SECTION 01005
MISCELLANEOUS REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL

A. Conform to all miscellaneous requirements as herein specified.

1.02 INTERFERENCE WITH EXISTING WORKS

A. The Contractor shall at all times conduct its operations so as to minimize or completely eliminate interference with existing works. The Contractor shall develop a program, in cooperation with the Engineer and site personnel, which shall provide for the construction and putting into service of the new works in the most orderly manner possible. This program shall be adhered to except as deviations therefrom are expressly permitted. All work of connecting with, cutting into, and reconstructing existing pipes or structures shall be planned to minimize or completely eliminate interference with the operation of the existing facilities. It may be necessary to work outside of normal working hours to meet these requirements. Before starting work which is likely to interfere with the operation of existing facilities, the Contractor shall do all possible preparatory work and shall see that all tools, materials, and equipment are made ready and at hand.

B. The Contractor shall make such minor modifications in the work relating to existing structures as may be necessary, without additional compensation.

C. The Contractor shall have no claim for additional compensation by reason of delay or inconvenience in adapting his operations to meet the above requirements.

1.03 MAINTAINING SEWAGE WATER, AND STORM WATER FLOWS AND OTHER UTILITIES AND PROCESS FLOWS

A. It is essential to the operation of existing facilities that there be no interruption. To this end, the Contractor shall provide, maintain, and operate all temporary facilities such as dams, pumping equipment, conduits, and all other labor and equipment necessary to intercept these utilities before they interfere with the work, carry them past the work, and return them to the existing utilities below the work.

B. Minimum facility usage flow occurs during the night hours and weekends. The Contractor may work on the existing utilities at such times if he so chooses at no additional cost to the City.

1.04 SPECIAL MATERIALS HANDLING

A. Groundwater and excavated material are indicated to have possible contamination that requires special handling. The Contractor is responsible to properly dispose of any contaminated materials as required by applicable Federal, State, and local laws, regulations, standards and requirements. Refer to specification section 01010-Summary of Work for further information.

1.05 PHASE CONSTRUCTION

A. Work under this contract is to be accomplished in a timely manner and in accordance with the completion time set forth in the Agreement Documents for this project.

1.06 MOTOR AND STARTING EQUIPMENT DATA LIST

A. Each Contractor shall obtain the necessary data from its equipment suppliers, and shall prepare a complete tabulation of all motors over 1/3 hp, and all electric heaters, to be furnished under his contract.

B. The motor and heater tabulation shall include firm and accurate information as follows:

1. Name and identification of equipment.
2. Manufacturer.
3. Horsepower or kilowatt rating.
4. Voltage.
5. Phase.
6. Speed.
7. Full load current.
8. Locked rotor current or code letter.
9. Type of enclosure (open dripproof, totally enclosed, fan cooled, etc.)
10. Automatic control equipment used (if applicable).
11. NEMA size of starter or contactor.
12. Overload heater size.
13. Type of starter (full-voltage, reduced-voltage, autotransformer, etc.).
14. Breaker trip setting or fuse size.
15. Voltage of starter operating coil.
16. If starter is at a motor control center, list motor control center number.

C. The correct submission of starting equipment shop drawings is dependent upon timely submission of the complete motor and electric heater tabulation. To this end, all Contractors shall cooperate fully in the assimilation and dissemination of motor and electric heater data.

D. Three copies of the tabulation shall be furnished to the Engineer. Two copies shall also be furnished concurrently to the Electrical Contractor, to use in preparing his order for starting equipment. The Electrical Contractor shall also prepare a composite tabulation of all of these motors and electric heaters, as specified under ELECTRICAL WORK - GENERAL.

1.07 VOLTAGE RATINGS OF MOTORS

A. Unless otherwise specified, motors with ratings in excess of 1/3 hp. shall be rated 460-volt (nameplate rating), three-phase, 60-Hertz; motors of 1/3 hp or less shall be rated 115-volt, single-phase, 60-Hertz.

1.08 HYDRAULIC UPLIFT OF STRUCTURES

A. The Contractor shall be responsible for the protection of all structures against hydraulic uplift until such structures have been accepted finally by the City.

B. The Contractor will coordinate its work with other contractors and activities, with specific attention to access to portions of the work. Construction sequence shall be determined by the Contractor subject to the needs for continuous access and operation by others.

END OF SECTION 01005

SECTION 01010
SUMMARY OF WORK

PART 1 - GENERAL

1.01 This section summarizes the work of the project as covered in detail in the complete Contract Documents. This is a general summary and is not intended to be complete and all inclusive of the required work items.

1.02 DESCRIPTION

A. Definition: The Work is defined per General Conditions Section GC-3.

B. Description of Work: The Work limits are shown in the Contract Documents and consist of furnishing all materials, equipment, and labor required to construct the facilities as shown on the Drawings. This Work includes properly handling all materials encountered including offsite disposal of excavation and other waste materials and proper treatment and disposal of water encountered in the excavation. This Work further includes relocation of the office trailers presently on the site to the location shown on the drawings. This work includes all activities and permitting associated with relocation, including set up at the designated location and connection to all utilities.

C. Description of Total Project: The finished project will consist of two sites named "The Equalization Site" and "The Diversion Site". The project includes the major structures and facilities that include, but are not limited to, the following items.

1. One 10-MG equalization tank.
2. One 67 MGD diversion pumping station.
3. One jet mix pumping station with 30 MGD return pumping capacity.
4. Diversion structures and associated piping.
5. Cheshire Bridge junction box.
6. Associated piping to convey diverted flows from the Diversion Site to the Equalization Site and back to the existing sanitary sewer.

1.03 CONTRACTOR'S USE OF PREMISES:

A. The contractor shall be responsible for maintaining all site access in good condition, including drainage.

B. Site Security: The Contractor shall secure area after work hours and ensure all Site gates are locked.

1.04 COORDINATION WITH OTHER ACTIVITIES:

A. The Owner may contract for other Work related to but not included in this Contract. The Contractor will coordinate his activities to facilitate other Contractor Work.

B. The Contractor shall coordinate with the Owner on the transfer of power, relocation of trailers and other activities, as necessary.

C. Owner has submitted a full set of plans and technical specifications to facilitate expedited permitting by the City of Atlanta Bureau of Buildings. Upon issuance of Notice to Proceed, the Contractor shall be responsible for completing the permits process.

1.05 SPECIAL MATERIALS HANDLING

A. Contractor is referred to the Environmental reports referenced in paragraph 1.06 regarding the potential presence of contaminated soil and / or groundwater and proper disposal of such materials.

B. Contractor shall ensure that all Federal, State, and local requirements are met for the removal, testing, transport, and disposal of any contaminated materials.

1.06 LIST OF REFERENCES:

A. Reference Materials:

1. The following reference materials are provided as attachments to these specifications for the Contractors information only:

   a. Geotechnical report dated October 9, 2012 and Addendum 1 dated October 30, 2012 prepared by Willmer Engineering, Inc. and titled:

      REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION
      Liddell Drive Equalization Project
      Atlanta, Fulton County, Georgia

   b. Environmental assessment report dated August 31, 2012 by United Consulting and titled:

      Phase II
      Environmental Assessment
      Liddell Drive Equalization Project
      Atlanta, Georgia

   c. Survey for asbestos and lead dated August 2, 2012 by United Consulting and titled:

      Asbestos and Lead Based Paint Survey
      Liddell Drive
      Fulton County
      Atlanta, Georgia

B. All reports and studies are for information only. It is the Contractor's responsibility to satisfy itself as to the accuracy and completeness of the information provided. Additional studies and investigations may be performed by the Contractor at no additional cost to the City.

END OF SECTION 01010

SECTION 01011
UNIQUE REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE

A. The scope of this Section is to convey to the Contractor unique and unusual stipulations and requirements, which have been established for this Project. Some of the stipulations and requirements are a result of negotiations with various entities and organizations, which have an interest in this Project. Some requirements are based on technical aspects of the Project, which are not otherwise conveyed to the Contractor. The provisions of this Section shall supersede the provisions of the Division 1 through 16 Specifications, but shall not supersede the Bidding Requirements, Contract Forms or Conditions of the Contract.

1.02 SEQUENCING

A. General: The Contractor shall be solely responsible for all construction sequencing.

B. The Contractor shall notify the City at least 48 hours prior to any land disturbing activities, relocating piping, or diverting flows.

C. Sequence Submittal

1. Submit a proposed sequence of tasks with appropriate times of starting and completion of each task to the Engineer for review within ten (10) days of the Notice to Proceed.

2. The Contractor may propose alternatives to the sequencing constraints shown in this Section in an attempt to reduce the disruption of the operation of the existing facility or streamline the tasks of this Contract. The City and the Engineer are not obligated to accept any of these alternatives.

1.03 DIVERSION FACILITY SITE SPECIAL REQUIREMENTS

A. Work at the project site may be performed 24 hours per day, seven days per week. Blasting hours shall be as noted in Section 02405. The Contractor must comply with local requirements including those controlling noise, light, and construction traffic. Costs incurred by the Owner for additional inspection and engineering for work beyond 8 hours work day 5 days work week will be reimbursed by the Contractor.

B. Blasting may not be performed prior to completion of pre-blast surveys or approval of blast plans.

C. Trucks are not permitted to access the Diversion Facility site via the CSX crossing west of the site and adjacent to 2039 Cheshire Bridge Road.

D. Parking for Contractor personnel shall be fully contained within the site boundaries. No parking is permitted on any public roads. If necessary, the Contractor shall make arrangements for remote parking for its personnel, at a site approved by the Engineer, at no additional cost to the City.

E. The Contractor is responsible for protecting the existing utility lines and radio tower above and below-ground facilities and shall be responsible for the repair and damages resulting from his

construction activities to these systems. In addition to the requirements of Special Conditions Section SC-8 the Contractor shall verify the actual locations of various buried lines shown on the Drawings by carefully excavated test pits or other direct means before starting Work in any given area at no additional cost to the City. Special care shall be taken during any excavation to mitigate potential damage in case previously unknown and active systems are encountered.

F. Groundwater discharged from the equalization facility site will be discharged to a storm sewer or waterway in accordance with the requirements of Section 02140 – Dewatering.

G. Unless shown otherwise on the Drawings or directed by the Engineer, the Contractor shall restore the site to its original grade. Any fill placed at the site to return it to its original grade shall be controlled fill, approved by the Engineer. The site shall be grassed and mulched. Final landscaping, including grassing, trees and shrubs shall be paid under Bid Item No. 1. Contractor shall stockpile native top soil for re-use during landscaping.

1.04 EQUALIZATION FACILITY SITE SPECIAL REQUIREMENTS

A. Work at the Equalization Facility site may be performed 24 hours per day, seven days per week. Blasting hours shall be as noted in Section 02405 Blasting. The Contractor must comply with local requirements including those controlling noise, light, and construction traffic. Costs incurred by the Owner for additional inspection and engineering for work beyond 8 hour work day 5 day work week will be reimbursed by the Contractor.

B. Blasting may not be performed prior to completion of pre-blast surveys or approval of blast plans.

C. The removal of the existing radio tower from the equalization facility site is underway by Others. The Contractor is responsible for protecting the existing utility lines and radio tower above and below-ground facilities and shall be responsible for the repair and damages resulting from his construction activities to these systems until the tower is removed. In addition to the requirements of Special Conditions Section SC-8 the Contractor shall verify the actual locations of various buried lines by carefully excavated test pits or other direct means at no additional cost to the City. Special care shall be taken to mitigate potential damage in case previously unknown and active systems are encountered.

D. Groundwater discharged from the equalization facility site will be discharged to the sanitary sewer system in accordance with the requirements of Section 02140 – Dewatering.

E. Parking for Contractor personnel shall be fully contained within the site boundaries. No parking is permitted on any public roads, or on Miss Astor Place. If necessary, the Contractor shall make arrangements for remote parking for its personnel, at a site approved by the Engineer, at no additional cost to the City.

F. The Contractor is responsible for protecting the existing utility lines and shall be responsible for the repair and damages resulting from his construction activities to these systems. In addition to the requirements of the Special Conditions Section SC-8 the Contractor is required to verify the actual locations of various buried lines shown on the Drawings by carefully excavated test pits and other direct means before starting Work in any given areas at no additional cost to the City. Special care shall be taken during any excavation to mitigate potential damage and minimize damage in case previously unknown and active systems are encountered.

G. Except where shown otherwise on the Drawings or directed by the Engineer, the Contractor shall restore any disturbed areas on the site to its original grade. Any fill placed at the site to return it to its original grade shall be controlled fill, approved by the Engineer. All disturbed areas shall be stabilized. Any temporary erosion control stabilization required during the course of the Work shall be at the contractor's expense and no additional compensation will be paid. Any final landscaping, including trees and shrubs, but not including grassing, shall be paid under the Site Landscaping Allowance Item. Contractor shall stockpile native top soil for re-use during landscaping.

H. Existing structures to be demolished may contain hazardous materials such as lead and asbestos. These contaminants shall be removed by under this Contract Agreement in accordance with federal, state and local laws, rules and regulations and shall be paid as part of the Contractor's lump sum bid item. The Contractor is responsible for inspecting and satisfying himself that material removal is complete and that no hazardous materials will be encountered prior to other demolition activities.

1.05 POWER SUPPLY

A. The contractor is responsible for all power needs and costs for the Work except as described in specification Section 01200 - Measurement and Payment. No additional compensation will be paid for Power Service.

B. Georgia Power will ultimately supply the power needs for the Project. They have been advised on the approximate power requirements for the completed Project and the probable locations for the substations. If the Contractor requires power service for the Work he shall contact Georgia Power for specific technical, schedule, and cost information required for the Project. No additional compensation for power supply will be made. The contact person is as follows:

Ms. Kristie Drury
Key Account Manager
Georgia Power Metro Key Accounts
5215 Minola Drive
Lithonia, Georgia 30038-2310
Office Phone: (770) 322-5733
Cell Phone: (404) 513-5984
Office Fax: (770) 322-5780

END OF SECTION 01011

SECTION 01014
WORK SEQUENCE

PART 1 - GENERAL

1.01 SCOPE

A. Work under this Section includes construction sequencing and provision of temporary facilities necessary to maintain the operation of the existing sewer and to prevent wastewater overflows/spills and basement flooding during the performance of this Work.

1. It is intended to provide guidance to the Contractor for preparing the detailed construction schedule specified in SC-16.
2. The contractor is free to change the order in which various facilities are constructed as he sees fit, subject to the approval of the engineer, as long as the changes meet the stated project goals.
3. The sequence specified herein does not address the means and methods of performing the construction as these are the contractor's sole responsibility.

B. Use of the specified sequence of construction is not guaranteed by the engineer to meet the specified project goals. The scheduling and performance of construction operations is solely the Contractor's responsibility. The construction sequence specified is solely to advise the Contractor of some of the more important considerations necessary to develop the detailed construction schedule.

C. The existing sewer is currently and continuously conveying sewage, and that function shall not be interrupted except as specified herein. The Contractor shall comply with the following general requirements:

1. Provide temporary pumps, piping, and other facilities necessary to meet the requirements of this Section.
2. Notify the Engineer at least forty-eight (48) hours prior to connection to the existing pipe or taking existing system components out of service.
3. Bypassing of untreated sewage to surface waters or drainage courses is prohibited during construction. In the event accidental overflows or spills are caused by the Contractor's operations, the Owner shall immediately be entitled to employ others to stop the bypassing without giving written notice to the Contractor.

D. Penalties imposed on the Owner as a result of any overflows or spills caused by the actions of the Contractor, his employees, or subcontractors, shall be borne in full by the Contractor, including legal fees and other expenses to the Owner resulting directly or indirectly from the event.

E. Contractor shall insure that all permits required for Work are obtained in a timely manner prior to commencement of Work to insure timely completion of Work in accordance with approved schedule. Contractor acknowledges that permits for such as items as tree removal or disturbance (Tree Plans), road closures, and other required permits may require additional documentation. Contractor should allow adequate time to obtain such permits.

1.02 SUBMITTALS

A. In accordance with the General Conditions, the Contractor shall submit a detailed outage plan and time schedule for operations which will make it necessary to remove a pipeline or structure from service. The schedule shall be coordinated with the construction schedule specified in the Special Conditions and shall meet the restrictions and conditions specified in this section. The detailed plan shall describe:

1. The Contractor's method for maintaining service while preventing overflows, surcharging, or spills.
2. The length of time required to complete said operation.
3. Equipment or temporary bypassing and shut down requirements from the beginning to the end of construction activities.
4. Contingency plan to deal with problems which could occur during the construction period. Examples include high flows, pump failure, etc.

B. Sequence Submittal: The sequence provided in Part 3 of this Section is offered as a suggestion to the Contractor. Submit a proposed sequence with appropriate times of starting and completion of tasks to Engineer for review.

C. Alternate Sequences: Contractor may propose alternate sequences to that shown in Part 3 of this Section in an attempt to reduce the disruption of the operation of the existing facility or streamline the tasks of this Contract.

1.03 SYSTEM INTERRUPTION

A. At least two weeks prior to any proposed activity which will require any portion of the system be removed from operation, require temporary bypassing or require interruption of flow, the Contractor shall schedule a meeting with Owner's Operating Personnel and the Engineer. At this meeting, the Contractor shall present Contractor's detailed plan for the proposed operation for general discussion. The plan shall meet the minimum requirements below:

1. Plan shall be written outline form and presented in a format which shall show the progression of events in sequential and/or concurrent order of activity and the duration of each activity.
2. The written plan shall be supplemented by drawings, sketches, and details as required to show the logic of the plan and make it understandable.
3. The plan shall delineate the responsibilities of the Owner's Operating Personnel and the Contractor, so as to eliminate any delay due to conflicting viewpoints upon implementation of the plan.
4. After discussion of the plan at the meeting, any changes agreed upon shall be incorporated into the plan and a copy of the plan and details shall be distributed to Owner's Operating Personnel, the Engineer, and Contractor personnel at least one week prior to commencement of activities. On the day prior to commencement of activity a brief meeting of involved parties shall be convened. In this meeting the starting time and initial activity of Owner's Operating Personnel and Contractor's personnel shall be agreed upon.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The sequence of construction is outlined for the major items of Work required; no attempt has been made to describe every detail of the Project. The Contractor shall coordinate his work with the Owner's Operating Personnel to minimize disruptions in sewer system operation. It shall be the Contractor's responsibility to ensure that all existing facilities are protected and will not be damaged as a result of this construction. No settlement of existing facilities will be acceptable and all work shall be performed in a safe manner.

B. Equalization Site:

1. Earthwork
2. 10 MGD Prestressed Concrete Tank and piping
3. Jet-Mix Pump Station (concurrent with tank) and piping
4. Cheshire Bridge Junction Box

C. Diversion Site:

1. Earthwork, retaining wall, and force main piping
2. Diversion Pump Station and piping
3. Diversion Structures and gravity piping

3.02 MISCELLANEOUS CONSTRUCTION

A. Miscellaneous work necessary to complete any flow diversion required may include piping, pumps, electrical work, diversion plugs, bulkheads, and equipment installation, etc. The cost for these items shall be included in the Contractor's base bid.

END OF SECTION 01014

SECTION 01040
COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall coordinate execution of the Work with subcontractors and the Engineer as required to maintain operation of the existing facilities and satisfactory progress of the Work.

B. Requirements of this Section will be in addition to those stated in the General Conditions.

C. The Engineer may require a written explanation of the Contractor's plan for executing separate phases of the Work.

1.02 CUTTING AND PATCHING

A. The Contractor shall leave all chases or openings for the installation of its own or any of its subcontractor's Work, or shall cut the same in existing work, and shall see that all sleeves or forms are at the work and properly set in ample time to prevent delays. The Contractor shall ensure that all such chases, openings, and sleeves are located accurately and are of proper size and shape, and shall consult with the Engineer and its subcontractors concerned in reference to this Work. In case of its failure to leave or cut all such openings or have all such sleeves provided and set in proper time, the Contractor shall cut them or set them afterwards at its own expense, but in so doing shall confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall structural members be cut without the written approval of the Engineer.

B. The Contractor shall carefully fit around, close up, repair, patch, and point around the Work specified herein to the satisfaction of the Engineer.

C. All of this work shall be done by careful workers competent to do such work and with the proper small hand tools. Power tools shall not be used except where, in the opinion of the Engineer, the type of tool proposed can be used without damage to any work or structures and without inconvenience or interference with the operation of any facilities. The Engineer's approval of the type of tools shall not in any way relieve or diminish the responsibility of the Contractor for such damage, inconvenience, or interference resulting from the use of such tools.

D. Do not cut or alter the work of any subcontractor, except with the written consent of the contractor whose work is to be cut or altered, or with the written approval of the Engineer. All cutting and patching or repairing made necessary by the negligence, carelessness or incompetence of the Contractor or any of its subcontractors, shall be done by, or at the expense of, the Contractor and shall be the responsibility of the Contractor.

1.03 EXISTING UTILITIES

A. The Contractor shall consult with the Engineer on a daily basis while performing demolition, excavation, or any other alteration activity. No sewer function, utility, or structure shall be altered, shut off, or removed unless approved in advance, and in writing, by the Engineer. The Contractor shall give the Engineer at least 48 hours advanced notice, in writing, of the need to alter, shut off or remove such function.

B. Coordinate the Work with the Engineer and revise daily activities if needed so as to not to adversely affect system operations. Such revisions in the proposed work schedule will be accomplished with no additional compensation to the Contractor.

C. Comply with the requirements of Section 01011 of these Specifications.

END OF SECTION 01040

SECTION 01060
REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE

A. Permits and Responsibilities. The Contractor shall, without additional expense to the City, be responsible for obtaining NPDES permits for stormwater discharges from this Project, and for complying with any applicable federal, state, and local laws, regulations, standards, policies and requirements in connection with the prosecution of the Work.

B. The Contractor shall, without additional expense to the City, be responsible for obtaining permits for contaminated material disposal, including dewatering discharges, from this Project, and for complying with any applicable federal, state, and local laws, regulations, standards, policies and requirements, in connection with the prosecution of the Work.

C. The Contractor shall take proper safety and health precautions to protect the Work, the workers, the public, and the property of others.

D. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the Work, except for any completed unit of construction thereof which may heretofore have been accepted.

1.02 NPDES PERMITS FOR STORM WATER DISCHARGES

A. The Federal Water Pollution Control Act (also known as the Clean Water Act (CWA)), as amended in 1987, requires National Pollutant Discharge Elimination System (NPDES) permits for storm water discharges associated with industrial activity.

B. On November 16, 1990, (55 FR 47990), the Environmental Protection Agency (EPA) issued regulations establishing permit application requirements for storm water discharges associated with industrial activity. These regulations are primarily contained in Section 122.26 of Section 40 of the Code of Federal Regulations (40 CFR Part 122.26).

C. The November 16, 1990 regulation established the following definition of "storm water discharge associated with industrial activity" at 40 CFR 122.26(b)(14):

"Storm water discharge associated with industrial activity" means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. For the categories of industries identified in subparagraphs (i) through (x) of this subsection, the term includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are

exposed to storm water. The following categories of facilities are considered to be engaging in "industrial activity" for purposes of this subsection:

(i) through (ix) omitted for brevity.

(x) Construction activity including clearing, grading and excavation activities except: operations that result in the disturbance of less than five acres of total land area which are not part of a larger common plan of development or sale;

D. These regulations are effective for all activities covered by the regulation on or after October 1, 1992.

E. As a minimum, the Contractor shall complete EPA Form 3510-2F. A manual entitled "Guidance Manual for the Preparation of NPDES Permit Applications for Storm Water Discharges Associated with Industrial Activity" as published by the United States Environmental Protection Agency, is available to assist the Contractor in the application process.

END OF SECTION 01060

SECTION 01200
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SCOPE

A. Work includes furnishing all plant, labor, equipment, tools, materials, and performing all operations required to complete the Work satisfactorily, in-place, as specified and as indicated on the Drawings.

B. All costs of required items of work and incidentals necessary for the satisfactory completion of the Work shall be considered as included in the Bid Total. The cost of work not directly covered by the pay items shall be considered incidental to the Contract and no additional compensation shall be allowed.

C. The Contractor shall take no advantage of any apparent error or omission on the Drawings or Specifications, and the Engineer shall be permitted to make corrections and interpretations as may be deemed necessary for fulfillment of the intent of the Contract Documents.

1.02 SUBMITTALS

A. The Contractor shall submit to the Engineer for approval, in the form directed or acceptable to the Engineer, a complete schedule of values of the various portions of the Work, including quantities and unit prices, aggregating the Contract Price. An unbalanced breakdown providing for overpayment to the Contractor on items of Work, which would be performed first, will not be approved.

B. Submit application for payment on a form approved by the Engineer showing allowances, lump sum schedule of value items, and unit price items in accordance with Section SC-16.

C. Final payment quantities shall be determined from the record drawings. The record drawing lengths, dimensions, quantities, etc. shall be determined by a survey after completion of all required work. The precision of final payment quantities shall match the precision shown for that item in the Bid Schedule.

1.03 LUMP SUM ITEM

A. Payment of the lump sum item (Bid Item No.1) established in the Contractor's Bid shall be full compensation for all labor, materials, and equipment required to furnish, install, construct, and test the Work covered under the lump sum bid item.

B. Payment of the lump sum item (Bid Item No.1) established in the Contractor's Bid shall also fully compensate the Contractor for any other work which is not specified or shown, but which is necessary to complete the Work.

C. The lump sum item shall be specifically subdivided by Activity, broken-out in the Schedule of Values.

D. Payments for the lump sum items specifically broken-out in the Schedule of Values will be based upon physical progress for each activity in accordance with the breakdown of the Lump Sum prices agreed to in the Schedule of Values.

1.04 UNIT PRICE ITEMS

A. Payment for all work shall be in accordance with the unit price bid items in the Bid Schedule and shall be full compensation for all labor, materials, and equipment required to furnish, install, construct, and test the Work covered under the unit price bid item. Work for which there is no price schedule item will be considered incidental to the Work and no additional compensation shall be allowed.

B. Payment will be made only for the actual quantities of work performed in compliance with the Drawings and Specifications. The Contractor will be paid an amount equal to the approved quantity multiplied by the applicable unit price. Any unused balance of the unit price work shall revert to the City upon completion of the Project.

C. All unit price work shall be considered as part of the Work to be performed within the time limits specified elsewhere for Substantial Completion and Project Completion. No increase in Contract time will be allowed for increases in quantities of unit price work performed beyond the quantities shown in the Bid Schedule, unless it can be demonstrated that the additional Work performed under the unit price item is on the critical path of the Project Schedule.

D. All variable costs associated with variation in quantities shall be included in the unit prices. All fixed costs associated with performing the items of work for which unit prices are paid shall be included in Item 1 of the Bid.

1.05 ITEM NO.1- ALL WORK TO COMPLETE

A. All work to complete the Project, and which is not included in all other Items, shall be included in the lump sum amount bid for Item No.1 of the Bid. Item No. 1 shall include, but not be limited to, the following specific items:

1. Mobilization and demobilization.
2. Bonds and Insurance.
3. Document control including requirements of section 01350.
4. Permits including but not limited to land disturbance permit, demolition permit, building permit.
5. Temporary facilities as described in section 01500.
6. Excavation and backfill, including all excavation support systems, e.g., sheeting, bracing,, and timbering.
7. Design, installation, maintenance and operation of dewatering systems.
8. Site security.
9. Site landscaping.
10. Erosion, sediment, and water pollution prevention and control measures.
11. Removal of all temporary facilities, site improvements and restoration.

12. Traffic control (both on and off site).
13. Temporary access road construction and maintenance.
14. Testing and commissioning of all facilities.
15. Operation and maintenance of all facilities during the acceptance testing period.

1.06 ITEM NO. 2 – HAUL AND DISPOSE TO SUBTITLE D LANDFILL

A. Haul and dispose of non-hazardous excavated waste material offsite. This material is required to be land filled but is not hazardous and may be disposed of in a Subtitle D landfill.

B. Measurement for payment shall be made based upon actual Landfill Dump Tickets showing the actual weight of material, truck identification, date, and time. The contractor shall maintain a log of all trucks entering and leaving the site. No payment will be made for landfill dump tickets that are not cross-referenced to the contractor's truck record log.

1.07 ITEM NO. 3 – HAUL AND DISPOSE TO SUBTITLE C LANDFILL

A. Haul and dispose of hazardous excavated waste material offsite. This material is required to be land filled, is considered hazardous, and must be disposed of in a Subtitle C landfill.

B. Measurement for payment shall be made based upon actual Landfill Dump Tickets showing the actual weight of material, truck identification, date, and time. The contractor shall maintain a log of all trucks entering and leaving the site. No payment will be made for landfill dump tickets that are not cross-referenced to the contractor's truck record log.

1.08 ITEM NO. 4 – ALLOWANCES

A. The allowances specified in the Bid Schedule are to establish a fund to pay the cost of items for which the City could not establish accurate quantities and/or detailed scope of work. This work shall be completed only at the written direction of the Engineer, and the cost of such work shall be approved prior to performance of the work.

B. The Contractor shall be responsible for the payment for these services to the appropriate payee providing such service, and shall submit evidence of payments to the Engineer prior to its inclusion in the progress payments.

C. Payment will be made for invoices submitted by the Contractor subject to the conditions and limitations in the Contract Documents.

D. Allowance allocations shall only be paid to the Contractor for completed work authorized by the Engineer. All allowance dollar amounts not expended shall revert to the City at the completion of the Project. Should the allowance costs be greater than the specified amount of the allowance, the Contract will be adjusted accordingly by change order. The amount of change order will not recognize any changes in handling costs at the site, labor, overhead, profit and other expenses caused by the adjustment to the allowance item.

E. Item 4a - Partnering: An allowance has been established as the value of this item. This allowance shall be used to pay the City's 50 percent share of the direct costs of an outside facilitator and conference facilities to conduct partnering in accordance with these Specifications. The Contractors costs for attending and participating in the partnering sessions is not covered under

this allowance item and all such costs shall be included in the Contractor's 50 percent share of the Partnering included in the Lump Sum Bid amount. The Contractor shall allocate an amount equal to this allowance in their Lump Sum Bid for paying their 50 percent share of the direct Partnering costs. Any unused portion of the amount allocated by the Contractor for their 50 percent share of the direct costs of Partnering shall be credited to the City on the Final Payment Request.

F. Item 4b - Additional Paving: An allowance has been established as the value of this item. This allowance may be used, as authorized and directed by the Engineer, to pay the costs of additional work, where the cost amounts are determined as specified in General Condition Article GC-41.2.4 for Force Account Work. Such additional work is not to be related to repairing/repaving roadways damaged by normal wear caused by heavy construction traffic. No separate payment will be made for continuously and consistently maintaining, to their pre-construction condition, all roads and other paved surfaces used by the Contractor throughout the construction period. The cost of such work will be considered incidental to Item No. 1 of the Bid and are not part of this allowance bid item, for pavement shown on the Drawings or specified, nor for repairs of damage not related to normal wear caused by heavy construction traffic.

G. Item No. 4c - Unforeseen Utility Conflicts: An allowance has been established as the value of this item. This allowance may be used, as authorized and directed by the Engineer, to pay the costs of additional work, where the cost amounts are determined as specified in General Condition Article GC-41.2.4 for Force Account Work. This work may be required in the event utilities not shown in the Drawings are encountered and impact the Contract related work.

H. Item No. 4d - Owner Directed Specialty Services: An allowance has been established as the value of this item. This allowance may be used, as authorized and directed by the Engineer, to pay the costs of consultants providing specialty services to the City in support of the project including but not limited to community relations. The City selected firms, providing services to the City, shall invoice the Contractor for services rendered. The payment to the Contractor shall be based on these invoices.

I. Item No. 4e - Additional Work Elements: An allowance has been established as the value of this item. This allowance may be used, as authorized and directed by the Engineer, to pay the costs of additional work, where the cost amounts are determined as specified in General Condition Article GC-41.2.4 for Force Account Work. This work, not shown or specified in the Drawings and Specifications bid by the Contractor and not covered by another item in the Bid Schedule, may be required in the event the Engineer establishes the need for additional work deemed to be necessary for the successful completion of this Contract.

J. Item 4f – Additional Site Landscaping: An allowance has been established as the value of this item. This allowance shall be used to pay the costs, where the amounts are determined as specified in General Condition Article GC-41.2.4 for Force Account Work for additional landscaping of the various sites of this contract as directed by the Engineer. The costs of final grading, site restoration consisting of grassing, shrub, and tree plantings, and maintenance thereof, shown in the Drawings and/or required by the specifications are not covered in this allowance item, and are to be included in Item No. 1 of the Bid.

K. Item No. 4g - Generators: An allowance has been established as the value of this item. This allowance shall be used to pay the costs, where the amounts are determined as specified in General Condition Article GC-41.2.4 for Force Account Work as directed by the engineer for backup generators. This allowance may be used, as authorized and directed by the Engineer, to pay the costs of design, procurement, furnishing, and installing a complete. This system shall

include any necessary modifications to the existing design to accommodate the backup generator system.

L. Item No. 4h - Additional Testing: An allowance has been established as the value of this item. This allowance may be used, as authorized and directed by the Engineer, to pay the costs of additional testing, as determined by the Owner. This allowance does not include testing required under these Agreement Documents.

M. Item No. 4i –Downstream Remote Monitoring (LE-120A and LE-120B): An allowance has been established as the value of this item. This allowance may be used to pay the costs, where the amounts are determined as specified in General Condition Article GC-41.2.4 for Force Account Work as directed by the engineer for downstream remote monitoring. This allowance may be used, as authorized and directed by the Engineer, to pay the costs of all work at remote monitoring location including electrical, instrumentation, civil and other work items associated with the downstream remote monitoring location. Location of Work is generally shown on drawing CS-105.

N. Item No 4j – Trailer Relocation: An allowance has been established as the value of this item. This allowance may be used to pay the costs, where the amounts are determined as specified in General Condition Article GC-41.2.4 for Force Account Work as directed by the engineer for relocating and setting up existing trailers at the site designated by the City, including all equipment, materials and labor to disassemble, secure, install and make trailers usable. Work shown on drawings CS-901, CG-901, CE-901, and CF-901 will be paid under this allowance.

O. The following allowances will be considered "pass through" allowances. As such, these allowances will not be subject to markup for overhead and profit:

1. Partnering.
2. Owner Directed Specialty Services.

END OF SECTION 01200

SECTION 01320
CONSTRUCTION VIDEOS AND PHOTOGRAPHS

PART 1 - GENERAL

1.01 SCOPE

A. The Contractor shall furnish all equipment, labor, and materials required to provide the Owner with digital construction videos and photographs of the Project.

B. Photo and video files shall become the property of the Owner and none of the videos or photographs shall be published without express permission of the Owner.

1.02 PRE- AND POST-CONSTRUCTION VIDEOS AND PHOTOGRAPHS

A. Prior to the beginning of any work, the Contractor shall take videos and photographs of the work area to record existing conditions.

B. Following completion of the work, another set of videos and photographs shall be made showing the same areas and features as in the pre-construction videos and photographs.

C. All conditions which might later be subject to disagreement shall be shown in sufficient detail to provide a basis for decisions.

1.03 PROGRESS VIDEOS AND PHOTOGRAPHS

A. Progress videos and photographs shall include the date and time marking of the recording.

B. A minimum of twenty-five (25) videos/photographs shall be submitted with each request for payment. The view selections will be as approved by the Engineer.

1.04 FILE FORMAT, MEDIA AND SUBMITTALS

A. Photographs shall be in "jpg" format.

B. Videos shall be in a format viewable by Microsoft Windows Media Player or Apple QuickTime Player. Audio narration is desirable.

C. Files shall be named such that what is being viewed is self evident.

D. Files shall be submitted on a compact disk (CD) or a digital video disk (DVD). If submitted on DVD, disk shall be recorded in "Minus R" format.

E. The pre-construction videos and photographs shall be submitted to the Engineer within twenty-five (25) calendar days after the date of receipt by the Contractor of Notice to Proceed. Post-construction videos and photographs shall be provided prior to final acceptance of the Project.

F. Construction photographs shall be submitted with each payment request. Failure to include photographs may be cause for rejection of the payment request.

END OF SECTION 01320

SECTION 01350
PROJECT DOCUMENT TRACKING AND CONTROL SYSTEM

PART 1 - GENERAL

1.01 SCOPE

A. The Contractor shall utilize the Owner's Project Document Tracking and Control System (DTCS). The primary function of the system is to facilitate timely processing and approval of all contract documents in coordination with the overall Project Schedule established by these Specifications and the Contractor. This system will utilize Skire Unifier for document tracking and control and Lynx Photo Management software. The Skire Unifier software will:

1. Facilitate communication among the Owner, Engineer and Contractor.
2. Facilitate turn-around time with regard to responses and approvals.
3. Provide a central location for all Project information to facilitate all Project participants in performing their tasks based on the latest Project data.
4. Provide a standard system of project administration with accountability.

B. The Contractor shall be required to utilize the web-based DTCS system that resides on the Department of Watershed Management server to generate documents in the proper format for submission to the Owner. The Contractor shall access the system through the internet using a compatible web browser from the Contractor's administrative field office location, and/or other locations where work associated with the Project is being performed.

C. The Contractor shall be required to generate Project documents and records utilizing the aforementioned system. The Contractor shall be required to transmit and submit the Project documents within the system to the Owner.

D. The Contractor shall utilize a high capacity scanner capable of scanning 11 x 17 documents, double sided, on site for the entire duration of the Project. All documents must be scanned in and attached to the appropriate Skire Unifier document, including submittals, shop drawings, O&Ms, Record Agreement Documents (As-built Drawings and Specifications), and all other documents requested by the Engineer.

E. The Contractor shall utilize the DTCS to create and maintain Project documents, including, but not limited to the following:

1. Company Directory: Addresses, Phone Numbers, Personnel Contacts, etc.
2. Drawings Log: Current Drawing revision log.
3. Submittals (Integrated with Project Schedule through Activity codes).
4. Transmittals.
5. Requests for Information and Answers (RFIs).
6. Change Documents, Including:
   a. Requests for Proposal (RFPs).
   b. Work Authorizations (WAs).
   c. Change Order Requests (CORs).

d. Change Orders (CO).
e. Design Clarifications (DC).

7. Daily Reports (Daily Diaries).
8. Field Decisions and Clarification Memos.
9. Notice of Non-Compliance.
10. Construction Issue Memos.
11. Punchlists.
12. Meeting Minutes and Agendas.
13. Correspondence.
14. Work Plans.
15. Start-up Plans.
16. Equipment Operation and Maintenance Training.
17. Spare Parts.
18. Record Agreement Documents (As-built Drawings and Specifications).

F. The Contractor shall utilize the complete capabilities of the DTCS to meet the requirements of this Section. The Contractor shall provide a highly trained and experienced construction project controls person knowledgeable in construction work sequencing, productivity, scheduling, and application of the Skire Unifier software system. This person, along with the Contractor's management team, shall work closely with the Owner to deliver the documents outlined in this Section.

G. Software Support

1. The Contractor shall provide for a one day training class for the Lynx PM software for ten personnel, seven for Owner and three for the Contractor. The type of class shall be determined by the Owner. The Contractor may contact Lynx PM Representative at 1-877-955-7711.
2. The Contractor shall provide twenty (20) Lynx Licenses (ten (10) User Master Enterprise License and ten (10) User Enterprise Remote License).
3. The Contractor shall purchase ten (10) additional licenses of the Skire Unifier software on behalf of the Owner for use during the project. At project closeout, the licenses will remain with the Owner.
4. The Contractor shall be required to establish an internet connection using a Digital Subscriber Line (DSL) or better to connect to the DTCS to permit the forwarding and receipt of documents.
   a. The Skire Unifier software supports the following Email programs, and the Contractor shall utilize:
      i) Microsoft Outlook 2003.
      ii) Microsoft Outlook 2007.
   b. The Contractor shall also provide two (2) days of consulting services in the base bid for troubleshooting and maintenance of the DTCS at any location designated by the Owner or at the Contractor's administrative field office (if authorized by the Owner).

Troubleshooting, maintenance, upgrade, configuration, and set up shall be performed by Skire Unifier or their authorized consulting service representative based on a scope pre-defined by the Owner. The Contractor shall utilize the custom data fields, dictionaries, and coding systems as required by the Owner.

H. The Contractor shall be required to attend a 2-day training session on the operation of the Owner's DTCS, provided by a Skire Unifier Authorized Trainer. The Contractor shall provide the training session for ten (10) participants (fee for the Skire Unifier Owner Authorized Trainer). The training session shall be held at the Owner authorized consulting service facility or Owner facility and shall be attended by the Contractor (limited to three (3) participants) as well as representatives of the Owner (seven (7) participants). The Contractor shall be responsible for the cost of training for additional members of their firm or future retraining, as may be deemed necessary by the Contractor.

I. The Contractor shall meet with the Owner within fifteen (15) days after the Contract is awarded to discuss access requirements and the Contractor's plan to utilize DTCS and execute the document control functions herein.

J. Access through the internet to the DTCS shall be operational within thirty (30) days following the pre-construction meeting date. This must be operational from the Contractor's administrative field office location.

1.02 COMPANY DIRECTORY

A. The Contractor and the Owner will monitor and manage the Company Directory. The directory must include Company name, Company abbreviation, contact names, address, phone numbers, and e-mail addresses.

1.03 DRAWING LOG

A. The Owner will maintain a log of initial "issued for construction" drawings in the DTCS. Information shall include drawing number, title, and revision number. In addition to logging the initial project drawing list, the Owner will maintain a log on the DTCS of all subsequent revisions to these drawings and any sketches resulting from clarification memos, RFIs, field orders and Change Orders. It is the Contractor's responsibility to utilize the latest drawings and sketches in the performance of the Work.

1.04 SUBMITTALS/SHOP DRAWINGS

A. Requirements: This section specifies supplemental requirements to GC-28, related to the processing of submittals and shop drawings. The Contractor shall utilize the DTCS to log and track submittals, as well as generate associated transmittal letters.

B. Submittals and Product Data: A list of all required submittals will be entered into the DTCS by the Contractor. Submittals shall be incorporated into packages, with the submittal numbering format to be provided by the Owner's Engineer. The Contractor shall log and track all submittals utilizing the DTCS. Each review cycle shall be entered into the DTCS. The Contractor shall identify as activities in the CPM schedule, specified in SC-16, to include all data submittals, as well as those involving complex reviews and long lead deliveries, and all procurement items required for construction activities. Submittal schedule information shall be updated monthly with the Contractor's updated project CPM schedule, as specified in SC-16.

C. Samples: A list of all required sample submittals shall be entered into the DTCS by the Contractor. Sample submittals shall be identified as individual submittals within the submittal packages with numbering as specified above.

D. Guarantees/Warranties: A list of all required Guarantee/Warranty submittals shall be entered into the DTCS by the Contractor. These submittals shall be identified as individual submittals within the submittal packages with numbering as specified above.

E. Work Plans, Start-up Plans, O&M Submittals, and Spare Parts: All testing, Start-up, and O&M submittals shall be entered into the DTCS by the Contractor. These submittals shall be identified as individual submittals within the submittal packages identified with numbering as specified above.

F. Submittal Procedures: The Contractor shall prepare all submittal packages utilizing the submittal numbering system, description, and packaging conventions described above. Submittals prepared by the Contractor, which fail to follow the conventions described above, will be returned to the Contractor to "amend and resubmit". Should the Contractor determine that a submittal is required but is not covered by the listing within the DTCS, the Contractor shall consult with the Engineer to determine whether the submittal is required, and if so, obtain submittal number, description, and packaging required.

1.05 CORRESPONDENCE

A. The Owner will monitor and manage the correspondence, Non-Compliance Notices, Field Decisions & Clarification Memos, and Construction Issue Memo logs. The Contractor shall generate Project correspondence within the DTCS, and forward the correspondence to the Owner.

1.06 TRANSMITTAL LOG

A. The Contractor and the Owner shall monitor and manage the transmittal log. All Project transmittals shall be created electronically, automatically sequentially numbered and logged into the DTCS system as they are created. The Contractor shall utilize the DTCS system to create transmittals for items transmitted to the Owner, Engineer, Resident Inspection Staff, and other contractors.

1.07 REQUEST FOR INFORMATION AND ANSWERS

A. The Contractor shall be responsible for generating RFIs on the DTCS system. The Contractor shall notify the Owner when an RFI is submitted. The Owner will monitor and manage the RFI log. The Engineer will generate an Answer document in response to each RFI and forward them to the Contractor. The DTCS will track "Ball in Court" for all RFIs and Answers, as well as date of original generation and response date. In addition the RFIs will reference the relative Specification Section and Drawings. The DTCS will identify the date of the request and the originator, responsible party for a response, and the date of the response.

1.08 CHANGE DOCUMENTS

A. Change documents include Request for Proposals (RFPs), Work Authorization Requests (WARs), Work Authorizations (WAs), Change Orders Requests (CORs), Design Clarifications (DC), and Change Orders (COs). All change documents will be monitored and managed by the Owner utilizing the DTCS. The DTCS will track "Ball in Court" status of all change documents.

1.09 DAILY REPORTS

A. The Contractor shall create daily reports (daily diaries) utilizing the DTCS. The Contractor shall enter the Daily Reports into the DTCS by 10:00 a.m. of the subsequent day that the Contractor or any subcontractor performs work. All daily reports shall be logged into the DTCS by the Contractor. The Contractor shall also provide one signed hard copy of all daily reports to the Owner on a weekly basis. Required information shall include Contractor, Date, Day, Temperature, Precipitation, Sky, Wind, Work Activity, Equipment, Field Force, Visitors, Materials, and Scheduled Activities utilizing the Primavera schedule activity codes. Daily reports which fail to link work activities to the active Primavera schedule will not be acceptable.

1.10 PUNCHLISTS

A. The Owner will monitor and manage punch lists, and will create Punchlists to be forwarded to the Contractor. The Contractor shall address the Punchlist items that have been assigned to the Contractor and forward updates to the Owner. Once accepted as complete, the Owner will access the punchlist in the DTCS and close it out.

1.11 MEETING MINUTES AND AGENDA

A. The Owner shall monitor and manage the meeting minute process. The Owner will forward meeting minutes to the Contractor electronically. The Owner will log the meeting minute items into the DTCS within three (3) days of the meeting date.

1.12 PROGRESS PAYMENTS / REQUISITIONS FOR PAYMENT

A. The Contractor shall for prepare progress payment applications directly from the Primavera scheduling software and then forward them to the Owner electronically along with hard copies by 4:00 p.m. at the end of each update/billing period. The Contractor shall also simultaneously provide a separate submittal of the updated Primavera progress schedule (P6 or latest version at the time of purchase), as specified in SC-16. All Progress Payments and schedule of values shall be developed as defined in the Special Conditions Required information within the Pay Application shall be coordinated with the Owner's Project Manager. Maintenance of the "As Built" record documents by the Contractor shall be verified before processing will be approved. Failure of a Contractor to maintain project record documents, maintain current and properly prepared daily reports or to submit the project schedule update per SC-16 will be just cause for withholding of the monthly or final payment.

1.13 LYNX PHOTO MANAGEMENT SOFTWARE

A. The Lynx PM software shall be utilized by the Owner and the Contractor for the duration of the project. The daily construction photographs will be the permanent visual record of the pre-construction conditions, daily construction site activities, and the completion of construction work. The Contractor must submit to the Owner no less than four (4) record photos for each activity ID listed in the project schedule per the last schedule update. Applicable photos must accompany each Pay Application.

1.14 RECORD AGREEMENT DOCUMENTS (AS-BUILT DRAWINGS & SPECIFICATIONS)

A. General - This section specifies supplemental requirements to GC-28.4

1. Record Agreement Documents (As-Built documents) are the amended "Conformed Drawings and Specifications" revised to show the Project as constructed by the Contractor. The revisions from Working Red-line Record Drawings shall ultimately be transferred to the final as-built set of drawings in AutoCAD format by the Contractor.
2. The Engineer will provide the Contractor with two (2) complete sets of printed Contract documents (Drawings and Specifications) specifically for the Contractors use for maintaining Working (Red-line) Record Documents. The Engineer will also provide the Contractor with one CD containing a complete set of the electronic Contract drawing files in AutoCAD format, for the Contractors use in providing finalized record drawings in AutoCAD format.
3. The Contactor shall submit to the Engineer on a monthly basis As-Built Drawings indicating work in place and changes to Contract Drawings for the previous month. The Monthly As-Built Drawings will be part of the documentation required for review and approval of Monthly Progress Payments.
4. At the point of substantial completion of the Project and before any release of retainage is granted, the Contractor shall furnish the Engineer with the following documents for review and approval: One (1) complete set of Working (Red-line) Record Drawings.
5. At the point of final completion of the Project, and before final payment is made, the Contractor shall furnish the Engineer with the following documents for review and approval: One (1) complete printed full size set, and one (1) complete printed half size set, of finalized Record Drawings and Specifications; and one (1) complete set of finalized electronic Record Drawing files in the latest AutoCAD format and one (1) complete set in PDF format, reflecting all Working (Red-line) changes herein described.

B. Reference Coordinate System:

1. The Contractor shall use the same reference coordinate system provided on the Conformed Drawings when modifying the Drawings as required under GC-28.4.
   a. The horizontal position of all points shall be referenced to the North American Datum of 1983 (1986 adjustment) in the Georgia State Plane West 1002 Coordinate System.
   b. The vertical position of all points shall be referenced to the North American Vertical Datum of 1988.
   c. All coordinate values shall be delivered as grid coordinates in US Survey Feet.
   d. GPS data shall be collected using eGPS Solutions or equivalent internet-based real time GPS network. The network shall provide continuous error correction and accuracy. The Contractor shall use high accuracy GPS equipment that is manufactured for and capable of producing survey-grade coordinates that are suitable for use in engineering design and hydraulic analyses.
   e. The minimum data accuracy required for all as-builts is +/- 0.10 USFT (one tenth of a foot).
   f. Any transformation or adjustment necessary to re-project surveyed coordinates to the Reference Coordinate System will be the responsibility of the Contractor, at no additional cost to the Owner.

g. The locations of all piping and structures shall be verified using GPS technology and designated on the Working Record Drawings using State Plane Coordinates.

C. Working (Red-line) Mark-up Document Requirements:

1. The Contractor shall keep and maintain the following Record Documents at the site of the work in good order to track changes, additions, or deletions from the original design during construction: (1)two (2) sets of Drawings and Specifications; and (2)one (1) set of all other Agreement Documents, reference documents, and all technical submittals. The Working Record Documents shall be up-dated and kept current on a continual basis by the Contractor. The redline Working Record Documents will be reviewed monthly by the Engineer prior to approval of the Contractor's Application for Payment. Failure to maintain the red-line Working Record Documents in a satisfactory manner shall be cause for rejecting the monthly Application for Payment.

2. For all projects, the two (2) sets of Working (Red-line) Record Documents shall include all changes to the Conformed Plans and Specifications including but not limited to the following:
   a. Where Contract Drawings and/or Specifications present options, only the option selected for construction shall be shown on the Final As-Built Documents. The Contractor shall cross out such words and phrases as "optimal requirement," "or equal," etc., and list specifically the items of materials provided.
   b. Obstructions not shown on the Drawings that are encountered on the site of the work during construction.
   c. Changes in details of design or additional information obtained from shop drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
   d. Differing topography, invert elevations and grades of drainage installed or affected as part of the project construction.
   e. Approved systems modifications installed by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.
   f. Changes or modifications that result from the final inspection.
   g. Changes issued as Work Authorizations (WAs), Change Orders, Design Clarifications (DCs), responses to Requests for Information (RFIs), Field Variance Directives, or Jobsite Memos.
   h. Any additional details needed for the construction of the Project but not shown on the Conformed Design Drawings.
   i. RFIs, DCs, and Field Variance Directives shall be posted in such a manner so as to clearly identify the following information about each:
      i) The RFI/DC/Field Variance Directive number.
      ii) The Date of the RFI/DC/Field Variance Directive.
      iii) The full question and answer.
      iv) Any sketches that accompany the RFI/DC/Field Variance Directive that reflect changes (additions or deletions) to the drawings.
   j. Any substructures, not shown on the Drawings, encountered while excavating, or substructures that are left in place shall be located by survey to the satisfaction of the Engineer.

k. All substructures including, but not limited to, concrete structures, electrical conduits and duct banks, drains and sanitary sewer pipelines, process piping, water lines, etc, whose installed location differs from that shown on the Conformed Drawings shall be precisely located by survey to the satisfaction of the Engineer and recorded on the Working Red-line Drawings before backfilling.

l. The actual locations, kinds and sizes of all of existing utilities uncovered or located by the Contractor, where locations on the Drawings are not correct, and any utility lines that are added or modified, within the construction area. Measurements shall be shown for all change or direction points and all surface or underground components such as valves, manholes, drop inlets, clean outs, meters, etc. The descriptions of exterior utilities shall include the actual quantity, size, and material of the utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the Working Red-line Drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes, and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.

m. The location and dimensions of any changes within the building structure.

n. Layout and schematic drawings of phone lines, gas lines, water lines, sewer lines, electrical lines, piping, ductbanks, and associated handhole and manholes, and pullboxes, junction boxes, and terminal boxes uncovered or located by the Contractor, where locations on the Drawings are not correct and any that are added or modified within the construction area.

o. Correct dimensions and details transferred from shop drawings.

p. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from Drawings.

q. Actual locations of anchors, construction or control joints, etc., in concrete.

r. Changes in location of equipment and architectural features.

s. All tables and schedules included in the drawings, for any discipline, shall be updated to reflect the as-installed condition.

3. Working (Red-line) Record Drawing Requirements for sewer line projects and work scopes (storm and sanitary). The Contractor shall provide detailed mark-ups of the Conformed Contract Drawings, or additional detailed drawings, as required to reflect the following information:

a. Provide the as-installed sewer plan and profiles.

b. Show the as-installed sanitary profiles with material, size, length, slope, inverts, manhole numbers/designation, station, manhole diameters, and rim elevation. Call out sections that are micro-tunnel, tunneling, and/ or jack and bore. The contractor shall include an Excel sheet listing the manhole with number, size, coordinates, and clean-out locations with coordinates.

c. Label laterals based on street address and include station. Lateral information shall include but not be limited to: Station, wyes, bends, street address, and length of pipe.

d. Show stationing in plan and profile view.

e. Show distance between new sanitary sewer and existing combined sewer or trunk sewer when running parallel to one another when the existing sewer location has been

verified.

f. Provide coordinates for manhole in plan view.

g. Show new storm line information (inverts, material size, and top) in plan view.

h. Label drainage structure installed in plan view; e.g. type of structure installed (Type B etc.)

i. Any change in alignment of the proposed sewer pipe, or when proposed manholes are moved to a new location, or any other change occurs in the field, the working (Red-line) Record Drawing must reflect these changes accurately. The old alignment or obsolete information shall be marked out.

j. Any change to the proposed slope of the sewer pipe must be reflected accurately in the profile: i.e., the invert elevation, stations, slope percent, pipe length should be revised as needed.

k. Show clean out locations in plan views to include station and coordinates.

l. Call-out inverts or top elevations and provide GPS coordinates at all utility crossings in profile view for mains only including size and material type.

m. Identify all sewers/manholes abandoned in place.

n. Call-out hand--tunnel and jack and bore shafts in plan view (either by note or actual location) that was left in place and greater than 5 ft. in depth.

o. Provide a general note stating who the pipe manufacturer is, the class of pipe, material type, joint type, and lining.

D. Working Drawing (Red-Line) Mark-up Guidelines / Requirements:

1. Marked-up changes on the prints shall be complete and understandable.

2. The Contractor shall use three base colors in marking up the hard copy of the working as-built drawings as follows.
   a. Deletions (Red) - Deleted graphic items (lines) shall be colored red with red lettering in notes and leaders.
   b. Additions/As-built Notations (Blue) - Added items and As-built information shall be drawn in blue with blue lettering in notes and leaders.
   c. Special (Green) - Items requiring special information, coordination, or special detailing or detailing notes shall be in green.

3. The Contractor shall use written explanations on Record Red-Line drawings to describe changes (do not rely totally on graphic means to convey the revision).

4. Legibility of lettering and digit values shall be precise and clear when marking documents, and clarify ambiguities concerning the nature and application of change involved.

5. Wherever a revision is made, the Contractor shall make changes to affect related section views, details, legend, profiles, plans and elevation views, schedules, notes and call-out designations, and mark accordingly to avoid conflicting data on all other sheets.

6. When changes are made, the Contractor shall cross out all features, data, and captions that relate to that revision that are being deleted or changed.

7. When changes are required on small-scale drawings and in restricted areas, large-scale inserts shall be drawn or sketched, with leaders to the location where applicable.

8. The Contractor shall be sure to add and denote in legend, any additional equipment or material facilities, service lines, etc., incorporated under as-built revision if not already shown in legend.

9. When attached prints (or sketches) are provided with marked-up print, the Contractor shall indicate whether:
   a. Entire drawing shall be added to the Original Conformed Design Drawings or
   b. Whether the Original Conformed Design drawings shall be changed to agree, or
   c. For reference only to further details not required for initial design.

10. The Contractor shall make the comments on the drawing complete without reference to letters, memos, or materials that are not also a part of the Red-line Working drawing. For example, annotating the drawing, "Per Work Authorization #42," is not acceptable when the actual Work Authorization states, "Added an additional 12 ea. duplex outlets" or similar statements.

11. The Working Drawing Red-Line shall be on black line prints of the most current sheet.

12. Shop drawings shall be incorporated into the Working Drawing Red-Line. The Contractor shall ensure its suppliers provide Shop Drawing submittals in electronic CADD file format that conform to the United States National CAD standard, latest version. Hand drawn or plotted paper shop drawings will not be accepted as part of a vendor submittal or for the Working Drawing Red-Line or the final record document drawings unless accompanied by the electronic AutoCAD file in the proper format.

13. Any drawing provided by non-COA sources will be drawn in AutoCAD. Sheets shall be drawn at the same scale as similar drawings in the set (example: Fire alarm systems shall be drawn to the same scale as the plumbing or electrical drawings). The drawing shall meet the same standards required for the rest of the "As-Designed" drawing set. Sheet number, detail number, etc shall tie details and sketches to existing drawings. The vendor shall be provided with the Contract CAD drawings as a base for the shop drawing

14. The sheet index shall be updated if any sheets are added or the sheet name has been modified.

E. Final AutoCAD Record Drawing Requirements:

1. The Contractor shall hire an experienced engineering firm, approved by the Engineer, to incorporate all the Redline Changes to the AutoCAD Record Drawings.

2. The Working (Red-Line) drawing changes made throughout the course of the project shall be incorporated electronically into the AutoCAD set. The changes recorded electronically into AutoCAD shall be done in a neat and workmanlike manner, similar to the AutoCAD drawings as originally provided to the Contractor by the Engineer. The Final AutoCAD Record Drawings shall conform to the standards of the original Design drawings provided.

F. Final Record Drawing AutoCAD Drafting Standards:

1. Standard professional engineering drafting practices shall be utilized in correcting the original electronic AutoCAD drawings to show as-built conditions. In general, the letter styles, line thickness, and scale shall be the same as the original drawings. Any additional sheets added shall conform to the standards of the original Design drawings provided, and the United States National CAD standard, latest version.

2. CADD Standards: File Naming Convention will be maintained on all existing CADD files and followed for any new files added. The Contractor shall revise CADD files as-built drawing layers, to show the as-built conditions during the prosecution of the project. All as-built "triangle" changes shall be on a separate single layer, using a single color, with an associated medium pen width for example:

   Level Number: 63
   Level Name: ANNO-REVS
   Level Description: Revisions

3. The following specific requirements apply to the preparation of the Record (As-built) Drawings:
   a. As-Built Stamp: When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the Contractor and project completion date in letters at least 3/16 inch high. All other contract drawings shall be marked in the bottom right-hand corner of each drawing either "RECORD DRAWING" denoting no revisions on the sheet, or "REVISED RECORD DRAWING" denoting one or more revisions. Original contract drawings shall be dated in the revision block.
   b. Revisions Block Entries: Those sheets, which have no changes, will only be labeled RECORD DRAWING as described above. Those sheets which have changes shown on them will have REVISED RECORD DRAWING entered in the first available space. This will be revision one and a number 1 will be entered in the triangle at the beginning of that line. In the event the sheet has already been revised and a number and revision appear in the revision lines, the next sequential number will be used. Normally the first entry is made in the first line. The completed Record Drawing original CADD file drawings shall be reviewed for accuracy and initialed by the Contractor prior to submission to the Engineer.
   c. Revision Annotations:
      i) Deletion - to show an item was not installed, remove the item from the drawing along with any associated devices, connecting lines, ducts, pipes etc., including notes and dimensions. To show a detail is not being used, remove the detail
      ii) Notes - remove any notes that are no longer applicable. Modify as needed remaining notes to reflect actual conditions.
      iii) Additions - show a new or additional item or items and associated connections made if the print indicates such connections.
      iv) Relocations - draw the item in the new location and erase it from the old location. All connections will be transferred if applicable, such as wiring, piping, and ducts.
   d. Sentence Tense: Changes to Record drawings shall not include text changes that are tense changes, for example, "EXISTING GROUND LINE" to "ORIGINAL GROUND LINE"; "SHALL BE REMOVED" to "REMOVED."
   e. Drawing continuity: The applicable drawings shall be marked-up when a change is made. Final responsibility for drawing continuity is with the person doing the Record Drawing. When one floor plan indicates a wall, room, doors, etc., has been changed, the same change shall be made on all other applicable drawings. When the change is applicable to only one discipline such as electrical and does not directly affect other discipline sheets, a note may be added to other discipline sheets such as "See sheet _____ for As-built Record Conditions."

f. Shop drawings: The shop drawing information shall be incorporated into the original contract drawings. When shop drawings are added to the original contract drawing set they need to be appropriately labeled with the established file numbering convention, discipline, and sequence sheet number. The Index of Drawings shall be revised to show the additional sheet(s) with the appropriate sheet title. In the case where the shop drawing is smaller than the standard sheet size (i.e. 8.5"x11" or 11"x17" or 24"x36" etc.) the sheets will be cut into a standard sheet size border sheet and appropriately labeled. (For additional information refer to Working Drawing Mark-up Guidelines, Shop drawings above.)

END OF SECTION 01350

SECTION 01351
COMMUNICATIONS & PUBLIC RELATIONS

PART 1 - GENERAL

1.01 SCOPE

A. The Contractor shall provide all personnel, services and materials as specified under this Section necessary to meet the requirements and responsibilities related to the Office of Communications & Public Relations and the Customer Services Manager, as specified hereinafter, during performance of Work under the Agreement by the Contractor.

1.02 STAFFING

A. The Contractor shall employ a full time Customer Services Manager (CSM) meeting the required minimum qualifications and experience below. The sole and specific duties and job of the CSM shall be to perform Customer Service related functions and to continuously coordinate and provide information and services as required to the City's Construction Manager, Office of Communications staff and others as necessary.

B. CSM must have been employed on at least two (2) satisfactorily completed sanitary sewer projects.

C. CSM must have had the responsibilities of receiving, logging, tracking, responding and resolving customer/citizen complaints and claims, providing notices to and personal interaction with affected customers/citizens regarding project impact and projected work schedules of the Contractor, reviewing project schedules and "look-ahead" to determine projected areas of impact from the Work.

D. CSM must have a minimum of two (2) years of experience in performing this type of work on similar projects.

E. CSM shall attend a mandatory public outreach training session presented by the City of Atlanta Office of Communications & Public Relations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PUBLIC OUTREACH KICK-OFF MEETING

A. Prior to commencement of Work under the Agreement and following the preconstruction meeting, the Contractor, the CSM and the Engineer will be required to attend a public information meeting hosted by the Office of Communications & Public Relations. At this meeting the Contractor's responsibilities will be discussed, the relationship with the Office of Communications & Public Relations, the Engineer and/or designated representative of the City regarding the functions and responsibilities of the CSM employed by the Contractor as required under Section 1.02 A, above. The Contractor's CSM and backup individual shall be identified to Office of Communications administrative assistant and the Public Information Manager (PIM) with 24/7 contact telephone numbers provided.

3.02 RESPONSIBILITIES OF THE CSM

A. The duties of the Contractor's CSM are defined below and may be expanded by the City's Construction Manager as needed. Responsibilities of the Contractor's CSM shall include, but not be limited to, the following elements.

B. Receiving, logging, tracking and resolving customer/citizen complaints and claims; either received directly, by the City or its authorized representative and providing periodic updates and reports as specified.

C. Providing notice to affected stakeholders in the event there are scheduled service outages or other work elements required for the performance of Work under the Agreement that are scheduled which will have an impact on the neighborhood or property owners.

D. Attendance and participation in scheduled project progress meetings for discussion, updates and resolution to customer/citizen complaints, claims, review of schedules and other matters as required.

E. Attendance and participation in periodic public meetings. Work with the PIM to prepare necessary documents for distribution in advance of these meetings.

F. In the event work is required on private property where an easement has been acquired, the CSM shall notify the property owner at least fourteen (14) days in advance of commencement of the work in writing, a copy of which must be provided to the Office of Communications.

G. Prior to commencement of work in any neighborhood, the CSM shall provide notice to the PIM and at the PIM's direction and with their coordination, notice the customers/citizens thirty (30) days in advance. In addition, twenty-four (24) hours prior to actual commencement of the work, the CSM shall notify the customers/citizens via door or mailbox hanger as hereinafter provided for in this Section. All such notices shall be coordinated with the City's Construction Manager and PIM.

H. The CSM will be responsible for managing those notifications within the context of the Project Schedule and the approved project procedures. The CSM will assist the City of Atlanta site staff with the resolution of any public outreach-related items that might delay or disrupt the project work.

I. The CSM shall be on twenty-four (24) hour call, seven (7) days a week and be equipped with a mobile phone. In the event of the CSM being away from work, the contractor shall designate a second individual to handle the responsibilities and functions who shall be fully familiar and aware of the duties and prosecution of the work

J. The Contractor/CSM must report and log in all complaints to Office of Communication's administrative assistant and the City's PIM within six (6) hours of receipt. Conversely, all calls received by the Office of Communications (404-546-3200) will be transmitted to the CSM within twenty-four (24) to forty-eight (48) hours of receipt and the CSM must perform follow-up within twenty-four (24) hours with resolution after receipt of the notice. Upon receipt of the information the Office of Communications will create a file to document the incident.

K. The Contractor's CSM must maintain a Project Complaint Log fully detailing all customer/citizen complaints/claims, questions and resolutions. All complaints/inquiries received in the field by the

work crew regarding the project must be documented by the CSM and entered into the Project Log, even if resolved immediately. This complaint log will be available to the City's Construction Manager and the PIM in its updated state for review or reference when needed. Log shall be submitted on a monthly basis with the progress payment request

L. Where property owners make damage claims, CSM shall coordinate the activities of the Contractor's, Subcontractor's or Vendor's insurance provider(s) during the investigation and repair process and obtain the complainant's signoff to conclude and close the file. The City shall be informed in writing upon resolution of any complaint by the Contractor or its designated representative and copied on the sign-off documents. The CSM shall track any and all insurance damage claims, payments, settlements etc., on the Project, whether they are the responsibility of General Contractor, subcontractors or disputed. This Damage Claim Log will be separate from the Complaint Log, but may be cross-referenced if the damage results in a complaint.

M. The CSM shall assist the Contractor's Traffic Control Officer in coordination of all street closures, detours and traffic pattern changes with the Contractor's field management staff, the City's Construction Manager, PIM and the Department of Public Works or the Georgia Department of Transportation (GDOT). The CSM will check the notice status with the Contractor's Traffic Control Officer each morning and confirm that notifications to the City of Atlanta's Traffic Control center are current and accurate for Police, Fire and Emergency vehicle access. The CSM will also assist in the coordination on the signal changes involved with temporary traffic plans.

N. As required, the CSM must provide notice to the affected areas in advance of the scheduled closures, detours and traffic pattern changes. This includes but is not limited to maintaining safe residential and business access, mail delivery and garbage pick-up, providing temporary and /or alternate services and relocation coordination for school bus, MARTA stops and any other temporary facilities needed to keep neighborhood safety, security and services within acceptable limits. All these items and the coordination of them will be required as part of the detailed work plans, site specific safety plans, traffic management plans, erosion and sedimentation plans and project schedules.

O. In the event there is an emergency involving the public or a situation where media inquiries and responses are possible, the City's PIM shall be notified immediately. The PIM will then coordinate with the City's Media Relations Manager for appropriate action. Under no circumstance shall the CSM, any employee, Subcontractor or Vendor of the Contractor make any comments to the media regarding the project at any time.

P. The Office of Communications is responsible for conducting media relations training and management with the on-site staff. Procedures will be developed within the site specific safety plan which sets up guidelines for managing any media response to an emergency issue and the entire site staff will be trained on them.

3.03 CUSTOMER SERVICE TRACKING SOFTWARE

A. The Office of Communications shall use "Footprints" by Unipress Software to track and enter information from customers/citizens regarding complaints, claims and inquiries. All related information shall be updated on a daily basis by the PIM. Tracking information and responses shall be coordinated with the PIM. Reports shall be provided as weekly updates on all activities and on specific cases within twenty-four (24) hours when requested.

B. Information recorded shall include but not be limited to the following:

1. Date complaint/claim/inquiry received.
2. Name, address and telephone number of individual filing complaint/claim/inquiry.
3. Nature of complaint/claim/inquiry.
4. Address where problem is located if different than above.
5. Action required, date, action taken, date action completed.
6. Follow-up with person who filed under 2 above to verify satisfaction or status.
7. Documents associated with actions taken.
8. Any information regarding resolution with the Contractor's, Subcontractor's or Vendor's Insurance Company shall be fully documented.

3.04 DOOR-HANGERS

A. The Contractor shall produce door hangers required for notice to customers/citizens and residents from the template provided by the City's PIM (SEE EXAMPLE AT END OF SECTION) as specified hereinabove in paragraph 3.02. Door hangers shall be utilized for notification in the event of, but not limited to, the following events:

1. Planned service disruption/outages
2. Road closures/detours/traffic pattern changes
3. Access/entrance to property
4. Work start-up
5. Smoke testing
6. Blasting

3.05 IMPACTED AREA ADDRESS DATABASE

A. The Office of Communications shall provide the CSM a database of addresses and phone numbers (and names if available) of all project impacted residences, businesses and facilities at least three (3) weeks prior to project start-up. The database will be used by the PIM & CSM for regular citizen communications and notifications.

B. The Contractor and Engineer shall copy the City's PIM on all correspondence and Right-of-Entry Agreements with citizens and property owners.

3.06 SCHEDULE

A. The CSM shall provide the PIM with a copy of the detailed project schedule following approval by the Engineer.

B. Bi-weekly, the CSM shall provide a list of properties:

1. That will be affected by the Contractor's activities within the upcoming 4 weeks;
2. Where work is ongoing in the right of way in front or in the back of the property;

3. Where site restoration activities are ongoing.

C. The Contractor shall inform the City's PIM through scheduled progress meetings and in writing of any project schedule changes or changes in "disruptive work" such as blasting, road closures, etc., that would have significant impact on citizens or require prior citizen notification. The CSM shall notify the PIM of any "disruptive" activities affecting the public that occur on the jobsite within 4 hours of their occurrence.

3.07 MEDIA RELATIONS AND JOB SITE INQUIRIES

A. As specified above in paragraph 3.01, only authorized persons shall release any information to media inquiries. The Contractor's field personnel shall at all times have project information cards available that will be provided to media and citizens if inquiries are made on-site. All inquiries shall be directed to the person referred to on the card and citizens shall be referred to the Office of Communications.

B. Project information cards shall be produced by the Contractor from the template provided by the PIM. A sample information card is provided at the end of this Section. Final language to be included on the Project Information Card will be provided at the preconstruction conference. (SEE EXAMPLE AT END OF SECTION)

3.08 VEHICLE SIGNS AND PROJECT SITE SIGNAGE

A. The Contractor shall place pre-approved magnetic signs on all job-site project vehicles. The signage template will be approved by the City PIM with the signs to be produced by the Contractor.

B. All project sites shall have pre-approved project signs which read in accordance with the Template provided as part of the Special Conditions Signs shall be produced by the Contractor. Some of the signs shall be mounted on moveable skids so they can be relocated as the project progresses on various streets in the basin. Sizes will vary, but all will be smaller than the 96"x 48" size project signs shown. Size shall be as directed by the Engineer. Contractor shall provide a minimum of 25 project signs. These sign are required in addition to the four City of Atlanta Project signs identified in the Special Conditions.

3.09 NOTIFICATIONS

A. The Contractor shall provide the following notifications to the PIM to facilitate their communication with affected citizens through automated phone message or mailers :

1. Anticipated work start date-must be three (3) weeks prior so PIM may send out two (2) week notice mailer.
2. Service disruptions - Notify PIM at least 72 hours in advance so that 48 hour notice automated phone message notice may be issued.
3. Street Closure or Partial Closure - Notify PIM at least 72 hours in advance to permit 48 hour automated phone message.
4. Significant work in neighborhood - Blasting, directional drilling, trenchless installation, open cut, etc.-notify the PIM at least 72 hours in advance to permit 48 hour automated phone message.

B. The Contractor shall provide the following door hanger notifications and the manpower to deliver them at a minimum:

1. Service disruptions- notice to citizens 24 hours prior to disruption.
2. Street Closure or Partial Closure- notify fire, police other emergency services and other authorities 24 hours prior to street closure.
3. Significant work in neighborhood- blasting, directional drilling, trenchless installation, open cut, etc.-notify citizens via door hangers 24 hours in advance.

C. The Contractor shall be fully responsible for notification to all emergency related services for detours, closures (partial or full) or traffic pattern changes and as such they must be detailed in their traffic control plan and implemented through the Contractor's Traffic Control Manager and per all permitting requirements.

D. The Contractor shall be fully responsible for distributing all notifications a minimum of 48 hours in advance of service outages for schools, nursing homes, hospitals, medical clinics, assisted living facilities or other types of facilities. Contractor shall also make personal contact with facility representatives no later than 60 minutes prior to the outage.

E. The Contractor shall at all times coordinate with the City of Atlanta PIM and Call Center to provide detailed schedules and street locations for service disruptions or street closures to ensure that Call Center is well equipped to provide adequate response to citizen inquiries.

3.10 RESOLUTION OF COMPLAINTS AND CLAIMS

A. Failure of the Contractor to resolve any legitimate complaint or claim filed resulting from the work performed under this contract, following notice in accordance with the General Conditions, may result in resolution of the complaint or claim by the City. The Contractor will be charged for the associated cost in accordance with the applicable General Conditions of the contract. No additional payment will be made to the Contractor for any costs associated with complaint or claim resolution, same being incidental to the various contract items which are bid. Failure to manage the issues and items adequately to minimize public complaints and impacts will be cause for increasing the retainage, withholding payment and/or Notice and Termination of the Contractor for cause if more than 10% of the noticed complaints or claims age past 30 days without decisive resolution and scheduling of recovery work.

SAMPLE DOOR HANGER

NOTICE OF SEWER SYSTEM IMPROVEMENT WORK

City of Atlanta
Department of Watershed Management

The City is pleased to announce that we are moving forward with plans to fix our sewer system to meet state and federal requirements.

We are now at the point where construction activities are about to begin on your street for the South River Capacity Relief Projects. These planned improvements will reduce the incidents of sewage backups, leaks and sanitary sewer overflows.

The particular work planned for your street is checked below.

- o OPEN-CUT CONSTRUCTION
- o TUNNELING
- o SMOKE TESTING
- o ROAD CLOSURES AND/OR DETOURS
- o OTHER _____

We will do our best to minimize any inconvenience to you. All personnel are required to wear Clean Water Atlanta identification badges. If you have any questions or concerns, please contact William Horton, the Public Information Manager for this project at 770-294-3240 or call the Clean Water Atlanta Help Line at 404-529-9211.

If you have any questions, please call the Department of Watershed Management Helpline at 404-529-9211.

SAMPLE PROJECT INFORMATION CARD – TRI FOLD

City will enter into an easement agreement with the owner. The City's real estate agents are currently negotiating access agreements with the affected property owners.

Sewer separation contractors may use different technologies to construct the new sewers; including open-cut and tunnel construction. Neighborhoods in the separation area will experience some disruption, such as partial or complete street closures, traffic rerouting, storage of materials and equipment near construction sites, brief interruptions in sewer service, dust and noise. The City will take every practical measure to reduce disruption during the sewer separation projects.

If you have any concerns about work in your area or would like additional information, you contact the Project Help Line at 404-529-9211 or visit the City's Public Information Office located at 290 M.L.K. Blvd., Suite 103. The office is open from 8:00 am to 5:00 pm, Monday through Friday.

City of Atlanta

Shirley Franklin
Mayor

City Council
Lisa Borders
President

Carla Smith
Kwanza Hall
Ivory Young
Cleta Winslow
Natalyn Archibong
Anne Fauver
Howard Shook
Clair Muller
Felicia Moore
C.T. Martin
Jim Maddox
Joyce Sheperd
Ceasar Mitchell
Mary Norwood
H. Lamar Willis

CLEAN WATER ATLANTA

Stockade Project Information Card

COMBINED SEWER OVERFLOW REMEDIATION PROGRAM

The federal Environmental Protection Agency and state Environmental Protection Division have approved the City's plan to eliminate water quality violations from combined sewer overflows (CSOs). This plan includes a combination of deep-rock storage tunnels, new treatment facilities and the separation of combined sewers in selected basins- Greensferry, McDaniel and the Stockade sub-basin portion of the Intrenchment Creek basin.

You live in the Stockade Basin. Work in this basin extends roughly as far south as Lester Avenue, as far east as Stovall Street (north of I-20) or Ormewood Terrace (South of I-20), as far north as Decatur Street and as far west as Boulevard. Sewer separation construction activities commenced on May 1, 2005 and are slated for completion by December 2007.

WHAT HOMEOWNERS MIGHT EXPERIENCE DURING SEWER SEPARATION

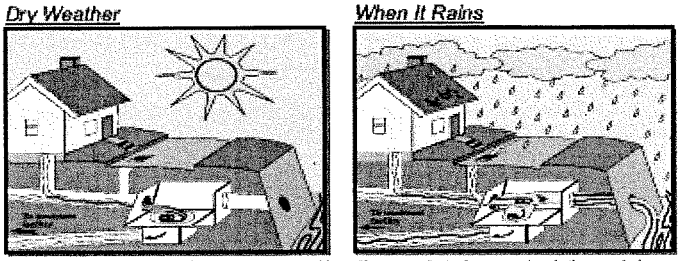
Most of the homes and businesses in the Greensferry, McDaniel and Stockade areas are connected to a combined sewer system. The combined system will be converted to a separated sewer system under the federal consent decree program. Sewer separation involves constructing new sanitary or storm sewers within a combined sewer service area. This allows wastewater and stormwater, currently collected in the same pipe, to be collected in separate pipes. The wastewater would be carried to an existing treatment plant where pollutants are removed before discharge to the South River. Separately treated stormwater would be collected and discharged to a local stream.

The Department of Watershed Management has been working with elected officials and community leaders to keep affected residents and business owners update about this project and to address specific neighborhood concerns.

Most of the existing combined sewers run beneath city streets but some were constructed in areas that are now private property. If a sewer is on private property and there is no existing easement, the

EXISTING COMBINED SEWER SYSTEM

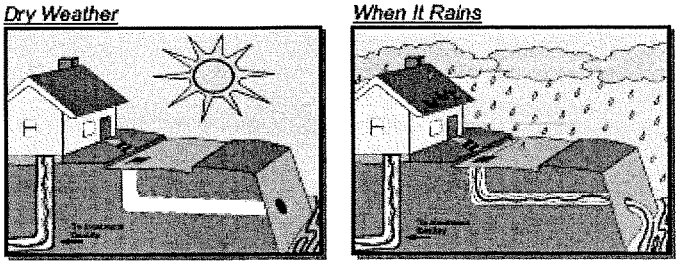
Dry Weather *When It Rains*



In a combined sewer system, domestic sewage combine with stormwater in the same pipe. In the event of heavy rains, the stormwater can cause an overflow into a receiving stream.

AFTER SEPARATION

Dry Weather *When It Rains*



In a separate sewer system, domestic sewage and stormwater flow into separate pipes. The sewage is diverted to a wastewater treatment plant and stormwater is released untreated to a receiving stream.

END OF SECTION 01351

SECTION 01400
QUALITY ASSURANCE/QUALITY CONTROL

PART 1 - GENERAL

1.01 SCOPE

A. This section includes requirements for the implementation of the Contractor's quality assurance and quality control program.

B. Related sections:

1. Section 01410 Testing Laboratory Services.
2. General Conditions.
3. Section 01600, General Equipment and Material Requirements.
4. Section 01664, Training.

1.02 REFERENCES

A. International Building Code 2006 (IBC).

1. IBC – Chapter 17 – Structural Tests and Special Instructions.

1.03 SITE INVESTIGATION AND CONTROL

A. The Contractor shall check and verify all dimensions and conditions in the field continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the Work due to the Contractor's failure to comply with this requirement.

B. The Contractor shall inspect related and appurtenant Work and report in writing to the Engineer any conditions that will prevent proper completion of the Work. Failure to report such conditions shall constitute acceptance of all Site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor solely and entirely at the Contractor's expense.

1.04 INSPECTION OF THE WORK

A. All Work performed by the Contractor shall be inspected by the Contractor and non-conforming Work and any safety hazards in the work area shall be noted and corrective action shall be taken immediately. The Contractor is responsible for performing the Work safely and in conformance with the Agreement Documents.

B. The Work shall be conducted under the general observation of the Engineer and is subject to inspection by representatives of the Owner acting on behalf of the Owner to ensure strict compliance with the requirements of the Agreement Documents. Such inspection may include mill, plant, shop, or field inspection, as required. The Engineer shall be permitted access to all parts of the Work, including plants where materials or equipment are manufactured or fabricated.

C. The presence of the Engineer, however, shall not relieve the Contractor of the responsibility for the proper execution of the Work in accordance with all requirements of the Agreement Documents. Compliance is the responsibility of the Contractor. No act or omission on the part of the Engineer, shall be construed as relieving the Contractor of this responsibility. Inspection of Work later determined to be non-conforming shall not be cause or excuse for acceptance of the non-conforming Work.

D. All materials and articles furnished by the Contractor shall be subject to rigid documented inspection, by qualified personnel, and no materials or articles shall be used in the Work until they have been inspected and accepted by the Contractor's Quality Control representative and the Engineer or other designated representative. No Work shall be backfilled, buried, cast in concrete, covered, or otherwise hidden until it has been inspected and approved by the Engineer. Any Work covered in the absence of inspection shall be subject to uncovering. Where uninspected Work cannot be easily uncovered, such as in concrete cast over reinforcing steel, all such Work shall be subject to demolition, removal, and reconstruction under proper inspection at the Contractor's expense.

E. All materials, equipment, and/or articles furnished to the Contractor by the Owner shall be subject to thorough inspection by the Contractor's Quality Control representative before being used or placed by the Contractor. The Contractor shall inform the Engineer, in writing, of the results of said inspections within one working day after completion of inspection. In the event the Contractor believes that any material or articles provided by the Owner to be of insufficient quality for use in the Work, Contractor shall immediately notify the Engineer.

1.05 TIME OF INSPECTION AND TESTS

A. Samples required under these Specifications shall be furnished and prepared for testing in ample time for the completion of the necessary tests and analyses before said articles or materials are to be used. The Contractor shall furnish and prepare all required test specimens at the Contractor's own expense.

B. When the Contractor is ready to backfill, bury, cast in concrete, or otherwise cover any Work under this Contract, the Engineer shall be notified not less than three (3) Work Days in advance to request inspection before beginning any such Work of covering. Failure of the Contractor to notify the Engineer at least three (3) Work Days in advance of any such inspections shall be reasonable cause for the Engineer to order a sufficient delay in the Contractor's schedule to allow time for such inspection. The costs of any remedial or corrective work required, and all costs of such delays, including its impact on other portions of the Work, shall be borne by the Contractor.

1.06 SAMPLING AND TESTING

A. The Contractor shall retain and pay for an independent materials testing agency approved by the Engineer and the Owner per Article 1.07. The independent testing agency will develop and submit a testing plan for quality assurance on each type of work activity. The testing agency will document the processes and procedures utilized to verify and maintain quality work. When not otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the most current standards, as applicable to the class and nature of the article or materials considered. However, the Engineer reserves the right to use any generally accepted system of inspection which, in the opinion of the Engineer, will assure the Engineer that the quality of the workmanship is in full accord with the Agreement Documents. Copies of all test results are to be submitted to the Owner in a timely manner.

B. The Owner reserves the right to abbreviate, modify the frequency of, or waive tests or quality assurance measures. Waiver of any specific testing or other quality assurance measure shall not be construed as a waiver of any technical or qualitative requirements of the Agreement Documents. Whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, the waiver shall not be construed as a waiver of any technical or qualitative requirements of the Agreement Documents. Whether or not such guarantee is accompanied by a performance bond to ensure execution of any necessary corrective or remedial work, the waiver shall not be construed as a waiver of any technical or qualitative requirements of the Agreement Documents.

C. Not withstanding the existence of such waiver, the Owner shall reserve the right to make independent investigations and tests as specified in the following paragraph. Failure of any portion of the Work to meet any of the qualitative requirements of the Agreement Documents shall be reasonable cause for the Owner to require the removal or correction and reconstruction of any such Work.

D. In addition to any other inspection or quality assurance provisions that may be specified, the Owner shall have the right to independently select, or request a second test, and analyze, at the expense of the Owner, additional test specimens of any or all of the materials to be used. Results of such tests and analyses shall be considered, along with the tests or analyses made by the Contractor, to determine compliance with the applicable specifications for the materials so tested or analyzed. Wherever any portion of the Work is discovered, as a result of such independent testing or investigation by the Engineer, which fails to meet the requirements of the Agreement Documents, all costs of such independent inspection and investigation and all costs of removal, correction, reconstruction, or repair of any such Work shall be borne by the Contractor.

1.07 CONTRACTOR'S QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

A. The Contractor shall establish and execute a Quality Assurance/Quality Control (QA/QC) program for the services that are being procured from the Contractor. The program shall provide the Contractor with adequate measures for verification and conformance to defined requirements by his personnel and lower-tier subcontractors (including fabricators, suppliers, and sub-subcontractors). This program shall be described in a QA/QC Plan responsive to this Section. It shall utilize the services of an independent testing agency/company that is industry certified to provide QA/QC and compliance with the standards specified.

B. The Contractor shall furnish the Engineer a project specific QA/QC Plan. The Plan shall contain a comprehensive account of the Contractor's QA/QC procedures as applicable to this job. The Contractor shall furnish for review by the Engineer, no later than fourteen (14) days after receipt of the Notice to Proceed, the QA/QC Plan proposed to be implemented. The QA/QC Plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. Construction will be permitted to begin only after acceptance of the QA/QC Plan. The detailed requirements for this QA/QC Plan are delineated in the following paragraphs. No payments will be made to the Contractor until the QA/QC Plan is approved by the Engineer.

C. The QA/QC Plan shall describe and define the personnel requirements described herein. The Contractor shall employ a full time on-site Field QA/QC Manager to manage, address, and resolve all QA/QC issues.

1. The QA/QC Manager shall be as identified by the Contractor and agreed to by the Owner. A resume for the potential QA/QC Manager shall be submitted to the Owner for review and approval. The QA/QC Manager shall have a minimum of ten (10) years of experience in the construction of water/wastewater treatment plant and/or conveyance system. The QA/QC Manager shall be onsite at all times while work is being performed by the contractor, to ensure that work is being performed properly and to routinely observe all Work in progress. This individual shall be responsible only for QA/QC activities and shall have no supervisor managerial responsibility other than the QA/QC. No change in the QA/QC Manager may occur without written consent of the Owner, and the prior approval of a replacement.

2. The Contractor shall provide additional personnel who are assigned to assist the QA/QC Manager fulfill the requirements of the QA/QC Plan. The Contractor shall provide a letter (to the QA/QC Manager) signed by an authorized official of the firm empowering the QA/QC Manager to address quality issues, and if necessary, to stop work which is not in compliance with the contract. The QA/QC Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Owner.

D. The Contractor's QA/QC program shall ensure and substantiate quality throughout all areas of the contract. A customized QA/QC Plan shall be developed that discusses each type of work for which the Contractor is responsible within the Project. The QA/QC Plan shall describe the program, include procedures, work instructions, records, and a description of the quality control organization.

1. The description of the quality control organization shall include a chart showing lines of authority, staffing plan, and acknowledgment that the QA/QC staff shall implement the system for all aspects of the work specified. The staffing plan shall identify the name, qualifications (in résumé format), duties, responsibilities, and authorities of each person assigned a QA/QC function including the QA/QC Manager. In addition, the Plan shall describe methods relating to areas that require special testing and procedures as noted in the specifications.

2. This plan shall require a preparatory installation training, follow-up monitoring and ongoing observation of the work.
   a. The preparatory installation training class attendance will be required by the Contractor's and/or sub-contractor's crews before the start of each new construction activity. The Owner will attend and monitor the training. This training will consist of a hands-on demonstration of the work activities by the crews. The contractor crews shall demonstrate proper construction techniques in the performance of the work. No crews may begin work prior to successfully completing the preparatory installation training. This training will be monitored by the contractor's QA/QC Manager, Safety Manager and supervisory personnel. The QA/QC Manager shall submit a certification to the Engineer after each training session that the work crew have attended and successfully completed the training.
   b. The follow-up monitoring will take place no later than 10 days after the preparatory installation training. The follow-up monitoring will require the work crews to continue to demonstrate the proper means and methods of construction as performed in the preparatory installation training class. If in the sole judgment of the Engineer that the Work is not being performed as per the QA/QC Plan and/or the Agreement Documents, the crews shall discontinue the Work and will be required to attend the preparatory training class, again. The QA/QC Manager shall submit a certification to the Engineer after each follow-up training session that the work crews have continued to perform the

Work per the QA/QC Plan and/or Agreement Documents. Any retraining will be at no cost to the Owner.

c. Ongoing inspections will take place throughout the duration of the Project. The on-going monitoring will require the work crews to demonstrate the proper means and methods of construction as performed in the preparatory class. If in the judgment of the Engineer that the Work is not being performed as per the QA/QC Plan and/or the Agreement Documents the crews shall be required to attend the preparatory training class, again. Any retraining will be at no cost to the Owner.

E. Identification and Control of Items and Materials: Procedures to ensure that items or materials that have been accepted at the site are properly used and installed shall be described in the QA/QC Plan. The procedures shall provide for proper identification and storage, and prevent the use of incorrect or defective materials.

F. Inspection and Tests: The Contractor shall have written procedures defining a program for control of inspections performed and these procedures shall be described in the QA/QC Plan.

1. Inspections and tests shall be performed and documented by qualified individuals. At a minimum, "qualified" shall mean having performed similar QA/QC functions on similar type projects for a minimum of five (5) years and possession of industry standards certification and license. Records of personnel experience, training, and qualifications shall be submitted to the Engineer for review and approval.

2. The Contractor shall maintain and provide to the Engineer, within two working days of completion of each inspection and test, adequate records of all such inspections and tests. Inspection and test results shall be documented and evaluated to ensure that requirements have been satisfied.

3. Procedures shall include:
   a. Specific instructions defining procedures for observing all Work and comparing the Work with the Contract requirements (organized by specification section).
   b. Maintaining and providing Daily QA/QC Inspection Reports. Such reports shall, at a minimum, include the following:
      i) Dated list of Item(s) inspected.
      ii) Location of the test sample(s).
      iii) Logs, detailed location drawings and confirmation reports.
      iv) Quality characteristics in compliance.
      v) Quality characteristics not in compliance.
      vi) Corrective/remedial actions taken.
      vii) Statement of certification.
      viii) QC Manager's signature.
   c. Specific instructions for recording all observations and requirements for demonstrating through the reports that the Work observed was in compliance or a deficiency was noted and action to be taken.
   d. Procedures to preclude the covering of deficient or rejected Work.
   e. Procedures for halting or rejecting Work.
   f. Procedures for resolution of differences between the QA/QC representative(s) and the production representative(s).

g. Method of documenting QA/QC process and results including:
   i) Automatic exception reporting.
   ii) Resolution tracking.
   iii) Quality Confirmation Test reports.
   iv) Sample retention index and storage.

4. The QA/QC Plan shall identify all contractual hold/inspection points as well as any Contractor imposed hold/inspections points.

5. The QA/QC Plan shall include procedures to provide verification and control of all testing provided by Contractor including:
   a. Individual test records will contain the following information:
      i) Item tested – item number and description.
      ii) Test results.
      iii) Test designation.
      iv) Test work sheet including location sample was obtained.
      v) Acceptance or rejection.
      vi) Date sample was obtained.
      vii) Retest information, if applicable.
      viii) Control requirements.
      ix) Tester signature.
      x) Testing QC staff initials.
   b. Maintaining and providing to the Engineer Daily Testing Records. Such records shall, at a minimum, contain the following:
      i) Dated list of Item(s) inspected.
      ii) Location of the test sample(s) Logs, detailed location drawings and confirmation reports.
      iii) Quality characteristics in compliance.
      iv) Quality characteristics not in compliance.
      v) Corrective/remedial actions taken.
      vi) Statement of certification.

6. QA/QC Manager's signature providing for location maps/drawings (i.e. lift drawings, instrument loop sheets, laying schedules, etc.) for all tests performed or location of Work covered by the tests.

7. Maintaining copies of all test results.

8. Ensuring Engineer receives a copy of all tests directly from lab(s).

9. Ensuring testing lab(s) are functioning independently of Contractor in accordance with the specifications.

10. Ensuring re-tests are properly taken and documented.

11. Special Inspection and Documentation: In addition to the above inspection requirements, certain Special Inspection and Documentation requirements may be contained in the specification Sections. Perform Special Inspection and Documentation and submit a record showing results on an "as occurred" basis unless otherwise indicated.

12. The Contractor will employ separate qualified persons to provide Special Inspections required by reference 1.02 A., above, and as detailed in the Statement Special Inspections. The Contractor may employ an Independent Testing Laboratory (ITL), other inspection entities, or combinations of the above to perform Special Inspections.

G. Control of Measuring and Test Equipment: Measuring and/or testing instruments shall be adequately maintained, calibrated, certified and adjusted to maintain accuracy within prescribed limits. Calibration shall be performed at specified periods against valid standards traceable to nationally recognized standards and documented. Copies of measuring and / or testing instrument certifications shall be on file with the QA/QC Manager.

H. Supplier Quality Assurance: The QA/QC Plan shall include procedures to ensure that procured products and services conform to the requirements of the Specifications. Requirements of these procedures shall be applied, as appropriate, to lower-tier suppliers and/or subcontractors. QA/QC inspections and certifications may not be deferred to the Contractor's subs or suppliers.

I. Deficient, Defective, and Non-conforming Work; Corrective Action:

1. The QA/QC Plan shall include procedures for handling deficiencies and non-conformances. Deficiencies and non-conformances are defined as documentation, drawings, material, and equipment or Work not conforming to the specified requirements or procedures. The procedure shall prevent non-conformances by identification, documentation, evaluation, separation, disposition, and corrective action to prevent recurrence. Conditions having adverse effects on quality shall be promptly identified and reported to the senior level management. The cause of conditions adverse to quality shall be determined and documented and measures implemented to prevent recurrence. In addition, at a minimum, this procedure shall address:
   a. Personnel responsible for identifying deficient and non-complying items within the work.
   b. How and by whom deficient and non-compliant items are documented "in the field".
   c. The personnel and process utilized for logging deficient and non-compliant work at the end of each day onto a Deficiency Log.
   d. Tracking processes and tracking documentation for Deficient and Non-Compliant items.
   e. Personnel responsible for achieving resolution of outstanding deficiencies.
   f. Once resolved, how are the resolutions documented and by whom.

J. Special Processes And Personnel Qualifications:

1. The QA/QC Plan shall include detailed procedures for the performance and control of special process (e.g. welding, soldering, heat treating, cleaning, plating, nondestructive examination, etc.).
2. Personnel performing special process tasks shall have the experience, training and certifications commensurate with the scope, complexity, or nature of the activity. They shall be approved by the Engineer before the start of Work on the Project.

K. Audits: The Contractor's QA/QC program shall provide for documented audits to verify that QA/QC procedures are being fully implemented by the Contractor as well as its subcontractors and suppliers. Audit records shall be made available to the Engineer upon request., Quarterly reports will be provided to the Owner indicating any outstanding and unresolved exceptions to the QA/QC program or Agreement Documents. This will include documentation on any standards

modifications, corrections, failed tests, and a review of field procedures and checks and balances effectiveness.

L. Documented Control/Quality Records

1. The Contractor shall establish methods for control of Agreement Documents that describe how Drawings and Specifications are received and distributed to assure the correct issue of the document being used. The methods shall also describe how as-built data are documented and furnished to the Engineer.

2. The Contractor shall maintain evidence of activities affecting quality, including operating logs, records of inspections and tests, audit reports, material analyses, personnel qualification and certification records, procedures, and document review records.

3. Quality records shall be maintained in a manner that provides for timely retrieval, and traceability. Quality records shall be protected from deterioration, damage, and destruction. The Contractor shall maintain an automated exceptions list of any non-conforming or defective or substandard work.

4. The Contractor shall provide a list with specific records as specified in the Agreement Documents to the Engineer at the completion of activities and in conjunction with logs and locational drawings.

M. Acceptance of QA/QC Plan: Engineer's review and acceptance of the Contractor's QA/QC Plan shall not relieve the Contractor from any of its obligations for the performance of the Work. The Contractor's QA/QC staffing is subject to the Engineer's review and continued acceptance. The Owner, at its sole option, without cause, may direct the Contractor to remove and replace the QA/QC representative. No Work covered by the QA/QC Plan shall start until Engineer's acceptance of Contractor's QA/QC plan has been obtained.

N. Engineer may perform independent quality assurance audits to verify that actions specified in Contractor's QA/QC Plan have been implemented. No Engineer audit finding or report shall in any way relieve Contractor from any requirements of this Contract.

1.08 TESTING SERVICES

A. All tests which require the services of a laboratory to determine compliance with the Agreement Documents shall be performed by an independent commercial testing firm approved by the Engineer as specified in Section 01410-Testing Laboratory Services. The testing firm's laboratory shall be staffed with experienced technicians, properly equipped, and fully qualified to perform the tests in accordance with the specified standards. All standard quality assurance testing and installation verification testing will be at the expense of the Contractor.

B. Testing, when required, will be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

C. The Engineer shall have the right to inspect work performed by the independent testing laboratory both at the project and at the laboratory. This shall include inspection of the independent testing laboratory's internal quality assurance records (quality assurance manual, equipment calibrations, proficiency sample performance, etc.).

D. The Contractor shall obtain the Engineer's approval of the testing firm before having services performed, and shall pay all costs for these testing services.

E. Testing services provided by the Owner, if any, are for the sole benefit of the Owner, however, test results shall be made available to Contractor. Testing necessary to satisfy the Contractor's internal quality control procedures shall be the sole responsibility of the Contractor.

F. Testing Services Furnished By The Contractor: Unless otherwise specified, and in conjunction with, all other specified testing requirements, the Contractor shall provide the following testing services, and write up a detailed testing plan for each along with proposed forms for the Engineer's review:

1. Continuity and insulation megger testing.
   a. All Circuits.
   b. All Motors 25hp and greater.
2. Individual component calibration and testing.
   a. Instrument loop testing.
3. Calibration of fixed instruments.
4. Process / Mechanical/ Drainage pipe testing.
   a. Cleaning and flushing of all process / mechanical piping.
5. Equipment tests.
   a. Factory tests.
   b. Field functional, operational, and performance tests.
6. Tanks.
   a. All water-retaining concrete structures shall be tested for water tightness in accordance with ACI 350.1R.
7. Flow meter (installed) calibration / testing.
8. System acceptance testing.
9. Concrete tests.
10. Moisture-density and relative density tests on embankment, fill, and backfill materials.
11. In-place field density test on embankments, fills, and backfill.
12. Other materials and equipment as specified herein.
13. Concrete materials and mix designs.
14. Embankment, fill, and backfill materials, density, optimum moistures and compaction.
15. QC testing of all precast and/or pre-stressed concrete.
16. All other tests and engineering data required for Engineer's review of materials and equipment proposed to be used in the Work.
17. In addition, the following QC tests shall be performed by Contractor:
    a. Holiday testing of pipeline and all other coatings systems applied to surfaces as required by the Engineer.
    b. Slumps, air bucket tests, compression tests and other confirmation tests.
    c. Air testing of field-welded joints for steel pipe or pipe cylinders and fabricated specials.

d. All testing and inspection of welding work including, but not limited to, welding procedure qualifications, welder operator qualifications, all work performed by the certified welding inspector, all appropriate nondestructive testing of welds and all repair and retest of weld defects.

18. Testing, including sampling, shall be performed by the Contractor's testing firm's laboratory personnel, in general manner and frequency indicated in the Specifications. The Engineer and/or the Owner's representative shall have the right to stipulate the location of the confirmation tests. The Contractor shall provide preliminary representative samples of materials to be tested to laboratory, in required quantities.

19. The testing firm's laboratory shall perform all laboratory tests within a reasonable time consistent with the specified standards and will furnish a written report of each test.

20. The Contractor shall furnish all sample materials and cooperate in the testing activities, including sampling. The Contractor shall interrupt the Work when necessary to allow testing, including sampling to be performed. The Contractor shall have no claim for an increase in Contract Price or Contract Times due to such interruption. The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

21. When testing activities, including sampling are performed in the field by the testing firm's laboratory personnel, the Contractor shall furnish required labor and facilities.
    a. To provide access to Work to be tested.
    b. To obtain and handle samples at the site of the Work.
    c. To facilitate inspections and tests.
    d. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.

22. Where such inspection and testing are to be conducted by an independent laboratory agency, the sample or samples shall be selected by such laboratory or agency or the Engineer and shipped to the laboratory by the Contractor at Contractor's expense.

23. The Contractor shall notify the testing laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.

24. The Contractor shall be responsible for furnishing all materials necessary for testing.

G. Transmittal of Test Reports: Written reports of tests and engineering data furnished by the Contractor for the Engineer's review of materials and equipment proposed to be used in the Work shall be submitted as specified for Shop Drawings. Final transmittal of all Project testing records shall be required as a final close-out submittal for the release of retainage.

1. The Contractor shall promptly process and distribute all required copies of test reports and related instructions to ensure all necessary retesting or replacement of materials with the least possible delay in progress of the Work.

H. The Contractor shall provide copies of all correspondence between the Contractor and testing agencies to the Engineer.

I. Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Agreement Documents.

J. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

K. Schedules For Testing

1. Establishing Schedule
   a. The Contractor shall, by advance discussion with the testing laboratory determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.
   b. The Contractor shall provide for all required time within the construction schedule.
   c. When changes of construction schedule are necessary during construction, the Contractor shall coordinate all such changes of schedule with the testing laboratory as required.

END OF SECTION 01400

SECTION 01410
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 SCOPE

A. From time to time during progress of the Work, the Engineer may require that testing be performed to determine that materials provided for the Work meet the specified requirements, in accordance with the requirements of the Specifications. Such testing includes, but is not necessarily limited to:

1. Soil.
2. Groundwater.
3. Cement.
4. Aggregate.
5. Concrete.
6. Concrete block.
7. Pipe.
8. Steel and metals.
9. Welding.
10. Soil compaction.
11. Bituminous pavement.

B. Requirements for testing may be described in various sections of these Specifications; where no testing requirements are described but the Engineer decides that testing is required to demonstrate compliance with specified material or performance standards, the Engineer may require such testing to be performed under current pertinent standards for testing.

C. Employment of a testing laboratory shall in no way relieve the Contractor of Contractor's obligation to perform work meeting the requirements of the Contract.

D. The independent testing laboratory shall be selected and paid by the Contractor. The testing laboratory must be approved in writing by the Engineer before any testing services are performed.

E. The Contractor shall pay directly for the services of the independent testing laboratory, approved by the Engineer, for all testing required under this Contract.

1.02 LABORATORY DUTIES

A. Cooperate with Engineer and Contractor.

B. Provide qualified personnel promptly on notice.

C. Perform specified inspections, sampling and testing of materials and methods of construction.

1. Comply with specified standards, ASTM, other recognized authorities and as specified.
2. Ascertain compliance with requirements of Agreement Documents.

D. Promptly notify Engineer and Contractor of irregularity or deficiency of work, which are observed during performance of services.

E. Promptly submit three (3) copies (two (2) copies to the Engineer and one (1) copy to the Contractor) of report of inspections and tests in addition to those additional copies required by the Contractor including:

1. Date issued.
2. Project title and number.
3. Testing laboratory name and address.
4. Name and signature of inspector.
5. Date of inspection or sampling.
6. Record of temperature and weather.
7. Date of test.
8. Identification of product and Specification section.
9. Location of Project.
10. Type of inspection or test.
11. Results of test.
12. Observations regarding compliance with Agreement Documents.

F. Perform additional services as required.

G. Laboratory is not authorized to:

1. Release, revoke, alter, or enlarge on requirements of Agreement Documents.
2. Approve or accept any portion of Work.

1.03 CONTRACTOR RESPONSIBILITIES

A. Cooperate with laboratory personnel; provide access to Work and/or manufacturer's requirements.

B. Provide to laboratory, preliminary representative samples, in required quantities, of materials to be tested.

C. Furnish copies of mill test reports.

D. Furnish required labor and facilities.

1. To provide access to Work to be tested.
2. To obtain and handle samples at the site.
3. To facilitate inspections and tests.

4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.

E. Notify the testing laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.

F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample or samples shall be selected by such laboratory or agency or the Engineer and shipped to the testing laboratory by the Contractor at Contractor's expense.

G. Copies of all correspondence between the Contractor and testing laboratory shall be provided to the Engineer.

1.04 QUALITY ASSURANCE

A. Testing, when required, will be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

1.05 PRODUCT HANDLING

A. The Contractor shall promptly process and distribute all required copies of test reports and related instructions to ensure all necessary retesting or replacement of materials with the least possible delay in progress of the Work.

1.06 FURNISHING MATERIALS

A. The Contractor shall be responsible for furnishing all materials necessary for testing.

1.07 CODE COMPLIANCE TESTING

A. Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Agreement Documents.

1.08 CONTRACTOR'S CONVENIENCE TESTING

A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.09 SCHEDULES FOR TESTING

A. Establishing Schedule

1. The Contractor shall, by advance discussion with the testing laboratory, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be at the site of the Work to provide the required testing.
2. Provide all required time within the construction schedule.

B. When changes of construction schedule are necessary during construction, the Contractor shall coordinate all such changes of schedule with the testing laboratory as required.

1.10 TEST AND CERTIFICATIONS

A. General: As a minimum, the following tests shall be performed and the following certifications provided:

1. Cement: Certified test results by cement manufacturer or by independent laboratory shall be furnished as required by the Engineer.
2. Aggregate and Mortar Sand: Certified test results by aggregate producer or by independent laboratory shall be furnished as required by the Engineer.

B. Soil: The material testing for the soil shall be performed by an independent laboratory as deemed necessary by the Engineer.

C. Groundwater: The material testing for the groundwater shall be performed by an independent laboratory as deemed necessary by the Engineer.

D. Concrete: The material testing for the concrete shall be performed by an independent laboratory as deemed necessary by the Engineer.

E. Steel and Miscellaneous Metal: Reinforcing steel, structural steel and miscellaneous metal may be inspected visually on the site by the Engineer.

F. Compaction of Earthwork

1. The compaction shall be tested by the Engineer or by an independent testing laboratory.
2. The testing shall be performed in a manner in accordance with these Specifications.

G. Bituminous Concrete: The material testing for the bituminous concrete shall be performed by an independent laboratory as deemed necessary by the Engineer.

1.11 TAKING SPECIMENS

A. Unless otherwise provided in the Agreement Documents, all specimens and samples for tests will be taken by the testing laboratory or the Engineer.

1.12 TRANSPORTING SAMPLES

A. The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

END OF SECTION 01410

SECTION 01500
TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 SCOPE

A. The work covered under this Section includes furnishing all labor, equipment, and materials required to furnish and install temporary facilities and accessories, as shown on the Drawings and specified herein. The Contractor shall provide all temporary facilities necessary for the proper completion of the Work, as necessary and as specified.

B. The Contractor shall maintain temporary facilities in proper and safe condition through the progress of the Work. In the event of loss or damage, the Contractor shall immediately make all repairs and replacements necessary subject to approval of the Engineer and at no additional cost to the Owner. At completion of the Work, remove all such temporary facilities or as directed by the Engineer.

C. All of the office furnishings and equipment provided by the Contractor for the Engineer's facilities under this Section shall remain as property of the Owner.

D. All expenditures for furnishing, installation, maintenance, and recurring costs of temporary facilities, office furnishings, office electrical equipment, various hardware and software, lines, line extensions, and installation of utility service shall be paid by the Contractor and included in Item No. 1 of the Base Bid.

1.02 REQUIREMENTS

A. General

1. The materials, equipment, and furnishings provided under this Section shall be new, and shall meet all the applicable codes and regulations.
2. The Contractor shall make all provisions, and pay all costs of furnishing, installation, maintenance, professional services, permit fees, and site work for the temporary facilities.

B. Construction:

1. Temporary buildings shall be structurally sound, weather tight, with floors raised above ground. All mobile/modular buildings shall comply with the GA-DCA/SBCC/ADA requirements, and shall be Williams-Scottsman or equal.
2. Temporary buildings shall have temperature transmission resistance compatible with occupancy and storage requirements.

1.03 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of the General Conditions of the Contract Documents. In addition, the following specific information shall be provided:

1. Construction Facilities Plan for each work site for approval by the Engineer.
2. Shop drawings of all signs prior to their manufacture and erection.

3. Copy of the Contractors proposed wheel washing stations in the event the Engineer determines their deployment is necessary.

1.04 CONTRACTOR'S FACILITIES

A. The Equalization Facility Site shall be the main staging area for the Contractor's operations. Any additional staging that the Contractor may require shall be identified in the Facilities Plan and provided by the Contractor at no additional cost to the Owner. The Facilities Plan shall include narrative of the mobilization, site preparation, and the schedule for each site of the Work.

B. Contractor's Facilities: The Contractor shall submit a plan of the plant layout to the Engineer for approval within fifteen (15) days of the Notice to Proceed. The Contractor's Facilities, for purposes of this Section, is defined to include but not limited to its field offices, first aid station, and storage facilities. Sufficient construction plant shall be provided and maintained at all points where work is in progress to meet adequately the demands of the Work and with ample margin for emergencies or overload.

C. The Facilities shall be of sufficient capacity and reliability to permit a rate of progress, which will insure completion of the Work within the time stipulated in the Contract. Insufficient, inadequate, improper Facilities, or equipment shall be brought to acceptable condition or shall be removed from the site of the Work.

D. The location of stationary and mobile equipment shall be subject to the Engineer's approval.

E. First Aid Stations: The Contractor shall provide a suitable first aid station at each work site. Each station shall be equipped with all facilities and medical supplies necessary to administer emergency first aid treatment. The Contractor shall have standing arrangements for the removal and hospital treatment of any injured person. The information reflecting this arrangement shall be clearly posted for easy visibility. All first aid facilities and emergency ambulance services shall be made available by the Contractor to the Owner's and Engineer's personnel.

F. The Contractor shall be wholly responsible for the security of the site office and storage compound and for all its plant, materials, equipment, and tools at all times.

G. The Contractor shall make all arrangements for all utilities and shall be responsible for maintaining all utilities, including all Engineer's Facility utility services, at no additional cost to the Owner. In areas where connections to local sewer systems are not practical, the Contractor shall install and maintain sewage holding tank systems. These sewer systems must be equipped with a means of monitoring and preventing overflows. The Contractor shall remove the systems at the end of construction at no additional cost to the Owner.

1.05 ENGINEER'S FACILITIES

A. Engineer's Field Office:

1. Within 90 days after receipt of the Notice to Proceed construct, paint, and furnish all materials and equipment and maintain Engineer's Field Office at the Equalization Facility Site as directed by the Engineer.
2. Furnish equipment specified under this article for the exclusive use of Engineer and its representatives.

3. The Contractor shall provide one 60-foot-long double-wide trailer to serve as the Site Office for the Owner's and Engineer's field staff at the location specified under 1.05.A.1. The interior of the trailer shall be divided by partitions with doors and have a minimum of 6 offices, one conference room, copier room, supply room, a men's and women's restroom. Dimensions for all rooms shall be determined by the Engineer. The size and number of storage closets shall be as directed by the Engineer. All closets and partition doors shall be furnished with integral locks

4. The office shall have at least two exterior entries with solid core doors with deadbolts and a covered porch at least 6 feet square at each entrance.

5. The Engineer will indicate the locations of telephone/computer outlets and certain electrical outlets on the modular office shop drawing. However, there shall be a minimum of one-combination telephone/computer outlets per office including, the conference room and all shall be wired to the communication's closet

6. Electrical outlets are to be no more than 6 feet apart, minimum two per wall, and all are to be surge protected type; provide four duplex surge protected outlets at 42 inches AFF in communication closet. Other changes in the desired arrangement will be shown on the shop drawing, also.

7. Provide approximately, 1-foot wide, perforated aluminum soffits on all four sides and a continuous ridge vent.

8. All walls are to be vinyl covered sheetrock (all exterior and all interior walls to be fully insulated).

9. Floors to be double 3/4-inch CDX plywood minimum with vinyl tile floor covering throughout. Color coordinated vinyl base-cove throughout.

10. Provide eighteen 48-inch by 30-inch minimum sliding, lockable, double pane insulated windows with insect screens and metal mini-blinds.

11. Provide 4-foot fluorescent lighting fixtures with diffuser covers to provide 100-foot candles of illumination for each and every area; Provide 18-inch fluorescent lighting fixture in bathrooms.

12. The complete restrooms are to include:
    a. An elongated ceramic commode.
    b. Ceramic urinal (for one restroom only).
    c. Ceramic sink.
    d. Single handle brass/chrome faucet (Delta minimum).
    e. Vinyl coated wire shelf for supplies 12-inch depth by 24-inch width, minimum.
    f. Bobrick No. B-398 stainless steel medicine cabinet with mirror doors.
    g. Bobrick No. B-35903 stainless steel paper towel dispenser.
    h. Bobrick No. B-697 stainless steel toilet paper holder.
    i. 40-gallon hot water heater (to serve both restrooms).
    j. Bobrick No. B-147 stainless steel liquid soap dispenser.

13. Exterior doors to be insulated heavy-duty steel with pneumatic/hydraulic closures and Best lock sets and double cylinder deadbolts. Keyed locksets on all interior doors except restrooms to be privacy type, all to be Kwikset, or equal.

14. Chrome coat hook on the back of all interior doors.

15. Interior doors to be pre-hung solid core wood doors with wood trim, all painted gloss white.
16. Sound attenuation/insulation in all interior walls is required.
17. Janitorial equipment closet with door.
18. Communication equipment closet with door to have painted plywood walls. Up to 24 J-boxes with conduit stubbed to under trailer for use in communication installation including up to 2 wall mounted phone boxes. Stainless steel switch-plate and outlet covers. Master circuit surge protector. Lights and receptacles to be on separate circuits; provide 10 dedicated circuits for computers, copiers, etc. Emergency lights and lighted exit signs.
19. Three 10-pound fire extinguishers mounted at each exit and at break area.
20. High-pressure sodium photocell controlled light at each entrance, and four exterior flood lights to illuminate parking area.
21. Freeze protection system for water piping, black asphalt architectural shingles, 20-year warranty roof, color-coordinated plastic or PVC skirting with access door, porch with landing, steps and full aluminum canopy at each exterior door..
22. Provide 4" black rain gutter system along entire length of both sides of the trailer along with downspouts, and splash blocks.
23. HVAC system to include:
    a. Dual one-ton minimum heat pump units; two-ton minimum total.
    b. No "end pack" units. A factory applied marine coating of all metal parts on the exterior heat pump unit excepting only the compressor fins is required (no field application of this coating is permitted); auxiliary, in duct heat strips as required; piped condensate drains to eliminate surface evaporation including dry well if needed; single programmable thermostat to control both units simultaneously; easily accessible filter locations; individual returns and supplies for all rooms or spaces including hallways.
    c. Locate units at center of each side of building for optimum and equal air distribution.
    d. All HVAC duct is to be insulated and run on the underside of the trailer with vents in each area in the floor strategically located on interior walls, behind doors.
    e. HEPA air filtration system including manufacturer's recommended maintenance.
24. Computer Systems
    a. Local Area Network. Furnish and install CAT-5e cable, terminations, and connectors to connect the Ethernet 10/100 cards on the computer systems, the printer Ethernet card and copier as a local area network. Cable to be professionally and neatly installed inside the walls or under the floor. Furnish the services of a qualified field technician to set up the Windows XP software as a local area network to function as instructed by the Engineer.
    b. Furnish and install four Dell Dimension 9200 with Intel Pentium D Processor 915 (4MB L2 Cache, 2.8 GHz, 800 FSD) or latest equivalent model. Personal Computer Systems, each equipped as follows:
        i) 2GB Display Adapter and internal 500GB hard drive storage.
        ii) Internal Dual Drive 16X CD/DVD Burner (DVD+RW)
        iii) Optical USB support mouse.
        iv) 20" Wide Screen Flat Panel display
        v) Battery Back-up UPS systems by APC Model Back-UPS ES 725 Broadband (BE725BB).

vi) Dell USB Keyboard
vii) Microsoft Office Professional 2010, Small Business+ Access database
viii) 3 Year On-Site Business Standard Plan
ix) Adobe Acrobat Reader 10.0
x) Integrated Intel PRO 10/100 Ethernet Network Card
xi) HP Color Laser Jet 3600n printer (equivalent latest model)

c. Furnish (2 ea) Laptop computers equipped as follows:
i) Operating System: Genuine Windows 7 Pro Professional.
ii) Memory: 2GB DDR2 SDRAM at 667 MHZ, 2 DIMM each
iii) Hard Drive: 250GB Hard Drive
iv) Combo/DVD+RW Drives: 8X CD/DVD Burner/DVD (Blue Ray) Combo Drive
v) Network Card and Modem: Integrated 10/100/1000 Network Card and Modem.
vi) External Keyboard & Mouse: Wireless Optical mouse & Keyboard (Bluetooth)
vii) Port Replicator: D/Dock, Expansion Station.
viii) Additional Battery: 9-cell Lithium Ion Additional Battery (80 WHr).
ix) Multimedia Cable Kit
x) Notebook carrying case (leather)
xi) Provide maintenance service agreements for all hardware for duration of contract.

d. Computer Software, Latest Versions for each computer system.(Note: This software shall be supplied in addition to the software specified in Specification 01350- Project Document Tracking and Control System);
i) Microsoft Windows 7Pro Professional Edition.
ii) Microsoft Office 7Pro, Professional Edition.
iii) Adobe Professional, latest version

25. Wall jacks are to be located as designated by the Engineer.

26. Provide the following furnishings, fixtures, and equipment, as modified and approved by the Engineer, as follows:
a. Seven (7) - 60 x 30-inch desks.
b. Nine (9) - 36 x 12 x 72-inch bookcases.
c. One (1) - 46 x 144-inch conference table.
d. Seven (7) Herman Miller Aeron ® loaded chairs w/Titanium base. (color-carbon).
e. Fourteen (14) - swivel/tilt conference arm chairs approximately twenty-two (22) inches wide.
f. Six (6) - side chairs.
g. Six (6) Fireking 22125, black, 4-drawer, legal locking fireproof file cabinets.
h. Two (2) - metal storage cabinet, 36 x 78 x 18-inch w/ lock.
i. One (1) - drafting table, 37.5 x 72-inch top.
j. Two (2) - drafting stool.
k. One (1) - 1.2 cubic, 900 watt microwave.
l. One (1) - minimum 18 cubic feet refrigerator/freezer with ice maker.
m. Eight (8) - marker board, 4 x 6-feet.
n. One (1) - mobile plan rack w/ 8 clamps.

o. Two (2) - drafting fluorescent light with bulbs.

p. One (1) - water cooler with bottled water, with hot and cold potable water.

q. One (1) double pot coffee machine with water supply connection.

r. One (1) boot scraper with dual brushes for each exterior door.

s. Six (6) Tenex static control chair mats, 46-inch by 60-inch with 33-inch by 10-inch lip, standard weight.

t. Six (6) tall black plastic trash receptacles (Rubbermaid).

27. Provide the following Video/Photo Electronics:
    a. Four (4) Canon Power Shot SD1000 Digital Elph Camera or equivalent current model with 4 GB SD Memory Card, soft carry case, and spare battery.

28. Provide one (1) plain paper copier machine, Konika Minolta, Model DI 5510 or equivalent current model (Owners choice) with automatic document feeder, multisheet and single sheet feeder, 5-1/2 by 8-1/2 to 11 by 17; zoom reduction/enlargement from 64 percent to 156 percent in 1 percent increments; 3 paper supply trays with 250 sheets each (8-1/2 by 11, 8-1/2 by 14, 11 by 17); and with a office finisher with multi-position stapling and optional hole punching. The Contractor shall provide a three-year maintenance service contract and copy paper, toner/ink cartridges, etc., for this machine during the Contract period plus 6 months. Furnish two spare toner/ink cartridges for each machine at all times.

29. The Contractor shall be responsible for all office setup costs including electrical, water, sewer, and telephone installation costs. The Contractor is also responsible for all service and maintenance including cleaning, light bulbs, and HVAC filters, etc. for the City field office.

30. The Contractor shall furnish the services of a professional computer system installer to install, connect, and test the various computers, printers, communication equipment, and other peripherals specified in this Section. The various cable types, lengths, adapters, and other connectors are not listed below and will have to be furnished to conform to the Project office and equipment layout and to complete the installation as a satisfactorily functioning system. In addition, maximum effort shall be made to terminate the various cables in wall mounted outlets with appropriate connectors to reduce cable clutter and achieve an orderly appearance for the installation. The wall outlets are also not listed below. The same professional firm shall provide a full on-site maintenance agreement covering all replacement parts and labor. The Contractor shall provide operational support of the computer network for the duration of the construction Contract.

31. The Contractor shall provide free and clear access for the occupants and visitors for the duration of the Project.

32. The Contractor shall protect all utility lines leading to and from the Project office, including all water, sewer, gas, telephone, and other communication lines.

1.06 TELEPHONE SERVICES

A. General

1. A telephone system to be installed and maintained for the duration of the project.

2. Make all necessary arrangements for outside telephone service to Contractor's office, Engineer's Field Office, and the First Aid Stations. The connection to Engineer's Facilities shall be consistent with the specified hardware requirements for such facilities. Schematic drawings, showing the complete telephone system to be installed, shall be provided for

review by the Engineer before installation of the service. All portions of the communication system shall be maintained in good working condition.

3. All expenditures for installation costs of hardware, lines, line extensions, service changes, and recurring service charges for telephone service shall be paid by the Contractor.

4. The Contractor shall provide the Engineer's Field Office with two (2) dedicated lines, with paging, voice mail, conference calling, speaker phone, redial and speed dialing, call and message waiting signals, volume control, outgoing call restriction, night service, and flexible function keys.

5. One phone sets will be provided in each office, and in the conference room.

6. The Contractor shall furnish two (2) additional dedicated telephone lines to the Engineer's Project Office. At each office, one (1) line will be used for a dedicated facsimile machine. The second line at each office will be used for dedicated computer communications.

7. The Contractor shall furnish one (1) cable modem, ADSL, DSL or ISDN line to the Engineer's Project Office. These lines will be used to access the server for the Primavera Expedition software maintained in the Engineer's Project Office.

1.07 PARKING FACILITIES

A. General: The Contractor shall provide ample parking, either graveled or paved, adjacent to the Engineer's Field Office and without necessitating jockeying of cars, for a minimum of ten (10) cars at the Engineer's Field Office.

B. The parking surfaces shall be promptly and adequately maintained by the Contractor for the duration of the Contract.

1.08 SECURITY AND MAINTENANCE

A. General: The Contractor shall provide periodic indoor and outdoor maintenance and weekly cleaning for the Engineer's Field Office, furnishings, equipment, and services as specified herein above. This shall include maintenance of the grounds, including picking up trash and mowing grass.

B. During other than normal daytime office working hours, the Contractor shall provide a totally separate electronic security system monitored by a security agency for the Engineer's Field Office. All offices shall be equipped with exterior security flood lights automatically activated by darkness and in sufficient number and placement to provide adequate lighting of the office and the parking areas.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PREPARATION

A. The Contractor shall fill and grade sites for temporary structures to provide surface drainage.

3.02 INSTALLATION

A. The Contractor shall construct temporary field offices, first aid stations, and storage facilities on proper foundations and provide connections for all utility services.

B. The Contractor shall locate construction office facilities at locations within the Project approved by the Engineer.

C. The Contractor shall determine the need for temporary utility services, including utility services for the Engineer's facilities and first aid stations, and make all arrangements with utility companies and governmental agencies to secure such services. Such services shall be provided at no additional cost to the Owner. Temporary utility services shall be furnished, installed, connected, and maintained by Contractor in a workmanlike manner, satisfactory to the Engineer, and shall be removed in like manner prior to final acceptance.

D. The Contractor shall provide an outside standpipe equipped with a non-freeze hose bib at each of the Engineer and Inspector's Site Office. The hosebib shall be sized for a standard one-half inch (½") garden hose connection.

3.03 MAINTENANCE AND CLEANING

A. For the duration of the Project, the Contractor shall repair and clean the office, parking area, and access route and provide complete professional janitorial services, including toilet paper and paper towels, liquid soap, air fresheners in the Engineer's Field Office. The Contractor or the janitorial service is to provide floor mats at exterior entrances (inside and outside of door).

B. Cleaning shall be done on a weekly basis, to the satisfaction of the Engineer, during other than normal daytime office working hours. These services shall include sweeping, vacuuming, dusting, emptying of trash, cleaning and sanitizing of wash basins, bathroom and shower facility, mopping, and monthly waxing of all vinyl floors. Trash containers shall be lined with trash bags.

C. The Contractor shall provide for monthly exterminating services of the office.

3.04 REMOVAL

A. The Contractor shall remove temporary field offices, contents, and discontinue services at a time when no longer needed as agreed to in writing by the Engineer. The office furnishings and equipment shall be packed, moved, and unpacked by the Contractor to a location designated by the Owner.

B. The Contractor shall remove foundations and debris; grade site to required elevations; clean, and restore areas to Engineer's satisfaction.

END OF SECTION 01500

SECTION 01540
SECURITY AND SAFETY

PART 1 - GENERAL

1.01 SECURITY PROGRAM

A. The Contractor shall protect the Work, including all field office trailers and their contents from theft, vandalism, and unauthorized entry.

B. The Contractor shall initiate a site security program at the time of mobilization onto the site of the Work, which provides adequate security for site stored and installed material.

C. The Contractor shall maintain the security program throughout the duration of the Contract.

D. The Contractor is wholly responsible for the security of their storage compound and laydown areas, and for all their plant, material, equipment, and tools at all times.

E. The Contractor shall provide the Engineer with a list of twenty-four (24) hour emergency phone numbers including chain of command.

1.02 ENTRY CONTROL

A. The Contractor shall restrict entry of unauthorized personnel and vehicles onto the site of the Work.

B. The Contractor shall allow entry only to authorized persons with proper identification.

C. The Contractor shall maintain an Employee Log and Visitor Log and make the logs available to the Owner upon request. These logs shall be submitted to the Engineer bi-weekly or as requested.

D. The Contractor shall require all visitors to sign the Visitor Acknowledgment of the Program Site Rules/Visitor Log, which includes a release form. Copies of these forms shall be submitted to the Engineer bi-weekly and maintained in the Contractor's security files on-site.

E. The Contractor shall require all employees to sign the Employee Acknowledgment of Project Site Rules Log included at the end of this Section. All Contractor and sub-contractor employees shall receive a new employee orientation. Signing the Employee Log by the employee is certifying that the orientation training has been received.

F. The Engineer has the right to refuse access to the site of the Work or request that a person or vehicle be removed from the site of the Work, if found violating any of the Project safety and security conduct rules.

1.03 BARRICADES, LIGHTS AND SIGNALS

A. The Contractor shall furnish and erect such barricades, fences, lights and danger signals and shall provide such other precautionary measures for the protection of persons or property and of the work as necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise, the Contractor shall furnish and maintain at least one (1) light at each barricade

and sufficient numbers of barricades shall be erected to keep vehicles from being driven on or into any work under construction.

B. The Contractor shall be held responsible for all damage to the Work and any resulting injuries due to failure of barricades, signs, and lights and whenever evidence is found of such damage, the Contractor shall immediately remove the damaged portion and replace it at Contractor's cost and expense. The Contractor's responsibility for the maintenance of barricades, signs, and lights shall not cease until the Project has been accepted by the Owner.

1.04 RESTRICTIONS

A. The Contractor shall not allow cameras on site or photographs taken except with approval of the Owner or the Engineer.

1.05 CONTRACTOR SAFETY/HEALTH AND SECURITY PLAN

A. Prior to the performance of any work the Contractor shall prepare a contract specific Safety/Health and Security Plan signed by an officer of the Contractor's organization. Adequacy of the Safety/Health and Security Plan is the responsibility of the Contractor.

B. The Engineer will not review the Contractor's safety plan for the adequacy of the plan. The plan shall:

1. Identify the person(s) responsible for implementation and enforcement of Safety/Health and Security rules and regulations for this Project.
2. Generally address safe work procedures for the activities within the Contractor's scope of work.
3. Include a new employee orientation program, which addresses job and site specific rules, regulations, and hazards.
4. Include the Contractor's Drug Free Work Place Policy including substance abuse prevention and testing program.
5. Include provisions to protect all of the Contractor's employees, and other persons and organizations who may be affected by the work from injury, damage, or loss.
6. Comply with current federal, state and local laws including those promulgated by OSHA; locally accepted safety codes; applicable regulations, standards and practices.
7. Include a site specific emergency action and evacuation plan.
8. Include Hazard Communication/Right To Know Program.
9. Include security procedures for the Contractor's work, tools, and equipment.
10. Include the capability of providing the Engineer with documentation to show compliance with their plan, plus accidents and investigation reports.
11. Address any other Contract Specific requirement, including the Unique Requirements of these specifications.

C. Provide a Job Safety Analysis (JSA) for the scope of work, prior to the start of Work.

D. Review of the Contractor's Safety Plan by the Engineer shall not impose any duty or responsibility upon the Engineer for the Contractor's performance of the Work in a safe manner.

E. The Contractor shall be fully responsible for the safety and health of its employees, its subcontractors, Engineer's employees, Owner's employees, and any other personnel at the site of the Work.

F. The Contractor shall provide the Engineer with all safety reports, training records, competent persons list, and accident reports prepared in compliance with Fed/OSHA and the Project Safety/Health and Security Plan.

1.06 PROJECT SAFETY COORDINATOR

A. The Contractor shall be responsible for the safety of the Contractor's and Engineer's employees, the Owner's personnel and all other personnel at the site of the Work. The Contractor shall identify a Project Safety Coordinator, as required under GC-18, Paragraph F., on the job with an appropriate office on the job site to maintain and keep available safety records and up-to-date copies of all pertinent safety rules and regulations.

B. The Project Safety Coordinator shall:

1. Ensure compliance with all applicable health and safety requirements of all entities having jurisdiction.
2. Schedule and conduct safety meetings and safety training programs as required by law for all personnel engaged in the Work.
3. Post all appropriate notices regarding safety and health regulations at locations that afford maximum exposure to all personnel at the site of the Work.
4. Post the name, address, and hours of the nearest medical doctor; names and addresses of nearby clinics and hospitals; and the telephone numbers of the fire and police departments.
5. Post appropriate instructions and warning signs with regard to all hazardous areas or conditions.
6. Have proper safety and rescue equipment adequately maintained and readily available for any contingency. This equipment shall include such applicable items as: proper fire extinguishers, first aid kits, safety ropes and harnesses, stretcher, life savers, breathing apparatus, resuscitators, gas detectors, oxygen deficiency indicators, explosion meters, and any other equipment mandated by law.
7. Make inspections at least once daily in accordance with an inspection checklist report form to ensure that all machines, tools, and equipment are in safe operating condition; that all work methods are not dangerous; and that all work methods are free of hazards.
8. Submit to the Engineer upon request, copies of all inspection checklist report forms, safety records, and all safety inspection reports and certifications from regulating agencies and insurance companies.
9. Notify the Engineer of a serious accident immediately, followed by a detailed written report within twenty-four (24) hours. "Serious accident" is defined as that requiring an absence of work of more than two (2) days and/or hospitalization.
10. Notify the Engineer immediately in the event of a fatal accident.

11. Notify Engineer of any accident claim against the Contractor or any sub-contractor immediately, followed up by a detailed written report on the claim and its resolution.

12. Review safety aspects of the Contractor's submittals as applicable.

1.07 HEALTH AND SAFETY PERSONNEL

A. The Contractor shall provide Health and Safety personnel to monitor worker safety including but not limited to the removal of contaminated soil. The qualifications of such personnel shall be submitted to the City for approval prior to assignment to the Work.

VISITOR ACKNOWLEDGMENT OF THE PROJECT SITE RULES

By Signing this Visitor's Log, I acknowledge that I have read, understand and agree to abide by the project rules outlined below.

In consideration of my receipt of a visitor's pass as issued by the Engineer directly or indirectly for the Owner of Atlanta, I waive on behalf of myself, my heirs, employer, legal representatives, and assigns and hereby release and discharge the Owner, the Engineer, the Designer, and their subcontractors and consultants and each of their directors, officers, employees, representatives, and agents from any and all claims, actions, causes of action or any charge of any kind whatsoever which may arise or could arise in the future as a result of my being present at the facility including injury, death or property damage whether or not caused by the fault or negligence of any of the parties released hereunder.

I further acknowledge that I have been briefed on specific hazards, hazardous substances that are on the site of the Work and the site emergency action procedure.

PROHIBITED ACTIVITIES

- Unauthorized removal or theft of City's property.
- Violation of safety and security rules or procedures.
- Possession of firearms or lethal weapons on the site of the Work.
- Acts of sabotage.
- Destruction or defacing City's property.
- Failure to use sanitary facilities.
- Failure to report accidents or job related injuries.
- Being under the apparent influence of drugs, alcohol or other intoxicants or in possession of drugs, alcohol or other intoxicants on the property.
- Wearing shorts or tennis shoes on the site of the Work.
- Failure to wear a hardhat/safety glasses.
- Gambling at any time on the site of the Work.
- Fighting, threatening behavior, or engaging in horseplay on the project.
- Smoking in unauthorized areas on the project.
- Open fire cooking or making unauthorized fires on project property.
- Selling items or raffles without authorization.
- Use of unauthorized cameras on the project.
- Use of radio or television in the construction area.
- Failure to park personal vehicle in authorized parking area.
- Failure to wear designated identification [Site Specific].
- Failure to use designated gates.

I have read, understand, and agree to abide by the PROJECT SITE RULES. Furthermore, I understand that failure to abide by these rules is grounds for being denied access to the site of the Work. I have received a personal copy for my use and reference.

VISITOR LOG

BY SIGNING THIS LOG I ACKNOWLEDGE THAT I HAVE READ, UNDERSTAND, AND AGREE TO ABIDE BY THE PROJECT RULES OUTLINED ABOVE. THIS IS NOT A VEHICLE ACCESS PERMIT.

VISITOR'S NAME PRINT	SIGNATURE	COMPANY VISITED	DATE	IN	OUT

EMPLOYEE ACKNOWLEDGMENT OF THE PROJECT SITE RULES

By Signing this Employee Log, I acknowledge that I have read, understand, and agree to abide by the project rules outlined below.

PROHIBITED ACTIVITIES

- Unauthorized removal or theft of City's property.
- Violation of safety or security rules or procedures.
- Possession of firearms or lethal weapons on site of the Work.
- Acts of sabotage.
- Destruction or defacing City's property.
- Failure to use sanitary facilities.
- Failure to report accidents or job related injuries.
- Under the apparent influence of drugs, alcohol or other intoxicants or in possession of drugs, alcohol or other intoxicants on the property.
- Wearing shorts or tennis shoes at the site of the Work.
- Failure to wear a hardhat.
- Gambling at any time at the site of the Work.
- Fighting, threatening behavior, or engaging in horseplay on the site of the Work.
- Smoking in unauthorized areas on the project.
- Open fire cooking or making unauthorized fires on site of the Work.
- Selling items or raffles without authorization.
- Use of unauthorized cameras on the project.
- Use of radio or television in the construction area.
- Failure to park personal vehicle in authorized parking area.
- Failure to wear designated identification [Site Specific].
- Failure to use designated gates.

I have read, understand, and agree to abide by the PROJECT SITE RULES. Furthermore, I understand that failure to abide by these rules is grounds for being denied access to the project site. I have received a personal copy for my use and reference.

EMPLOYEE LOG

BY SIGNING THIS LOG ACKNOWLEDGMENT I HAVE READ, UNDERSTAND, AND AGREE TO ABIDE BY THE PROJECT RULES OUTLINED ABOVE AND ALL STATE, FEDERAL, LOCAL OR ANY OTHER CONTRACT OBLIGATIONS THAT MAY APPLY. I FURTHER ACKNOWLEDGE THAT I HAVE BEEN ORIENTATED AS TO THE SITE SPECIFIC HAZARDS, ANY HAZARDOUS SUBSTANCES I MAY BE EXPOSED TO WHILE ON THE SITE AND THE SITE/COMPANY EMERGENCY ACTION PROCEDURES, BY A REPRESENTATIVE OF THE COMPANY.

EMPLOYEES (PRINT)	SIGNATURE	COMPANY NAME	DATE
Signature of Company Representative		Date Signed	

END OF SECTION 01540

SECTION 01600
GENERAL MATERIAL AND EQUIPMENT REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. All installed materials and equipment are to be the latest version of the manufacturer's product line and not be outdated by newer versions at the time of purchasing. Materials and equipment, which show any signs of extended storage such as corrosion, scratches, and dents will not be accepted for installation in this project.

B. All equipment used for performing the Work shall conform to the latest version of all applicable safety standards including, but not limited to, OSHA requirements. The Contractor shall not exceed or ignore any requirements or recommendations of the equipment manufacturer. Equipment not meeting requirements of this Section will be barred from use on the project.

C. All installed material and equipment shall meet or exceed the latest applicable code requirements including, but not limited to; Underwriters Laboratory, Standard Building Code, and OSHA, as well as requirements of these Specifications. Where there is conflict with requirements of the Contract Documents and code requirements, comply with the more stringent requirements with no additional compensation to the Contractor.

PART 2 - MATERIALS AND EQUIPMENT

2.01 ANCHOR BOLTS

A. All anchor bolts to be ANSI type 316 stainless steel unless otherwise specified or indicated, and must conform to requirements of this Section and the material articles in the appropriate Sections they are used.

B. All anchor bolts are to be supplied by the manufacturer or fabricator of the specific material or equipment to be installed.

C. Design Criteria for Anchor Bolts:

1. When the size, length, or load carrying capacity of an anchor bolt, expansion anchor, or concrete insert is not shown on the Drawings, provide the size, length, and capacity required to carry the design load times a minimum safety factor of four.
2. Determine design loads as follows:
   a. For equipment anchors, use the design load recommended by the manufacturer and approved by the Engineer.
   b. For pipe hangers and supports, use one half the total weight of pipe, fittings, valves, accessories, and water contained in pipe, between the hanger or support in question and adjacent hangers and supports on both sides.
3. Allowances for vibration are included in the safety factor specified above.
4. Anchors shall develop ultimate shear and pull-out loads of not less than the following values in concrete:

Bolt Diameter (Inches)	Min. Shear (Pounds)	Min. Pull-Out Load (Pounds)
½	4,500	6,300
⅝	6,900	7,700
¾	10,500	9,900

5. Embedment depth to be 6 inches for epoxy anchors and 4 inches for steel expansion anchors, unless noted otherwise on the drawings.

D. Anchor Type and Manufacturer

1. Where epoxy anchors are noted on the drawings, provide ANSI type 316 stainless steel threaded rod with Speed Bond #1 epoxy injection as manufactured by Prime Resins, Inc. or equal.
2. For all other applications, provide ANSI type 316 steel expansion anchors from one of the following manufacturers.
   a. Hilti, Incorporated.
   b. Ramset, Incorporated.
   c. or equal.
3. Install anchors per manufacturer's recommendations and this Section.
   a. Drilled anchorage holes are to be blown out with compressed air before installing anchor.

2.02 CONNECTION BOLTS

A. Materials shall be as specified in other Sections of the Specifications, or as shown on the Drawings. Where materials are not specified or shown on the Drawings, they shall be of ANSI Type 316 stainless steel, with ANSI Type 316 stainless steel nuts and washers.

B. Unless otherwise specified, stud, tap, and machine bolts and nuts shall be ANSI Type 316 stainless steel and shall conform to the requirements of ASTM Standard Specification for Carbon Steel Externally and Internally Threaded Standard Fasteners, Designation A307-80. Hexagonal nuts of the same quality of metal as the bolts shall be used. All threads shall be clean cut and shall conform to ANSI Standard B1.1-1974 for Unified Inch Screw Threads (UN and UNR Thread Form).

2.03 CONCRETE INSERTS

A. Concrete inserts for hangers shall be designed to support safely, in the concrete that is used, the maximum load that can be imposed by the hangers used in the inserts. Inserts for hangers shall be of a type, which will permit adjustment of the hangers both horizontally (in one plane) and vertically and locking of the hanger head or nut. All inserts shall be galvanized, then epoxy phenolic primed and top coated with PVC, using thermal bond process.

2.04 SLEEVES

A. Unless otherwise indicated on the Drawings or specified, openings for the passage of pipes through floors and walls shall be formed of sleeves of standard-weight, stainless-steel pipe. The sleeves shall be of ample diameter to pass the pipe and its insulation, if any, and to permit such expansion as may occur. Sleeves shall be of sufficient length to be flush at the walls and the bottom of slabs and to project 4-in. above the finished floor surface. Threaded nipples shall not be used as sleeves.

B. Sleeves in exterior walls below grade or in walls to have liquids on one or both sides shall be as detailed on the Drawings and specified in other Sections.

C. All sleeves shall be set accurately before the concrete is placed or shall be built in accurately as the masonry is being built.

2.05 ELECTRICAL EQUIPMENT ENCLOSURES

A. All items of electrical equipment that are furnished with process equipment shall conform to the requirements specified under the appropriate electrical sections of the specifications. Enclosures for electrical equipment such as switches, starters, etc., shall conform to the requirements specified under the appropriate electrical sections of the specifications.

2.06 EQUIPMENT DRIVE GUARDS

A. All equipment driven by open shafts, belts, chains, or gears shall be provided with acceptable all-metal guards enclosing the drive mechanism. Guards shall be constructed of epoxy paint coated, galvanized sheet steel or galvanized woven wire or expanded metal set in a frame of galvanized steel members. Guards shall be secured in position by steel braces or straps, which will permit easy removal for servicing the equipment. The guards shall conform in all respects to all applicable safety codes and regulations.

2.07 NAMEPLATES

A. With the exception of the items mentioned below, each piece of equipment shall be provided with a substantial nameplate of non-corrodible metal, securely fastened in place and clearly and permanently inscribed with the manufacturer's name, model or type designation, serial number, principal rated capacities, electrical or other power characteristics, and similar information as appropriate.

B. This requirement shall not apply to standard, manually operated gate, lobe, check and plug valves.

C. Each process valve shall be provided with a substantial tag of non-corrodible metal securely fastened in place and inscribed with an identification number in conformance with the tag numbers indicated on the Process and Instrumentation Drawings.

2.08 LUBRICANTS

A. During testing and prior to acceptance, the Contractor shall furnish all lubricants necessary for the proper lubrication of all equipment furnished under this contract.

2.09 PROTECTION AGAINST ELECTROLYSIS

A. Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other acceptable materials.

2.10 TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

A. Packing and Shipping:

1. Product and materials shall be shipped and handled in ways which will prevent damage.
2. Equipment shall be protected against damage from moisture, dust, handling, or other cause during transport from manufacturer's premises to the site of the Work. Bearing housing, vents, and other types of openings shall be wrapped or otherwise sealed to prevent contamination by grit and dirt.
3. Ship equipment, material, and spare parts in assembled units except where partial disassembly is required by transportation regulations or for protection of components.
4. Pipe and appurtenances shall be handled, stored, and installed as recommended by the manufacturer. Pipes shipped with interior bracing shall have the bracing removed only when recommended by the pipe manufacturer.
5. Stiffeners shall be used where necessary to maintain shapes and to give rigidity.
6. Each item or package shall be marked with the number unique to the specification reference covering the item. Spare parts shall be packed in containers bearing labels clearly designating contents and pieces of equipment for which intended.

B. Acceptance at Site:

1. Damaged items will not be permitted as part of the Work except in cases of minor damage that have been satisfactorily repaired and are acceptable to the Engineer.
2. Damage shall be corrected to conform to the requirements of the Contract before the assembly is incorporated into the Work.
3. The Contractor shall bear the costs arising out of dismantling, inspection, repair, and reassembly.

C. Storage and Protection:

1. During the interval between the delivery to the site and installation, equipment, and materials shall be stored in an enclosed space affording protection from weather, dust, and mechanical damage and providing favorable temperature, humidity, and ventilation conditions to ensure against equipment deterioration. Equipment shall be stored at an elevation higher than the 100 year flood plain. Manufacturer's recommendations shall be adhered to in addition to these requirements.
2. Equipment and materials to be located outdoors may be stored outdoors if protected against moisture condensation. Equipment shall be stored at least 6 inches above the ground at an elevation higher than the 100 year flood plain. Temporary power shall be provided to

energize space heaters or other heat sources for control of moisture condensation. Space heaters or other heat sources shall be energized without disturbing the sealed enclosure.

2.11 UNIT RESPONSIBILITY

A. Equipment systems made up of two or more components shall be provided as a unit by the responsible manufacturer. Unless otherwise specified, the Contractor shall obtain each system from the supplier of the driven equipment, which supplier shall provide all components of the system to enhance compatibility, ease of construction, and efficient maintenance. The Contractor shall be responsible to the Owner for performance of all systems in accordance with the provisions of the General Conditions of the Contract Documents.

B. Where the detailed specifications require the Contractor to furnish a certificate of unit responsibility, such certificate shall be executed by the manufacturer. No other submittal material shall be processed until the Certificate of Unit Responsibility has been received and has been found to be satisfactory. A typical Manufacturer's Certificate of Unit Responsibility form is included in this specification.

2.12 SERVICES OF MANUFACTURER'S REPRESENTATIVE

A. Where manufacturers' services are specified, the Contractor shall furnish a qualified representative of the manufacturer to provide these services. Where time is necessary in excess of that stated in the Specifications for the manufacturers' service representative to complete the specified services, the additional time required to perform the services shall be considered incidental work for which the Contractor will receive no additional compensation.

B. After installation of the listed equipment has been completed and the equipment is presumably ready for operation, but before it is operated by others, the manufacturers' representative shall inspect, operate, test and adjust the equipment. The inspection shall include, but shall not be limited to, the following points as applicable:

1. Soundness (without cracked or otherwise damaged parts).
2. Completeness in all details, as specified.
3. Correctness of setting, alignment, and relative arrangement of various parts.
4. Adequacy and correctness of packing, sealing and lubricants.

C. The operation, testing and adjustment shall be as required to prove that the equipment is left in proper condition for satisfactory operation under the conditions specified.

D. On completion of its work, the manufacturer's or supplier's representative shall submit in triplicate to the Engineer Certificate Submittals in accordance with sub-paragraph M of this paragraph and a complete signed report of the result of his inspection, operation, adjustments, and tests. The report shall include detailed descriptions of the points inspected, tests and adjustments made, quantitative results obtained if such are specified, and suggestions for precautions to be taken to ensure proper maintenance. The report also shall include a certificate that the equipment conforms to the requirements of the Contract and is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty null and void.

E. After the Engineer has reviewed the reports from the manufacturers' representative, the Contractor shall make arrangements to have the manufacturers' representatives present when the field acceptance tests are made.

F. Requirements of this paragraph will be in addition to those of appropriate equipment and material Sections.

G. Definitions

1. For purposes of furnishing manufacturers' services, refer to Section 01664-Training, and the following definitions shall apply:
   a. Manufacturer's Representative: Employee of manufacturer who is factory trained and knowledgeable in technical aspects of their products and systems.
   b. Construction Period: The time period from the Contractor's purchase order date to the date of certification by the manufacturer that the material or equipment is properly installed and that functional and performance tests, as applicable to the equipment specified, have been successfully demonstrated.
   c. Man-Day: One man for 8 hours straight time, exclusive of Saturdays, Sundays, or holidays.

H. Fulfillment of Specified Minimum Services

1. Only those manufacturers' services, including trips to the jobsite or training classroom, receiving prior written acceptance or authorization by the Engineer shall act to fulfill the specified services.
2. If manufacturer's representative is found deficient in training or experience by the Engineer, furnish other acceptable representatives after acceptance of resumes and other documentation of proposed representatives.

I. Proper Installation of Products and Systems

1. Furnish manufacturers' representatives of products and systems. Representatives shall resolve assembly or installation problems attributable to, or associated with, their products and systems, whether or not specifically required in the Specifications.

J. Functional Testing

1. Where functional (or run) testing is required in the Specifications, furnish manufacturer's representative to assist with the test. This shall include checking for proper rotation, alignment, speed, excessive vibration, and quiet operation. Perform initial equipment and system adjustment and calibrations in the presence and with the assistance of the manufacturer's representative.
2. Obtain manufacturer's review and acceptance of Contractor's certification of functional testing, where such certification is specified.

K. Performance Testing

1. Where performance testing is specified, furnish manufacturer's representative to assist the test as specified for the particular equipment, and to correct malfunction of equipment. Follow specified test procedures.

2. These services shall continue until:
   a. Equipment or systems have been successfully tested for performance.
   b. Performance test report has been reviewed and accepted.
   c. Equipment or systems have been accepted by Engineer for startup.
3. Unless otherwise specified, performance testing shall use plant fluid or material that the equipment or system is designed to handle during normal service conditions.

L. Training of Owner's Personnel

1. Contractor's Personnel: Designate and provide the Contractor's personnel to be responsible for coordinating and expediting training duties. The person(s) shall be present during training coordination meetings with the Engineer and shall be familiar with the Operation and Maintenance (O & M) Manual information specified in the General Conditions of the Contract Documents.
2. Manufacturer's Representative: Where training of Owner's personnel is required in the Specifications, furnish manufacturer's representative to provide detailed instructions to Owner's personnel for operation and maintenance of the specified equipment.
   a. Training services include pre-startup classroom instruction, post-startup classroom instruction, and onsite equipment instruction, as stated in the Specifications.
   b. Manufacturer's representative shall be familiar with plant O & M requirements as well as with the specified equipment.
3. Pre-startup Training: Coordinate pre-startup training periods with Owner's operating personnel and manufacturers' representatives, and with submittal of O & M Manuals.
   a. Pre-startup training shall be completed at least fourteen (14) days prior to actual startup.
   b. O & M Manuals shall be reviewed, accepted, and resubmitted, in accordance with GC-28, before startup.
4. Post-Startup Training: Where post-startup training is required in the Specifications, furnish and coordinate the specified manufacturers' services and Contractor's personnel for post-startup training of Owner's operating personnel.

M. Certificate Submittals

1. The forms included with this Section are to be used by the Contractor and by manufacturers of systems and products to certify proper installation, completion of functional testing, and performance testing results.

MANUFACTURER'S CERTIFICATE
OF
PROPER INSTALLATION

Contractor: _____

Equipment Name: _____

Equipment Tag Number(s): _____

Specification Section: _____

Manufacturer/Phone No.: _____

Service Rep./Phone No.: _____

Date: _____ Hours on Site: _____

Purpose: To verify installation recommendations and warranty is valid.

At a minimum, the following items (if applicable) must be checked:

	Yes	No	NA
Equipment serviced with proper lubricants.			
All safety equipment properly installed.			
Proper electrical connections.			
Proper mechanical connections.			
Equipment meets all warranty requirements.			

List additional items checked: (See Detailed Specification Section)

_____
_____
_____
_____

Comments: _____
_____
_____

(List and attach additional pages, if necessary.)
Signatures (Do not initial.)

Contractor: _____ Date: _____
Manufacturer: _____ Date: _____
Engineer: _____ Date: _____

MANUFACTURER'S CERTIFICATE
OF
FUNCTIONAL TEST ACCEPTANCE INSTALLATION

Contractor: _____

Equipment Name: _____

Equipment Tag Number(s): _____

Specification Section: _____

Manufacturer/Phone No.: _____

Service Rep./Phone No.: _____

Date: _____ Hours on Site: _____

Purpose: To verify installation, that proper adjustments have been made, that the equipment or system is ready for plant startup and operation and warranty is valid.

At a minimum, the following items (if applicable) must be checked:

	Yes	No	NA
Rotation			
Alignment			
Speed			
Noise level			
Initial adjustments			
Initial calibration			

List additional items checked: (See Detailed Specification Section)

_____
_____
_____
_____

Comments: _____
_____
_____

(List and attach additional pages, if necessary.)
Signatures (Do not initial.)

Contractor: _____ Date: _____
Manufacturer: _____ Date: _____
Engineer: _____ Date: _____

MANUFACTURER'S CERTIFICATE
OF
PERFORMANCE TEST ACCEPTANCE

Contractor: _____

Equipment Name: _____

Equipment Tag Number(s): _____

Specification Section: _____

Manufacturer/Phone No.: _____

Service Rep./Phone No.: _____

Date: _____ Hours on Site: _____

Purpose: To certify that the equipment or system identified above has been successfully tested for performance and is ready to be accepted by the City for full-time operation.

This certifies that the above equipment or system operated under actual performance conditions, and that the equipment or system meets the specified performance criteria.

Comments: _____
_____
_____
_____

(List and attach additional pages, if necessary.)
Signatures (Do not initial.)

Contractor: _____ Date: _____
Manufacturer: _____ Date: _____
Engineer: _____ Date: _____

CONTRACTOR'S CERTIFICATE
OF
EQUIPMENT START-UP READINESS

Contractor: _____

Equipment Name(s): _____

_____

_____

Equipment Tag Number(s): _____

_____

_____

Specification Section: _____

"I, the undersigned, do hereby certify that all of the necessary hydraulic structures, piping systems, and valves have been successfully tested; that all necessary equipment systems and subsystems have been checked for proper installation, started and successfully tested to indicate that they are all operational; that the systems and subsystems are capable of performing their intended functions; and that the facilities noted above are ready for startup and intended operation."

_____ _____ _____

Signature Title Date

MANUFACTURER'S CERTIFICATE
OF
UNIT RESPONSIBILITY

Manufacturer: _____

Equipment Name: _____

Specification Section(s): _____

Manufacturer/Phone No.: _____

Service Rep./Phone No.: _____

Purpose: To certify that the equipment or system manufacturer identified above accepts unit responsibility for equipment or systems furnished.

This certifies that the above equipment or system manufacturer accepts unit responsibility for equipment or systems furnished under the indicated specification section(s) and that the components furnished are compatible and comprise a functional unit suitable for the specified performance and design requirements.

Signatures (Do not initial.)

Contractor: _____ Date: _____
Manufacturer: _____ Date: _____

END OF SECTION 01600

SECTION 01610
TRANSPORTATION AND HANDLING

PART 1 - GENERAL

1.01 SCOPE

A. The Contractor shall provide transportation of all equipment, materials and products furnished under these Contract Documents to the site of the Work. In addition, the Contractor shall provide preparation for shipment, loading, unloading, handling, and preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the Work.

B. All equipment, materials, and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the City, prior to being incorporated into the Work.

1.02 TRANSPORTATION

A. All equipment shall be suitably boxed, crated, or otherwise protected during transportation.

B. Where equipment will be installed using existing cranes or hoisting equipment, the Contractor shall ensure that the weights of the assembled sections do not exceed the capacity of the cranes or hoisting equipment.

C. Small items and appurtenances such as gauges, valves, switches, instruments, and probes which could be damaged during shipment shall be removed from the equipment prior to shipment, packaged, and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.03 HANDLING

A. All equipment, materials, and products shall be carefully handled to prevent damage or excessive deflections during unloading or transportation.

B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice.

C. Under no circumstances shall equipment or products such as pipe, structural steel, castings, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.

D. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

END OF SECTION 01610

SECTION 01611
STORAGE AND PROTECTION

PART 1 - GENERAL

1.01 SCOPE

A. The work under this Section includes, but is not necessarily limited to, the furnishing of all labor, tools, and materials necessary to properly store and protect all materials, equipment, products and the like, as necessary for the proper and complete performance of the Work.

B. The Contractor shall store materials, supplies, and equipment at the site of the Work, in such orderly fashion and in such locations as approved by the Engineer that will not unduly interfere with the progress of the Work or the work of any other contractors, or the activities of City personnel.

1.02 STORAGE AND PROTECTION

A. Storage

1. Maintain ample way for foot traffic at all times, except as otherwise approved by the Engineer.
2. All property damaged by reason of storing of material shall be properly replaced at no additional cost to the Owner.
3. Packaged materials shall be delivered in original unopened containers and so stored until ready for use.
4. All materials shall meet the requirements of these Specifications at the time that they are used in the Work.
5. Store products in accordance with manufacturer's instructions.

B. Protection

1. Use all means necessary to protect the materials, equipment and products of every section before, during and after installation and to protect the installed Work and materials of all other trades.
2. All materials shall be delivered, stored, and handled to prevent the inclusion of foreign materials and damage by water, breakage, vandalism, or other causes.
3. Substantially constructed weathertight storage sheds, with raised floors, shall be provided and maintained as may be required to adequately protect those materials and products stored at the site of the Work, which may require protection from damage by the elements.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Engineer and at no additional cost to the Owner.

D. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending between supports. Items such as pipe, structural steel, and sheet construction products shall be stored with one end elevated to facilitate drainage.

E. Unless otherwise permitted in writing by the Engineer, building products and materials such as cement, grout, plaster, gypsum board, particleboard, resilient flooring, acoustical tile, paneling, finish lumber, insulation, wiring, etc., shall be stored indoors in a dry location. Building products such as rough lumber, plywood, concrete block, and structural tile may be stored outdoors under a properly secured waterproof covering.

F. Tarps and other coverings shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent ponding of water.

1.03 EXTENDED STORAGE

A. In the event that certain items of major equipment such as air compressors, pumps, and mechanical aerators have to be stored for an extended period of time, the Contractor shall provide satisfactory long-term storage facilities which are acceptable to the Engineer. The Contractor shall provide all special packaging, protective coverings, protective coatings, power, nitrogen purge, desiccants, lubricants, and exercising necessary or recommended by the manufacturer to properly maintain and protect the equipment during the period of extended storage.

END OF SECTION 01611

SECTION 01640
MANUFACTURER SERVICES

PART 1 - GENERAL

1.01 SCOPE

A. The work under this Section defines the minimum scope of services to be provided by the Contractor using factory representatives of the manufacturers of the equipment to be installed during installation, start-up, and operator training.

B. Equipment manufacturers assigned unit responsibility for systems comprised of several components shall provide the services of factory representatives from each component manufacturer to perform the duties required under these Specifications. The equipment manufacturer assigned unit responsibility shall be responsible for coordinating the activities of the system component manufacturers.

1.02 QUALIFICATION

A. Qualification of the representatives for installation, start-up, and operator training purposes shall be appropriate for the equipment being installed and shall be subject to the approval of the Engineer. Where equipment has significant process complexity, furnish the services of engineering personnel knowledgeable in the process involved and the function of the equipment.

B. References in various equipment sections of the terms "factory representative" or "field representative" shall mean an employee of the equipment manufacturer who is completely knowledgeable of the construction, installation, operation, and maintenance of the equipment. A sales representative does not qualify. Any field or factory representative not an active employee of the manufacturer must provide documentation from the manufacturer stating that the individual, by name, has been formally trained in the installation, operation, and maintenance of the equipment and is authorized to make the required certification to perform the required services.

1.03 COORDINATION

A. The Contractor shall coordinate the visits of factory representatives during installation, start-up and operator training in accordance with the requirements of Section 01650-Facility Start-Up of these Specifications.

B. The Contractor shall notify the Engineer seventy-two (72) hours prior to any impending visit by factory representatives so that the Engineer can be present.

C. The Contractor shall coordinate the visits of all factory representatives for operator training with the Owner. The Contractor shall provide the Engineer and the Owner with a training schedule a minimum of thirty (30) days prior to the start of the training period.

D. When approved by the Engineer, the period of service on more than one item furnished by the same manufacturer may run concurrently.

1.04 INSTALLATION INSPECTION SERVICES

A. The Contractor shall furnish the services of a competent factory representative to inspect the installation of each piece of equipment prior to start-up and functional testing in accordance with the requirements of these Specifications. The time required shall be shown in the equipment sections of these Specifications, but shall be no less than one, eight (8) hour day.

B. The factory representative shall certify that the equipment has been installed in accordance with the manufacturers' recommendations and is ready for start-up.

1.05 START-UP SERVICES

A. The Contractor shall furnish the services of a competent factory representative to supervise the start-up, functional testing, and field performance testing for each item or system installed in accordance with Section 01650-Facility Start-Up and the equipment sections shown in Divisions 2 through 16 of these Specifications. The time required shall be shown in the equipment sections, but shall be no less than one, eight (8) hour day.

1.06 OPERATOR TRAINING SERVICES

A. The Contractor shall furnish the services of a factory representative to train the Owner's personnel in the operation and maintenance of each item installed under these Specifications. The time required shall be shown in the equipment sections, but shall be no less than one, eight (8) hour day.

END OF SECTION 01640

SECTION 01650
FACILITY STARTUP

PART 1 - GENERAL

1.01 RELATED SECTIONS

A. The follow Specifications are related to this Specification:

1. Section 02730 – Sewers, Storm Drains and Grate Inlets
2. Section 03300 – Cast-in-Place Concrete
3. Section 03414 – Prestressed Circular Concrete Tanks.
4. Division 11 – Equipment
5. Division 13 – Special Construction
6. Division 15 – Mechanical
7. Division 16 - Electrical

1.02 DEFINITIONS

A. Pre-Operational Checkout (Step 1): Are those documented physical checks (tests) that must occur to ensure that a structure or an item of equipment or equipment system is ready for functional testing. Example components of pre-operational checkout /testing include but are not limited to the following:

1. Pressure and/or leakage tests, water-tightness of concrete structures, and pipe testing.
2. Electrical testing, resistance testing in accordance with NETA - Section 16T. Also, phase/motor rotation checks.
3. Instrument calibration and loop tests. Pre-operational check-out of instrumentation system controls.
4. Pre-operational checkout of mechanical and HVAC equipment to include alignment, lubrication, and other checks as recommended by the manufacturer.

B. Functional Test: (Step 2): A test or tests, in the presence of the Engineer and Owner, to demonstrate that the installed equipment or system meets manufacturer's installation and adjustment requirements and other requirements.

1. The testing of the individual items of equipment within a system will be performed under simulated conditions to determine contract compliance. This test will utilize potable water or another acceptable substitute test media. The equipment will be operated long enough to gather information (data) on noise, temperature, vibration, performance characteristics, and to make initial adjustments of any applicable controls. Initial baseline data will be gathered on equipment with motors greater than one (1) horsepower including amperage, bearing temperatures, and vibration.
2. The instrumentation and control field testing (loop checks from the field devices to PLC or distributed control systems as well as field calibrations), will be accomplished during the pre-operational checkout and functional testing stages as defined above. This includes field

verification of all control system inputs/outputs and setting of level switches, pressure switches and other field devices as well as PLC setpoints for control and alarm functions.

C. Operational Test (Step 3): A test, performed in the presence of the Engineer and Owner, of all components within a system collectively to ensure that the system and all of its integral components function as intended. Water and/or other temporary media supplied by the Contractor will be circulated through the completed facility/system for five (5) days with systems being operated under various loading conditions as proposed by the Contractor and approved by the Engineer. Upon completion of this operational test period the Contractor may apply for a Substantial Completion certificate.

1. The instrumentation and control system automatic function for the overall system will be verified for all modes of operation and documented during the operational testing stage as described above.
2. The diversion pump station system operational test is anticipated to be independent of the equalization tank and jet mix pump station system operational test with provisions for flow recirculation internal to each system to facilitate testing and minimize potable water consumtion. A tee is installed on the 48 inch diversion pipeline anticipating the installation of temporary recirculating loops for operational testing.

D. Punchlist: All items that could affect, or be affected by, the full time operation of the system (as deemed critical by the Engineer) must be complete prior to the Operational Test phase.

E. Acceptance Test (Step 4): The start-up and operation of the systems installed, under actual operating conditions, as part of the sewer system. The Contractor shall be responsible for operation and maintenance of the complete facility during the Acceptance Test period. The Acceptance Test period shall begin at the date of Substantial Completion. The duration of Acceptance Testing shall be as follows:

1. A period that covers a minimum of eight (8) diversion events of which the peak pumped flow during at least one (1) diversion event exceed 50 MGD, or
2. A six month period if eight (8) diversion events do not occur in the six (6) month period following substantial completion.

F. During the Acceptance test period, the Owner may provide operating staff to monitor the facility operation, During the Acceptance Test period, the Contractor shall also notify the Owner of the beginning of every event so that the Owner can have operating personnel or other individuals on site for observation and to monitor the Acceptance Testing.

G. Performance Test: Any special tests performed in the presence of the Engineer and Owner called for by the specific equipment or system specification, which are to be performed in addition to the installation and acceptance tests noted in this start-up specification (pre-operational checkout, functional testing, operational testing, and acceptance testing).

H. System: The overall process, or a portion thereof, that performs a specific function. A system may consist of two or more subsystems as well as two or more types of equipment. Examples of systems on this Project are as follows:

1. Pumps, motors, and controls.
2. Instrumentation and control system(s).

I. Substantial Completion: The date certified by the Engineer when all or a part of the work as identified in the Engineer's certification, has been properly installed per the contract documents and manufacturer recommendations, deemed operational through the completion of the Pre-operational checkout, Functional Test, Operational Test, has all test documents with Operation and Maintenance manuals delivered, is sufficiently completed in accordance with the requirements of the Contract Documents and can be utilized for the purposes for which it is intended.

1.03 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of the General Conditions of the Contract Documents. In addition, the following specific information shall be provided:

1. Administrative Submittals:
   a. Functional and performance test schedules and plan for equipment, units, and systems at least fourteen (14) days prior to start of related testing. Include test plan, procedures, and log format.
   b. Schedule and plan of facility startup activities at least twenty-one (21) days prior to commencement.
2. Quality Control Submittals:
   a. Manufacturer's Certificate of Proper Installation as required.
3. Test Reports: Functional, Operational, Acceptanceand Performance testing reports, in format acceptable to Engineer and certification of functional and performance test for each piece of equipment or system specified. Reports shall include, logs for each component, device, setpoint and other parameters tested indicating flow rates, levels, and other operational data and verification of successful completion.
4. Certifications of Calibration: Testing equipment.

1.04 CONTRACTOR FACILITY STARTUP RESPONSIBILITIES

A. General:

1. The Contractor shall provide, at no expense to the Owner, all power, fuel, compressed air supplies, water, and chemicals; as well as all labor, temporary piping, valves, instrumentation, heating, ventilating, and air conditioning or bypass pumping, for any areas where the Facilities are not complete and operable at the time of Operational Testing and its prerequisites. Contractor shall provide all other items and work required to complete Operational Testing and its prerequisites. Temporary facilities shall be maintained until permanent systems are in service.
2. Acceptance testing under actual operating conditions shall be completed only after satisfactory completion of Operational Testing with all systems operational. No temporary systems will be used during Acceptance testing.
3. The Contractor shall provide, at no expense to the Owner, temporary piping, valves and appurtenances to create re-circulating loops capable of producing conditions simulating design conditions.
4. The Contractor shall provide all necessary qualified operations personnel and manufacturers' field service personnel of the major equipment suppliers on an eight (8) hour per day basis at

the facilities and on a twenty-four (24) hour per day basis locally during the operational test period.

5. The Contractor shall provide all necessary qualified operations personnel on a twenty-four (24) hour per day basis locally and have manufacturers' field service personnel of the major equipment suppliers available on an emergency response basis during the acceptance test period.

6. At no time during startup shall the Contractor allow the facility to be operated in a manner which subjects equipment to conditions that are more severe than the maximum allowable operating conditions for which the equipment was designed.

7. The Contractor shall make provisions to conserve the water used on site for testing purposes. Recirculation or reuse of water shall be required to limit the amount of water discharged to the Owner's existing trunk sewer.

B. Tie-Ins or Modifications To The Existing Systems

1. Anytime the Contractor ties into or modifies an existing system, a detailed Work Plan shall be required. Submittal of this Work Plan must be a minimum of thirty (30) days in advance of commencement of the subject work. This Work Plan shall include a detailed description of the work, a step-by-step plan of the modification or tie-in, a detailed timeline schedule, a detailed list of materials and equipment required, demonstrated communications capacity, and a listing of any gates or valves which must be operated. Working drawings shall be submitted as required under GC-28 for any permanent or temporary structural modifications. A temporary safety plan covering the period of the work, and a listing of contingency plans and supplies, including but not limited to spill prevention planning and spill containment kits, shall be required. A coordination meeting with the Owner's operating staff, the Contractor and the Engineer must be held at least seven (7) days prior to the commencement of the modification or tie-in. The day before the commencement of the modification or tie-in, a final coordination meeting shall be held giving final detailed work assignments to all parties involved.

2. The Owner and Engineer have the right to require, at no additional cost to the Owner, stand-by equipment on any item(s) deemed critical enough to delay the work. The Contractor shall have available stand-by personnel to supplement the committed forces should problems arise. The Contractor is responsible for meeting all OSHA standards including entrance and exit safety, confined space entry, fall protection, scaffolding, rigging, etc.

C. Contractor's Startup Quality Assurance Manager

1. The Contractor shall appoint an operations engineer or equally qualified operations specialist as Startup Manager to manage, coordinate, and supervise all aspects of the Contractor's startup and testing program including, but not limited to those components of the program as listed with this appendix. The Startup Manager shall have at least five (5) years of total experience, or experience on at least five separate projects, in managing the startup commissioning of mechanical, electrical, instrumentation, HVAC, and piping systems. Operations engineers shall be graduates from a minimum 4-year course in mechanical, civil or a related program of study. Operations specialists shall have equivalent documented experience in operation and maintenance. Contractor shall submit the Startup Manager's resume for review and approval a minimum of six (6) months prior to any testing, or prior to 50% completion of the first constructed system.

D. Contractor's Testing Team

1. Contractor's Testing Team shall include at a minimum the Quality Assurance Manager, qualified Mechanical/Equipment Foreman, qualified Electrical Journeyman, qualified Instrument Technician, and qualified/Certified Operations personnel.

2. Contractor is responsible to have the appropriate personnel, procedures, and test forms at the test site when performing a scheduled checkout/testing activity that is to be witnessed by the Engineer.

E. Test Equipment

1. All test equipment (gauges, meters, thermometers, analysis instruments, and other equipment) used for calibrating or verifying the performance of equipment installed under this contract shall be calibrated to within plus or minus two (2) percent of actual value at full scale. Test equipment employed for individual test runs shall be selected so that expected values as indicated by the detailed performance specifications will fall between 60 and 85 percent of full scale. Pressure gages shall be calibrated in accordance with ANSI/ASME B40.1. Thermometers shall be calibrated in accordance with ASTM E77 and shall be furnished with a certified calibration curve.

2. Test instruments shall be calibrated to references traceable to the National Bureau of Standards and shall have a current sticker showing date of calibration, deviation from standard, name of calibration laboratory and technician, and date recalibration is required.

3. Calibration equipment/test instruments utilized for start-up and testing shall be documented to include identification (by make, manufacturer, model, and serial number) of the test equipment, date of original calibration, subsequent calibrations, calibration method, and test laboratory as well as documentation of current calibration.

4. All analysis instruments, sensors, gauges, and meters used for performance testing shall be subject to recalibration to confirm accuracy after completion, but prior to acceptance of each performance test. All analysis instruments, sensors, gages, and meters installed under this contract shall be subject to recalibration prior to Acceptance.

5. Test equipment used to simulate inputs and read outputs shall have a rated accuracy at the point of measurement at least three (3) times greater than the component under test. Buffer solutions and reference fluids shall be provided as necessary for tests of analytical equipment.

1.05 OWNER/ENGINEER FACILITY STARTUP RESPONSIBILITIES

A. General:

1. Review Contractor's test plan and schedule.

2. Witness each functional, operational (portions of) and performance test.

3. Coordinate other Owner operations, if necessary, to facilitate Contractor's tests.

B. Acceptance Test Period:

1. Operate process units and equipment, with support of Contractor.

2. Provide sampling, labor, and materials as required and provide laboratory analyses.

3. Provide operational data to the Contractor for Contractor's completion of Acceptance Test Report(s).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 START-UP PROGRAM IMPLEMENTATION

A. Start-Up Meetings

1. The Contractor shall schedule and conduct regular periodic start-up meetings (separate from regular progress meetings). The start-up meetings will be held at least every ten (10) days (once start-up planning commences) and may be scheduled at a more frequent interval by the Engineer if necessary. Start-up meetings shall be held at a location designated by the Contractor and approved by the Engineer.

2. Start-up meetings shall be attended by the Engineer, Contractor, Subcontractors and suppliers as appropriate to the agenda and others as required.

3. The meeting agenda shall generally include review and approval of minutes of previous meeting, review of start-up progress since the previous meeting, field observations, problems, and conflicts, problems which impede Start-Up Schedule, delivery schedules, corrective measures and procedures to regain the start-up schedule, revisions to Start-Up Schedule, progress and schedule of the preceding work period, coordination of schedules, review of start-up submittal schedules and status, status of start-up related requests for information, and any other business deemed appropriate.

B. Start-up and Testing Schedule

1. The Contractor shall produce an overall testing schedule setting forth the sequence contemplated for performing the test work. The schedule shall be in bar chart form, plotted against calendar time, shall detail the equipment and systems to be tested, and shall be coordinated with the Construction Schedule. The testing schedule shall show the contemplated start date, duration of the test and completion of each test.

2. The preliminary test schedule shall be submitted with the overall Start-up Acceptance Test Plan. The Engineer will not witness any testing work until the Contractor has submitted a schedule to which the Engineer takes no exception. The test schedule shall be updated weekly, and presented at each start-up meeting, showing actual dates of test work, indicating systems and equipment testing completed satisfactorily and meeting the requirements of the Contract Documents, and also re-forecast the upcoming testing and reflect any schedule adjustments accompanied by written reason for the change. The Contractors baseline start-up and testing schedule is to be submitted with the overall test plan.

C. Documentation

1. The Contractor shall develop a records-keeping system to document all activities associated with Acceptance Testing and its prerequisites.

2. Equipment and system documentation shall include date of test, equipment number or system name, nature of test, test objectives, test results, test instruments employed for the test, and signature spaces for witness by the Engineer, the Contractor's Start-Up/Quality

Assurance Manager, and the Equipment Manufacturer. A separate file shall be established for each system, organized by start-up phase (i.e., pre-operational, functional, operational, acceptance test phase), and will include sections for each item of equipment. These files shall include the following information and documentation as a minimum. Test plan and documentation organization shall be as follows:

D. Test Plan Organization

1. Index.
2. Schedule
3. Steps 1 and 2: Each type of equipment will have its own section within the system and include the following:
   a. The detailed pre-operational test procedures.
   b. The detailed functional test procedures.
   c. Customized mechanical equipment, customized electrical, and customized instrumentation pre-operational, and functional test forms as applicable.
   d. Other pre-operational test documentation as required for piping and mechanical equipment.
4. Step 3: A separate section will be created for the system operational testing and include the following:
   a. Detailed plans for recirculation of flows and producing conditions simulating design conditions.
   b. The detailed five (5) day operational test procedure.
   c. A detailed operational system check/sign-off sheet (based on system tests, control checks, and interlock checks to be performed).
   d. System operational test completion sign-off form.
5. Step 4: Another section is to be designated for the Acceptance Testing and include the following:
   a. Detailed Work Plans, Communications Plan, Safety Plan, and contingencies, as well as other requirements outlined under tie-ins and modifications to existing systems (SC-24).
   b. Test overview and proposed spreadsheet forms to be utilized by the Contractors staff to record appropriate operational and performance data for each diversion event during the Acceptance Test period.
   c. System acceptance test completion/sign-off form.
6. The forms attached to Section 01600-General Material and Equipment Requirements are samples showing the required format and level of detail for documentation. The Contractor is advised that these are samples only and are not specific to this project nor to any item of equipment or system to be installed under this contract. The Contractor shall develop test documentation forms specific to each item of equipment and system installed under this contract. Acceptable example documentation forms for all systems and items of equipment shall be produced and submitted for review and approval by the Engineer as a condition precedent to the Contractor's receipt of progress payments in excess of 60 percent of the contract amount. Once the Engineer has reviewed and taken no exception to the forms proposed by the Contractor, the Contractor shall produce customized forms for each item of equipment and system and include these individual forms in the overall test plan that will be submitted for approval.

7. The complete test plan and all its sections are to be submitted 60 days prior to any testing and approved, Code 1 or Code 1C, prior to the start of any testing.

3.02 TEST PLAN IMPLEMENTATION

A. This program will be implemented in 4 distinct steps (phases). These steps are the Pre-**Operational Checkout**, the **Functional Testing**, the **Operational Testing**, and the **Acceptance Testing**.

3.03 STEP 1 – PRE-OPERATIONAL CHECKOUT AND TESTING

A. The first step involves the **Pre-operational checkout**. This would include multi-discipline work completion and physical checkout. The **Pre-operational Completion** and **Pre-operational test reports** include the following required testing. Examples of these documented tests include, but are not limited to:

1. Field pressure/leakage test reports for all pipe, valves, structures and appurtenances.
2. Wire insulation megohm reports for all 120V and greater wire.
3. Phasing, ratio, polarity, ground resistance, current injection, insulation resistance, over potential test, and circuit breaker contact resistance reports for medium voltage switchgear.
4. Insulation power factor and resistance test reports for surge arresters.
5. Megger reports for Unit Substations, Three Winding Transformers, and 460V motor control centers.
6. Megger reports and ground connection tests.
7. Loop Status Report and Component Calibration forms.
8. Equipment installation checkout forms.

B. Pipe Testing

1. Prior to application of insulation on exposed piping, test the piping systems at the appropriate pressure according to the requirements of related piping specifications. All buried piping shall be tested prior to any backfill being placed, unless prior approval by the Engineer is given in writing. Test duration shall be one-hundred twenty (120) minutes for all tests and witnessed by the Engineer. Isolate equipment that may be damaged by the specified test conditions. Testing shall be performed using calibrated test gages and calibrated volumetric measuring equipment to determine leakage rates. Each test gage shall be selected so that the specified test pressure falls within the upper half of the gage's range. Testing shall include existing piping systems that connect with new pipe systems. Existing pipe shall be tested to the nearest existing valve. Any piping that fails the test shall be repaired and re-tested.
2. For gas, air, and vapor systems, the allowable leakage rate for systems tested with air shall be based on a maximum pressure drop of 5 percent of the specified test pressure for the duration of the period. Prior to starting a test interval using air, the air shall be at ambient temperature and specified test pressure. The allowable leakage rate for hazardous gas systems, insulated systems, and systems tested with water shall be zero at the specified test pressure throughout the specified test period. Hazardous gas systems shall include sulfur dioxide, chlorine, propane, sludge gas and natural gas systems. Testing medium shall be as

follows for gas, air, and vapor systems:

Pipeline size	Specified test pressure	Testing medium
2 inch and smaller	75 psi or less	Air or water
2 inch and smaller	Greater than 75 psi	Water
Greater and 2 inch	3 psi or less	Air or water
Greater and 2 inch	Greater than 3 psi	Water

3. For liquid systems, leakage shall be zero at the specified test pressure throughout the specified duration for exposed piping, buried insulated piping, and buried or exposed piping carrying liquid chemicals. Leakage from other buried liquid piping systems shall be less than 0.02 gallon per hour per inch diameter per 100 feet of buried piping. Drain systems, other than pumped drain systems, shall be tested in accordance with Georgia State Minimum Standards.

4. For hydraulic and lube oil systems, upon completion of cleaning, all field connections shall be completed and the system tested at the specified pressure. Pressure loss shall be zero for the specified test period. For fluid power systems, the manufacturer shall supervise the installation and testing of all system components including all field piping.

C. Pipe System Cleaning and Flushing

1. Piping systems shall be cleaned following completion of testing and prior to connection to operating, control, regulating, or instrumentation equipment. The Contractor may, at his option, clean and test sections of buried or exposed piping systems. Use of this procedure, however, will not waive the requirement for a full pressure test of the completed system. Unless specified otherwise, piping twenty-four (24) inches in diameter and smaller shall first be cleaned by pulling a tightly fitting cleaning ball or swab through the system. Piping larger than twenty-four (24) inches in diameter may be cleaned manually or with a cleaning ball or swab.

   Upon completion of the cleaning, the Contractor shall connect the piping systems to related process equipment. Temporary screens, provided with locator tabs that remain visible from the outside when the screens are in place, shall be inserted in pipelines at the suction of pumps and compressors in accordance with the following table:

Equipment suction or piping size, inches	Maximum screen opening, inches
0 to 1	1/16
1-1/4 to 3	1/4
3-1/2 to 6	1/2
Over 6	1

2. The Contractor shall maintain the screens during all testing prior to the start of Acceptance testing. In special cases, screens may be removed as required for performance tests. Systems handling solids are exempted.

3. Gas and air system piping six (6) inches in diameter and smaller shall be blown out, using air or the testing medium specified. Piping larger than six (6) inches shall be cleaned by having a swab or "pig" drawn through the separate reaches of pipe. After connection to the equipment, it shall then be blown out using the equipment. Upon completion of cleaning, the piping shall be drained and dried with an air stream.

4. After completion of cleaning, liquid systems, unless otherwise specified, shall be flushed with clean water. With temporary screens in place, the liquid shall be circulated through the

piping system using connected equipment for a minimum period of fifteen (15) minutes and until no debris is collected on the screens. Potable water piping systems shall be flushed and disinfected in accordance with AWWA C651.

D. Equipment – Pre-Operational Checkout

1. Equipment pre-operational checks and tests shall include, but are not limited to, the following:
2. Check for proper installation, alignment, support, and anchorage per the applicable manufacturers installation, operation and maintenance manual and in accordance with the contract documents.
3. Check the equipment for proper adjustment, packing of seals, lubrication, drive connection, motor connection, and belt/chain tension per the applicable manufacturers installation, operation and maintenance manual and in accordance with the contract documents.
4. Check the associated process, seal water, cooling water, drain, and vent pipe connections for proper routing and connection. Check to ensure the pipe testing was performed and signed as completed for all the associated piping.
5. Ensure that the equipment is clean and free of any construction debris that could potentially cause a malfunction.
6. Ensure that all safety guards, signage, and other safety measures such as hearing protection, etc., are in place.
7. Have the manufacturer's representative perform all pre-operational tests per the manufacturers' recommendations and review the equipment installation and sign the Manufacturer's Installation portion of the certification form. If the manufacturer's representative brings his own checklist, obtain a copy of the completed form and attach it to the Contractors completed forms. Note that the manufacturer must also fill out the contract approved checkout form (their own form will not serve as a substitute).
8. All gates and valves associated with the equipment system must be checked for proper installation, adjustment, and lubrication per the manufacturer's recommendations.

E. Concrete Structure Water-tightness – Pre-Operational Checkout

1. Pre-stressed circular concrete tanks shall be hydrostatically tested per Section 03414 – Prestressed Circular Concrete Tanks.
2. All other water-retaining concrete structures shall be tested for water-tightness in accordance with ACI 350.1R. The maximum allowable leakage rate shall be 0.075% over a twenty-four (24) hour period.

F. Electrical Pre-Operational Checks/Tests

1. Prior to energizing electrical circuits, use a 1,000-volt megohmeter to measure insulation resistance on conductors and insulated parts of electrical equipment. All measurements shall meet or exceed the appropriate ICEA, NEMA, or ANSI standard. Any insulation resistance less than ten (10) megohms is unacceptable. Record results, as well as ambient temperature.
2. Measure phase-to-ground insulation resistance for all circuits 120 volts and above, with the exception of lighting circuits. Measurements may be made with motors and other equipment

connected, except that solid state equipment shall be disconnected unless the equipment is normally tested by the manufacturer at voltages in excess of 1,000 volts DC.

3. Complete Test Form for each installed motor. Measure the insulation resistance of all motors before connection. Measure the insulation resistance for all motors at the time of delivery as well as when connected. Insulation resistance values less than ten (10) megohms are not acceptable.

4. Adjust and make operative all protective devices. Perform a functional check of the control circuit prior to energizing the equipment.

5. Review all associated electrical terminations, switches, and breakers for satisfactory installation.

G. Individual Component/Instrument Calibration Pre-Operational Check/Test

1. Each instrument and final element shall be field calibrated in accordance with the manufacturer's recommended procedure. Instruments shall then be tested in compliance with ISA S51.1 and the data entered on the applicable test report form. Alarm trips, control trips, and switches shall be set to initial values specified in the design at this time. Final elements shall be checked for range, dead band, and speed of response.

2. Calibration of analysis instruments, sensors, gauges, and meters installed under this contract shall proceed on a system-by-system basis. No equipment or system operational, performance or acceptance tests shall be performed until instruments, gages, and meters to be installed in that particular system have been calibrated and the calibration work has been witnessed by the Engineer.

3. Testing of instrument process piping/tubing, wiring, and individual components shall be completed and documented on the approved test forms provided to the Engineer as part of the pre-operational testing phase and prior to commencement of individual loop testing conducted during the pre-operational functional test phase.

4. Any component which fails to meet the required tolerances shall be repaired by the manufacturer or replaced, and the above tests repeated until the component is within tolerance.

5. System instrumentation equipment supplied and installed must also be reviewed for proper installation and termination as part of the pre-operational checkout.

H. Pre-Operational Checkout Summary

1. The pre-operational checkout and testing for each item shall be carried out in accordance with the Contractors submitted and approved procedures and documented on the Contractors approved pre-operational test forms.

2. The Contractor shall complete the pre-operational testing requirements listed above, at a minimum, for each item of mechanical, electrical, instrumentation, and HVAC equipment prior to beginning any functional testing with regard to the equipment or the systems in which the equipment functions.

3. Provide Pre-Operational Test summary including all signed forms and checklists to document that the work has been successfully completed.

3.04 STEP 2 – FUNCTIONAL TEST

A. General

1. The second step in the program is the **Functional Test.** This is the functional testing of the equipment. These tests begin for each item of equipment only after the **Pre-operational Checks** have been completed for all components for the particular equipment.

2. The functional testing for each item of equipment shall be carried out in accordance with the Contractors submitted and approved procedures and documented on the Contractors approved functional test forms.

3. Once 1) all affected equipment has been subjected to the required pre-operational testing procedures; and 2) the Engineer has witnessed and has not found deficiencies in that portion of the work, individual items of equipment and systems may be started and operated under simulated operating conditions to determine as nearly as possible whether the equipment and systems meet the Contract Documents. It is anticipated that potable water will be employed as the test medium and be supplied by the contractor. The contractor may propose alternate sources of water for testing to minimize the potable water demand. The equipment shall be operated for a sufficient period of time to determine machine operating characteristics, including noise, temperatures, and vibration; to observe performance characteristics; and to permit initial adjustment of operating controls. When testing requires the availability of auxiliary systems such as looped piping, electrical power, compressed air, control air, or instrumentation which have not yet been placed in service, the Contractor shall provide acceptable substitute sources, capable of meeting the requirements of the machine, device, or system at no additional cost to the City. Disposal methods for test media shall be subject to review by the Engineer. During the functional test period, the Contractor shall obtain baseline operating data on all equipment with motors greater than one (1) horsepower to include amperage, bearing temperatures, and vibration. The baseline data shall be collected for use in the CMMS.

4. Test results shall be within the tolerances set forth in the detailed specification sections of the Contract Documents and as indicated in the Contractors functional test plan and the manufacturers criteria. If no tolerances have been specified, test results shall conform to tolerances established by recognized industry practice. Where, in the case of an otherwise satisfactory functional test, any doubt, dispute, or difference should arise between the Engineer and the Contractor regarding the test results or the methods or equipment used in the performance of such test, than the Engineer may order the test to be repeated at the Contractors expense. Where the results of any functional test fail to comply with the Contract Documents for such test, then such repeat tests as may be necessary to meet the Contract Documents shall be made by the Contractor at his expense.

B. The **Functional Test** reports (test documentation) include the required testing. Examples of these types of reports include, but are not limited to:

1. The Functional Field Test of valves.

2. The cycling/functions check of the sluice gates, and stop logs.

3. The leakage testing of sluice gates, and stop logs in accordance with AWWA specifications.

4. Vibration, noise, and capacity testing of Pumps.

5. Loop functional test for Instrumentation and Control.

C. Process/Mechanical/Equipment – (Functional Testing)

1. During the Functional Verification Check and Testing process, the Contractor and the various Manufacturer's Technical representatives shall examine and record the initial start-up performance of the components provided by their respective firms in accordance with the Contractors approved functional test procedure.
2. The initial operation, testing and adjustment shall be as required to prove that the equipment has been installed properly and operates under the conditions specified.
3. Upon completion of this work, the manufacturer's field service technician shall complete the Contractors approved functional test form as well as their own signed report to record the results of his/her inspection, operation, adjustments and tests. The report shall include detailed descriptions of the points inspected, tests and adjustments made, quantitative results if such are specified, and suggestions for precautions to be taken to ensure proper maintenance.

D. Electrical - (Functional Testing)

1. The Contractors' electrician shall be present during all testing to confirm the electrical testing, provide troubleshooting assistance, repair as needed, and assist in gathering baseline data such as motor amperages.
2. Energize each control circuit and operate each control, alarm or malfunction device and each interlock in turn to verify that the specified action occurs. The Contractor shall submit a description of his proposed functional electrical test procedures as part of the testing plan.
3. Verify that motors are connected to rotate in the correct direction. Verification may be accomplished by momentarily energizing the motor, provided the Contractor confirms that neither the motor nor the driven equipment will be damaged by reverse operation.

E. Instrumentation and Control – (Functional Testing)

1. The Contractors' instrumentation representative shall be on site full time during the functional test phase to perform loop checks and to support the Contractors start-up team as needed. Any packaged equipment or manufacturer supplied control panels must be field tested to verify all control interlocks and control functions during this phase of testing by the equipment supplier. Note that the Contractors functional test procedure for each piece of equipment shall define each interlock to be tested.
2. Each instrument loop shall be tested. This testing shall check operation from transmitter to readout components. Signals shall be generated utilizing the primary measuring elements where possible. Signals shall be injected only if primary element is unavailable.
3. If any output device fails to indicate properly, corrections to the loop shall be made as necessary and the test repeated until all instruments operate properly.

F. Functional Testing Summary

1. The functional testing for each item of equipment, electrical, and instrumentation shall be carried out in accordance with the Contractors submitted and approved procedures and documented on the Contractors approved functional test forms. A Functional Test Report shall be provided compiling all results and testing forms for the project.

3.05 STEP 3 – OPERATIONAL TESTING

A. The third step in the program is the Operational Testing. This step begins after all Pre-operational checks and Functional tests have been satisfactorily completed. The Contractor shall plan his activities to allow for Owner witnessing of all tests and shall provide twenty-four (24) hours advance notice of all testing activities.

B. The Contractors operational test plan shall be a detailed procedure to confirm all System Automatic Mode functions, verify all system interlocks and alarms, and reconfirm all equipment functions and controls. All design and performance criteria will be demonstrated and documented during this five (5) day period. The Contractors manufacturer, electrical, and instrumentation representatives will be on site on an eight (8) hour a day basis and locally on a twenty-four (24) hour a day basis during this period.

C. In the event of failure to demonstrate satisfactory performance of the system on the first or any subsequent attempt, all necessary alterations, adjustments, repairs, and replacements shall be made. When the system is again ready for operation, it shall be brought on line and a new test shall be started. This procedure shall be repeated as often as necessary until the system has operated continuously to the satisfaction of the Owner and Engineer, for the specified duration.

D. Prerequisites

1. Prior to the Owner's issuance of a Certificate of Substantial Completion for the Work, the contractor shall perform Operational Testing. Any failures of process, equipment, or systems shall result in re-starting the operational testing period. During this test period the facility must meet the following criteria:
   a. Satisfactory operation at the rated capacity;
   b. Operation without violating the Contract Document requirements;
   c. Operation without creating a materially unsafe condition, nuisance condition or unacceptable risk to personnel, facilities, or the public;
   d. Operation without producing, air or water emissions, traffic, noise, odors, or other environmental impacts that the Owner, in its sole discretion, determines to be unacceptable to public safety, health, or welfare.

E. OperationalTesting Summary

1. An Operational Testing report shall be provided compiling all results of the testing including test forms, logs for each component, device, setpoint and other parameters tested indicating flow rates, levels, and other operational data and verification of successful completion.

3.06 STEP 4 – ACCEPTANCE TESTING

A. The fourth step in the program is **Acceptance Testing**. The Acceptance test period shall begin at the date of Substantial Completion when all new systems and equipment have successfully completed the operational test period.

B. The Contractor shall provide operation staff to operate and maintain the facility throughout the Acceptance Test period.

C. All spare parts, safety equipment, tools and maintenance equipment, lubricants, approved operation and maintenance data and the specified operation and maintenance instruction shall be

provided prior to the startup. The Owners and Contractors operation staff shall also receive training from the equipment and instrument suppliers, etc. prior to Acceptance Testing/start-up.

D. As part of the acceptance test plan the Contractor shall submit detailed Staffing Operations Plans, Work Plans, Communications Plan, Safety Plan, contingencies, and other requirements as outlined under tie-ins and modifications to existing systems (SC-24). Also an acceptance test overview and proposed spreadsheet forms to be utilized to record appropriate operational and performance data for each diversion event during the acceptance testing.

E. Instrumentation Acceptance Test

1. The instrument loop acceptance test shall fully demonstrate stable operation of the loop under normal operating conditions. This test shall be witnessed by the Engineer and performed and documented by the Instrumentation System Supplier.
2. Tuning parameters (proportional gain, integral time constant, and derivative time constant) for each control loop shall be adjusted to provide 1/4 amplitude damping unless otherwise specified and witnessed during system supplier factory testing.

F. Acceptance Test Report

1. A final Acceptance Testing report shall be provided compiling all results of the acceptance Test period. The report shall cover Dry Weather and Wet Weather events. An independent test report shall be provided for each Wet Weather event including test forms, logs for each component, device, setpoint and other parameters tested indicating flow rates, levels, and other operational data and verification of successful completion. The final Acceptance Test report shall compile all Wet Weather events and a summary of Dry Weather operation Flow Meters
2. Liquid flow meters, including all open channel flow meters and all meters installed in pipelines with diameters greater than two (2) inches shall be calibrated insitu using either the total count or dye dilution methods. Flow meter calibration work shall be performed by individuals skilled in the techniques to be employed. Calibration tests for flow metering systems shall be performed over a range of not less than 10 percent to at least 75 percent of system full scale. At least five (5) confirmed valid data points shall be obtained within this range and witnessed by the Engineer. Confirmed data points shall be validated by not less than three (3) test runs with results which agree within plus or minus two (2) percent.

G. In the event of failure to demonstrate satisfactory performance of the system on the first or any subsequent attempt, all necessary alterations, adjustments, repairs, and replacements shall be made. When the system is again ready for operation, it shall be brought on line and a new test shall be started. This procedure shall be repeated as often as necessary until the system has operated continuously to the satisfaction of the Owner and Engineer, for the specified duration.

H. All completed Acceptance test forms will be placed into the master record test plan binder and provided to the Owner prior to acceptance.

END OF SECTION 01650

SECTION 01664
TRAINING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related work specified elsewhere;

1. Section 01640- Manufacturer's Services.
2. Section 01650- Facility Startup.
3. Section 13000- Instrumentation, Control and Monitoring System General Requirements.

B. This section contains requirements for training the Owner's personnel, by persons retained by the Contractor specifically for the purpose, in the proper operation and maintenance of the equipment and systems installed under this Contract.

1.02 QUALITY ASSURANCE

A. Where required by the detailed specifications, the Contractor shall provide on-the-job training of the Owner's personnel. The training sessions shall be conducted by qualified, experienced, factory-trained representatives of the various equipment manufacturers. Training shall include instruction in both operation and maintenance of the subject equipment.

1.03 SUBMITTALS

A. The following information shall be submitted to the Engineer in accordance with paragraph GC-28 of the General Conditions. The material shall be reviewed and accepted by the Engineer as a condition precedent to receiving progress payments in excess of 75 percent of the Contract amount and not less than three (3) weeks prior to the commencement of training.

1. Lesson plans for each training session to be conducted by the manufacturer's representatives. In addition, training manuals, handouts, visual aids, and other reference materials shall be included.
2. Subject of each training session, identity and qualifications of individuals to be conducting the training, and tentative date and time of each training session.

PART 2 - PRODUCTS

2.01 GENERAL

A. Where specified, the Contractor shall conduct training sessions for the Owner's personnel to instruct the staff on the proper operation, care, and maintenance of the equipment and systems installed under this contract. Training shall take place at the site of the work after the equipment has been installed and tested and under the conditions specified in the following paragraphs. Approved operation and maintenance manuals shall be available at least thirty (30) days prior to the date scheduled for the individual training session.

2.02 LOCATION

A. Training sessions shall take place at the site of the Work.

2.03 LESSON PLANS

A. Formal written lesson plans shall be prepared for each training session. Lesson plans shall contain an outline of the material to be presented along with a description of visual aids to be utilized during the session. Each plan shall contain a time allocation for each subject.

B. One complete set of originals of the lesson plans, training manuals, handouts, visual aids, and reference material shall be the property of the Owner and shall be suitably bound for proper organization and easy reproduction. The Contractor shall furnish ten (10) copies of necessary training manuals, handouts, visual aids and reference materials at least one (1) week prior to each training session.

2.04 FORMAT AND CONTENT

A. Each training session shall be comprised of time spent both in the classroom and at the specific location of the subject equipment or system. As a minimum, training session shall cover the following subjects for each item of equipment or system:

1. Familiarization:
   a. Review catalog, parts lists, drawings, etc., which have been previously provided for the plant files and operation and maintenance manuals.
   b. Check out the installation of the specific equipment items.
   c. Demonstrate the installed unit and indicate how all parts of the specifications are met.
   d. Answer questions.
2. Safety:
   a. Using material previously provided and installed equipment, review safety references.
   b. Discuss proper precautions around equipment.
3. Operation:
   a. Using material previously provided and installed equipment, review reference literature.
   b. Explain all modes of operation (including emergency).
   c. Check out Owner's personnel on proper use of the equipment.
4. Preventive Maintenance:
   a. Using material previously provided and installed equipment, review preventive maintenance (PM) lists including:
      i) Reference material.
      ii) Daily, weekly, monthly, quarterly, semi-annual, and annual jobs.
   b. Show how to perform PM jobs.
   c. Show Owner's personnel what to look for as indicators of equipment problems.
5. Corrective Maintenance:
   a. List possible problems.
   b. Discuss repairs; point out special problems.
   c. Open up installed equipment and demonstrate procedures, where practical.

6. Parts:
   a. Show how to use previously provided parts list and order parts.
   b. Check over spare parts on hand. Make recommendations regarding additional parts that should be available.
7. Local Representatives:
   a. Where to Order Parts: Name, address, and telephone.
   b. Service Problems:
      i) Who to call.
      ii) How to get emergency help.
8. Operation and Maintenance Manuals:
   a. Review any other material submitted.
   b. Update material, as required.

2.05 VIDEO RECORDING

A. The Owner will retain the services of a commercial video taping service to record each training session. After taping, the material may be edited and supplemented by the Owner with professionally produced graphics to provide a permanent record. The Contractor shall advise all manufacturers providing training sessions that the material will be video taped and shall make available to the Owner's videotaping Contractor such utility services and accommodation as may be required to facilitate the production of the video tape record.

PART 3 - EXECUTION

3.01 GENERAL

A. Training shall be conducted in conjunction with the operational testing and commissioning periods. Classes shall be scheduled such that classroom sessions are interspersed with field instruction in logical sequence. The Contractor shall arrange to have the training conducted on consecutive days, with no more than six (6) hours of classes scheduled for any one day. Concurrent classes shall not be allowed. Contractor/Manufacturer is to plan for up to three (3) classes in any twenty-four (24) hour period to ensure all shifts are properly trained

B. Acceptable operation and maintenance manuals for the specific equipment shall be provided to the Owner prior to the start of any training. Video taping shall take place concurrently with all training sessions.

C. The following services shall be provided for each item of equipment or system as required in individual specification sections. Additional services shall be provided, where specifically required in individual specification sections.

   1. As a minimum classroom equipment training for operations personnel will include:
      a. Using slides and drawings, discuss the equipment's specific location in the plant and an operational overview.
      b. Purpose and plant function of the equipment.
      c. A working knowledge of the operating theory of the equipment.
      d. Startup, shutdown, normal operation, and emergency operating procedures, including a discussion on system integration and electrical interlocks, if any.

e. Identify and discuss safety items and procedures.

f. Routine preventative maintenance, including specific details on lubrication and maintenance of corrosion protection of the equipment and ancillary components.

g. Operator detection, without test instruments, of specific equipment trouble symptoms.

h. Required equipment exercise procedures and intervals.

i. Routine disassembly and assembly of equipment if applicable (as judged by the Owner on a case-by-case basis) for purposes such as operator inspection of equipment.

2. As a minimum, hands-on equipment training for operations personnel will include:
   a. Identify location of equipment and review the purpose.
   b. Identifying piping and flow options.
   c. Identifying valves and their purpose.
   d. Identifying instrumentation:
      iii) Location of primary element.
      iv) Location of instrument readout.
   e. Discuss purpose, basic operation, and information interpretation.
   f. Discuss, demonstrate, and perform standard operating procedures and routine checks.
   g. Discuss and perform the preventative maintenance activities.
   h. Discuss and perform startup and shutdown procedures.
   i. Perform the required equipment exercise procedures.
   j. Perform routine disassembly and assembly of equipment if applicable.
   k. Identify and review safety items and perform safety procedures, if feasible.

3. Classroom equipment training for the maintenance and repair personnel will include:
   a. Theory of operation.
   b. Description and function of equipment.
   c. Startup and shutdown procedures.
   d. Normal and major repair procedures.
   e. Equipment inspection and troubleshooting procedures including the use of applicable test instruments and the "pass" and "no pass" test instrument readings.
   f. Routine and long-term calibration procedures.
   g. Safety procedures.
   h. Preventative maintenance such as routine lubrication; normal maintenance such as belt, seal, and bearing replacement; and up to major repairs such as replacement of major equipment part(s) with the use of special tools, bridge cranes, welding jigs, etc.

4. Hands-on equipment training for maintenance and repair personnel shall include:
   a. Locate and identify equipment components.
   b. Review the equipment function and theory of operation.
   c. Review normal repair procedures.
   d. Perform startup and shutdown procedures.
   e. Review and perform the safety procedures.
   f. Perform Owner approved practice maintenance and repair job(s), including mechanical and electrical adjustments and calibration and troubleshooting equipment problems.

END OF SECTION 01664

SECTION 01800
MAINTENANCE

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor will be required to maintain stored and installed equipment and materials until Final Acceptance of the Work as defined by the General Conditions. Work included, but is not limited to:

1. Perform all required maintenance.
2. Repair and maintain protective coatings.
3. Repair and replace scratched and damaged materials and equipment.
4. Maintain and operate new equipment placed into service.

B. Work per this Section starts on the date the equipment and materials are received and continued until the Date of Final Acceptance.

C. Contractor will monitor equipment storage and subsequently the operation and material functionality on a continual basis during the specified time period. Any deterioration of materials or malfunction of equipment will be followed by swift repair action to minimize the damage. Such repair may include repair and technical services by an independent contractor if the Engineer deems the Contractor's efforts are ineffective in correcting the problem.

D. All costs for maintenance and repair of stored and installed equipment and materials, including costs from an independent contractor, during the specified time period will be the sole responsibility of the Contractor.

END OF SECTION 01800