEDULE ANALYSIS (By Major Work Area)

END

Attachment 015 – 1
Page 3 of 3
Construction Schedule Review/Acceptance Form

CONTRACT NO. and TITLE: _____

CORRECTION/REJECTION CRITERIA:

(Cite specific paragraph of 01311 when not in compliance).

END

Attachment 015 – 2
Revision Control Log

Revision No.	Revision Date	What changed?
Rev 1	August 14, 2009	<ul style="list-style-type: none">• Standardized Repeated Text• Refreshed Attachment 1• Revised Section 7.0; added Sections 7.1 and 7.2• Added Attachment 2; Revision Control Log
Rev 0	March 16, 2009	Signed