

## **San Antonio Water System Standard Specifications for Construction**

### **ITEM NO. 903 Construction QC/QA Program**

**903.1 DESCRIPTION:** This item shall govern the preparation and implementation of the Contractor's Construction Quality Control/Quality Assurance (QC/QA) Program for the specified project. The enclosed guidance document, outlines general activities, procedures and reporting requirements for the contractor to prepare a project specific QC/QA Plan. The contractor shall prepare and implement their project specific QC/QA Plan throughout the construction phase of the project.

The contractor shall submit the project specific QC/QA Plan and receive approval of the plan by Engineer prior to the beginning of the construction phase of the project.

The contents and obligations of both the contractor and SAWS relative to the Quality Control and Quality Assurance Program, are further addressed below.

**903.2 INTRODUCTION:** This Construction Quality Control/Quality Assurance (QC/QA) Program has been written to define the activities of all persons performing, managing and administering construction for the San Antonio Water System (SAWS) and is intended to be a positive contribution toward obtaining quality construction.

This Construction QC/QA Program is only a guidance document which outlines general activities, procedures and reporting requirements of SAWS. Contractors shall have their own Quality Control (QC) Plan which complies with general requirements detailed in the Appendix.

**903.3 QUALITY CONTROL:** The primary function of Quality Control (QC) is to establish standards of quality for construction. The Contractor's plan defines procedures to manage and control his/her own activities, all Sub-contractor's activities, and all supplier's activities ensuring the completed project conforms to the intent of the Contract Documents.

The Contractor's QC plan is the foundation for quality work. It outlines the planned quality control procedures, and is vital to the SAWS Construction QC/QA Program. The plan must be comprehensive, detailed, and logical if the Contractor's quality control system is to be effective.

1. Objective: The Contractor has the contractual responsibility to manage construction quality and inspect the work. Control is an ongoing system of planning future activities. Inspection is the process by which on-going and completed work is reviewed. The objectives of work, to eliminate deficiencies, and to follow through

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in accomplishing the work in accordance with the Contract Documents. The objective of inspection is to see that the work is implemented in accordance with the intent of the Contract Documents.

The responsibility for quality control lies solely with the Contractor. The Contractor must continually strive to make improvements and to keep deficiencies from resulting in their finished work.

2. Contractor Responsibilities: As stated previously, QC is the Contractor's sole responsibility. This includes, but is not limited to, the following:
  - a. Providing the quality specified in the contract documents;
  - b. Implementing and maintaining an effective QC system;
  - c. Performance of all control activities and tests;
  - d. Completion of acceptable documentation of QC activities.

The Contractor shall place a "competent" person onsite to oversee the QC system. This person, along with an approved alternate, must have full authority to act for the Contractor on all QC matters and shall be on-site during all phases of Construction activities. The responsibilities include testing, materials, workmanship, methods, and techniques to provide that all work is constructed properly by qualified, competent, and professional craftsmen and/or tradesmen. A "competent" person is one that has been trained in excavation safety, work zone traffic control, confined space entry, and hazardous materials responsibilities. Additionally, this person must have authority to perform such duties as sign pay requests, negotiate change orders, etc.

Clear and effective communication between the Contractor, Engineer, and Inspector is vital to QC which is dependent on mutual cooperation. Effective QC requires the complete cooperation of the Contractor, Engineer, and Inspector.

The Contractor has the responsibility to make themselves totally familiar with the nature and location of the work by site visits and investigations. The Contractor shall evaluate all general and local conditions which may affect work and/or costs. The Contractor has the responsibility to review the contract documents and request clarification where necessary. All of this is accomplished by asking questions during the bidding phase or submitting Request for Information (RFI) documents during construction.

3. Quality Control Plan: The Contractor shall develop a project specific Quality Control (QC) Plan. The Contractor's QC Plan will address all definable features of construction and unusual or unique aspects of the job or activity for which it is written. The primary function of the QC Plan is for a successful execution of a

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realistic construction plan, by control and inspection, to insure that the required standards of quality are met and to preclude problems resulting from poor quality and/or workmanship. The QC Plan will define procedures to manage and control the contractors' own operations, site conditions, workmanship and safety, as well as his subcontractors, suppliers, manufacturers, products, and services to produce work of a specified quality while completing a project that complies with the Contract Documents, on time, and within budget. The contractor has the contractual responsibility to control construction activities, quality, inspect the work, and prepare documentation as appropriate in a timely and efficient process.

The QC Plan shall be prepared in accordance with the following concepts. Quality Control should be divided into three sub-construction phases. Each control phase provides the opportunity to prevent problems, deficiencies and misunderstandings. The phases are as follows and are further detailed in the Appendix.

4. Preconstruction Phase: Those actions done in advance of construction; advance planning, shop drawings, lay out schedules, detailed sketches, test reports, mix designs, schedule of values (payment schedule for non-unit cost contracts), Contractor's Safety and Health program, and physical checks of materials on site comparing to approved submittals and contract requirements.
5. Construction Phase:
  - a. Initial Phase: The initial control of each separate feature or segment of work is made at the outset of the operation to assure a proper start-up of work and full compliance with all contract requirements. This is the phase in which the Contractor will establish acceptable standards of workmanship. The initial phase is the most logical time to resolve any difference of opinion or interpretation of plans, rather than when the work is in place.
  - b. Follow-up Phase: Inspection and testing is made to determine continuation of compliance and workmanship standards established during preconstruction and initial phases. Follow-up inspections are more productive when they are preceded by thorough Preconstruction and Initial Phases and workmanship standards have been established prior to construction.
6. Construction Completion Phase: The last follow-up, or when any segment of work is complete, the contractor is to carefully examine the work, prepare a deficiency list of anything not completed or not conforming to the contract requirements. Work yet to be accomplished could include:  
paperwork/documentation, submittal of test results or other documents, certificates, diagrams, warranties, Operation and Maintenance Manuals, etc.

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When deficiencies are found in the Contractor's quality control and/or implementation of the QC Plan, many actions can be taken depending on the circumstances. Such actions may include, but are not limited to: improving the QC Plan, correcting deficient management, removing incompetent QC personnel, correcting defective work, refusing to allow work to continue in defective areas, and/or disallowing payment for the defective work. An aggressive and effective application of the Contractor's QC Plan can minimize or eliminate the need to take these actions.

The Contractor shall develop and submit, for review by SAWS, a detailed project specific Quality Control Plan after receipt of Notice of Award and prior to the Preconstruction Conference. It shall be reviewed and formally accepted prior to the initiation of construction.

7. Documentation: The Contractor shall document all QC activities performed during the contract by the Contractor, subcontractors, testing laboratories, and vendors in accordance with the Contract Documents.

The Contractor shall prepare QC reports consisting of or considering the following items:

- a. Testing activities, control procedures, test results, nature of deficiencies, proposed remedial actions, and corrective procedures instituted;
  - b. Reports shall reference specification section;
  - c. Reports shall also include subcontractor work;
  - d. Reports should concentrate on work items that have been completed and provide evidence of control activities;
  - e. Reports shall be submitted on a weekly basis, but always before request for payment on completed work;
  - f. Reports shall reflect accurate and precise QC actions taken.
8. Submittals: It is imperative that the Contractor's QC representative review all submittals.
- a. Typical types of submittals are:
    - (1) Testing Data;
    - (2) Shop Drawings;
    - (3) Work Schedules;
    - (4) Reports/Statements;
    - (5) Material or Product;
    - (6) Materials Samples;

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- (7) Materials Testing;
  - (8) Contractor's Safety and Health Program.
- b. The primary responsibility for overall management and control of submittals lies with the Contractor.
  - c. All required submittals shall be provided in a timely manner, and according to Contract Documents, to allow for the review, approval, procurement, delivery, and QC preparatory phase of an item before it is needed for construction.
9. Testing: Testing procedures described in the Contract Documents are another form of quality control to be performed at the sole expense and responsibility of the Contractor, ensuring delivery of an end product which meets the requirements in the contract.

Testing requirements and procedures shall include, but not be limited to, the following:

- a. An outline of proposed testing procedures developed and submitted prior to construction;
- b. Provide a listing of all required tests as specified in the contract, in addition to providing a listing of all non-specified testing procedures pending approvals;
- c. Specify who will be performing all required testing and at what frequencies;
- d. ASTM D3740-96 - Minimum Requirement for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.

**903.4 QUALITY ASSURANCE:** Quality Assurance (QA) is the means by which SAWS assures that the completed project complies with the quality established by the construction contract documents. SAWS assures that the Quality Control (QC) will be accomplished through reviews, observation and tests by QA personnel (SAWS Construction Observer/Inspector, Engineer, or any other authorized SAWS representative).

1. Quality Assurance Plan: An important tool in the success of the Construction QC/QA Program which will result in a qualitatively completed project is "partnering," which provides for the development of trust and effective communication between the Contractor, Engineer, and SAWS. SAWS will initiate partnering on appropriate construction projects, shortly after the award of the contract.

Responsibilities of the QA personnel include, but are not limited to, the following:

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- a. Respond to Contractor's requests for information (RFI) in a clear and timely manner;
  - b. Require the materials and standard of workmanship specified in the contract documents;
  - c. Require from the beginning that the Contractor maintain the quality specified in the construction contract documents and detailed in the Contractor's QC Plan;
  - d. Deal only with authorized Contractor's representatives;
  - e. Advise the Contractor of and document deficiencies as discovered;
  - f. Follow up with the Contractor to assure deficiencies are corrected;
  - g. Establish and maintain throughout the project clear and effective communications with the Contractor;
  - h. Designate a SAWS representative as the Contractor's single point of contact;
  - i. Identification and scheduling of training requirements for SAWS personnel;
  - j. Identification of pre-award activities;
  - k. Identification of any special project requirements;
  - l. Establish procedures for QA tests at random and unannounced intervals;
  - m. Review qualifications of Contractor's identified quality control laboratory.
2. Specific Activities: Specific activities associated with QA include, but are not limited to, the following:
- a. QC Plan review and acceptance;
  - b. Pre-construction conference;
  - c. Partnering workshop (to be determined by SAWS);
  - d. Coordination meetings;
  - e. Issuance of approved meeting minutes;
  - f. Submittal reviews and acceptance;
  - g. Assurance testing;
  - h. Acceptance of completed work;
  - i. Implementing approved Construction QC/QA Program
  - j. Implementing approved Safety and Health Program
3. QC's Plan Review and Acceptance: QC plan review shall include, but is not limited to, the following:
- a. Evaluation of the QC plan with regard to the contract document's requirements and determine overall compliance;
  - b. Identification of any problem areas needing change or clarification;

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- c. Determination if QC plans provide adequate control of defined segments of work;
  - d. Evaluation of QC staffing and organization for compliance with the intent of the contract documents;
  - e. Check the qualifications, training (Excavation/Safety competent person, work zone traffic control, confined space entry, hazardous materials), responsibilities, and authority (sign pay request, negotiate change orders) of Contractor's/Subcontractor's QC "competent" person;
  - f. Determination that QC plan adequately addresses submittals process;
  - g. Check proposed QC documentation formats.
4. Preconstruction Conference: This conference is a specific contract requirement and shall be held soon after contract award and prior to start of actual construction, contingent on receipt of contract documents specified in the General Conditions, including Contractor's QC Plan. The conference will address contract clauses covering quality control, testing, warranties, safety, personnel, and procedural items with discussions on specific rules and procedures. Specific responsibilities and authorities shall be presented and agreed upon so that the Contractor, Engineer, and Inspector will share the same understanding of the project scope and conditions.
5. Partnering Workshop: Shortly after the award of contract, the Contractor, Engineer and Inspector will participate in a Partnering Workshop (when deemed appropriate by SAWS) that will be directed by a qualified facilitator and will result in a Partnering Charter for the specific construction project.
6. Coordination Meetings: These meetings are scheduled and conducted by SAWS. They will be scheduled as required and/or prior to the start of a definable feature of work on the project. The primary purpose of these meetings is to establish a positive working relationship and to achieve a mutual agreement with the Contractor on the QC Plan and Safety Plan requirements.

The Coordination Meetings should address the following:

- a. Responsibilities of the "Competent Person";
- b. Quality control concepts;
- c. Definable segments of the physical work;
- d. Correction of the QC plan, if necessary;
- e. Procedures to be followed if deficiencies are discovered;
- f. Testing and documentation;
- g. Procedures for making changes;
- h. Safety plan;
- i. Review list of Contractor submittals.

SAWS is responsible for taking detailed conference minutes and for distribution of the minutes.

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7. **Submittal Review and Acceptance:** SAWS' responsibilities regarding submittals include, but are not limited to, the following:
  - a. Review list of submittals, prepared by Contractor, against requirements of the Contract Documents;
  - b. Review Contractor's submittal control document for compliance with submittal schedules, review time and procurement lead times;
  - c. Check submittal control documents against construction schedule;
  - d. Continually monitor status of submittals;
  - e. Respond to submittals in accordance with contract documents;
  - f. Enforce submittal requirements of the contract documents.
  
8. **Assurance Testing:** Quality Assurance (QA) testing is necessary to assure a quality project. SAWS performs QA testing to verify that QC testing is accomplishing the specified objectives. QA testing can be performed by either SAWS personnel or an independent testing laboratory.

Specific scope and objectives include:

- a. Review Contractor's proposed QC testing methodology, quantity of tests, and laboratory or Contractor's equipment certifications contained in the QC plan;
- b. Review reports of QC tests performed and document corrective actions taken for any problem area;
- c. Verify QC testing by random and unannounced tests that repeat the Contractor's QC tests.

**903.5 COMPLETION OF WORK:** In order to properly complete a quality project, defined procedures are necessary. Activities involving QC/QA personnel include, but are not limited to, the following:

1. Participation in preliminary and final inspections;
2. Prepare deficiency "punchlist";
3. Completion of "punchlist" deficiencies;
4. Review and approve Contractor's redline drawings;
5. Submittal of approved Operation and Maintenance manuals;
6. Completion of Operation and Maintenance training;
7. Submittal of specified spare parts;
8. Submittal of Contractor warranty information.



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**903.6 SAWS OPTIONS IN THE QC/QA PROGRAM:** The QC/QA program will be successful only if all parties, the Contractor, Engineer, and SAWS, are committed to “Quality of Excellence.” Preparation of high quality design documents by SAWS and the Engineer provide the basis for high quality construction. Contractor Quality Control is the key to providing an excellent product. SAWS' cost for providing, maintaining, and replacing its infrastructure continues to escalate. SAWS' core values dictate the pursuit of excellence and the elimination of poor quality, incompetency and unsafe processes and products.

Proper QC by the Contractor can prevent adverse SAWS actions. The contract documents contain clauses that provide means for enforcing contract compliance. Available means include, but are not limited to:

1. Require the Contractor to remove and replace deficient materials and/or workmanship;
2. Withhold payment;
3. Require removal of unqualified personnel;
4. Stop work until deficiencies are corrected;
5. Default the Contract;
6. Enforce liquidation damages;
7. Disqualification from bidding on future SAWS projects.

Such drastic actions are not desirable and would be necessary only when all other amenable avenues of partnering have failed. As originally stated, Quality is more than meeting the minimum requirements of the contract documents. Quality is also complying with SAWS core values and providing legendary service. And this requires the complete and full commitment to quality by all parties of this partnership.

**903.7 MEASUREMENT:** Measurement of the Item, "Construction QC/QA Program," as specified herein, will not be measured for payment.

**903.8 PAYMENTS:** No direct payment shall be made for incidental cost associated with preparation and implementation of the Contractors project specific QC/QA Program.

**903.9 APPENDIX: MINIMUM BASIC OUTLINE FOR A CONTRACTOR QC PLAN.**

The following general outline shall be used by the contractor to develop a project specific QC Plan. All QC Plans must comply with the overall Construction QC/QA Program. This QC Plan must be approved by SAWS prior to the beginning of construction.

1. **PRECONSTRUCTION PHASE:**

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- a. QC ORGANIZATION:
  - (1) List of personnel / chain of authority;
  - (2) Qualifications of QC personnel (including sub-contractors, suppliers, manufacturers);
  - (3) Name and qualifications of “Competent Person,” and alternate.
  
- b. DEFINABLE CONSTRUCTION FEATURES:
  - (1) List of definable features / items (identified by SAWS specification numbers);
  - (2) Schedule of Values for all definable features shall be submitted and approved prior to submittal of first pay request.
  
- c. GENERAL ADMINISTRATIVE PROCEDURES:
  - (1) Identify all responsible personnel (Contractor authorized representatives to sign Contract Documents, Pay Request, Change Orders, etc.);
  - (2) Identify all construction forms / procedures required (in accordance with SAWS Construction Phase Procedures guidance manual);
  - (3) Identify all SAWS personnel, Engineer, etc. responsible for the review or acceptance of submittals and construction activities.
  
- d. CONTRACTOR COORDINATION WITH OTHER AGENCIES:
  - (1) Identify all agencies and a contact person from each agency, as appropriate (including but not limited to: City of San Antonio Departments, Bexar County Departments, Texas Department of Transportation, Texas Commission on Environmental Quality, San Antonio Water System, etc.);
  - (2) Identify all existing utilities / field conditions as appropriate (including but not limited to: SAWS, CPS Energy, AT&T Telephone, Time Warner Cable, etc.).

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e. SUBMITTALS:

- (1) Identify as appropriate, including but not limited to: all definitions, procedures, product data, shop drawings, samples, manufacturers certificates/warranties, etc.;
- (2) Prepare a schedule of specified submittals to be submitted for review/approval (verify all material and contract requirements);
- (3) Identify SAWS personnel, Engineer, etc. responsible for the review and acceptance of project submittals;
- (4) Prepare a Construction Safety and Health Program (contractor and sub-contractors) in accordance with SAWS Construction Safety and Health Program guidance document;
- (5) Testing laboratory services (to be used by contractor): submit data for review and approval of laboratory as specified in the contract documents;
- (6) Material testing:
  - (a) Attach testing analysis data of materials to be used on the project to the appropriate material submittal.
  - (b) Submit a QC testing plan (example backfill material, roadway construction material compaction testing, pipe testing, motors/pumps tests, other tests as required or appropriate).

2. CONSTRUCTION PHASE: Prepare written procedures with respect to issues including:

- a. CONSTRUCTION SEQUENCING  
Construction Schedule: include, but not limited to: bar graphs, phasing plan, network diagrams, critical path item identification, equipment/material/supplies delivery impact, narrative reports, etc.).
- b. SHOP DRAWING LOGS
- c. SUBMITTAL LOGS
- d. REQUEST FOR INFORMATION LOGS
- e. TRAFFIC CONTROL PLANS
- f. COORDINATE USE OF OWNERS PREMISES: Including, but not

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limited to, layout of temporary facilities, temporary utilities and controls, security, field office and storage facilities, operation of owners valves, facilities, tie-ins, by-pass pumping, flow diversion or interruption of owner's facilities. etc.

- g. PREPARATION OF RIGHT OF WAY
  - h. TEMPORARY CONTROLS: Including but not limited to: erosion and sedimentation controls, dust control, construction noise control, etc.
  - i. SURVEYING
  - j. DELIVERY, STORAGE, INSPECTION AND INSTALLATION OF MATERIALS AND EQUIPMENT
  - k. TESTING OF ON-SITE MATERIALS AND EQUIPMENT
  - l. MANUFACTURERS FIELD SERVICES
  - m. TRAINING SCHEDULE
  - n. STARTING OF SYSTEMS
3. Construction Completion Phase: Prepare written procedures with respect to issues including, but not limited to:
- a. EQUIPMENT TRAINING
  - b. MANUFACTURERS INSPECTION/ACCEPTANCE REPORTS (as applicable).
  - c. DEFICIENCY PUNCH LISTS
  - d. REMOVAL OF UTILITIES, FACILITIES AND CONTROLS  
Plan and coordinate with proper personnel and/or agencies.
  - e. COORDINATE SYSTEM OPERATION TURN-OVER TO OWNER
  - f. COMPLETE ALL POST CONSTRUCTION DOCUMENTATION/ADMINISTRATION (as required by contract)

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g. PROJECT RECORD DOCUMENTS:

- (1) Maintain records and documents throughout construction process.
- (2) Prepare final submittals on items required (include but not limited to: as-built drawings, specifications and addenda, approved shop drawings, material samples, construction photographs, change orders, contract modifications, testing and analysis records, survey data, construction reports such as daily reports, monthly reports, payroll records, and safety data such as MSDS, safety meetings, incident reports, etc.).

- End of Specification -