

CONSTRUCTION QUALITY CONTROL (CQC) PLAN

1. SUBMITTAL AND GENERAL REQUIREMENTS

- 1.1. Section 6.26 of the General Conditions requires a CQC Plan. This section provides further information about CQC Plan requirements.
- 1.2. The Contractor shall establish and maintain an effective quality management system. The quality management system shall consist of plans, procedures, and the organization necessary to provide material, equipment, and workmanship that comply with the requirements of the contract documents. The system shall cover operations both onsite and offsite, and shall be keyed to the proposed sequence of the work.
- 1.3. The Contractor shall prepare a Construction Quality Control (CQC) plan in conformance with the requirements of this appendix and all other contract documents. A complete detailed CQC plan shall be submitted to the Project Manager within 10 days of intent to award and shall be approved in writing by the Project Manager prior to proceeding with the work.

The Contractor's CQC plan shall include. The CQC plan shall include detailed description of how manufactured materials will be stockpiled and protected prior to incorporation into the project.

- 1.4. The CQC plan shall be capable of ensuring that the procurement, shipping, handling, fabrication, installation, cleaning, inspection, construction, testing, storage, examination, repair maintenance, and required modifications of all materials, equipment, and elements of the work comply with the requirements of the contract documents and that all materials incorporated in the work will perform satisfactorily for the purpose intended.
- 1.5. If Contractor does not provide an acceptable CQC plan, ARRC may, at its sole discretion, elect to award the contract to others.

2. AUTHORITY AND RESPONSIBILITY

- 2.1. Authority: The persons and organizations performing quality control and quality assurance functions shall have sufficient authority and organizational freedom to identify quality problems and to initiate, recommend, provide, and verify implementation of the solution.
- 2.2. Changes in Plan or Personnel: The Contractor shall not revise the CQC or the quality staffing levels or replace any of the key personnel specified herein without prior written approval from the Project Manager.
- 2.3. Contractor's Responsibility: The Contractor is solely responsible for achieving project quality and shall have overall responsibility for the quality of all construction work. The contractor shall conduct quality management activities, which include inspection, materials testing, and other activities specifically developed and/or chosen by the Contractor.

- 2.4. Owner's Responsibility: ARRC reserves the right to, and will, conduct inspections, testing, sampling, and evaluation associated with quality assurance and independent quality assurance. ARRC's role in construction is to provide the following.
 - 2.4.1. Quality assurance and independent assurance of construction activities, inspection, and materials testing. ARRC will do this with either its staff or a consultant acting as the Project Manager.
 - 2.4.2. Oversight of the Contractor's quality management activities to ensure adherence to the CQC plan and compliance with the contract documents.
 - 2.4.3. Notifying the Contractor promptly of irregularities or deficiencies observed in the work.
 - 2.4.4. Oversight of the Contractor's construction management, including but not limited to scheduling, invoicing, shop drawing review, submittal review and processing, document control, measurement of pay item quantities, and SWPPP implementation and maintenance and etc.

3. CONSTRUCTION QUALITY CONTROL (CQC) PLAN

- 3.1. Objectives: Quality in the construction phase is the program of policies, procedures, and responsibilities required to provide confidence that the desired characteristics have been obtained to help ensure the project will perform its intended function for its design life. Quality control in the construction phase shall consist of those actions necessary to assess production and construction processes so as to control the level of quality being produced in the end project. The Contractor's quality control actions shall include examining, checking, and inspecting in-process and completed work, and materials sampling and testing during production and construction, as a means of controlling and measuring the characteristics and conformity of an item, process, or feature to contract requirements.
- 3.2. The Contractor's CQC plan shall be capable of:
 - 3.2.1. Ensuring that the design, procurement, shipping, handling, fabrication, installation, cleaning, inspection, construction, testing, storage, examination, repair, maintenance, and required modifications of all materials, equipment, and elements of the work comply with the requirements of the contract documents.
 - 3.2.2. Ensuring that all materials incorporated in the work, all equipment, and all elements of the work will perform satisfactorily for the purpose intended.
- 3.3. Contents of the CQC Plan: The CQC plan shall delineate the type and frequency of inspection, sampling, and testing deemed necessary to measure and control the various properties of material and workmanship of all construction processes within the tolerances governed by the drawings and specifications, applicable codes and regulations, permit conditions, and other contract requirements as contained herein. The CQC plan shall include the following, at a minimum.
 - 3.3.1. Construction activity and item inspection plans.
 - 3.3.2. Schedule of materials control including materials to be tested, test methods, and frequency of testing. The CQC Plan shall reference and match any test methods or frequencies described in the Contract Documents.

- 3.3.3. Sampling techniques, and methodology, such as the use of random number tables, for selecting representative testing and or sampling locations.
- 3.3.4. Control of workmanship.
- 3.3.5. Identification and qualifications of key quality control personnel, including the quality control manager, inspectors, and technicians. Include an organization chart with reporting lines.
- 3.3.6. Name and location of testing laboratories.
- 3.3.7. Documentation procedures, including inspection and test records; accuracy and calibration checks; nature, number, and type of deficiencies found; nature of corrective actions; and quantities of work tested and sampled.
- 3.3.8. Inventory of the field and laboratory equipment (along with calibration certifications) that will be used to perform the testing.
- 3.3.9. Mandatory inspection points.
- 3.3.10. Description of the quality control process that will be employed to ensure that any items manufactured off-site, including but not limited to multi-plate pipes, piles, bridge girders and structural steel meet contract requirements. If quality control is performed by subcontractors, manufacturers, or suppliers, provide their item-specific quality control processes as part of the CQC plan.
- 3.3.11. Description of the quality control processes that will be employed to ensure installation of all structural items, including but not limited to utility crossings, culverts, multi-plate pipes, piles, structural concrete, and steel erection results in a product that conforms to contract requirements.
- 3.3.12. Description of how and where manufactured materials will be stockpiled and protected prior to incorporation into the project.

4. CONSTRUCTION QUALITY ORGANIZATION

- 4.1. The construction CQC shall describe the Contractor's quality management organization for all of the project construction processes. At a minimum, the CQC shall identify the following positions.
 - 4.1.1. Construction Manager or Superintendent: The Construction Manager shall be the individual responsible for the overall project construction, quality management, and contract administration for this project.
 - 4.1.2. Construction Quality Manager: The Construction Quality Manager may work directly for the Contractor or may be contracted from an independent firm or organization. The Construction Quality Manager shall work under the direct supervision of the Construction Manager. The Construction Quality Manager and the Construction Manager or Superintendent shall not be the same person. It shall be the responsibility of the Construction Quality Manager to perform workmanship inspections, implement quality planning, oversee quality control testing, and coordinate with Owner's QA testing and independent assurance testing. The Construction Quality Manager shall also cooperate with the Project Manager in compiling a statistical correlation of materials and workmanship data. The Construction Quality Manager shall be responsible for

submitting requested inspection, testing, and other data to the Project Manager on a daily basis or as determined by the Construction Quality Manager and ARRC's field representative.. The Construction Quality Manager shall have at least two years (within the last five years) of experience in inspection and materials testing for similar projects.

- 4.1.3. Construction Testing Technicians: The construction testing technicians may work directly for the Contractor or may be contracted from an independent firm or organization. They shall work under the direct supervision of the Construction Quality Manager and perform testing and inspections as indicated in the CQC plan. Each Construction Testing Technician shall have training and/or technical certification, as appropriate, for the specific type and level of work that they will be testing, including sampling methods appropriate to the type of material being tested. Appropriately trained Construction Testing Technicians shall perform all contract required tests for excavation and embankment materials, selected embankment materials, subbase and base materials, asphalt pavement, concrete, welding, structural steel bolting, painting and coating, and any other materials or work for which the Contractor is responsible under the Contractor's quality management system.

5. **PRECONSTRUCTION MEETING:** Before the start of construction, the Contractor shall meet with ARRC or its authorized representative in a pre-construction meeting. A topic of the pre-construction meeting shall be the Contractor's proposed quality management system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the Contractor's quality control operations, control activities, testing, administration of the system for both onsite and offsite work, and the Contractor's quality control program. Minutes of the meeting shall be prepared and signed by both the Construction Manager and the Project Manager. The minutes shall become a part of the contract file. Additional conferences may be called at any time to reconfirm mutual understandings.

6. INSPECTIONS AND TESTS

- 6.1. Except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity, the Contractor shall provide inspections, tests, and similar quality control services in accordance with the approved CQC plan. Costs for these services shall be included in the contract price, whether performed by the Contractor's personnel or an independent firm.
- 6.2. Associated Services: The Contractor shall cooperate with organizations performing required inspections, tests, and similar services and shall provide reasonable auxiliary services as requested. Auxiliary services required include, but are not limited to:
 - 6.2.1. Providing access to the work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 - 6.2.2. Taking adequate quantities of representative samples of materials that require testing or assisting the Owner in taking samples.
 - 6.2.3. Providing facilities for storage or curing of test samples, and delivery of samples to testing laboratories.

- 6.2.4. Providing the Owner with a proposed mix design for use for each materials mix that requires control. The mix design shall be for the current year, and shall be accompanied by current year test results from a materials testing laboratory with current AASHTO accreditation in the test methods required for the respective mix design. All source materials used for preparing the mix design shall be the same as those materials that will be used for the project.
- 6.2.5. Security and protection of samples and test equipment at the project site.
- 6.3. Coordination: The Contractor, the Project Manager, and any independent testing agencies shall coordinate the sequence of activities to accommodate required inspection and testing services with a minimum of delay. In addition, the Contractor and ARRC shall coordinate activities so that removing and replacing construction to accommodate inspections and tests will not be required.
- 6.4. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.
- 6.5. Mandatory Inspection Documentation Points: Documentation points are mandatory verification and inspection points that shall be identified in the CQC plan and the project schedule, and specifically approved by the ARRC. Documentation points should be points at which critical characteristics are to be measured and documented by the Construction Quality Manager. It will be the responsibility of the Construction Quality Manager to certify that the construction has met the requirements of the plans and specifications and to sign all inspection documentation. Inspection documentation shall be submitted to ARRC or its representative when requested. It shall be the responsibility of the Contractor to determine inspection documentation point criteria and required documentation.
- 6.6. ARRC shall be notified a minimum of 48 hours prior to any mandatory inspection.
- 6.6.1. The mandatory inspection points for this project shall be established through coordination between the contractor and the Project Manager.
- 6.7. Completion Inspection: At the completion of all work or any increment thereof established by a completion time stated in the schedule or in the CQC plan, the Construction Quality Manager shall conduct a completion inspection of the work and develop a punch list of items that do not conform to the contract documents. Such a list of deficiencies shall be included in the QC documentation as required herein, and shall include the estimated date by which the deficiencies will be corrected. The Construction Quality Manager shall make a second completion inspection to make certain that all deficiencies noted on the punch list have been corrected and so notify ARRC. The completion inspections and any deficiency corrections required by this paragraph shall be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

7. DOCUMENTATION

- 7.1. The Contractor shall maintain daily records of quality control operations, activities, and tests performed, including the work of suppliers and subcontractors. These records shall be on an acceptable form and shall include factual evidence that required activities or tests have been performed, including, but not limited to, the following.

- 7.1.1. Type and number of control activities and tests involved.
- 7.1.2. Results of control activities or tests.
- 7.1.3. Nature of nonconformance's, defects, and/or causes for rejection.
- 7.1.4. Proposed corrective action.
- 7.1.5. Corrective actions taken.
- 7.1.6. List of trades and subcontractors working on the project, and the number of personnel working.
- 7.1.7. Description and inventory of materials delivered by suppliers for future incorporation into the work, including identification of supplier.
- 7.1.8. Description of weather and site conditions encountered any delays, and acknowledgement of any instructions given by ARRC.
- 7.2. The daily quality control report records shall cover both conforming and non-conforming work and shall include a statement that supplies and materials incorporated in the work and workmanship comply with the contract. The Construction Quality Manager shall sign the daily quality control report and furnish legible copies to ARRC by the end of the following workday.
- 7.3. Monthly quality control reports that summarize project status, work completed related to funds expended, any nonconformance, and subsequent corrective actions shall be provided.