



Wells

Revision and Approval

Revision	Date	Nature of Changes	Approved By
0	04-25-2023	Original Issue	Richard Foley

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Background

This process establishes Structure Construction (SC) responsibilities and procedures for review and authorization of water well submittals, quality assurance, materials, and construction.

Prior to reviewing this Bridge Construction Memo (BCM), it is essential to review the following [Contract Specifications](#), as applicable:

- 76-1, *Wells – General*
- 76-2, *Wells – Water Wells*
- 76-3, *Wells – Exploration Holes*
- 76-4, *Wells – Monitor Wells*
- 76-5, *Wells – Rehabilitate Existing Water Wells*
- 76-6, *Wells – Destroy Wells*

Information in the *Contract Specifications* typically will not be repeated in the text of this BCM.

Process Inputs

1. Submittals

Procedure

1. All work associated with this process is charged as [Project Direct – Construction](#).
2. Inspection of field work for this process is:
 - a. [Benchmark](#) for:
 - i. All sampling for lab testing (e.g., water quality samples, formation samples)
 - ii. Sounding and cleaning of the well
 - iii. Sanitary well seal and all other pertinent connections
 - iv. Reviewing video survey
 - v. Well pump and equipment installation
 - vi. Caliper logging as applicable to the *Special Provisions (SP)*, Section 76-2, *Wells – Water Wells*, and the *SP*, Section 76-3, *Wells – Exploration Holes*
 - vii. Verification of casing plumbness as applicable to the *SP*, Section 76-2, *Wells – Water Wells*, or the *SP*, Section 76-4, *Wells – Monitor Wells*
 - viii. Verification of casing joints and welds as applicable to the *SP*, Section 76-2, *Wells – Water Wells*, or the *SP*, Section 76-4, *Wells – Monitor Wells*
 - ix. Authorization of well relocation as applicable to the *SP*, Section 76-2, *Wells – Water Wells*, or the *SP*, Section 76-3, *Wells – Exploration Holes*.
 - b. [Continuous](#) for:
 - i. Drilling (if applicable)
 - ii. Casing string installation as applicable to the *SP*, Section 76-2, *Wells – Water Wells*, or the *SP*, Section 76-4, *Wells – Monitor Wells*
 - iii. Well development and well tests
 - iv. Concrete placement, grouting and sealing
 - v. Well disinfection.
 - c. [Intermittent](#) for:
 - i. All other activities.
3. Before construction begins:
 - a. Review the following documents to verify work is completed in accordance with:
 - i. [Contract documents](#)

- ii. American National Standards Institute (ANSI)/American Water Works Association (AWWA) A100, *Water Wells*. As early as possible, obtain from the Electrical, Mechanical, Water and Wastewater Engineering (EMWW) designer, a current version of this standard as applicable to the project. Refer to:
 - 1. [Attachment 1](#), *Organization of ANSI/AWWA A100-20 Water Wells*, for an outline of ANSI/AWWA A100-20, *Water Wells* (2020 edition). Because the *Contract Specifications* provides only general information regarding water wells, it is essential to review ANSI/AWWA A100 to gain a complete understanding of water well construction and the relationship between various activities described in the contract documents.
 - iii. [Attachment 2](#), *Primer on Construction Contract Administration of Special Provisions Section 76 – Wells*.
 - iv. Manufacturer's data and instructions from authorized submittals and materials.
- b. Review the RE pending file. Content for wells in the RE pending file is prepared in accordance with [TAEMW&W Memo To Designers 4-2](#), *Resident Engineer's Pending File for Structures Projects*.
- i. The EMWW designer from the [Water and Wastewater Engineering Branch](#) will generally be the focal point for all construction support, including geotechnical services.
 - ii. Identify the District Maintenance focal point for construction of the project using the [Bridge Crew Supervisor, Superintendent and Managers Contact List](#), which is maintained by Structures Maintenance & Investigations (SM&I). Start with the Bridge Maintenance Supervisor (also referred to as the Bridge Crew Supervisor).
 - iii. Conduct an internal preconstruction meeting with the RE, EMWW designer, and District Maintenance to review the RE pending files, and expectations such as milestone inspection points and frequency of updates.
 - iv. Confirm with the EMWW designer that in the event of discrepancy between *Special Provisions* and ANSI/AWWA A100, *Water Wells*, the more stringent requirement will prevail.
 - 1. Always communicate discrepant specifications to the EMWW designer as they arise.
- c. Perform and document the preconstruction site visit as follows:

- i. Carefully document existing site and equipment conditions in accordance with the *Construction Manual (CM)*, Chapter 5, [Section 5-102C](#), *Contract Administration – Project Records and Reports – Organization of Project Documents – Description of Categories – Category 14, Photos Records*, and [Attachment 5](#), *Construction Photos and Videos*, of BCM C-7, *Daily and Weekly Reports*.
- ii. For existing facilities or well rehabilitation, conduct the site visit with District Maintenance. Take pre-job photos and document the condition of the equipment (e.g., in working condition, non-working condition, etc.)
 - 1. Discuss coordination of any items that need to be salvaged for District Maintenance.
 - 2. Prior to the pre job site visit, review the *Special Provisions (SP)*, Section 15, *Existing Facilities*, and SP, Section 99, *Building Construction*, for salvaging requirements.
- d. Coordinate with the RE and Contractor to ensure all specified permits are on track and do not delay the planned schedule of work (e.g., drilling operations).
 - i. Identify site water discharge points are permitted (e.g., drilling fluid, test water).
- e. Review and authorize submittals and work plans.
 - i. For submittals submitted to sc.office.associates@dot.ca.gov, verify the EMWW designer is receiving and reviewing submittals in a timely manner.
 - ii. Submit review comments from the Structure Representative (SR) to the EMWW designer using the sc.office.associates@dot.ca.gov email address.
 - iii. Submittals are authorized or rejected by the EMWW designer after all reviewers' comments have been addressed. The EMWW designer returns authorized or rejected submittals to sc.office.associates@dot.ca.gov, and returned to the SR by the SC Office Associates.
 - 1. When submittals are rejected by the EMWW designer, the SR must communicate the reasons for rejection to the Contractor.
 - 2. When appropriate, minimize adverse impact to the project schedule by coordinating a meeting between the Contractor, fabricator, supplier, and EMWW designer to discuss required corrections.
 - iv. Always review informational submittals for conformance with contract requirements.
- f. For control of materials:

- i. Review Materials Engineering and Testing Services (METS) [Form TL-608](#), *Notice of Materials to be Inspected*, which is generated by the METS Representative ([METS Rep](#)). These items will be inspected and released by the METS Rep.
 - ii. Review METS [Form TL-28](#), *Notice of Materials to be Inspected at Job Site*. During construction, field release the listed items using [Form CEM-4102](#), *Material Inspected and Released on Job*. Refer to the CM, [Chapter 6](#), *Sampling and Testing*.
 - iii. Materials are generally field released.
- g. When gravel pack is used, verify ASTM C136/C136M gradation test results.
- i. Ensure aggregate size specified for gravel pack is not too large for the annular space between casing and slotted PVC sleeve. Note that nominal dimensions called out do not include PVC sleeve thickness. Check dimensions on drawings and product data sheets. Refer to ANSI/AWWA A100 4.3.7.2.1, 4.3.7.2.2, and 4.6.
4. During construction:
- a. Throughout the project, coordinate submittal reviews and field work with EMWW designer and District Maintenance. The EMWW designer is the clearinghouse for all technical support during construction. Geotechnical Services is typically engaged by EMWW.
 - b. Review all collected data for compliance with contract requirements, authorized submittals, permits, and product data.
 - i. Ensure EMWW designer is reviewing all analysis of water quality samples for compliance with regulatory agencies such as Department of Drinking Water (DWW), Department of Public Health (DPH), etc.
 - c. Perform all activities in accordance the *Contract Specifications* and ANSI/AWWA A100.
 - d. For drilling operations (e.g., water wells, exploration holes), ensure formation samples, drilling reports and well logs are stored and organized at the job site as specified in the contract, including ANSI/AWWA A100, 4.2.2.3, *Collection and marking*, and 4.2.2.4, *Storage of samples*.
 - i. Verify formation samples are analyzed by a Department authorized laboratory.
 - 1. Contact the METS Rep for verification of authorized lab.
 - ii. For *SP*, Section 76-2, *Water Wells*, or *SP*, Section 76-3, *Exploration Holes*, verify caliper logging.

1. A caliper log is a well logging tool that provides a continuous measurement of the size and shape of a borehole along its depth. The measurements that are recorded can be an important indicator of cave-ins or shale swelling in the borehole, which can affect the results of other well logs.
- e. Install/modify casing(s) as applicable to *SP*, Section 76-2, *Water Wells*, *SP*, Section 76-4, *Monitor Wells*, or *SP*, Section 76-5, *Rehabilitate Existing Water Wells*.
 - i. Where new well screens are installed, verify downward facing direction of louvered openings as specified by the *SP*.
- f. For gravel pack as applicable to *SP*, Section 76-2 or *SP*, Section 76-4:
 - i. Track and verify the volume of gravel pack used. Immediately report any discrepancy between actual vs theoretical to EMWW designer.
- g. Sound and clean well as applicable to *SP*, Section 76-2, *SP*, Section 76-4, or *SP*, Section 76-5.
- h. Perform the well development test and well test as applicable to *SP*, Section 76-2 or *SP*, Section 76-5.
- i. Disinfect the well as applicable to *SP*, Section 76-2 or *SP*, Section 76-5.
- j. Review video survey as applicable to *SP*, Section 76-2 or *SP*, Section 76-5.
 - i. File in Project Category 63 Final Records.
- k. For well seal as applicable to *SP*, Section 76-6, *Destroy Wells*.
 - i. When abandoning or destroying wells, measure and monitor the depth of the well prior to and during sealing.
 - ii. During placement of the sealing material, track and verify the volume of sealing material used. Immediately report any discrepancy between actual vs theoretical to EMWW designer.
- l. Coordinate site acceptance test (SAT) with the EMWW designer. This is an onsite verification that all systems are operating per design including well, pump and appurtenances, and Supervisory Control and Data Acquisition (SCADA) system. The SCADA systems allow for remote communication with hardware such as pumps, water level sensors, etc.
- m. Coordinate final inspection by EMWW and District Maintenance to generate punchlist items.
 - i. When conducive, take the opportunity to perform a pre-final inspection during EMWW SAT. Include District Maintenance.
- n. Review well completion report prior to contract acceptance.

- o. Document all inspection, construction, and quality assurance activities in the daily reports per [BCM C-7](#), *Daily and Weekly Reports*.
- 5. Following Construction:
 - a. Transmit the following submittals to Maintenance:
 - i. Copies of the *Operation and Maintenance Manuals (O&M Manuals)* and product data sheets for new equipment installed; i.e., if specified in *SS* the *Contract Specifications*, Section 74-1.01C(6), *Pumping Equipment and Controls – Submittals – General – Maintenance and Operation Manual*.
 - ii. Video surveys.
- 6. File all project documentation (correspondence, materials acceptance documentation, daily reports, etc.) in the appropriate category in the project records as specified in the *CM*, Chapter 5, [Section 5-102](#), *Contract Administration – Project Records and Reports – Organization of Project Documents*.
- 7. Maintain as-built project plans in accordance with [Attachment 3](#), *Guidance for Completing As-Built Project Plans*, of BCM C-6, *Required Documents to be Submitted During Construction*, and BCM 99-1, *Building Construction – General*.

Process Outputs

- 1. Contract and regulatory compliance
- 2. Daily reports
- 3. Well completion report
- 4. Video survey

Attachments

- 1. [Attachment 1](#), *ANSI/AWWA A100-20, Water Wells*
- 2. [Attachment 2](#), *Primer on Construction Contract Administration of Special Provisions Section 76 – Wells*