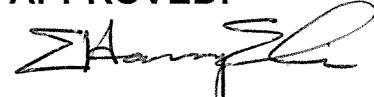


**SAN FRANCISCO PUBLIC UTILITIES COMMISSION
WATER SYSTEM IMPROVEMENT PROGRAM
CONSTRUCTION MANAGEMENT PROCEDURES**

**SECTION: WSIP CONSTRUCTION
MANAGEMENT**

APPROVED:



**PROCEDURE NO.: 014
TITLE: DRAWING CONTROL**

DATE: 08/12/09

REVISION NO.: 1

1.0 Policy

This CM Procedure applies to personnel involved in the Drawing Control process using the CMIS as an identification, tracking, storage and retrieval system.

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 the process, control, coordination of review and response, and retention of construction drawings by the Project Construction Management (CM) Team. The CM Procedure describes the process by which drawings are submitted, coded, filed, tracked, stored and retrieved using the WSIP Construction Management Information System (CMIS).

3.0 Definitions

3.1 As-Built Shop Drawings

As-Built Shop Drawings consist of approved Contractor's proposed installation and equipment details based on field conditions and requirements, and considered and/or acknowledged as As-Built Drawings, provided the Contractor has stamped them "As-Built" and submitted them as such.

3.2 Construction Drawings

Construction Drawings are Issued for Construction by the Project Engineer (PE), incorporating all changes to bid drawings via addenda during the bid period. Construction Drawings shall be stamped by the Project Engineer "Issued for Construction".

3.3 Interim Contractor's As-Built Drawings

The Project CM shall provide two sets of Construction Drawings to the Contractor following Notice to Proceed. Interim Contractor's As-Built Drawings are Construction Drawings issued to and used by the Contractor during construction to build and/or redline document changes or variations between designed and as-constructed facilities and to represent the site as constructed.

3.4 Contractor's As-Built Drawings

Contractor's As-Built Drawings are Interim Contractor's As-Built Drawings, certified by the Contractor and Project CM as representing the site as constructed.

3.5 Conformed As-Built Drawings

Conformed As-Built Drawings are AutoCAD files of conformed drawings incorporating all the mark-ups in the approved Contractor's As-Built Drawings. Project Engineer (PE) certifies that Conformed As-Built Drawings were correctly transcribed from the Contractor's As-Built Drawings and the changes were previously approved by the PE.

3.6 Drawing Register

The Drawing Register is a log of the drawings entered into the CMIS. The Drawing Register groups the drawings by Drawing Set (for specific purpose) and sorts them by Drawing Number, listing the Drawing Number, latest Revision Number, Title, project work area, discipline and dates received or sent.

3.7 Construction Management Information System (CMIS)

The WSIP Construction Management Information System (CMIS) is an on-line management tool for the processing of contract documents based on established construction management business processes. It serves as a tool for effective storage and retrieval of various documents generated during a construction project.

4.0 Responsibilities

4.1 Project Construction Manager (Project CM)

The Project CM is responsible for ensuring control of all project and contract documentation and for the periodic review of Interim Contractor's As-Built Drawings to ensure that they are current, accurate and complete. The Project CM is responsible to review and certify the Contractor's As-Built Drawings as a precedent to award of Final Completion. The Project CM is responsible to ensure that the Construction Drawing set in the Project CM Team's job site offices are up-to-date with current site conditions and reflect other project documentation and Contract Modifications. The Project CM may delegate this responsibility to a member of the Project CM Team.

4.2 Office Engineer (OE)

The Office Engineer is responsible to assist the Project CM in the control of Construction Drawings and As-Built Drawings, to set-up the drawing control register in the CMIS, manage drawing control within the Project CM Team, perform monthly review of Interim Contractor's As-Built Drawings, oversee revision control, production and processing of Interim Contractor's As-Built Drawings, and oversee submittal of Contractor's As-Built Drawings to the Project Engineer at Final Completion.

4.3 Administrative / Document Control Specialist (ADCS)

The Administrative/Document Control Specialist is responsible for the verification of the file code, assisting the OE to maintain the Drawing Register, logging the submittals into the CMIS, receiving and logging any non-electronic items and maintenance of hardcopy files and drawing libraries.

4.3.1 The Project CM may assign this function to another member of the Project CM Team on smaller projects where there is not an assigned ADCS.

4.4 Project Engineer (PE) / Engineer of Record

The Project Engineer may be the Engineer of Record. The Engineer of Record is the discipline engineer who was responsible for the production of the respective Contract Construction Documents.

4.4.1 Using the Contractor's As-Built Drawings, the Engineer of Record is responsible for incorporating all redline changes to Construction Drawings, submitting a set of back check drawings for review by the Project CM, and submitting the final Conformed As-Built

Drawings to Central Records Management Center (CRMC) for archiving.

4.5 Contractor

The Contractor shall maintain in an accurate, indexed and easily accessible manner both at the Contractor's job site offices and at an offsite location an orderly, clean, complete, accurately marked, up-to-date set of Interim Contractor's As-Built Drawings that accurately indicate all site conditions as detailed in Paragraph 5.3.7.

- 4.5.1 Interim Contractor's As-Built Drawings shall contain a complete history of the drawings, including all revisions due to Contract Modifications and shall be clearly marked to record accurately the Work as actually constructed, including changes, adjustments and other information relevant to the Work. The Contractor shall identify a staff member to be responsible for maintaining and updating the Interim Contractor's As-Built Drawings.
- 4.5.2 The Contractor Site Representative shall meet with the Project CM's QA Inspectors daily to identify and provide information regarding any changed project conditions, locations, configurations, and any other changes or deviations that vary from the details represented on the Construction Drawings, including buried or concealed construction and utility features that are revealed during the course of construction.
- 4.5.3 The Contractor Site Representative shall meet with the Project CM at least once per month to verify all such changes. The Contractor shall also be responsible for updating all OEM Manuals before close-out of the contract with any As-Built conditions including, but not limited to wiring schematics, panel drawings, control logic, and other items required for trouble shooting, repair, and maintenance of the equipment.
- 4.5.4 The Contractor Site Representative shall certify and submit the Contractor's As-Built Drawings at the completion of the project. The Contractor is not responsible for maintenance of the Drawing Register in CMIS.

5.0 Implementation

5.1 Initiation

- 5.1.1 The PE / Engineer of Record produces the Construction Drawings in reproducible format and a Drawing Log which contains the Plan Number, City Drawing Number, Drawing Revision Number, Drawing Title and Discipline.

- 5.1.2 The PE / Engineer of Record issues to the Project CM one half-size and one full-size hardcopy sets of Construction Drawings, one CD containing the Construction Drawings in .pdf format, and a Drawing Log in electronic format (.doc or .xls). The PE will confirm the drawing deliverable requirements based on Technical Specification No. 00800, 1.3 Article 2.
- 5.1.3 The Project CM transmits the two sets of Construction Drawings in hardcopy to the Contractor using the CMIS Transmittal Form.
- 5.1.4 The Office Engineer (OE) creates the Drawing Register in CMIS and attaches electronic files to the individual records in the Drawings module. The OE may obtain from the CMIS Administrator a Microsoft Excel template for the importing of the Drawing Log into CMIS. The OE is responsible to maintain the Project CM Team's set of Construction Drawings at the Project CM Team jobsite offices.
- 5.1.5 The Contractor shall maintain one set of hardcopy drawings at the job site and one set of hardcopy drawings at an off-site location. The Contractor shall maintain both sets of Interim Contractor's As-Built Drawings in order to represent the as-constructed site during construction so that in the event of loss of the job site set, As-Built drawings can be accurately reconstructed and replaced.

5.2 Change Implementation

- 5.2.1 The PE / Engineer of Record confirms the Revision Number of Construction Drawings revised due to Contract Modifications and produces and issues the revised Construction Drawing as described in Paragraph 5.1.2.
- 5.2.2 The OE logs the revision in the CMIS Drawings module, attaches the electronic file of the revised drawing to the CMIS Drawing record as a revision and creates a new "Drawing Set" in CMIS containing the revised drawing(s).
- 5.2.3 The Project CM issues two sets of hardcopies to the Contractor.
- 5.2.4 The OE inserts revised Construction Drawings into the Contractor's Interim As-Built Drawings in front of the prior revision sheet. The prior revision sheet shall be stamped "OBSOLETE", date stamped and the signature of the drawing custodian added; the title block shall be crossed out and a redline note shall be added under the page number: "See Revision No. [latest revision number]".
- 5.2.5 Any redline markups on the old sheet need not be transferred to the addenda as long as the old sheet remains in the As-Built Drawings set. All obsolete drawings shall be retained until after the Conformed As-Built Drawings have been certified.

5.3 Contractor Drawing Maintenance and Storage

- 5.3.1 The Contractor shall maintain at the Contractor's jobsite office accurately marked, up-to-date set of Interim Contractor's As-Built Drawings to document work actually installed and conditions encountered.
- 5.3.2 The Contractor is responsible for maintaining copies of As-Built Drawings and documents in a secure off-site location, so that in the event of loss of As-Built Drawings at the jobsite, they can be accurately reconstructed and replaced.
- 5.3.3 The Contractor shall appoint a designated team member to be responsible for updating and maintaining the Interim Contractor's As-Built Drawings.
- 5.3.4 The Interim Contractor's As-Built Drawings shall be kept in a safe place and protected from damage by weather and manhandling. The Contractor shall store drawings apart from documents used for performing the work and keep them in a dry, legible condition and in good order.
- 5.3.5 The Contractor shall keep Interim Contractor's As-Built Drawings and documents up to date during the entire progress of the work, updating drawings not more than five (5) working days after changes in the work are made. The Contractor shall make Interim Contractor's As-Built Drawings available to the City Representative at any time.
- 5.3.6 The Contractor shall accurately indicate on the Interim Contractor's As-Built Drawings all site conditions, measurements, dimensions, locations of utilities, all changes made by clarifications, Change Orders, and other modifications to the Contract Documents and details as approved by the Project CM.
- 5.3.7 All lines and notations on the up-to-date Interim Contractor's As-Built Drawings stamped "Construction Drawings" shall be neat, accurate, legible, and capable of being scanned into tiff format (or other electronic media file format, as specified) so that copies made from the scanned files are as legible as the original. The updated Interim Contractor's As-Built Drawings shall include but not be limited to the following:
- Field changes or adjustments in the final location, or in the final dimensions or details of the Contract Work relative to actual existing site conditions.
 - Changes resulting from Requests For Information (RFI).
 - Changes made by approved work Change Orders.

- Changes made by approved work Field Orders.
- Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to visible and accessible features of the Work.
- Details not included on the original Contract Drawings but incorporated into the Work by reference to approved shop drawings, product data, samples, calculations or other approved submittals.
- Location of items imbedded in concrete; such as conduits, cables, junction boxes, piping, re-bar, etc.
- Measured depths of foundations, in relation to finish main floor datum.
- Measured locations of internal utilities and appurtenances, referenced to visible and accessible locations features of the Work.
- Location (to within 1-inch) of the centerline of each run of conduits, circuits, piping, ducts and similar items which are shown schematically on the drawings, but where the final physical arrangement is determined by field conditions.
- Other approved applicable technical information.

5.3.8 The Interim Contractor's As-built Drawings shall be prepared as follows:

- Clearly describe changes on drawings by note as required.
- Date all entries, calling attention to the entry by a "cloud" drawn around the area or areas affected.
- Record for each piece of equipment incorporated into the Work the manufacturer, trade name, catalog number, model number, serial number, date of installation and supplier of each product and equipment item incorporated into the Work.

5.4 Closeout

- 5.4.1 Prior to Final Completion, the Contractor shall submit one original set of orderly, clean Contractor's As-Built Drawings that completely and accurately represent the as-constructed site.
- 5.4.2 The Project CM shall review the Contractor's As-Built Drawings and reject them or approve them prior to Contractor's certification.

- 5.4.3 After approval by the Project CM, the Contractor shall submit to the Project CM one original certified set of the Contractor's As-Built Drawings in hardcopy and in scanned "TIFF" files on CD.
- 5.4.4 The OE shall create a drawing set of Contractor's As-Built Drawings in CMIS and attach the scanned files to the CMIS Drawing Records. The OE shall transmit a CD and the hardcopy Contractor's As-Built Drawings to the Project Engineer.
- 5.4.5 The Project Engineer creates and certifies the Conformed As-Built Drawings in AutoCAD.
- 5.4.6 The PE transmits hardcopy sets and one CD of the Conformed As-Built Drawings to the Central Records Management Center (CRMC) for archiving.
- 5.4.7 Refer to WSIP CM Procedure No. 033 for specific format requirements for Contractor's As-Built Drawings, stamps and electronic files.

6.0 Other Procedural Requirements

None

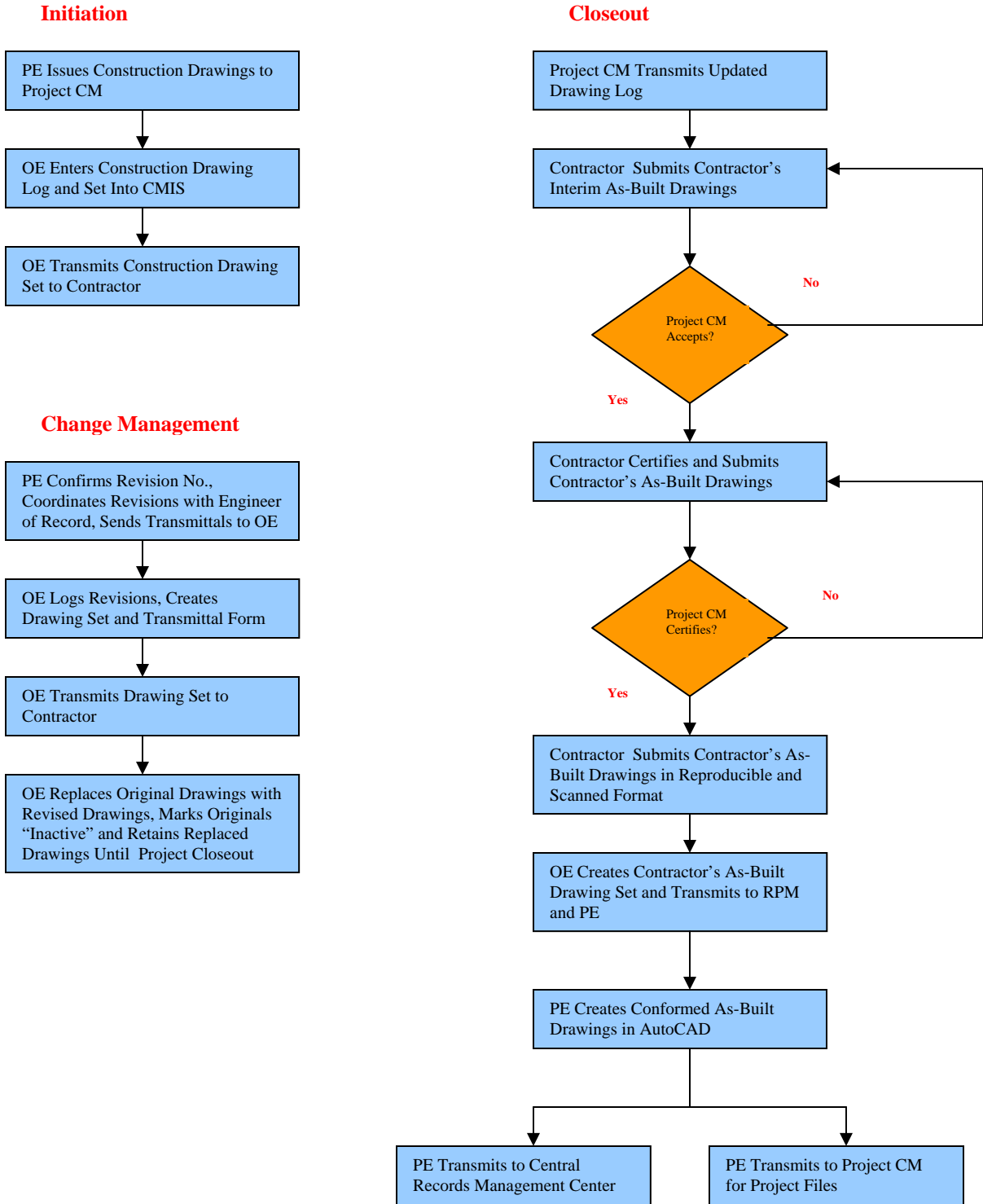
7.0 References

WSIP Project Technical Specification No. 00800, Supplementary Conditions
WSIP Project Technical Specification No. 01700, Closeout Procedures
WSIP Project Technical Specification No. 01720, Project Record Documents
WSIP Business Process Report No. 003b, Drawing Control
WSIP CM Procedure No. 004, Submittals
WSIP CM Procedure No. 006, Document Control and Correspondence
WSIP CM Procedure No. 033, As-Built Drawing Maintenance and Submittal

8.0 Attachments

014 -1 Drawing Control Flow Chart
014 -2 CMIS Drawing Log Template
014 -3 Transmittal Form
015 -4 Revision Control Log

Attachment 014 -1 Drawing Control Flow Chart



Attachment 014 - 2 CMIS Drawing Log Template

DRAWING LOG



SAN FRANCISCO PUBLIC UTILITIES COMMISSION
WATER SYSTEM IMPROVEMENT PROGRAM





CONTRACT NAME:
CONTRACT NO:

Date:

Drawing Number	Latest Rev. No.	Title	Area	Discipline	Date Received
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**Attachment 014 - 3
Transmittal Form**

	SAN FRANCISCO PUBLIC UTILITIES COMMISSION WATER SYSTEM IMPROVEMENT PROGRAM																		
CONTRACT NAME:		TRANSMITTAL NO:																	
TO:		DATE:																	
FROM:		REF:																	
WE ARE SENDING:		SUBMITTED FOR:																	
ACTION TAKEN:																			
<input type="checkbox"/>	Shop Drawings	<input type="checkbox"/>	Approval	<input type="checkbox"/>	Approved as Submitted														
<input type="checkbox"/>	Letter	<input type="checkbox"/>	Your Use	<input type="checkbox"/>	Approved as Noted														
<input type="checkbox"/>	Prints	<input type="checkbox"/>	As Requested	<input type="checkbox"/>	Returned After Loan														
<input type="checkbox"/>	Change Order	<input type="checkbox"/>	Review and Comment	<input type="checkbox"/>	Resubmit														
<input type="checkbox"/>	Plans			<input type="checkbox"/>	Submit														
<input type="checkbox"/>	Samples	SENT VIA:		<input type="checkbox"/>	Returned														
<input type="checkbox"/>	Specifications	<input type="checkbox"/>	Attached	<input type="checkbox"/>	Returned for Corrections														
<input type="checkbox"/>	Other:	<input type="checkbox"/>	Separate Cover Via:	<input type="checkbox"/>	Due Date:														
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ITEM NO	COPIES	DATE	ITEM NUMBER	REV #	DESCRIPITON	STATUS													
Signed: _____																			

**Attachment 014 - 4
Revision Control Log**

Revision No.	Revision Date	What changed?
Rev 1	August 12, 2009	<ul style="list-style-type: none">• Revised Attachment 1; removed page 1 of 1• Revised Attachment 2; Reduced to 1 page• Revised Attachment 3; Logos revised• Added Attachment 4; Revision Control Log
Rev 0	May 14, 2009	Signed