CONTRACT DOCUMENTS

FOR

Manatee County Master Reuse Wet Weather Management Well System Project

ELLENTON, FLORIDA

Project Number 6079480

February 2017 (Bid Documents)

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INFRASTRUCTURE ENGINEERING STANDARD SPECIFICATIONS

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01005
GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE AND INTENT

A. Description: The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract.

B. Work Included:

1. The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, shop drawings, working drawings and other means of construction necessary or proper for performing and completing the work. He shall obtain and pay for all required permits necessary for the work, other than those permits such as the FDEP exploratory well construction permit which has already been obtained. He shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the County, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all incidental costs. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the Work.
2. The cost of incidental work described in these General Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made.
3. The Contractor shall be solely responsible for the adequacy of his workmanship, materials and equipment.

C. Public Utility Installations and Structures:

1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes and all other appurtenances and facilities pertaining thereto.

2. The Contractor shall protect all installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the County. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor which are shown on the Drawings or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as approved by the County. No separate payment shall be made for such protection or repairs to public utility installations or structures.
3. Public utility installations or structures owned or controlled by the County or other governmental body, which are required by this contract to be removed, relocated, replaced or rebuilt by the Contractor not identified in any separate bid item shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various contract items. No separate payment shall be made.
4. Where public utility installations or structures owned or controlled by the County or other governmental body are encountered during the course of the work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the County, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the County, for the contractor to accomplish. If such work is accomplished by the utility having jurisdiction, it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be in accordance with the General and Supplemental General Conditions.
5. The Contractor shall give written notice to County and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least 48 hours in advance of breaking ground in any area or on any unit of the work. This can be accomplished by making the appropriate contact with the "Sunshine State One-Call of Florida, Inc. Call Center ("Call Sunshine") and per all requirements provided for in the Florida Underground Facilities Damage Prevention and Safety Act (Florida Statutes, Title XXXIII, Chapter 556).
6. The maintenance, repair, removal, relocation or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the County.

1.02 DRAWINGS AND SPECIFICATIONS

A. Drawings: When obtaining data and information from the Drawings, figures shall be used in preference to scaled dimensions, and large scale drawings in preference to small scale drawings.

B. Copies Furnished to Contractor: The Contractor shall furnish each of the subcontractors, manufacturers, and material men such copies of the Contract Documents as may be required for their work. Additional copies of the Drawings and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.

C. Supplementary Drawings: When, in the opinion of the County, it becomes necessary to explain more fully the work to be done or to illustrate the work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the County and five paper prints thereof will be given to the Contractor.

D. Contractor to Check Plans and Data: The Contractor shall verify all dimensions, quantities and details shown on the Drawings, Supplementary Drawings, Schedules, Specifications or other data received from the County, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the County, should such errors or omissions be discovered. All schedules are given for the convenience of the County and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

E. Specifications: The Technical Specifications consist of three parts: General, Products and Execution. The General Section (or Scope) contains General Requirements which govern the work. Products (or Materials and Equipment) and Execution (or Workmanship) modify and supplement these by detailed requirements for the work and shall always govern whenever there appears to be a conflict.

F. Intent:

1. All work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.
2. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.
3. The inclusion of the Related Requirements (or work specified elsewhere) in the General part of the specifications is only for the convenience of the Contractor, and shall not be interpreted as a complete list of related Specification sections.

1.03 MATERIALS AND EQUIPMENT

A. Manufacturer:

1. All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the County, that the manufacturer or subcontractor deal directly with the County. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.
2. Any two or more pieces or material or equipment of the same kind, type or classification, and being used for identical types of services, shall be made by the same manufacturer.

B. Delivery: The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work so as to complete the work within the allotted time. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.

C. Tools and Accessories:

1. The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.
2. Spare parts shall be furnished as specified.
3. Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rating data.

D. Installation of Equipment:

1. The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character.
2. Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Drawings, unless directed otherwise by the County during installation. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.
3. The Contractor shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified. Anchor bolts shall be as approved by the County and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.
4. The Contractor shall furnish all materials and labor for, and shall properly bed in non-shrink grout, each piece of equipment on its supporting base that rests on masonry foundations.
5. Grout shall completely fill the space between the equipment base and the foundation. All metal surfaces coming in contact with concrete or grout shall receive a coat of coal tar epoxy equal to Koppers 300 M or provide a 1/32-inch Neoprene gasket between the metal surface and the concrete or grout.

E. Service of Manufacturer's Engineer: The Contract prices for equipment shall include the cost of furnishing (as required by equipment specifications sections) a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation the equipment in conformity with the Contract Documents. After the equipment is placed in permanent operation by the County, such engineer or superintendent shall make all adjustments and tests required by the County to prove that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the County in the proper operation and maintenance of such equipment.

F. Workmanship:

1. Contractor, in addition to furnishing the services of drillers experienced in the type of formations to be encountered, shall also furnish an adequate number of competent helpers. The drillers shall keep well logs and reports of the drilling, developing, and test-pumping operations. Drillers shall also be capable of making accurate classifications of the formations and handle representative rock cuttings and water samples as indicated in Section 02673, Drilling and Section 02311, Water Quality Testing and Sampling.
2. Contractor shall perform all Work in a workmanlike manner by qualified well drillers and shall conform with these Specifications.
3. Contractor and his personnel shall not make any representations about this Project without the written approval from the Owner.
4. Contractor shall furnish capable equipment to construct the well by rotary drilling with conventional mud and reverse-air circulation, as specified in Section 02673, Drilling. Contractor's drilling rigs, tools, equipment and methods shall be subject to Engineer's approval.

1.04 INSPECTION AND TESTING

A. General:

1. Inspection and testing of materials will be performed by the County unless otherwise specified.
2. For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Three copies of the reports shall be submitted and authoritative certification thereof must be furnished to the County as a prerequisite for the acceptance of any material or equipment.

3. If, in the making of any test of any material or equipment, it is ascertained by the County that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the County.
4. Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.
5. The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the County formally takes over the operation thereof.

B. Costs:

1. All inspection and testing of materials furnished under this Contract will be performed by the County or duly authorized inspection engineers or inspections bureaus without cost to the Contractor, unless otherwise expressly specified.
2. The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the Contract price.
3. Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the County for compliance. The Contractor shall reimburse the County for the expenditures incurred in making such tests on materials and equipment which are rejected for non-compliance.

C. Inspections of Materials: The Contractor shall give notice in writing to the County, at least 2 weeks in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture of preparation of materials. Upon receipt of such notice, the County will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or he will notify the Contractor that inspection will be waived. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

D. Certificate of Manufacture: When inspection is waived or when the County so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

E. Shop Tests of Operating Equipment:

1. Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the work until the County notifies the Contractor, in writing, that the results of such tests are acceptable.
2. The cost of shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

F. Preliminary Field Tests: As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make preliminary field tests of equipment. If the preliminary field tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to the acceptance tests, make all changes, adjustments and replacements required. The furnishing Contractor shall assist in the preliminary field tests as applicable.

G. Final Field Tests:

1. Upon completion of the work and prior to final payment, all equipment and piping installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.
2. The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment and instruments necessary for all acceptance tests, at no additional cost to the County. The Supplier shall assist in the final field tests as applicable.

H. Failure of Tests:

1. Any defects in the materials and equipment or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor. The decision of the County as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make these corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees of specified requirements, the County, notwithstanding its partial payment for work, and materials and equipment, may reject the materials and equipment and may order the Contractor to remove them from the site at his own expense.
2. In case the County rejects any materials and equipment, then the Contractor shall replace the rejected materials and equipment within a reasonable time. If he fails to do so, the County may, after the expiration of a period of 30 calendar days after giving him notice in writing, proceed to replace such rejected materials and equipment, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under his Contract.

I. Final Inspection: During such final inspections, the work shall be clean and free from water. In no case will the final pay application be prepared until the Contractor has complied with all requirements set forth and the County has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Document.

1.05 TEMPORARY STRUCTURES

A. Temporary Fences: If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall, at his own expense, if so ordered by the County, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The County shall be solely responsible for the determination of the necessity for providing a temporary fence and the type of temporary fence to be used.

1.06 SAFETY

A. Safety: The Contractor shall comply with safety requirements in accordance with Section 01016, Safety Requirements and Protection of Property.

B. First Aid: The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when people are employed on the work.

1.07 LINES AND GRADES

A. Grade: All work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as given by the County. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

B. Safeguarding Marks:

1. The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or removing without authorization such established points, stakes and marks.
2. The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

C. Datum Plane: All elevations indicated or specified refer to the Mean Sea Level Datum of the NGVD 1929 Datum and/or NAVD 1988.

1.08 ADJACENT STRUCTURES AND LANDSCAPING

A. Responsibility:

1. The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Drawings, and the removal, relocation and reconstruction of such items called for on the Drawings or specified shall be included in the various Contract Items and no separate payments will be made therefore. Where such public and private property, structures of any kind and appurtenances thereto are not shown on the Drawings and when, in the opinion of the County, additional work is deemed necessary to avoid interference with the work, payment therefore will be made as provided for in the General Conditions.

2. Contractor is expressly advised that the protection of buildings, structures, tunnels, tanks, pipelines, etc. and related work adjacent and in the vicinity of his operations, wherever they may be, is solely his responsibility. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the Work shall be performed by and be the responsibility of the Contractor.
3. Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the County. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the County.
4. Prior to the beginning of any excavations, the Contractor shall advise the County of all buildings or structures on which he intends to perform work or which performance of the project work will affect.

B. Protection of Trees:

1. All trees and shrubs shall be adequately protected by the Contractor with boxes and otherwise and in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by him with new stock of similar size and age, at the proper season and at the sole expense of the Contractor.
2. Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or the trees or structures carefully supported and protected from damage.
3. The County may order the Contractor, for the convenience of the County, to remove trees along the line or trench excavation. If so ordered, the County will obtain any permits required for removal of trees. Such tree removal ordered shall be paid for under the appropriate Contract Items.

C. Lawn Areas: Lawn areas shall be left in as good condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed, and later replaced, or the area where sod has been removed shall be restored with new sod.

D. Restoration of Fences: Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the work. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the County. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract Item or items, or if no specific Item is provided therefore, as part of the overhead cost of the work, and no additional payment will be made therefore.

1.09 PROTECTION OF WORK AND PUBLIC

A. Barriers and Lights: During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers and lights as will effectually prevent accidents. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public, in accordance with state and local requirements.

B. Smoke Prevention: A strict compliance with ordinances regulating the production and emission of smoke will be required. No open fires will be permitted.

C. Noise: The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all engines or other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

D. Access to Public Services: Neither the materials excavated nor the materials or plant used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.

E. Dust prevention: The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the roads and/or construction areas sprinkled with water at all times.

1.10 CUTTING AND PATCHING

A. The Contractor shall do all cutting, fitting or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the County and in accordance with the Drawings and Specifications. The work must be done by competent workmen skilled in the trade required by the restoration.

1.11 CLEANING

A. During Construction: During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the County, such material, debris, or rubbish constitutes a nuisance or is objectionable. The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops.

B. Final Cleaning:

1. At the conclusion of the work, all equipment, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.
2. The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished and new operating condition.

1.12 DRILLING SERVICES

A. Contractor shall, except as specifically stated in the Contract Documents, provide all labor, materials, equipment, tools, and other facilities and services necessary for proper completion of all Work included in these Contract Documents.

B. Contractor, in addition to furnishing the services of drillers experienced in the type of formations to be encountered, shall also furnish an adequate number of competent helpers. The drillers shall keep well logs and reports of the drilling, developing, and test-pumping operations. Drillers shall also be capable of making accurate classifications of the formations and handle representative rock cuttings and water samples as indicated in Section 02673, Drilling and Section 02311, Water Quality Testing and Sampling.

C. Contractor shall perform all Work in a workmanlike manner by qualified well drillers and shall conform with these Specifications.

D. Contractor and his personnel shall not make any representations about this Project without the written approval from the Owner.

E. Contractor shall furnish capable equipment to construct the well by rotary drilling with conventional mud and reverse-air circulation, as specified in Section 02673, Drilling. Contractor’s drilling rigs, tools, equipment and methods shall be subject to Engineer’s approval.

1.13 COORDINATION

A. Contractor shall maintain a superintendent on-site during all drilling, testing, and construction operations.

B. Contractor shall cooperate in the coordination of its work with the activities of other subcontractors in a manner that will provide the least interference with Owner's operations and other subcontractors and utility companies working in the area, and in the interfacing and connection of the separate elements of the overall project work without additional costs to Owner.

C. If any difficulty or dispute should arise in the accomplishment of the above, the problem shall be immediately brought to the attention of Owner.

D. Contractor's project superintendent shall hold monthly or bi-weekly construction coordination meetings to be held at the site during normal working hours when requested by Owner. No additional charge shall be made for attendance at the meetings.

E. All subcontractors working on this site are subject to this requirement for cooperation, and all shall abide by the Owner's decision in resolving Project coordination problems.

1.14 PERMITS

A. Upon Notice of Award, Contractor shall acquire all necessary permits with local and state regulatory agencies for the drilling of the injection wells and monitor wells.

B. Contractor shall be solely responsible for acquiring all other necessary permits and remaining in compliance with all permits. Drilling operations shall not commence until all other necessary construction permits have been obtained and submitted to Owner. No construction shall be allowed until all permits are obtained or written evidence is submitted to Owner demonstrating that the permitting agency has given permission to proceed.

C. Owner will secure the FDEP Well Construction Permit and provide a copy to the Contractor who is responsible for complying with all provisions of the permit.

1.15 SCHEDULING

A. Contractor shall plan the Work and carry it out with minimum interference to the Owner and other contractors. Prior to starting the work, Contractor shall confer with Engineer and Owner representatives to develop an approved work schedule which will allow the project to progress as normally as practical.

B. Contractor's normal working hours shall be defined as Monday through Friday from 7:00 a.m. to 7:00 p.m. However, an alternate schedule of continuous drilling (24 hours per day and 5 days per week) will be accepted. Variations of these work hours will be considered at the request of Contractor. Alternate schedules will only be considered if the noise level is determined to be acceptable to during non-daytime hours.

C. Contractor shall make every effort to avoid drilling and testing activities on nationally recognized holidays (i.e., Labor Day, Thanksgiving Day, Christmas Day, New Years Day, Independence Day, Memorial Day, etc.). Work schedules should reflect these dates in particular.

D. Contractor shall schedule all work or tests, which are attended by representatives of FDEP, to begin between the hours of 9:00 a.m. and 4:00 p.m., Monday through Friday, nationally recognized holidays excluded.

1.16 CONSTRUCTION SCHEDULE

A. If Bid A time of completion schedule is selected by the Owner, the drilling Contractor shall have construction of IW-1, DZMW-1, and APMW substantially complete within 420 days of Notice to Proceed (NTP), construction of IW-2 and DZMW-2 substantially complete with 840 days of Notice to Proceed, and all wells (IW-1, IW-2, IW-3, DZMW-1, DZMW-2, DZMW-3, and APMW) substantially complete within 1260 days of NTP. Final completion for Bid A schedule will be within 1290 days of NTP. Work will be considered substantially complete when all drilling and testing activities for the well system is complete. Final completion requires that site work is substantially complete and demobilization is complete. All site work is to be 100 percent complete at 1290 days (Bid A) and all equipment demobilized from the site before final payment is given. Failure to meet this schedule shall result in enforcement of Liquidated Damages, which are detailed in paragraph 6.0 of the Proposal.

B. If Bid B time of completion schedule is selected by the Owner, the drilling Contractor shall have construction of IW-1, DZMW-1, and APMW substantially complete within 420 days of NTP, construction of IW-2 and DZMW-2 substantially complete within 900 days of Notice to Proceed, and all wells (IW-1, IW-2, IW-3, DZMW-1, DZMW-2, DZMW-3, and APMW) substantially complete within 1440 days of NTP. Final completion for Bid B schedule will be within 1470 days of Notice to Proceed. Work will be considered substantially complete when all drilling and testing activities for the well system is complete. Final completion requires that site work is substantially complete and demobilization is complete. All site work is to be 100 percent complete at 1470 days (Bid B) and all equipment demobilized from the site before final payment is given. Failure to meet this schedule shall result in enforcement of Liquidated Damages, which are detailed in Paragraph 6.0 of the Proposal

C. The construction summary and schedule presented in Section 01010, Summary of Work, has been prepared to illustrate the general manner that the Engineer intends for project activities to proceed.

D. Upon award of the Contract and before start of construction, Contractor shall prepare and submit to the Engineer for his approval a detailed construction schedule containing anticipated start and completion dates for each of the steps in Section 01010, Summary of Work, as well as other major events as Contractor deems necessary.

1.17 PUBLIC NUISANCE

A. The Contractor shall not create a public nuisance including but not limited to encroachment on adjacent lands, flooding of adjacent lands, excessive noise or dust.

B. Sound levels must meet Manatee County Ordinance No. 87-34, (which amends Ordinance 81-3, The Manatee County Noise Control Ordinance). Sound levels in excess of such ordinance are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the County for excessive noise shall not relieve the Contractor of the other portions of this specification. Contractor may be required, at their own expense, to furnish all diesel driven equipment with hospital rated noise suppression mufflers.

C. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

1.18 OTHER REQUESTED WORK AND STANDBY TIME

A. During the progress of the work under these Specifications, it may be necessary for Engineer to perform work of an experimental nature that will require the services of the drilling crew and drilling equipment, or work that may require such crew and equipment to standby during normal working hours. In such an event, Engineer shall request Contractor to furnish such assistance and Contractor shall promptly furnish such assistance. The time required for this purpose shall be recorded on Contractor's daily log and Engineer's daily log. If there are discrepancies, the time noted on Engineer's daily log shall prevail. This time shall be paid as stated in Contractor's Bid Schedule.

1.19 MISCELLANEOUS

A. Protection against Siltation and Bank Erosion:

1. The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed water courses and drainage ditches.
2. The Contractor, at his own expense, shall remove any siltation deposits and correct any erosion problems as directed by the County which results from his construction operations.

B. Protection of Wetland Areas: The Contractor shall properly dispose of all surplus material, including soil, in accordance with Local, State and Federal regulations. Under no circumstances shall surplus material be disposed of in wetland areas as defined by the Florida Department of Environmental Protection or Southwest Florida Water Management District.

C. Existing Facilities: The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in the Special Provisions.

D. Use of Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

E. Environmental Protection: Contractor shall not cause nor permit an action to occur which would allow drilling fluids, saline waters or high saline content cuttings to escape the confines of the drilling pad and or containment tanks. Contractor shall remain solely responsible for any property damage, remediation costs, or regulatory fines which might result from such occurrences.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS/REQUIREMENTS INCLUDED

A. Work Included: This section describes the work to be performed under this Contract. Detailed requirements and extent of work are stated in applicable Specification sections and shown on the Drawings.

1. The project will generally provide Owner with the following:
   a. Two 12-inch nominal diameter Class I municipal injection wells (Total Depth [TD] up to 3,500 feet). The well will be completed with a final carbon steel casing cemented to land surface and is designed for disposal of excess reclaimed water.
   b. One 9-inch nominal diameter Class I industrial injection well (TD up to 3,500 feet). The well will be completed with a final fiberglass reinforced plastic (FRP) casing cemented to land surface and designed for disposal of excess reclaimed water, brine concentrate, and water treated at the Water Reclamation Facility (WRF) that does not meet high level disinfection standards.
   c. Three 6-inch nominal diameter Deep Zone Monitoring Wells (DZMW), with an anticipated depth of approximately 1,600 feet. The wells will be located not more than 150 feet from each Class I injection well.
   d. Conversion of an existing onsite Avon Park Test Production well (TD 1,015 feet bls) to a monitoring well.
   e. Piping, valves, instruments, pipe supports, concrete pad, painting, and other miscellaneous site work.

B. The Contractor shall furnish all Shop Drawings, working drawings, labor, materials, equipment, tools, services and incidentals necessary to complete all work required by these Specifications and as shown on the Contract Drawings.

C. The Contractor shall perform the work complete, in place and ready for continuous service and shall include any repairs, replacements, and/or restoration required as a result of damages caused prior to acceptance by the County.

D. The Contractor shall furnish and install all materials, equipment and labor which is reasonably and properly inferable and necessary for the proper completion of the work, whether specifically indicated in the Contract Documents or not.

E. Owner reserves the right to award any or all of the Contract parts to Contractor, as best serves the interest of Owner. All parts thereof which shall be constructed shall be awarded to one Contractor. Owner further reserves the right to select which part to perform first, and the order of the parts performed thereafter. Time is of the essence in this Contract and the time of completion must be met for the whole project.

F. Owner may elect to stop the project at any time. If so, Contractor will not be awarded any additional payment except for the work performed up to that time and demobilization and cleanup. The Owner will not pay for stored materials if the project is stopped.

G. The injection capacity determined from the initial Class I municipal injection well will, in large part, determine whether the additional two Class I injection wells will be constructed at the site.

H. Contractor shall not begin work on all remaining wells until construction and testing of the initial well is completed and authorization is provided by Owner.

I. Contractor shall, except as otherwise specifically stated in applicable parts of these Contract Documents, provide and pay for labor, materials, equipment, tools, construction equipment, facilities, and services necessary for proper execution, testing, and completion of the work.

J. Work Parts include the following:

Part I: IW-1
Part II: IW-2
Part III: IW-3
Part IV: Construction of Deep Zone Monitoring Well (DZMW-1)
Part V: Construction of Deep Zone Monitoring Well (DZMW-2)
Part VI: Construction of Deep Zone Monitoring Well (DZMW-3)
Part VII: Avon Park Monitoring Well Conversion (APMW)

Bid A and Bid B include each of these parts and are different only in the time of completion.

K. List of Drawings:

Drawing No.	Drawing Title
1	Location Map
2	Site Plan
3	Pad Monitoring Well Detail
4	Conceptual Class I Injection Well System Well
5	IW Temporary Wellhead Completion Details

Drawing No.	Drawing Title
6	DZMW and APMW Temporary Wellhead Completion
7	Acidization Setup
005-Y-2001	Injection Well #1 Enlarged Plan
D008-N-6001	P&ID Injection Well #1
950-Y-501	Yard Piping Standard Details
950-Y-502	Yard Piping Standard Details

1.02 CONTRACTS

A. Construct all the Work under a single contract.

1.03 WORK SEQUENCE

A. The sequence of operations will be generally as outlined in Part 3 Execution contained at the end of this section.

B. All work done under this Contract shall be done with a minimum of inconvenience to the users of the system or facility. The Contractor shall coordinate his work with private property owners such that existing utility services are maintained to all users to the maximum extent possible.

C. The Contractor shall, if necessary and feasible, construct the work in stages to accommodate the County's use of the premises during the construction period; coordinate the construction schedule and operations with the County's Representative.

D. The Contractor shall, where feasible, construct the Work in stages to provide for public convenience and not close off public use of any facility until completion of construction to provide alternative usage.

1.04 CONSTRUCTION AREAS

A. The Contractor shall: Limit his use of the construction areas for work and for storage, to allow for:

1. Work by other contractors.
2. County’s use.
3. Public use.

B. Coordinate use of work site under direction of County's Representative.

C. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

D. Move any stored products under the Contractor's control, which interfere with operations of the County or separate contractor.

E. Obtain and pay for the use of additional storage of work areas needed for Contractor operations.

1.05 COUNTY OCCUPANCY

A. It is assumed that portions of the Work will be completed prior to completion of the entire Work. Upon completion of construction of each individual facility, including testing, if the County, at its sole discretion, desires to accept the individual facility, the Contractor will be issued a dated certificate of completion and acceptance for each individual facility. The County will assume ownership and begin operation of the individual facility on that date and the three-year guaranty period shall commence on that date. The County has the option of not accepting the entire work as a whole until it is completed, tested and approved by the County.

1.06 PARTIAL COUNTY OCCUPANCY

A. The Contractor shall schedule its operations for completion of portions of the Work, as designated, for the County's occupancy prior to substantial completion of the entire work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Site proposed Class I injection wells and associated monitoring wells at approved location as shown on Drawing No. 2.

B. Contractor shall submit cuttings disposal plan to FDEP for approval. Approval must be received prior to initiating any drilling activities. Contractor shall also provide specific drilling pad dimensions and design drawings for FDEP-approval prior to initiating drilling activities.

C. Install four shallow surficial aquifer pad monitor wells around the drilling pads and sample for FDEP required parameters weekly during well construction. Initial sampling results shall be submitted to FDEP prior to any drilling for the respective wells.

D. Control any potential artesian flowing zones by drilling with a containment system using closed circulation reverse-air drilling methods. A blowout preventer is required while drilling in the Floridan aquifer. Contractor shall be prepared to kill well with barite or salt if necessary.

E. Record drilling information during all pilot hole drilling, including penetration rate, voids, water producing zones, etc., in daily reports prepared during all drilling activities. Engineer's resident inspector and Contractor shall prepare independent daily reports, which will be submitted weekly throughout the drilling period to the FDEP along with a brief summary of the week's activities.

F. Run a mechanical drift indicator in pilot holes and reamed holes at intervals not greater than 90 feet. Tool scale shall clearly delineate 10 minutes or less. Any deviation in plumbness greater than 1 degree shall be corrected by the drilling Contractor at its own expense.

3.02 EXPLORATORY DRILLING PHASE: IW-1 AND IW-2

A. The construction and testing sequence outlined below is for each of the exploratory Class I municipal injection wells (IW-1 and IW-2).

B. Construct a temporary drilling pad to contain all fluids during drilling operations. Install pad monitoring wells at each of the four corners of the temporary pad and monitor the four wells throughout the drilling and testing period in accordance with the FDEP permit requirements.

C. Install a 42-inch diameter pit casing through unconsolidated surficial deposits. Section 02674, Casing provides a summary of the casing specifications for the well. Drawing 4 shows the completion details for injection well. The estimated depth of the pit casing is 60 feet below land surface (bls). The casing installation method shall be at the Contractor's discretion.

D. Drill nominal 8-inch to 12-inch diameter pilot hole to a depth of approximately 350 feet bls using standard mud rotary drilling techniques. The goal of this pilot hole will be to penetrate the fresh water aquifer units to the Tampa Member of the Hawthorn Group. Collect drill cuttings/samples every 10 feet to the total depth of the well and describe visually in a lithologic log. Include hydrogeologic-related information as applicable.

E. Record drilling information during all pilot-hole drilling, including penetration rate, voids, water producing zones, etc., in daily reports prepared during all drilling activities. Engineer's resident inspector and Contractor shall prepare independent daily reports, which will be submitted weekly throughout the drilling period to the FDEP along with a brief summary of the week's activities.

F. Ream pilot hole to nominal 41-inch diameter borehole to a depth of approximately 350 feet bls. Perform logging in accordance with Section 02679, Geophysical Logging.

G. Set and cement nominal 32-inch diameter surface casing to approximately 350 feet bls to isolate the surficial aquifer and Hawthorn Aquifer from the UFA and case through the clay units of the Hawthorn Group to facilitate drilling the remainder of the well using reverse-air drilling methods. Section 02674, Casing, provides a summary of the casing specifications for the well.

H. A mechanical drift indicator shall be run in pilot holes and reamed holes at intervals not greater than 90 feet. Tool scale shall clearly delineate 10 minutes or less. Any deviation in plumbness greater than 1 degree shall be corrected by the drilling Contractor at its own expense.

I. Drill a nominal 8-inch to 12-inch diameter pilot hole to approximately 1,800 feet bls using standard reverse-air drilling techniques. The goal of the pilot hole will be to fully penetrate the USDW in the upper Avon Park Formation and extend into the middle confining unit.

J. During reverse-air drilling activities, collect water samples (Table 02311-1, List A) approximately every 90 feet during pilot hole drilling (approximately 350 to 1,800 feet). Collect drill cuttings/samples every 10 feet to the total depth of the well and describe visually in a lithologic log. Include hydrogeologic-related information as applicable. Perform short-term (approximately 30-minute duration) drill stem specific capacity tests that includes a water sampling event at approximately every 60 feet.

K. Upon reaching approximately 1,800 feet, perform geophysical logging under static and dynamic conditions in the open borehole in accordance with Table 02679-1 to the total depth of the pilot hole. Engineer to select depth for deep intermediate casing using drilling, lithologic, and geophysical logs.

L. Complete up to two straddle packer or off-bottom packer tests within the interval from 350 feet to 1,800 feet. Collect hydraulic data and water quality data during the packer testing. The goal of these packer tests will be to define the base of the lowermost USDW and determine the deep intermediate casing setting depth. Two separate tests will be run at each packer test setting depth, testing below the packer and above the packer (annulus). At the end of each packer test collect quality water quality samples in accordance with Table 02311-1, List B.

M. Engineer to propose a deep intermediate casing setting depth to the FDEP for approval. Complete well as described below and as shown on Drawing 4.

N. Plug back pilot hole with cement through confining intervals between approximately 1,800 feet and approximately 1,100 feet.

O. Ream pilot hole to nominal 31-inch borehole to approximately 1,600 feet bls. Perform logging in accordance with Table 02679-1.

P. Set and pressure grout nominal 24-inch diameter intermediate casing to approximately 1,600 feet bls. Section 02674, Casing, provides a summary of the casing specifications for the well.

Q. Drill a nominal 12-inch diameter pilot hole to approximately 3,500 feet bls using standard reverse-air drilling techniques. The goal of the pilot hole will be to fully penetrate the permeable zones in the LFA and into less permeable units below.

R. During reverse-air drilling activities, collect water samples (Table 02311-1, List A) at every other drill rod connection (approximately every 90 feet) during pilot hole drilling (approximately 1,600 to 3,500 feet). Collect drill cuttings/samples every 10 feet to the total depth of the well and describe visually in a lithologic log. Include hydrogeologic-related information as applicable. Perform short-term (approximately 30-minute duration) drill stem specific capacity tests at every other drilling rod connection that includes a water sampling event (approximately every 90 feet).

S. During pilot-hole advancement, collect up to four 4-inch diameter, 10-foot length core sections. Cores will target potential confining intervals above the proposed injection zone. Cores will be shipped to a core laboratory for hydraulic testing of the core confining properties.

T. Upon reaching the total depth of the pilot hole, perform geophysical logging under static and dynamic conditions in the open borehole in accordance with Table 02679-1 to the total depth of the pilot hole.

U. Complete up to four straddle packer or off-bottom packer tests within the interval from approximately 1,600 feet to 3,500 feet. Collect hydraulic data and water quality data during the packer testing. The goal of these packer tests will be to evaluate hydraulic characteristics of the proposed injection interval, and to define ambient groundwater quality. Two separate tests will be run at each packer test setting depth, testing below the packer and above the packer (annulus). At the end of each packer test collect quality water quality samples in accordance with Table 02311-1, List B.

V. If data confirm the presence of an adequate injection zone, Engineer shall propose a final casing setting depth to the FDEP for approval. Receive concurrence from FDEP and complete well as described below and as shown in Drawing 4 and as described below.

3.03 COMPLETION OF MUNICIPAL CLASS I INJECTION WELLS IW-1 AND IW-2

A. Set drillable bridge plug in pilot hole near top of selected injection zone.

B. Plug back pilot hole with cement through confining interval above the injection zone.

C. Ream pilot hole to nominal 24 inches in diameter using mud rotary or reverse-air closed circulation drilling techniques, as appropriate. Perform logging in accordance with Table 02679-1.

D. Set and cement nominal 12-inch diameter carbon steel casing to approximately 2,000 feet bls to isolate the LFA from the permeable intervals of the upper Avon Park Formation and the confinement of the middle Avon Park Formation (Middle Confining Unit II). Section 02674, Casing provides a summary of the casing specifications for the well. Run temperature survey following each cementing stage to confirm cement fill in the annulus. The top 200 feet of annulus shall remain un-cemented until performance of the cement bond log (CBL) to assist with tool calibration during logging. Cement the top 200 feet after performing the CBL.

E. Perform geophysical logging in accordance with Table 02679-1.

F. Complete pressure test on 12-inch diameter final casing following final cement stage on well. The pressure test will utilize the cement plug at the base of the injection casing. Pressurize casing to 1.5 times the anticipated maximum necessary injection pressure in the well. The pressure test is estimated to be run at between 150 and 200 psi. The pressure test will be deemed successful if the pressure change is within plus or minus 5 percent of the starting pressure after one hour of testing. Repeat pressure test, as necessary, until pressure test is deemed successful.

G. Drill out the cement plug and re-establish nominal 12-inch open hole from base of 12-inch diameter casing to total depth of the well using reverse-air drilling, closed circulation techniques. The total depth of the well is anticipated to extend to as deep as 3,500 feet bls.

H. Develop open-hole interval of injection well using air-lift and pumping and surging well development practices. Develop until clear water is produced from the well and until water quality is acceptable to onsite geologist. Collect one water sample in accordance with Table 02311-1 (List C) at the end of the development period of the first injection well to establish background water quality of the injection zone. Background water quality sampling for subsequent injection wells at the site will include primary and secondary inorganic compound drinking water standards (DWS) listed in Florida Administrative Code (FAC) 62-550, Table 1 (primary DWS) and Table 6 (secondary DWS).

I. Following well development, perform geophysical logging in accordance with Table 02679-1. Run video log to total depth of well. Perform dynamic radioactive tracer survey (RTS) to demonstrate external mechanical integrity of the injection well.

J. Complete a 4-hour variable-rate pumping test and/or recirculation test followed by a recovery test on the finished well. Water for the injection test will be from the injection zone and will be stored onsite. Contractor will be required to have a minimum of 100,000 gallons of storage onsite to perform this test. Collect up to two water samples in accordance with Table 02311-1 (List B) near the beginning and middle of the pump out test. Collect one water sample in accordance with Table 02311-1 (List C) at the end of the testing period. Note: This test will be conducted following completion of the monitoring wells (shown on Drawing No. 4) to allow monitoring of water level impacts in this well during the test.

K. If required, acidize injection well in accordance with Section 02684, Well Acidization.

L. Demobilize all equipment from site and restore site to original or better condition. Remove drilling pad and complete temporary wellhead as shown in Drawing No. 5 for IW-2; and Drawings 005-Y-2001, D008-N-6001, 950-Y-501, 950-Y-502 for IW-1.

3.04 EXPLORATORY DRILLING PHASE: IW-3

A. The construction and testing sequence outlined below is for the exploratory Class I industrial injection well (IW-3). The location is proposed to be at the NRWRF, however depending on the results of IW-1 and IW-2, the County may elect to construct the well at the SEWRF.

B. Construct a temporary drilling pad to contain all fluids during drilling operations. Install pad monitoring wells at each of the four corners of the temporary pad and monitor the four wells throughout the drilling and testing period in accordance with the FDEP permit requirements.

C. Install a 48-inch diameter pit casing through unconsolidated surficial deposits. Section 02674, Casing provides a summary of the casing specifications for the well. Drawing 4 shows the completion details for the Class I industrial injection well. The estimated depth of the pit casing is 60 feet below land surface (bls). The casing installation method shall be at the Contractor's discretion.

D. Drill nominal 8-inch to 12-inch diameter pilot hole to a depth of approximately 350 feet bls using standard mud rotary drilling techniques. The goal of this pilot hole will be to penetrate the fresh water aquifer units to the Tampa Member of the Hawthorn Group. Collect drill cuttings/samples every 10 feet to the total depth of the well and describe visually in a lithologic log. Include hydrogeologic-related information as applicable.

E. Record drilling information during all pilot-hole drilling, including penetration rate, voids, water producing zones, etc., in daily reports prepared during all drilling activities. Engineer's resident inspector and Contractor shall prepare independent daily reports, which will be submitted weekly throughout the drilling period to the FDEP along with a brief summary of the week's activities.

F. Ream pilot hole to nominal 47-inch diameter borehole to a depth of approximately 350 feet bls. Perform logging in accordance with Section 02679, Geophysical Logging.

G. Set and cement nominal 34-inch diameter surface casing to approximately 350 feet bls to isolate the surficial aquifer and Hawthorn Aquifer from the UFA and case through the clay units of the Hawthorn Group to facilitate drilling the remainder of the well using reverse-air drilling methods. Section 02674, Casing, provides a summary of the casing specifications for the well.

H. A mechanical drift indicator shall be run in pilot holes and reamed holes at intervals not greater than 90 feet. Tool scale shall clearly delineate 10 minutes or less. Any deviation in plumbness greater than 1 degree shall be corrected by the drilling Contractor at its own expense.

I. Drill a nominal 8-inch to 12-inch diameter pilot hole to approximately 1,800 feet bls using standard reverse-air drilling techniques. The goal of the pilot hole will be to fully penetrate the USDW in the upper Avon Park Formation and extend into the middle confining unit.

J. During reverse-air drilling activities, collect water samples (Table 02311-1, List A) approximately every 90 feet during pilot hole drilling (approximately 350 to 1,800 feet). Collect drill cuttings/samples every 10 feet to the total depth of the well and describe visually in a lithologic log. Include hydrogeologic-related information as applicable. Perform short-term (approximately 30-minute duration) drill stem specific capacity tests that includes a water sampling event at approximately every 60 feet.

K. Upon reaching approximately 1,800 feet, perform geophysical logging under static and dynamic conditions in the open borehole in accordance with Table 02679-1 to the total depth of the pilot hole. Engineer to select depth for final casing using drilling, lithologic, and geophysical logs.

L. Complete up to two straddle packer or off-bottom packer tests within the interval from 350 feet to 1,800 feet. Collect hydraulic data and water quality data during the packer testing. The goal of these packer tests will be to define the base of the lowermost USDW and determine the deep intermediate casing setting depth. Two separate tests will be run at each packer test setting depth, testing below the packer and above the packer (annulus). At the end of each packer test collect quality water quality samples in accordance with Table 02311-1, List B.

M. Engineer to propose a deep intermediate casing setting depth to the FDEP. Complete well as described below and as shown on Drawing 4.

N. Plug back pilot hole with cement through confining intervals between approximately 1,800 feet and approximately 1,100 feet.

O. Ream pilot hole to nominal 33-inch borehole to approximately 1,600 feet bls. Perform logging in accordance with Table 02679-1.

P. Set and pressure grout nominal 26-inch diameter intermediate casing to approximately 1,600 feet bls. Section 02674, Casing, provides a summary of the casing specifications for the well.

Q. Drill a nominal 12-inch diameter pilot hole to approximately 3,500 feet bls using standard reverse-air drilling techniques. The goal of the pilot hole will be to fully penetrate the permeable zones in the LFA and into less permeable units below.

R. During reverse-air drilling activities, collect water samples (Table 02311-1, List A) at every other drill rod connection (approximately every 90 feet) during pilot hole drilling (approximately 1,600 to 3,500 feet). Collect drill cuttings/samples every 10 feet to the total depth of the well and describe visually in a lithologic log. Include hydrogeologic-related information as applicable. Perform short-term (approximately 30-minute duration) drill stem specific capacity tests at every other drilling rod connection that include a water sampling event (approximately every 90 feet).

S. During pilot-hole advancement, collect up to four 4-inch diameter, 10-foot length core sections. Cores will target potential confining intervals above the proposed injection zone. Cores will be shipped to a core laboratory for hydraulic testing of the core confining properties.

T. Upon reaching the total depth of the pilot hole, perform geophysical logging under static and dynamic conditions in the open borehole in accordance with Table 02679-1 to the total depth of the pilot hole.

U. Complete up to six straddle packer or off-bottom packer tests within the interval from 1,600 feet to 3,500 feet. Collect hydraulic data and water quality data during the packer testing. The goal of these packer tests will be to evaluate hydraulic characteristics of the proposed injection interval, define ambient groundwater quality. Two separate tests will be run at each packer test setting depth, testing below the packer and above the packer (annulus). At the end of each packer test collect quality water quality samples in accordance with Section 02311, Water Quality Testing and Sampling, Table 02311-1, List B.

V. If data confirm the presence of an adequate injection zone, Engineer shall propose a final casing setting depth to the FDEP for approval. Receive concurrence from FDEP and complete well as described below and as shown in Drawing 4.

3.05 COMPLETION OF INDUSTRIAL CLASS I INJECTION WELL IW-3

A. Set drillable bridge plug in pilot hole near top of selected injection zone.

B. Plug back pilot hole with cement through confining interval above the injection zone.

C. Ream pilot hole to nominal 26 inches in diameter using reverse-air closed circulation drilling techniques. Perform logging in accordance with Table 02679-1.

D. Set and cement nominal 16-inch diameter carbon steel casing to approximately 2,000 feet bls to isolate the LFA from the permeable intervals of the upper Avon Park Formation and the confinement of the middle Avon Park Formation (Middle Confining Unit II). Section 02674, Casing provides a summary of the casing specifications for the well. Run temperature survey following each cementing stage to confirm cement fill in the annulus. The top 200 feet of annulus shall remain un-cemented until performance of the cement bond log (CBL) to assist with tool calibration during logging. Cement the top 200 feet after performing the CBL.

E. Perform geophysical logging in accordance with Table 02679-1.

F. Complete pressure test on 16-inch diameter final casing following final cement stage on well. The pressure test will utilize the cement plug at the base of the injection casing. Pressurize casing to 1.5 times the anticipated maximum necessary injection pressure in the well. The pressure test is estimated to be run at between 150 and 200 psi. The pressure test will be deemed successful if the pressure change is within plus or minus 5 percent of the starting pressure after one hour of testing. Repeat pressure test, as necessary, until pressure test is deemed successful.

G. Drill out the cement plug and re-establish the nominal 12-inch open hole from base of 16-inch diameter casing to total depth of the well using reverse-air drilling, closed circulation techniques. The total depth of the well is anticipated to extend to as deep as 3,500 feet bls.

H. Develop open-hole interval of injection well using air-lift and pumping and surging well development practices. Develop until clear water is produced from the well and until water quality is acceptable to onsite geologist. Collect one water sample in accordance with Table 02311-1 (List C) at the end of the development period of the first injection well to establish background water quality of the injection zone. Background water quality sampling for subsequent injection wells at the site will include primary and secondary inorganic compound drinking water standards (DWS) listed in Florida Administrative Code (FAC) 62-550, Table 1 (primary DWS) and Table 6 (secondary DWS).

I. Install a nominal 9.625-inch diameter (7.8-inch ID) fiberglass reinforced pipe (FRP) using an external casing packer or a cement basket at the bottom of the 16-inch diameter casing at a depth of 2,000 feet bls. The type of packer or cement basket must be approved by the Engineer prior to use. Cement the FRP tubing to land surface using neat cement grout. The alternative completion using a cement filled annulus is proposed in lieu of a fluid filled annulus for the injection well tubing final completion.

J. Pressure test the FRP tubing at an anticipated pressure of between 150 and 200 psi. The casing will be sealed using a downhole inflatable packer.

K. Following well development, perform geophysical logging in accordance with Table 02679-1. Run video log to total depth of well. Perform dynamic radioactive tracer survey (RTS) to demonstrate external mechanical integrity of the injection well.

L. Complete a 4-hour variable-rate pumping test and/or recirculation test followed by a recovery test on the finished well. Water for the injection test will be from the injection zone and will be stored onsite. Contractor will be required to have a minimum of 100,000 gallons of storage onsite. Collect up to two water samples in accordance with Table 02311-1 (List B) near the beginning and middle of the pump out test. Collect one water sample in accordance with Table 02311-1 (List C) at the end of the testing period. Note: This test will be conducted following completion of the monitoring wells (shown on Drawing No. 4) to allow monitoring of water level impacts in this well during the test.

M. If required, acidize IW-3 in accordance with Section 02684, Well Acidization.

N. Demobilize all equipment from site and restore site to original or better condition. Remove drilling pad and complete temporary wellhead as shown in Drawing No. 5.

3.06 CONSTRUCT DEEP ZONE MONITOR WELL (DZMW-1, DZMW-2, DZMW-3)

A. Locate a deep zone monitoring well (DZMW) within 150 feet of each injection well as shown on Drawing No. 2. The goal for this well will be to confirm that the injected fluids do not cause endangerment to the USDW.

B. Construct a temporary drilling pad to contain all fluids during drilling operations. Construct four pad monitoring wells and monitor in accordance with the requirements of the FDEP well construction permit.

C. Install a 24-inch diameter pit casing through unconsolidated surficial deposits. Section 02674, Casing, provides a summary of the casing specifications for the well. Drawing No. 4 shows the completion details for the deep zone monitoring wells. The estimated depth of the surface casing is 60 feet bls. The casing installation method shall be at the Contractor's discretion.

D. Drill nominal 8-inch to 12-inch diameter pilot hole to a depth of approximately 350 feet bls using standard mud rotary drilling techniques. Perform logging in accordance with Table 02679-1. The goal of this pilot hole will be to penetrate the fresh water units to the Tampa Member of the Hawthorn Group. Collect drill cuttings/samples every 10 feet to the total depth of the well and describe visually in a lithologic log. Include hydrogeologic-related information as applicable.

E. Record drilling information during all pilot-hole drilling, including penetration rate, voids, water producing zones, etc., in daily reports prepared during all drilling activities. Engineer's resident inspector and Contractor shall prepare independent daily reports, which will be submitted weekly throughout the drilling period to the FDEP along with a brief summary of the week's activities.

F. Ream pilot hole to nominal 23-inch borehole to approximately 350 feet bls. Perform logging in accordance with Table 02679-1.

G. Set and cement nominal 16-inch diameter surface casing to approximately 350 feet bls to isolate the surficial aquifer and Hawthorn aquifer from the UFA and case through the clay units of the Hawthorn Group to facilitate drilling the remainder of the well using reverse-air drilling methods. Section 02674, Casing provides a summary of the casing specifications for the well.

H. A mechanical drift indicator shall be run in pilot holes and reamed holes at intervals not greater than 90 feet. Tool scale shall clearly delineate 10 minutes or less. Any deviation in plumbness greater than 1 degree shall be corrected by the drilling Contractor at its own expense.

I. Drill a nominal 8-inch to 12-inch diameter pilot hole to approximately 1,600 feet bls using standard reverse-air drilling techniques. The goal of the pilot hole will be to fully penetrate the USDW in the upper Avon Park Formation to the top of the middle confining unit.

J. Perform logging in accordance with Table 02679-1.

K. Complete up to two straddle packer or off-bottom packer tests within the interval from 350 feet to 1,600 feet. Collect hydraulic data and water quality data during the packer testing. The goal of these packer tests will be to evaluate hydraulic characteristics of the proposed injection interval, define ambient groundwater quality. Two separate tests will be run at each packer test setting depth, testing below the packer and above the packer (annulus). At the end of each packer test collect quality water quality samples in accordance with Table 02311-1, List B.

L. Engineer to propose a final casing setting depth to the FDEP for approval. Complete well as described below, as approved by FDEP, and as shown on Drawing 4.

M. Plug back pilot hole with neat cement through confining interval, set bridge plug as necessary prior to back-plugging pilot hole.

N. Ream pilot hole to nominal 15-inch borehole to approximately 1,600 feet bls. Perform logging in accordance with Table 02679-1.

O. Set and cement nominal 6-inch diameter FRP casing using cement baskets to approximately 1,500 feet bls. The top 200 feet of annulus shall remain un-cemented until performance of the cement bond log (CBL) to assist with tool calibration during logging. Cement the top 200 feet after performing the CBL Section 02674, Casing provides a summary of the casing specifications for the well.

P. Develop open-hole intervals of the monitoring zone using air-lift and pumping and surging well development practices. Develop until clear water is produced from the well and until water quality is acceptable to onsite geologist.

Q. Following well development, perform geophysical logging under static and dynamic conditions in accordance with Table 02679-1. During dynamic logging, run a constant rate pump test to estimate aquifer parameters at this well.

R. Collect a background water sample in accordance with Table 02311-1 (List C) following development and geophysical logging of the well.

S. Complete temporary wellhead to control fluids in well until final wellhead and appurtenances are constructed.

T. Remove drilling pad, demobilize all equipment from site, and restore site to original condition.

3.07 AVON PARK MONITORING WELL CONVERSION

A. Convert the existing ASR test well at the NRWRF to an APHPZ monitoring well (APMW-1). The location of the existing well is shown on Drawing 2. The existing well consists of 8-inch diameter steel casing to 890 feet with a total depth of 1,015 feet bls. This is proposed to be the single Avon Park high permeability zone monitoring well for the 3-injection well system.

B. Install gravel access road to APMW from existing gravel road as shown on Drawing 2.

C. Develop open-hole intervals of the monitoring zone using air-lift and pumping and surging well development practices. Develop until clear water is produced from the well and until water quality is acceptable to onsite geologist.

D. Perform a background suite of geophysical logging under static and dynamic conditions in the open borehole in accordance with Table 02679-1 to the total depth of the well. This logging event is intended to confirm the existing condition of the well and to confirm well completion details.

E. Based on the well completion information and the condition of the well documented with geophysical logging, propose a final open hole interval depth, and or casing liner depth to the FDEP. If necessary, mobilize rig and deepen open hole using reverse-air drilling methods to depth agreed upon by FDEP.

F. If open hole is deepened, re-develop open-hole intervals of the monitoring zone using air-lift and pumping and surging well development practices. Develop until clear water is produced from the well and until water quality is acceptable to onsite geologist.

G. Following well development, perform geophysical logging in accordance with Table 02679-1.

H. Conduct a short term constant rate specific capacity test and collect a background water sample in accordance with Table 02311-1 (List C).

I. Complete temporary wellhead to control fluids in well until final wellhead and appurtenances are constructed.

J. Demobilize all equipment from site, and restore site to original or better condition.

END OF SECTION

SECTION 01015
CONTROL OF WORK

PART 1 GENERAL

1.01 WORK PROGRESS

A. The Contractor shall furnish personnel and equipment which will be efficient, appropriate and adequately sized to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Contract. If at any time such personnel appears to the County to be inefficient, inappropriate, or insufficient for securing the quality of work required for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character, or increase the personnel and equipment and the Contractor shall conform to such order. Failure of the County to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

1.02 PRIVATE LAND

A. The Contractor shall not enter or occupy private land outside of easements, except by permission of the affected property owner.

1.03 WORK LOCATIONS

A. Work shall be located substantially as indicated on the drawings, but the County reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons.

1.04 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the County may require special construction procedures such as limiting the length of open trench, prohibiting stacking excavated material in the street and requiring that the trench shall not remain open overnight.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be barricaded and well lighted at all times when construction is not in progress.

1.05 DISTRIBUTION SYSTEMS AND SERVICES

A. The Contractor shall avoid interruptions to water, telephone, cable TV, sewer, gas, or other related utility services. He shall notify the County and the appropriate agency well in advance of any requirement for dewatering, isolating, or relocating a section of a utility, so that necessary arrangements may be made.

B. If it appears that utility service will be interrupted for an extended period, the County may order the Contractor to provide temporary service lines at the Contractor's expense. Inconvenience of the users shall be kept to the minimum, consistent with existing conditions. The safety and integrity of the systems are of prime importance in scheduling work.

1.06 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. The Contractor shall assume full responsibility for the protection of all buildings, structures and utilities, public or private, including poles, signs, services to building utilities, gas pipes, water pipes, hydrants, sewers, drains and electric and telephone cables and other similar facilities, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operation shall be repaired by the Contractor at his expense.

B. The Contractor shall bear full responsibility for obtaining locations of all underground structures and utilities (including existing water services, drain lines and sewers). Services to buildings shall be maintained and all costs or charges resulting from damage thereto shall be paid by the Contractor.

C. Protection and temporary removal and replacement of existing utilities and structures as described in this section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the unit prices established in the Bid.

D. If, in the opinion of the County, permanent relocation of a utility owned by the County is required, he may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work as classified in the General Conditions. If relocation of a privately owned utility is required, the County will notify the utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the County and utility and shall have no claim for delay due to such relocation. The Contractor shall notify public utility companies in writing at least 48 hours (excluding Saturdays, Sundays and legal holidays) before excavating near their utilities.

1.07 TEST PITS

A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor immediately after the utility location and the surface shall be restored in a manner equal or better than the original condition. No separate payment will be made.

1.08 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition equal or better to that existing before the damage was done, or he shall make good the damage in another manner acceptable to the County.

B. All sidewalks which are disturbed by the Contractor's operations shall be restored to their original or better condition by the use of similar or comparable materials. All curbing shall be restored in a condition equal to the original construction and in accordance with the best modern practice.

C. Along the location of this work, all fences, walks, bushes, trees, shrubbery and other physical features shall be protected and restored in a thoroughly workmanlike manner unless otherwise shown on the drawings. Fences and other features removed by the Contractor shall be replaced in the location indicated by the County as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be regraded and sodded to equal or exceed original conditions.

D. Trees close to the work which drawings do not specify to be removed, shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification to the County. All injuries to bark, trunk, limbs and roots of trees shall be repaired by dressing, cutting and painting according to approved methods, using only approved tools and materials.

E. The protection, removal and replacement of existing physical features along the line of work shall be a part of the work under the Contract and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Bid.

1.09 MAINTENANCE OF TRAFFIC

A. Open pits, trenches, unpaved streets, debris, or other obstructions due to construction that will prevent the normal flow of traffic during an extended construction stoppage, for any reason, shall be minimized. In the event an extended construction stoppage is found to be necessary, Contractor shall, at his own expense, provide normal traffic flow during extended construction stoppage. Extended stoppage will be defined by the County.

B. All excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary roadways, erect wheel guards or fences, or take other safety measures which are satisfactory to the County.

C. Any changes to the traffic pattern require a traffic control plan as detailed in Section 01570, Traffic Regulation of this Specification.

1.10 WATER FOR CONSTRUCTION PURPOSES

A. In locations where public water supply is available, the Contractor may purchase water for all construction purposes.

B. The Contractor shall be responsible for paying for all water tap fees incurred for the purpose of obtaining a potable water service or temporary use meter.

1.11 MAINTENANCE OF FLOW

A. The Contractor shall at his own cost, provide for the flow of sewers, drains and water courses interrupted during the progress of the work and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the County well in advance of the interruption of any flow.

1.12 CLEANUP

A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operations and shall leave the entire site of the work in a neat and orderly condition.

1.13 COOPERATION WITHIN THIS CONTRACT

A. All firms or person authorized to perform any work under this Contract shall cooperate with the General Contractor and his subcontractors or trades and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the County.

1.14 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions injured shall be reconstructed by the Contractor at his own expense.

B. All structures shall be protected in a manner approved by the County. Should any of the floors or other parts of the structures become heaved, cracked, or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor, at his own expense and to the satisfaction of the County. If, in the final inspection of the work, any defects, faults, or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the warranty period described in the Contract.

C. Further, the Contractor shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the County.

1.15 CONSTRUCTION WITHIN RIGHT-OF-WAY

A. Where pipe lines are installed within FDOT right-of-way, all excavation backfill and compaction for the purpose of reconstructing roadways and/or adjacent slopes contiguous thereto shall be in accordance with FDOT or Manatee County Standards and Specifications, whichever is applicable. Contractor shall satisfy the authorized representative of the FDOT with respect to proper safety procedures, construction methods, required permitting, etc., within the FDOT right-of-way.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01016
SAFETY REQUIREMENTS AND PROTECTION OF PROPERTY

PART 1 GENERAL

1.01 WORK INCLUDED

A. All Work completed by Contractor shall be accomplished in accordance with Contractor's submitted Site Health and Safety Plan and in accordance with Owner's Corporate and Site-Specific Health and Safety compliance requirements.

PART 2 PRODUCTS

2.01 GENERAL

A. Contractor agrees that each employee, while on the project site, shall wear the protective clothing and use all equipment specified in Contractor's Site Health and Safety Plan. These requirements shall apply continuously.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. Contractor shall comply with its own Site Health and Safety Plan for the health and safety of persons and property in the vicinity of the Work area. All Work shall be performed in accordance with the Site Health and Safety Plan. Noncompliance by Contractor or its personnel with the Site Health and Safety Plan is grounds for a stop work order or dismissal of Contractor with payment only for the Work completed.

B. Contractor shall develop and maintain, for the duration of this contract, a safety program that will effectively implement all required safety provisions. Contractor shall appoint an employee qualified to supervise and enforce compliance with the safety program. Contractor, as a part of its safety program, shall maintain at the jobsite, safety equipment applicable to the Work, including articles necessary for administering first-aid to the injured, and shall establish a procedure for the immediate removal to a hospital or a doctor's care of any person (including Contractor's employee) who may be injured on the jobsite.

C. The duty of Engineer to conduct review of Contractor's performance is not intended to include a review or approval of the adequacy of Contractor's health and safety supervisor, the Health and Safety Program, or any safety measures taken in, on, or near the site.

D. Contractor shall be familiar with and comply with all applicable safety codes, ordinances, and statutes, and bear sole responsibility for the penalties imposed for noncompliance.

E. Contractor shall submit the name, address, and phone number of a responsible individual or individuals who will be available on a 24-hour basis to handle all emergency problems in connection with this project. Engineer and authorized government agents, and their representatives, shall at all times be provided safe access to the Work wherever it is in progress, and Contractor shall provide facilities for such access and for inspection.

F. Contractor shall do all work necessary to protect the general public from hazards including, but not limited to, open boreholes, water sumps, and trenches or excavation. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the Work. During well construction, Contractor shall construct and at all times maintain satisfactory and substantial railing, barricades, shoring, or steel plates, as applicable, at all pits, sumps, trenches, or ditches. All such barriers shall have adequate warning lights as necessary, or required, for safety.

PART 4 PAYMENT

4.01 GENERAL

A. Payment for all work, materials, and equipment specified in this section will be at the unit price lump sum stated in Contractor's Unit Price Bid Schedule for Mobilization (Pay Item Nos. I-1, II-1, III-1, IV-1, V-1, VI-1 and VII-1). All other Work specified in this Section shall be considered incidental to the project cost and expenses, and shall be included as part of Contractor's Bid.

END OF SECTION

SECTION 01092
ABBREVIATIONS

PART 1 GENERAL

1.01 SUMMARY

A. This section lists many of the construction industry organizations, professional and technical associations, societies and institutes, and government agencies issuing, promoting, or enforcing standards to which references may be made in these Documents, as well as abbreviations commonly used for those references. Also included are certain general requirements for use of industry standards specified, and application of quality control standards.

1.02 USE OF REFERENCE STANDARDS

A. Work specified by reference to the published standard or specification of a government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall conform to or surpass the minimum standards of materials and workmanship quality established by the designated standard or specification.

B. Where so specified, products or workmanship shall also conform to the additional prescriptive or performance requirements included within these Documents to establish a higher or more stringent standard of quality than that required by the referenced standard.

C. Where the specific date or issue of the standard is not included with the reference to the standard, the latest edition, including all amendments published and available on the first published date of the Invitation to Bid, shall apply.

D. In case of conflict between referenced standards, the Engineer shall determine which shall apply.

E. Where two or more standards are specified to establish quality, the product and workmanship shall conform to or surpass the requirements of both.

F. Where both a standard and a brand name are specified for a product in the Contract Documents, the proprietary product named shall conform to or surpass the requirements of the specified reference standard. The listing of a trade name in a Contract Document shall not be construed as warranting that such product conforms to the respective reference standard.

G. Copies of Standards:

1. Copies of applicable referenced standards have not been bound in these Contract Documents.

2. Where copies of standards are needed by the Contractor for superintendent and quality control of the work, obtain a copy or copies at Contractor's expense directly from the publication source and maintain in an orderly manner at the job site, available to the Contractor's personnel, subcontractors, Owner, and Engineer.
3. Submittals: Submit for approval the requests to use products conforming to printed standards or publications with a different publication date from that effective under the Contract. Clearly indicate the changes in product or workmanship quality involved in the proposed change, if any, and reasons for the request.

1.03 ABBREVIATIONS

A. Table 01092-1 is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations noted.

TABLE 01092-1

ABBREVIATION	DESCRIPTION
AA	Aluminum Association
ACI	American Concrete Institute
AGA	American Gas Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
APMW	Avon Park Monitor Well
APHPZ	Avon Park High Permeability Zone
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BLS	Below Land Surface
BOP	Blowout Preventer
CBL	Cement Bond Log
CF	Cubic Foot
CRSI	Concrete Reinforcing Steel Institute
DWS	Drinking Water Standards
DZMW	Deep Zone Monitor Well
EA	Each
FAR	Field Activity Report
FDEP	Florida Department of Environmental Protection
FGS	Florida Geological Survey

TABLE 01092-1	
ABBREVIATION	**DESCRIPTION**
FS	Federal Specifications
FT	Feet
GPM	Gallons per Minute
HI	Hydraulic Institute
HR	Hours
IW	Injection Well
LFA	Lower Floridan Aquifer
LS	Lump Sum
MCU	Middle Confining Unit
MGD	Million Gallons Per Day
MI	Mechanical Integrity
MSDS	Material Safety Data Sheets
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NRWRF	North Regional Water Reclamation Facility
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Act (both Federal and State)
PMW	Pad Monitoring Well
RTS	Radioactive Tracer Survey
SEWRF	Southeast Water Reclamation Facility
SWFWMD	Southwest Florida Water Management District
SK	Sacks
SWWRF	Southwest Water Reclamation Facility
UFA	Upper Floridan Aquifer
UIC	Underground Injection Control
USDW	Underground Source of Drinking Water
USEPA	United States Environmental Protection Agency

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01150
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Payment for the work to be completed under this project will be based upon the unit prices bid by the Contractor and on the Bid Forms submitted by Contractors and accepted by Owner.

B. It is the intent of the Owner to make payment for construction associated with the Project using the Pay Items in the Bid, and specify method of measurement and payment for all listed Pay Items. As may be noted below, incidental work which may be associated with a specific Pay Item is to be included in the cost proposed by the bidding contractor for that Pay Item. It is not the intent of the Owner to allow for additional compensation beyond those Pay Items included in the Schedule of Quantities and Unit Prices Bid Form submitted by the Contractor. It is therefore important that all Bidders fully acquaint themselves with all Plans, Specifications, Drawings, and other details pertaining to the Work.

C. Work not shown or called out in either the Drawings or the Specifications, but necessary in carrying out the intent of the Project or in the complete and proper execution of the Work, is required and shall be performed by the Contractor as though it were specifically delineated or described. No additional compensation will be considered for this associated and necessary Work.

D. Damage caused by the construction activities to existing utilities including sewers and force mains, potable and reclaimed water mains and house services, underground electrical cable, TV and telephone cable and all other infrastructure shall be the sole responsibility of the Contractor. No additional payment will be made for replacement or restoration of these infrastructure components.

1.02 SUBMITTALS

A. Informational:

1. Schedule of Payment Forms: Submit on Manatee County Standard Forms PMD-1 (Application for Payment) and PMD-2 (Pay Application Schedule) with Schedule of Quantities and Unit Prices bid documentation, for approval by the Owner.

2. Monthly Progress Payments:
    a. Submit request for monthly progress payment in accordance with the measurement and payment requirements of this section of the specifications, the general conditions, and the agreement for approval by the Owner.
    b. Monthly applications for payment shall be provided to the Owner showing work completed through and including the 25th of the pay month in question.
3. Final Application for Payment: Submit request for final payment upon completion of all work required by the contract. A final application for payment will not be reviewed by the Owner until all work under the contract is complete. Utilize Manatee County Standard Forms PMD-8 (Certificate of Substantial Completion) and PMD-9 (Final Reconciliation, Warranty Period declaration and Contractor's Affidavit) as a part of the final payment application process.

1.03 APPLICATION FOR PAYMENT

A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment. Execute certification by authorized officer of Contractor.

B. Use detailed Application for Payment Form as approved by the Owner.

C. Preparation:

1. Calculate payment using measured lump sum quantities and unit price bid values for each pay item based upon that work actually constructed or furnished to the nearest cent.
2. List each Change Order and Written Amendment executed prior to date of submission as separate line item. Totals to equal those shown on the Transmittal Summary Form for each schedule as applicable.
3. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s).

1.04 MEASUREMENT—GENERAL

A. Quantities to be paid will be based on field measurements made by the Contractor and agreed to by Engineer and the Owner.

1.05 ESTIMATED QUANTITIES

A. The quantities shown are approximate and are given only as a basis of calculation upon which the award of the Contract is to be made. The Owner/Engineer does not assume any responsibility for the final quantities, nor shall the Contractor claim misunderstanding because of such estimate of quantities. The Owner has the right to change the listed quantities as they deem necessary. Final payment will be made only for satisfactorily completed quantity of each item.

1.06 MEASUREMENT AND PAYMENT

A. General:

1. The Contractor shall receive and accept the compensation provided in his Bid and defined in the Agreement as full payment for furnishing all materials and all labor, tools and equipment, for performing all operations necessary to complete the work under the project. It is the intent of these contract documents that any cost for which compensation is not directly provided by a bid item shall be prorated and included in the bid item for which they are required.
2. The prices stated in the Contractor's Schedule of Quantities and Unit Prices Bid Form include all costs and expenses for taxes, labor, materials, equipment, commissions, transportation charges and expenses, patent fees and royalties, labor for handling material during inspection together with any and all other costs and expenses for performing and completing the work as shown on the plans and specified herein. The basis of payment for any item at the unit price shown in the bid form shall be in accordance with the description of that item in this section. All work performed shall be in strict accordance with these Specifications.
3. No separate payment will be made for the following items, the cost of such work shall be included in the applicable contract pay items of work, including compliance with FDEP or any other agency:
    a. Shop Drawings, working drawings or other contractor documentation.
    b. Clearing and grubbing.
    c. Excavation, including shoring, sheeting and bracing as required by OSHA trench excavation safety standards.
    d. Dewatering and proper disposal of all water.
    e. Backfill and proper compaction, including suitable fill and all grading.
    f. Traffic and pedestrian control as required to complete the work and described in Section 01005, General Requirements.

g. Protection, repair, replacement of existing utilities, damaged as a result of construction activities.
h. Replacement or restoration of grass, trees and shrubbery in non-paved areas within established pay limits.
i. Replacement or restoration of paved or unpaved roadways, grass and shrubbery plots damaged as a result of construction activities.
j. Temporary facilities and controls during construction such as water/sanitary facilities, traffic control, informational signs and environmental protection, unless specifically provided for in a pay item.
k. Removing and disposing of waste material due to construction.
l. Cleanup and restoring the job site to its original condition, which includes but is not necessarily limited to restoring the ground surface to its original grade.
m. Testing of the system.
n. Any material and equipment required to be installed and used for the tests.
o. Maintaining the existing quality of service during construction.
p. Appurtenant work as required for a complete and operable system.
q. Coordination with all Federal, State and Local agencies and utilities.
r. Tree trimming as required by Manatee County or any other agency.
s. Repair of private irrigation systems damaged during construction.
t. Furnishing and installing suitable temporary fences, as directed by the Owner, to adequately secure areas protected by a permanent fence when that permanent fence must be removed. The temporary fence shall remain in place until the permanent fence is replaced.

B. The Contractor's attention is again called to the fact that the bids for the various items of work are intended to establish a total price for completing the work in its entirety. Should the Contractor feel that the cost for any item of work has not been established by the Bid or Contract Pay Items, he shall include the cost for that work in some other applicable bid item, so that his Bid for the project does reflect his total price for completing the work in its entirety.

C. The quantities for payment under this Agreement shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the Engineer or Owner, in accordance with the applicable method of measurement therefore. A representative of the Contractor shall witness all field measurements. Measurements shall be accomplished to the following accuracy unless otherwise specified:

Item	Measurement Accuracy	Method of Measurement
EA	Each	Each—Field Count by Engineer or Owner
LBS	100 LBs	100 pounds—Field Measured by Engineer or Owner
LS	One	Lump Sum—Unit is one; no measurement will be made. Payment will be made after full completion of the work item.
Gal	Gal	Gallon—Verification of Delivery Manifest by Engineer or Owner (gallon increments will be paid to nearest whole gallon used by field measure)
FT	Feet	Unit of length - Field Measured by Engineer or Owner
FT3	Cubit Feet	Volume - Field Measured by Engineer or Owner based on field count of whole bags of grout used
HR	Hours	Hour—As Recorded by Engineer or Owner. Measured to the nearest 0.5 hour.
YD3	Cubit Yard	Volume - Field Measured by Engineer or Owner based on verification with Delivery Manifest

D. All work and materials shall be in accordance with the Technical Specifications and Drawings herein. All materials shall be furnished by the Contractor.

1.07 BID ITEM DESCRIPTIONS

A. The following bid items establish a breakdown of the work to be performed under this Project. The bid item description, method of measurement and basis for payment are listed below for each of the bid items that are a part of this Project:

PART I IW-1

BID ITEM I-1: MOBILIZATION

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for the movement of personnel, equipment,

supplies and incidentals to the project site. Includes all work as specified in Section 01505, Mobilization/Demobilization and Site Work. Also include the costs of any bonds, maintenance of traffic and other pre-construction expenses necessary for the start of the Work under this Contract Item. The cost of all other work as shown, specified, directed or required for the expressed intent of the project that is not specifically included under other Contract Items shall also be included under this Contract Item. The value of Bid Item I-1 shall not exceed 12 percent of the total value of the Part I. A total of 70 percent of the amount of Bid Item I-1 will be awarded following completion of mobilization and 30 percent will be awarded after successful completion of demobilization and cleanup.

Measurement and Payment for Mobilization: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM I-2: SET PIT CASING

Description: Contractor shall provide and install pit casing to the depth selected by Contractor, complete as specified in Section 02674, Casing.

Measurement and Payment for SET PIT CASING: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM I-3: DRILL PILOT HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for drilling and sampling of boreholes by the rotary method, complete, during the drilling activities as specified in Section 02673, Drilling.

Measurement and Payment for DRILL PILOT HOLE: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM I-4: PILOT HOLE REAMING or OPEN HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for reaming pilot hole or drilling open hole by the rotary method, complete, as specified in Section 02673, Drilling.

Measurement and Payment for PILOT HOLE REAMING or OPEN HOLE: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM I-5: GEOPHYSICAL LOGGING

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for geophysical logging of the boreholes as specified in Section 02679, Geophysical Logging.

Measurement and Payment for Geophysical Logging: Shall be made at the unit price per logging event in accordance with the Bid Form. Standby time during logging shall be included Unit Price Bid price. No additional standby time shall be awarded during the logging events, including waiting on cement time for temperature logging following each stage of cementing the casings.

BID ITEM I-6: FURNISH AND INSTALL CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the well casing and all related fittings, appurtenances, and transition adapters, complete as specified in Section 02674, Casing.

Measurement and Payment for FURNISH AND INSTALL CASING: Payment will be made at the unit prices per foot installed in accordance with the Bid Form.

BID ITEM I-7: GROUT CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the grout seal as specified in Section 02677, Grout Seal.

Measurement and Payment for Grout Casing: Shall be made at the unit price per cubic foot of grout pumped in accordance with the Bid Form.

BID ITEM I-8: GRAVEL

Description: The Contractor shall furnish all labor, materials, and equipment necessary for emplacing clean gravel in highly permeable zones as specified in Section 02677, Grout Seal.

Measurement and Payment for Gravel: Shall be made at the unit price per cubic yard installed in accordance with the Bid Form.

BID ITEM I-9: PRESSURE TEST CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for demonstrating the final casing pressure test as specified in Section 02674, Casing and Section 02575, Mechanical Integrity Test.

Measurement and Payment for PRESSURE TEST CASING: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM I-10: CORING

Description: The Contractor shall furnish all labor, materials, and equipment necessary to drill, collect, and store core samples as specified in Section 02676, Coring.

Measurement and Payment for Coring: Shall be made at the unit price per foot recovered up to 10 feet per cored interval, in accordance with the Bid Form. At least 60 inches of core must be recovered in whole and undisturbed sections of not less than 6 inches in length. No payment for a core trip shall be made if the minimum recovery is not obtained.

BID ITEM I-11: PACKER TEST SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for installing and removing the packer, setting the packer, inflating the packer, installing and removing pumping equipment (including annular pump), deflating the packer, and removing the packer from the well as specified in Section 02987, Packer Testing. This will include all time and materials necessary for storing, managing, and disposing of water generated from the packer tests.

Measurement and Payment for Packer Test Setup: Shall be made at the Contract unit price in accordance with the Bid Form.

BID ITEM I-12: PACKER TEST PUMPING TIME

Description: The Contractor shall furnish all labor, materials, and equipment necessary for the pumping, data logging, and recovery testing during the packer test as specified in Section 02987, Packer Testing. This line item will not be used for the time required to manage and dispose of water generated from the packer test.

Measurement and Payment for Packer Test Pumping Time: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Payment to Contractor shall also be made at the same unit price for running the preliminary test to determine if a suitable hydraulic seal is obtained. Payment for running the annulus tests shall be included in the unit price per hour to the nearest 1/2-hour of pumping time.

BID ITEM I-13: PUMPING TEST SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for setup of pumping test, including furnishing, temporarily installing, and removing the high capacity pump, driver and associated discharge piping, and storage as specified in Section 02681, Pumping Test. This will include all time and materials necessary for storing, managing, and disposing of water generated from the pumping tests.

Measurement and Payment for Pumping Test Setup: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM I-14: PUMPING TEST PUMPING TIME

Description: The Contractor shall furnish all labor, materials, and equipment necessary for the pumping, data logging, recovery testing, and preliminary pumping test as specified in Section 02981, Pumping Testing. This line item will not be used for the time required to manage and dispose of water generated from the pumping test, unless an injection test is conducted, as directed by Engineer.

Measurement and Payment for Pumping Test Pumping Time: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for the pumping test during the time the equipment is not actually in use or in the event the pumping test is not performed for the full duration directed by Engineer.

BID ITEM I-15: DEVELOPMENT

Description: The Contractor shall furnish all labor, materials, and equipment necessary to complete development of well as specified in Section 02678, Well Development. This will include all time and materials necessary for storing, settling, filtering, managing, and disposing of water generated from the development.

Measurement and Payment for Development: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for development during the time the equipment is not actually in use or for any equipment repair, or for any time, in the opinion of Engineer, that the development procedure is not being accomplished in accordance with these Specifications, its direction, or both. Contractor will not be paid the hourly rate for development during the time required to manage and dispose of water generated from the development. Payment at the hourly rate shall constitute full compensation for all labor, materials, and equipment specified in this section. Includes setting of high capacity pump or other necessary equipment required to develop well. Development of the pad monitoring wells will be paid at the hourly rate.

BID ITEM I-16: TEMPORARY WELLHEAD

Description: The Contractor shall furnish all labor, materials, and equipment and services to construct wellhead piping complete in accordance with the Contract Documents. Includes aboveground and buried piping, valves, instruments, pipe supports, concrete pad, hot-tap, thrust restraint, painting, site work and all other components shown on the Drawings and indicated in the Specifications.

Measurement and Payment for Temporary Wellhead: Payment for all work, materials, and equipment shall be at the unit price and lump sum unit prices in accordance with the Bid Form.

BID ITEM I-17: STANDBY TIME

Description: Shutdown time of the equipment and crew for any portion of the normal working day (7:00 a.m. to 7:00 p.m., Monday through Friday unless otherwise approved) when Engineer's representative orders Work to cease or when other activities at the site preclude work by Contractor, as approved by Engineer's representative as specified in Section 02686, Standby Time and Down Time.

Measurement and Payment for Standby Time: Payment for standby time (resulting from each cause approved by Engineer) shall be at the unit price per hour, to the nearest half-hour per day in accordance with the Bid Form.

DOWNTIME: All downtime shall be at the sole expense of Contractor.

ENGINEER STANDBY TIME - If Engineer is notified to be on site and Contractor is not ready, then Engineer shall be reimbursed by Contractor at the rate of $200.00 per hour, during normal working hours, starting at the time scheduled by Contractor and notified to Engineer.

BID ITEM I-18: EXTRA WORK

Description: That time, other than standby time, during which Contractor is directed to provide all equipment and a crew to perform extra work not specifically addressed elsewhere in these Contract Documents.

Measurement and Payment for Extra Work: Payment for furnishing a crew and equipment to perform extra work at the direction of Engineer shall be at the unit price per hour in accordance with the Bid Form.

BID ITEM I-19: WATER SAMPLING

Description: The Contractor shall furnish all labor, materials, and equipment for water sampling and water quality testing work to be performed as specified in Section 02311, Water Quality Testing and Sampling.

Measurement and Payment for Water Sampling: Payment for all work, materials, and equipment specified in this section shall be at the Contract unit price in accordance with the Bid Form.

BID ITEM I-20: ACIDIZATION SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for acidization including well kills and storage, as specified in Section 02684, Well Acidization.

Measurement and Payment for Acidization Setup: Payment for all work, materials, and equipment to prepare the well for acidization shall be at the lump sum unit price in accordance with the Bid Form.

BID ITEM I-21: FURNISH AND EMPLACE ACID

Description: The Contractor shall furnish all labor, materials, and equipment necessary for acid emplacement in well, as specified in Section 02684, Well Acidization.

Measurement and Payment for Furnish and Emplace Acid: Payment for all work, materials, and equipment to furnish and emplace the acid in the well shall be at the unit price per gallon in accordance with the Bid Form.

PART II IW-2

BID ITEM II-1: MOBILIZATION

Description: Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for the movement of personnel, equipment, supplies and incidentals to the second injection well. Includes all work as specified in Section 01505 Mobilization/Demobilization and Site Work. The cost of all other work as shown, specified, directed or required for the expressed intent of the project that is not specifically included under other Contract Items shall also be included under this Contract Item. The value of Bid Item II-1 shall not exceed 12 percent of the total value of the Part II. A total of 70 percent of the amount of Bid Item II-1 will be awarded following completion of mobilization and 30 percent will be awarded after successful completion of demobilization and cleanup.

Measurement and Payment for Mobilization: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM II-2: SET PIT CASING

Description: Contractor shall provide and install pit casing to the depth selected by Contractor, complete as specified in Section 02674, Casing.

Measurement and Payment for Set Pit Casing: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM II-3: DRILL PILOT HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for drilling and sampling of boreholes by the rotary method, complete, during the drilling activities as specified in Section 02673, Drilling.

Measurement and Payment for Drill Pilot Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM II-4: PILOT HOLE REAMING or OPEN HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for reaming pilot hole or drilling open hole by the rotary method, complete, as specified in Section 02673, Drilling.

Measurement and Payment for Pilot Hole Reaming or Open Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM II-5: GEOPHYSICAL LOGGING

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for geophysical logging of the boreholes as specified in Section 02679, Geophysical Logging.

Measurement and Payment for Geophysical Logging: Shall be made at the unit price per logging event in accordance with the Bid Form. Standby time during logging shall be included Unit Price Bid price. No additional standby time shall be awarded during the logging events, including waiting on cement time for temperature logging following each stage of cementing the casings.

BID ITEM II-6: FURNISH AND INSTALL CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the well casing and all related fittings, appurtenances, and transition adapters, complete as specified in Section 02674, Casing.

Measurement and Payment for Furnish and Install Casing: Payment will be made at the unit prices per foot installed in accordance with the Bid Form.

BID ITEM II-7: GROUT CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the grout seal as specified in Section 02677, Grout Seal.

Measurement and Payment for Grout Casing: Shall be made at the unit price per cubic foot of grout pumped in accordance with the Bid Form.

BID ITEM II-8: GRAVEL

Description: The Contractor shall furnish all labor, materials, and equipment necessary for emplacing clean gravel in highly permeable zones as specified in Section 02677, Grout Seal.

Measurement and Payment for Gravel: Shall be made at the unit price per cubic yard installed in accordance with the Bid Form.

BID ITEM II-9: PRESSURE TEST CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for demonstrating the final casing pressure test as specified in Section 02674, Casing and Section 02575, Mechanical Integrity Test.

Measurement and Payment for Pressure Test Casing: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM II-10: CORING

Description: The Contractor shall furnish all labor, materials, and equipment necessary to drill, collect, and store core samples as specified in Section 02676, Coring.

Measurement and Payment for Coring: Shall be made at the unit price per foot recovered up to 10 feet per cored interval, in accordance with the Bid Form. At least 60 inches of core must be recovered in whole and undisturbed sections of not less than 6 inches in length. No payment for a core trip shall be made if the minimum recovery is not obtained.

BID ITEM II-11: PACKER TEST SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for installing and removing the packer, setting the packer, inflating the packer, installing and removing pumping equipment (including annular pump), deflating the packer, and removing the packer from the well as specified in Section 02987, Packer Testing. This will include all time and materials necessary for storing, managing, and disposing of water generated from the packer tests.

Measurement and Payment for Packer Test Setup: Shall be made at the Contract unit price in accordance with the Bid Form.

BID ITEM II-12: PACKER TEST PUMPING TIME

Description: The Contractor shall furnish all labor, materials, and equipment necessary for the pumping, data logging, and recovery testing during the packer test as specified in Section 02987, Packer Testing. This line item will not be used for the time required to manage and dispose of water generated from the packer test.

Measurement and Payment for Packer Test Pumping Time: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Payment to Contractor shall also be made at the same unit price for running the preliminary test to determine if a suitable hydraulic seal is obtained. Payment for running the annulus tests shall be included in the unit price per hour to the nearest 1/2-hour of pumping time.

BID ITEM II-13: PUMPING TEST SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for setup of pumping test, including furnishing, temporarily installing, and removing the high capacity pump, driver and associated discharge piping, and storage as specified in Section 02681, Pumping Test. This will include all time and materials necessary for storing, managing, and disposing of water generated from the pumping tests.

Measurement and Payment for Pumping Test Setup: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM II-14: PUMPING TEST PUMPING TIME

Description: The Contractor shall furnish all labor, materials, and equipment necessary for the pumping, data logging, recovery testing, and preliminary pumping test as specified in Section 02981, Pumping Testing. This line item will not be used for the time required to manage and dispose of water generated from the pumping test, unless an injection test is conducted, as directed by Engineer.

Measurement and Payment for Pumping Test Pumping Time: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for the pumping test during the time the equipment is not actually in use or in the event the pumping test is not performed for the full duration directed by Engineer.

BID ITEM II-15: DEVELOPMENT

Description: The Contractor shall furnish all labor, materials, and equipment necessary to complete development of well as specified Section 02678, Well Development. This will include all time and materials necessary for storing, settling, filtering, managing, and disposing of water generated from the development.

Measurement and Payment for Development: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for development during the time the equipment is not actually in use or for any equipment repair, or for any time, in the opinion of Engineer, that the development procedure is not being accomplished in accordance with these Specifications, its direction, or both. Contractor will not be paid the hourly rate for development during the time required to manage and dispose of water generated from the development. Payment at the hourly rate shall constitute full compensation for all labor, materials, and equipment specified in this section. Includes setting of high capacity pump or other necessary equipment required to develop well. Development of the pad monitoring wells will be paid at the hourly rate.

BID ITEM II-16: TEMPORARY WELLHEAD

Description: The Contractor shall furnish all labor, materials, and equipment for installing the well heads and various manually operated valves and check valves in the wellheads, complete as specified in Section 02689, Temporary Wellhead Capping and Valves, and in Drawings.

Measurement and Payment for Temporary Wellhead: Payment for all work, materials, and equipment shall be at the lump sum unit prices for temporary wellheads and pads in accordance with the Bid Form.

BID ITEM II-17: STANDBY TIME

Description: Shutdown time of the equipment and crew for any portion of the normal working day (7:00 a.m. to 7:00 p.m., Monday through Friday unless otherwise approved) when Engineer's representative orders Work to cease or when other activities at the site preclude work by Contractor, as approved by Engineer's representative as specified in Section 02686, Standby Time and Down Time.

Measurement and Payment for Standby Time: Payment for standby time (resulting from each cause approved by Engineer) shall be at the unit price per hour, to the nearest half-hour per day in accordance with the Bid Form.

DOWNTIME: All downtime shall be at the sole expense of Contractor.

ENGINEER STANDBY TIME - If Engineer is notified to be on site and Contractor is not ready, then Engineer shall be reimbursed by Contractor at the rate of $200.00 per hour, during normal working hours, starting at the time scheduled by Contractor and notified to Engineer.

BID ITEM II-18: EXTRA WORK

Description: That time, other than standby time, during which Contractor is directed to provide all equipment and a crew to perform extra work not specifically addressed elsewhere in these Contract Documents.

Measurement and Payment for Extra Work: Payment for furnishing a crew and equipment to perform extra work at the direction of Engineer shall be at the unit price per hour in accordance with the Bid Form.

BID ITEM II-19: WATER SAMPLING

Description: The Contractor shall furnish all labor, materials, and equipment for water sampling and water quality testing work to be performed as specified in Section 02311, Water Quality Testing and Sampling.

Measurement and Payment for Water Sampling: Payment for all work, materials, and equipment specified in this section shall be at the Contract unit price in accordance with the Bid Form.

BID ITEM II-20: ACIDIZATION SET UP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for acidization including well kills and storage, as specified in Section 02684, Well Acidization.

Measurement and Payment for Acidization Setup: Payment for all work, materials, and equipment to prepare the well for acidization shall be at the lump sum unit price in accordance with the Bid Form.

BID ITEM II-21: FURNISH AND EMPLACE ACID

Description: The Contractor shall furnish all labor, materials, and equipment necessary for acid emplacement in well, as specified in Section 02684, Well Acidization.

Measurement and Payment for Furnish and Emplace Acid: Payment for all work, materials, and equipment to furnish and emplace the acid in the well shall be at the unit price per gallon in accordance with the Bid Form.

PART III IW-3

BID ITEM III-1: MOBILIZATION

Description: Line Item III-1A.

The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for the movement of personnel, equipment, supplies and incidentals to the third injection well at the NRWRF. Includes all work as specified in Section 01505 Mobilization/Demobilization and Site Work. The cost of all other work as shown, specified, directed or required for the expressed intent of the project that is not specifically included under other Contract Items shall also be included under this Contract Item. The value of Bid Item III-1 shall not exceed 12 percent of the total value of the Part III. A total of 70 percent of the amount of Bid Item III-1 will be awarded following completion of mobilization and 30 percent will be awarded after successful completion of demobilization and cleanup.

Description: Line Item III-1B.

Mobilization to Southeast Water Reclamation Facility (SEWRF) for completion of IW-3. Includes the additional cost to mobilize to the offsite location. The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for the movement of personnel, equipment, supplies and incidentals to the third injection well at the SEWRF. Includes all work as specified in Section 01505 Mobilization/Demobilization and Site Work. The cost of all other work as shown, specified, directed or required for the expressed intent of the project that is not specifically included under other Contract Items shall also be included under this Contract Item. The sum of Bid Item III-1A. plus III-1B. shall not exceed 12 percent of the total value of the Part III. A total of 70 percent of the amount of Bid Item III-1 will be awarded following completion of mobilization and 30 percent will be awarded after successful completion of demobilization and cleanup.

Measurement and Payment for Mobilization: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM III-2: SET PIT CASING

Description: Contractor shall provide and install pit casing to the depth selected by Contractor, complete as specified in Section 02674, Casing.

Measurement and Payment for Set Pit Casing: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM III-3: DRILL PILOT HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for drilling and sampling of boreholes by the rotary method, complete, during the drilling activities as specified in Section 02673, Drilling.

Measurement and Payment for Drill Pilot Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM III-4: PILOT HOLE REAMING or OPEN HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for reaming pilot hole or drilling open hole by the rotary method, complete, as specified in Section 02673, Drilling.

Measurement and Payment for Pilot Hole Reaming or Open Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM III-5: GEOPHYSICAL LOGGING

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for geophysical logging of the boreholes as specified in Section 02679, Geophysical Logging.

Measurement and Payment for Geophysical Logging: Shall be made at the unit price per logging event in accordance with the Bid Form. Standby time during logging shall be included Unit Price Bid price. No additional standby time shall be awarded during the logging events, including waiting on cement time for temperature logging following each stage of cementing the casings.

BID ITEM III-6: FURNISH AND INSTALL CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the well casing and all related fittings, appurtenances, and transition adapters, complete as specified in Section 02674, Casing.

Measurement and Payment for Furnish and Install Casing: Payment will be made at the unit prices per foot installed in accordance with the Bid Form.

BID ITEM III-7: GROUT CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the grout seal as specified in Section 02677, Grout Seal.

Measurement and Payment for Grout Casing: Shall be made at the unit price per cubic foot of grout pumped in accordance with the Bid Form.

BID ITEM III-8: GRAVEL

Description: The Contractor shall furnish all labor, materials, and equipment necessary for emplacing clean gravel in highly permeable zones as specified in Section 02677, Grout Seal.

Measurement and Payment for Gravel: Shall be made at the unit price per cubic yard installed in accordance with the Bid Form.

BID ITEM III-9: PRESSURE TEST CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for demonstrating the final casing pressure test as specified in Section 02674, Casing and Section 02575, Mechanical Integrity Test.

Measurement and Payment for Pressure Test Casing: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM III-10: CORING

Description: The Contractor shall furnish all labor, materials, and equipment necessary to drill, collect, and store core samples as specified in Section 02676, Coring.

Measurement and Payment for Coring: Shall be made at the unit price per foot recovered up to 10 feet per cored interval, in accordance with the Bid Form. At least 60 inches of core must be recovered in whole and undisturbed sections of not less than 6 inches in length. No payment for a core trip shall be made if the minimum recovery is not obtained.

BID ITEM III-11: PACKER TEST SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for installing and removing the packer, setting the packer, inflating the packer, installing and removing pumping equipment (including annular pump), deflating the packer, and removing the packer from the well as specified in Section 02987, Packer Testing. This will include all time and materials necessary for storing, managing, and disposing of water generated from the packer tests.

Measurement and Payment for Packer Test Setup: Shall be made at the Contract unit price in accordance with the Bid Form.

BID ITEM III-12: PACKER TEST PUMPING TIME

Description: The Contractor shall furnish all labor, materials, and equipment necessary for the pumping, data logging, and recovery testing during the packer test as specified in Section 02987, Packer Testing. This line item will not be used for the time required to manage and dispose of water generated from the packer test.

Measurement and Payment for Packer Test Pumping Time: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Payment to Contractor shall also be made at the same unit price for running the preliminary test to determine if a suitable hydraulic seal is obtained. Payment for running the annulus tests shall be included in the unit price per hour to the nearest 1/2-hour of pumping time.

BID ITEM III-13: PUMPING TEST SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for setup of pumping test, including furnishing, temporarily installing, and removing the high capacity pump, driver and associated discharge piping, and storage as specified in Section 02681, Pumping Test. This will include all time and materials necessary for storing, managing, and disposing of water generated from the pumping tests.

Measurement and Payment for Pumping Test Setup: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM III-14: PUMPING TEST PUMPING TIME

Description: The Contractor shall furnish all labor, materials, and equipment necessary for the pumping, data logging, recovery testing, and preliminary pumping test as specified in Section 02981, Pumping Testing. This line item will not be used for the time required to manage and dispose of water generated from the pumping test, unless an injection test is conducted, as directed by Engineer.

Measurement and Payment for Pumping Test Pumping Time: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for the pumping test during the time the equipment is not actually in use or in the event the pumping test is not performed for the full duration directed by Engineer.

BID ITEM III-15: DEVELOPMENT

Description: The Contractor shall furnish all labor, materials, and equipment necessary to complete development of well as specified in Section 02678, Well Development. This will include all time and materials necessary for storing, settling, filtering, managing, and disposing of water generated from the development.

Measurement and Payment for Development: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for development during the time the equipment is not actually in use or for any equipment repair, or for any time, in the opinion of Engineer, that the development procedure is not being accomplished in accordance with these Specifications, its direction, or both. Contractor will not be paid the hourly rate for development during the time required to manage and dispose of water generated from the development. Payment at the hourly rate shall constitute full compensation for all labor, materials, and equipment specified in this section. Includes setting of high capacity pump or other necessary equipment required to develop well. Development of the pad monitoring wells will be paid at the hourly rate.

BID ITEM III-16: TEMPORARY WELLHEAD

Description: The Contractor shall furnish all labor, materials, and equipment for installing the well heads and various manually operated valves and check valves in the wellheads, complete as specified in Section 02689, Temporary Wellhead Capping and Valves, and in Drawings.

Measurement and Payment for Temporary Wellhead: Payment for all work, materials, and equipment shall be at the lump sum unit prices for temporary wellheads and pads in accordance with the Bid Form.

BID ITEM III-17: STANDBY TIME

Description: Shutdown time of the equipment and crew for any portion of the normal working day (7:00 a.m. to 7:00 p.m., Monday through Friday unless otherwise approved) when Engineer's representative orders Work to cease or when other activities at the site preclude work by Contractor, as approved by Engineer's representative as specified in Section 02686, Standby Time and Down Time.

Measurement and Payment for Standby Time: Payment for standby time (resulting from each cause approved by Engineer) shall be at the unit price per hour, to the nearest half-hour per day in accordance with the Bid Form.

DOWNTIME: All downtime shall be at the sole expense of Contractor.

ENGINEER STANDBY TIME - If Engineer is notified to be on site and Contractor is not ready, then Engineer shall be reimbursed by Contractor at the rate of $200.00 per hour, during normal working hours, starting at the time scheduled by Contractor and notified to Engineer.

BID ITEM III-18: EXTRA WORK

Description: That time, other than standby time, during which Contractor is directed to provide all equipment and a crew to perform extra work not specifically addressed elsewhere in these Contract Documents.

Measurement and Payment for Extra Work: Payment for furnishing a crew and equipment to perform extra work at the direction of Engineer shall be at the unit price per hour in accordance with the Bid Form.

BID ITEM III-19: WATER SAMPLING

Description: The Contractor shall furnish all labor, materials, and equipment for water sampling and water quality testing work to be performed as specified in Section 02311, Water Quality Testing and Sampling.

Measurement and Payment for Water Sampling: Payment for all work, materials, and equipment specified in this section shall be at the Contract unit price in accordance with the Bid Form.

BID ITEM III-20: ACIDIZATION SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for acidization including well kills and storage, as specified in Section 02684, Well Acidization.

Measurement and Payment for Acidization Setup: Payment for all work, materials, and equipment to prepare the well for acidization shall be at the lump sum unit price in accordance with the Bid Form.

BID ITEM III-21: FURNISH AND EMPLACE ACID

Description: The Contractor shall furnish all labor, materials, and equipment necessary for acid emplacement in well, as specified in Section 02684, Well Acidization.

Measurement and Payment for Furnish and Emplace Acid: Payment for all work, materials, and equipment to furnish and emplace the acid in the well shall be at the unit price per gallon in accordance with the Bid Form.

PART IV DZMW-1

BID ITEM IV-1: MOBILIZATION

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for the movement of personnel, equipment, supplies and incidentals to the monitor well. Includes all work as specified in Section 01505, Mobilization/Demobilization and Site Work.. The cost of all other work as shown, specified, directed or required for the expressed intent of the project that is not specifically included under other Contract Items shall also be included under this Contract Item. The value of Bid Item IV-1 shall not exceed 12 percent of the total value of Part IV. A total of 70 percent of the amount of Bid Item IV-1 will be awarded following completion of mobilization and 30 percent will be awarded after successful completion of demobilization and cleanup.

Measurement and Payment for Mobilization: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM IV-2: SET PIT CASING

Description: Contractor shall provide and install pit casing to the depth selected by Contractor, complete as specified in Section 02674, Casing.

Measurement and Payment for Set Pit Casing: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM IV-3: DRILL PILOT HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for drilling and sampling of boreholes by the rotary method, complete, during the drilling activities as specified in Section 02673, Drilling.

Measurement and Payment for Drill Pilot Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM IV-4: PILOT HOLE REAMING or OPEN HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for reaming pilot hole or drilling open hole by the rotary method, complete, as specified in Section 02673, Drilling.

Measurement and Payment for Pilot Hole Reaming or Open Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM IV-5: GEOPHYSICAL LOGGING

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for geophysical logging of the boreholes as specified in Section 02679, Geophysical Logging.

Measurement and Payment for Geophysical Logging: Shall be made at the unit price per logging event in accordance with the Bid Form.

DZMW-1 MONITORING WELL PUMPING TEST: Payment for pumping test setup and pumping time, including the preliminary pumping test, shall be made at Lump Sum Price for Geophysical Logging (Item No. IV-5). This test will be used to determine the specific capacity of the monitoring well. The pumping test is assumed to include an estimated 4 hours of pumping time.

BID ITEM IV-6: FURNISH AND INSTALL CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the well casing and all related fittings, appurtenances, and transition adapters, complete as specified in Section 02674, Acidization.

Measurement and Payment for Furnish and Install Casing: Payment will be made at the unit prices per foot installed in accordance with the Bid Form.

BID ITEM IV-7: GROUT CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the grout seal as specified in Section 02677, Grout Seal.

Measurement and Payment for Grout Casing: Shall be made at the unit price per cubic foot of grout pumped in accordance with the Bid Form.

BID ITEM IV-8: GRAVEL

Description: The Contractor shall furnish all labor, materials, and equipment necessary for emplacing clean gravel in highly permeable zones as specified in Section 02677, Grout Seal.

Measurement and Payment for Gravel: Shall be made at the unit price per cubic yard installed in accordance with the Bid Form.

BID ITEM IV-9: DEVELOPMENT

Description: The Contractor shall furnish all labor, materials, and equipment necessary to complete development of well as specified in Section 02678, Well Development. This will include all time and materials necessary for storing, settling, filtering, managing, and disposing of water generated from the development.

Measurement and Payment for Development: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for development during the time the equipment is not actually in use or for any equipment repair, or for any time, in the opinion of Engineer, that the development procedure is not being accomplished in accordance with these Specifications, its direction, or both. Contractor will not

be paid the hourly rate for development during the time required to manage and dispose of water generated from the development. Payment at the hourly rate shall constitute full compensation for all labor, materials, and equipment specified in this section. Includes setting of high capacity pump or other necessary equipment required to develop well. Development of the pad monitoring wells will be paid at the hourly rate.

BID ITEM IV-10: TEMPORARY WELLHEAD

Description: The Contractor shall furnish all labor, materials, and equipment for installing the well heads and various manually operated valves and check valves in the wellheads, complete as specified in Section 02689, Temporary Wellhead Capping and Valves, and Drawings

Measurement and Payment for Temporary Wellhead: Payment for all work, materials, and equipment shall be at the lump sum unit prices for temporary wellheads and pads in accordance with the Bid Form.

BID ITEM IV-11: PACKER TEST SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for installing and removing the packer, setting the packer, inflating the packer, installing and removing pumping equipment (including annular pump), deflating the packer, and removing the packer from the well as specified in Section 02987, Packer Testing. This will include all time and materials necessary for storing, managing, and disposing of water generated from the packer tests.

Measurement and Payment for Packer Test Setup: Shall be made at the Contract unit price in accordance with the Bid Form.

BID ITEM IV-12: PACKER TEST PUMPING TIME

Description: The Contractor shall furnish all labor, materials, and equipment necessary for the pumping, data logging, and recovery testing during the packer test as specified in Section 02987, Packer Testing. This line item will not be used for the time required to manage and dispose of water generated from the packer test.

Measurement and Payment for Packer Test Pumping Time: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Payment to Contractor shall also be made at the same unit price for running the preliminary test to determine if a suitable hydraulic seal is obtained. Payment for

running the annulus tests shall be included in the unit price per hour to the nearest 1/2-hour of pumping time.

BID ITEM IV-13: STANDBY TIME

Description: Shutdown time of the equipment and crew for any portion of the normal working day (7:00 a.m. to 7:00 p.m., Monday through Friday unless otherwise approved) when Engineer's representative orders Work to cease or when other activities at the site preclude work by Contractor, as approved by Engineer's representative as specified in Section 02686, Standby Time and Down Time.

Measurement and Payment for Standby Time: Payment for standby time (resulting from each cause approved by Engineer) shall be at the unit price per hour, to the nearest half-hour per day in accordance with the Bid Form.

DOWNTIME: All downtime shall be at the sole expense of Contractor.

ENGINEER STANDBY TIME - If Engineer is notified to be on site and Contractor is not ready, then Engineer shall be reimbursed by Contractor at the rate of $200.00 per hour, during normal working hours, starting at the time scheduled by Contractor and notified to Engineer.

BID ITEM IV-14: EXTRA WORK

Description: That time, other than standby time, during which Contractor is directed to provide all equipment and a crew to perform extra work not specifically addressed elsewhere in these Contract Documents.

Measurement and Payment for Extra Work: Payment for furnishing a crew and equipment to perform extra work at the direction of Engineer shall be at the unit price per hour in accordance with the Bid Form.

BID ITEM IV-15: WATER SAMPLING

Description: The Contractor shall furnish all labor, materials, and equipment for water sampling and water quality testing work to be performed as specified in Section 02311, Water Quality Testing and Sampling.

Measurement and Payment for Water Sampling: Payment for all work, materials, and equipment specified in this section shall be at the Contract unit price in accordance with the Bid Form.

PART V DZMW-2

BID ITEM V-1: MOBILIZATION

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for the movement of personnel, equipment, supplies and incidentals to the monitor well. Includes all work as specified in Section 01505, Mobilization/Demobilization and Site Work. The cost of all other work as shown, specified, directed or required for the expressed intent of the project that is not specifically included under other Contract Items shall also be included under this Contract Item. The value of Bid Item V-1 shall not exceed 12 percent of the total value of Part V. A total of 70 percent of the amount of Bid Item V-1 will be awarded following completion of mobilization and 30 percent will be awarded after successful completion of demobilization and cleanup.

Measurement and Payment for Mobilization: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM V-2: SET PIT CASING

Description: Contractor shall provide and install pit casing to the depth selected by Contractor, complete as specified in Section 02674, Casing.

Measurement and Payment for Set Pit Casing: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM V-3: DRILL PILOT HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for drilling and sampling of boreholes by the rotary method, complete, during the drilling activities as specified in Section 02673, Drilling.

Measurement and Payment for Drill Pilot Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM V-4: PILOT HOLE REAMING or OPEN HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for reaming pilot hole or drilling open hole by the rotary method, complete, as specified in Section 02673, Drilling.

Measurement and Payment for Pilot Hole Reaming or Open Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM V-5: GEOPHYSICAL LOGGING

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for geophysical logging of the boreholes as specified in Section 02679, Geophysical Logging.

Measurement and Payment for Geophysical Logging: Shall be made at the unit price per logging event in accordance with the Bid Form.

DZMW-2 MONITORING WELL PUMPING TEST: Payment for pumping test setup and pumping time, including the preliminary pumping test, shall be made at Lump Sum Price for Geophysical Logging (Item No. V-5). This test will be used to determine the specific capacity of the monitoring well. The pumping test is assumed to include an estimated 4 hours of pumping time.

BID ITEM V-6: FURNISH AND INSTALL CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the well casing and all related fittings, appurtenances, and transition adapters, complete as specified in Section 02674, Acidization.

Measurement and Payment for Furnish and Install Casing: Payment will be made at the unit prices per foot installed in accordance with the Bid Form.

BID ITEM V-7: GROUT CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the grout seal as specified in Section 02677, Grout Seal.

Measurement and Payment for Grout Casing: Shall be made at the unit price per cubic foot of grout pumped in accordance with the Bid Form.

BID ITEM V-8: GRAVEL

Description: The Contractor shall furnish all labor, materials, and equipment necessary for emplacing clean gravel in highly permeable zones as specified in Section 02677, Grout Seal.

Measurement and Payment for Gravel: Shall be made at the unit price per cubic yard installed in accordance with the Bid Form.

BID ITEM V-9: DEVELOPMENT

Description: The Contractor shall furnish all labor, materials, and equipment necessary to complete development of well as specified in Section 02678, Well Development. This will include all time and materials necessary for storing, settling, filtering, managing, and disposing of water generated from the development.

Measurement and Payment for Development: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for development during the time the equipment is not actually in use or for any equipment repair, or for any time, in the opinion of Engineer, that the development procedure is not being accomplished in accordance with these Specifications, its direction, or both. Contractor will not be paid the hourly rate for development during the time required to manage and dispose of water generated from the development. Payment at the hourly rate shall constitute full compensation for all labor, materials, and equipment specified in this section. Includes setting of high capacity pump or other necessary equipment required to develop well. Development of the pad monitoring wells will be paid at the hourly rate.

BID ITEM V-10: TEMPORARY WELLHEAD

Description: The Contractor shall furnish all labor, materials, and equipment for installing the well heads and various manually operated valves and check valves in the wellheads, complete as specified in Section 02689, Temporary Wellhead Capping and Valves, and Drawings

Measurement and Payment for Temporary Wellhead: Payment for all work, materials, and equipment shall be at the lump sum unit prices for temporary wellheads and pads in accordance with the Bid Form.

BID ITEM V-11: PACKER TEST SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for installing and removing the packer, setting the packer, inflating the packer, installing and removing pumping equipment (including annular pump), deflating the packer, and removing the packer from the well as specified in Section 02987, Packer Testing. This will include all time and materials necessary for storing, managing, and disposing of water generated from the packer tests.

Measurement and Payment for Packer Test Setup: Shall be made at the Contract unit price in accordance with the Bid Form.

BID ITEM V-12: PACKER TEST PUMPING TIME

Description: The Contractor shall furnish all labor, materials, and equipment necessary for the pumping, data logging, and recovery testing during the packer test as specified in Section 02987, Packer Testing. This line item will not be used for the time required to manage and dispose of water generated from the packer test.

Measurement and Payment for Packer Test Pumping Time: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Payment to Contractor shall also be made at the same unit price for running the preliminary test to determine if a suitable hydraulic seal is obtained. Payment for running the annulus tests shall be included in the unit price per hour to the nearest 1/2-hour of pumping time.

BID ITEM V-13: STANDBY TIME

Description: Shutdown time of the equipment and crew for any portion of the normal working day (7:00 a.m. to 7:00 p.m., Monday through Friday unless otherwise approved) when Engineer's representative orders Work to cease or when other activities at the site preclude work by Contractor, as approved by Engineer's representative as specified in Section 02686, Standby Time and Down Time.

Measurement and Payment for Standby Time: Payment for standby time (resulting from each cause approved by Engineer) shall be at the unit price per hour, to the nearest half-hour per day in accordance with the Bid Form.

DOWNTIME: All downtime shall be at the sole expense of Contractor.

ENGINEER STANDBY TIME - If Engineer is notified to be on site and Contractor is not ready, then Engineer shall be reimbursed by Contractor at the rate of $200.00 per hour, during normal working hours, starting at the time scheduled by Contractor and notified to Engineer.

BID ITEM V-14: EXTRA WORK

Description: That time, other than standby time, during which Contractor is directed to provide all equipment and a crew to perform extra work not specifically addressed elsewhere in these Contract Documents.

Measurement and Payment for Extra Work: Payment for furnishing a crew and equipment to perform extra work at the direction of Engineer shall be at the unit price per hour in accordance with the Bid Form.

BID ITEM V-15: WATER SAMPLING

Description: The Contractor shall furnish all labor, materials, and equipment for water sampling and water quality testing work to be performed as specified in Section 02311, Water Quality Testing and Sampling.

Measurement and Payment for Water Sampling: Payment for all work, materials, and equipment specified in this section shall be at the Contract unit price in accordance with the Bid Form.

PART VI DZMW-3

BID ITEM VI-1: MOBILIZATION

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for the movement of personnel, equipment, supplies and incidentals to the monitor well. Includes all work as specified in Section 01505, Mobilization/Demobilization and Site Work. The cost of all other work as shown, specified, directed or required for the expressed intent of the project that is not specifically included under other Contract Items shall also be included under this Contract Item. The value of Bid Item VI-1 shall not exceed 12 percent of the total value of Part VI. A total of 70 percent of the amount of Bid Item VI-1 will be awarded following completion of mobilization and 30 percent will be awarded after successful completion of demobilization and cleanup.

Measurement and Payment for Mobilization: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM VI-2: SET PIT CASING

Description: Contractor shall provide and install pit casing to the depth selected by Contractor, complete as specified in Section 02674, Casing.

Measurement and Payment for Set Pit Casing: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM VI-3: DRILL PILOT HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for drilling and sampling of boreholes by the rotary method, complete, during the drilling activities as specified in Section 02673, Drilling.

Measurement and Payment for Drill Pilot Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM VI-4: PILOT HOLE REAMING or OPEN HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for reaming pilot hole or drilling open hole by the rotary method, complete, as specified in Section 02673, Drilling.

Measurement and Payment for Pilot Hole Reaming or Open Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM VI-5: GEOPHYSICAL LOGGING

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for geophysical logging of the boreholes as specified in Section 02679, Geophysical Logging.

Measurement and Payment for Geophysical Logging: Shall be made at the unit price per logging event in accordance with the Bid Form.

DZMW-3 MONITORING WELL PUMPING TEST: Payment for pumping test setup and pumping time, including the preliminary pumping test, shall be made at Lump Sum Price for Geophysical Logging (Item No. VI-5). This test will be used to determine the specific capacity of the monitoring well. The pumping test is assumed to include an estimated 4 hours of pumping time.

BID ITEM VI-6: FURNISH AND INSTALL CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the well casing and all related fittings, appurtenances, and transition adapters, complete as specified in Section 02674, Acidization.

Measurement and Payment for Furnish and Install Casing: Payment will be made at the unit prices per foot installed in accordance with the Bid Form.

BID ITEM VI-7: GROUT CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the grout seal as specified in Section 02677, Grout Seal.

Measurement and Payment for Grout Casing: Shall be made at the unit price per cubic foot of grout pumped in accordance with the Bid Form.

BID ITEM VI-8: GRAVEL

Description: The Contractor shall furnish all labor, materials, and equipment necessary for emplacing clean gravel in highly permeable zones as specified in Section 02677, Grout Seal.

Measurement and Payment for Gravel: Shall be made at the unit price per cubic yard installed in accordance with the Bid Form.

BID ITEM VI-9: DEVELOPMENT

Description: The Contractor shall furnish all labor, materials, and equipment necessary to complete development of well as specified in Section 02678, Well Development. This will include all time and materials necessary for storing, settling, filtering, managing, and disposing of water generated from the development.

Measurement and Payment for Development: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for development during the time the equipment is not actually in use or for any equipment repair, or for any time, in the opinion of Engineer, that the development procedure is not being accomplished in accordance with these Specifications, its direction, or both. Contractor will not be paid the hourly rate for development during the time required to manage and dispose of water generated from the development. Payment at the hourly rate shall constitute full compensation for all labor, materials, and equipment specified in this section. Includes setting of high capacity pump or other necessary equipment required to develop well. Development of the pad monitoring wells will be paid at the hourly rate.

BID ITEM VI-10: TEMPORARY WELLHEAD

Description: The Contractor shall furnish all labor, materials, and equipment for installing the well heads and various manually operated valves and check valves in the wellheads, complete as specified in Section 02689, Temporary Wellhead Capping and Valves, and Drawing.

Measurement and Payment for Temporary Wellhead: Payment for all work, materials, and equipment shall be at the lump sum unit prices for temporary wellheads and pads in accordance with the Bid Form.

BID ITEM VI-11: PACKER TEST SETUP

Description: The Contractor shall furnish all labor, materials, and equipment necessary for installing and removing the packer, setting the packer, inflating the packer, installing and removing pumping equipment (including annular pump), deflating the packer, and removing the packer from the well as specified in Section 02987, Packer Testing. This will include all time and materials necessary for storing, managing, and disposing of water generated from the packer tests.

Measurement and Payment for Packer Test Setup: Shall be made at the Contract unit price in accordance with the Bid Form.

BID ITEM VI-12: PACKER TEST PUMPING TIME

Description: The Contractor shall furnish all labor, materials, and equipment necessary for the pumping, data logging, and recovery testing during the packer test as specified in Section 02987, Packer Testing. This line item will not be used for the time required to manage and dispose of water generated from the packer test.

Measurement and Payment for Packer Test Pumping Time: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Payment to Contractor shall also be made at the same unit price for running the preliminary test to determine if a suitable hydraulic seal is obtained. Payment for running the annulus tests shall be included in the unit price per hour to the nearest 1/2-hour of pumping time.

BID ITEM VI-13: STANDBY TIME

Description: Shutdown time of the equipment and crew for any portion of the normal working day (7:00 a.m. to 7:00 p.m., Monday through Friday unless otherwise approved) when Engineer's representative orders Work to cease or when other activities at the site preclude work by Contractor, as approved by Engineer's representative as specified in Section 02686, Standby Time and Down Time.

Measurement and Payment for Standby Time: Payment for standby time (resulting from each cause approved by Engineer) shall be at the unit price per hour, to the nearest half-hour per day in accordance with the Bid Form.

DOWNTIME: All downtime shall be at the sole expense of Contractor.

ENGINEER STANDBY TIME - If Engineer is notified to be on site and Contractor is not ready, then Engineer shall be reimbursed by Contractor at the rate of $200.00 per hour, during normal working hours, starting at the time scheduled by Contractor and notified to Engineer.

BID ITEM VI-14: EXTRA WORK

Description: That time, other than standby time, during which Contractor is directed to provide all equipment and a crew to perform extra work not specifically addressed elsewhere in these Contract Documents.

Measurement and Payment for Extra Work: Payment for furnishing a crew and equipment to perform extra work at the direction of Engineer shall be at the unit price per hour in accordance with the Bid Form.

BID ITEM VI-15: WATER SAMPLING

Description: The Contractor shall furnish all labor, materials, and equipment for water sampling and water quality testing work to be performed as specified in Section 02311, Water Quality Testing and Sampling.

Measurement and Payment for Water Sampling: Payment for all work, materials, and equipment specified in this section shall be at the Contract unit price in accordance with the Bid Form.

PART VII APMW

BID ITEM VII-1: MOBILIZATION

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for the movement of personnel, equipment, supplies and incidentals to the monitor well. Includes installation of a permanent gravel access road as shown in Drawings. Includes all work as specified in Section 01505 Mobilization/Demobilization and Site Work. The cost of all other work as shown, specified, directed or required for the expressed intent of the project that is not specifically included under other Contract Items shall also be included under this Contract Item. A total of 70 percent of the amount of Bid Item VII-1 will be awarded following completion of mobilization and 30 percent will be awarded after successful completion of demobilization and cleanup.

Measurement and Payment for Mobilization: Shall be made at the Contract Lump Sum Bid Price in accordance with the Bid Form.

BID ITEM VII-4: DRILL OUT OPEN HOLE

Description: The Contractor shall furnish all labor, materials, and equipment necessary for drilling open hole by the rotary method, complete, as specified in Section 02673, Drilling.

Measurement and Payment for Drill Out Open Hole: Shall be made at the unit price per foot drilled in accordance with the Bid Form. Payment for all sampling and testing activities during drilling, as described in Section 02673, Drilling shall be included in the unit price per foot.

Drilling depths and casing depths are estimates only. The actual depths of these items shall be more or less as determined in the field by Engineer. Unit costs for these items shall remain the same, regardless of the actual depths or quantities used.

BID ITEM VII-3: GEOPHYSICAL LOGGING

Description: The Contractor shall furnish all labor, materials, equipment and services to perform those operations necessary for geophysical logging of the boreholes as specified in Section 02679, Geophysical Logging.

Measurement and Payment for Geophysical Logging: Shall be made at the unit price per logging event in accordance with the Bid Form.

APMW MONITORING WELL PUMPING TEST: Payment for pumping test setup and pumping time, including the preliminary pumping test, shall be made at Lump Sum Price for Geophysical Logging (Item No. VII-3). This test will be

used to determine the specific capacity of monitoring well. The pumping test is assumed to include an estimated 4 hours of pumping time.

BID ITEM VII-4: FURNISH AND INSTALL LINER CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the well casing and all related fittings, appurtenances, and transition adapters, complete as specified in Section 02674, Acidization.

Measurement and Payment for Furnish and Install Casing: Payment will be made at the unit prices per foot installed in accordance with the Bid Form.

BID ITEM VII-5: GROUT CASING

Description: The Contractor shall furnish all labor, materials, and equipment necessary for furnishing and installing the grout seal as specified in Section 02677, Grout Seal.

Measurement and Payment for Grout Casing: Shall be made at the unit price per cubic foot of grout pumped in accordance with the Bid Form.

BID ITEM VII-6: DEVELOPMENT

Description: The Contractor shall furnish all labor, materials, and equipment necessary to complete development of well as specified in Section 02678, Well Development. This will include all time and materials necessary for storing, settling, filtering, managing, and disposing of water generated from the development.

Measurement and Payment for Development: Shall be made at the unit price per hour, to the nearest 1/2-hour in accordance with the Bid Form. Contractor will not be paid the hourly rate for development during the time the equipment is not actually in use or for any equipment repair, or for any time, in the opinion of Engineer, that the development procedure is not being accomplished in accordance with these Specifications, its direction, or both. Contractor will not be paid the hourly rate for development during the time required to manage and dispose of water generated from the development. Payment at the hourly rate shall constitute full compensation for all labor, materials, and equipment specified in this section. Includes setting of high capacity pump or other necessary equipment required to develop well. Development of the pad monitoring wells will be paid at the hourly rate.

BID ITEM VII-7: TEMPORARY WELLHEAD

Description: The Contractor shall furnish all labor, materials, and equipment for installing the well heads and various manually operated valves and check valves in the wellheads, complete as specified in Section 02689, Temporary Wellhead Capping and Valves, and Drawings.

Measurement and Payment for Temporary Wellhead: Payment for all work, materials, and equipment shall be at the lump sum unit prices for temporary wellheads and pads in accordance with the Bid Form.

BID ITEM VII-8: STANDBY TIME

Description: Shutdown time of the equipment and crew for any portion of the normal working day (7:00 a.m. to 7:00 p.m., Monday through Friday unless otherwise approved) when Engineer's representative orders Work to cease or when other activities at the site preclude work by Contractor, as approved by Engineer's representative as specified in Section 02686, Standby Time and Down Time.

Measurement and Payment for Standby Time: Payment for standby time (resulting from each cause approved by Engineer) shall be at the unit price per hour, to the nearest half-hour per day in accordance with the Bid Form.

DOWNTIME: All downtime shall be at the sole expense of Contractor.

ENGINEER STANDBY TIME - If Engineer is notified to be on site and Contractor is not ready, then Engineer shall be reimbursed by Contractor at the rate of $200.00 per hour, during normal working hours, starting at the time scheduled by Contractor and notified to Engineer.

BID ITEM VII-9: EXTRA WORK

Description: That time, other than standby time, during which Contractor is directed to provide all equipment and a crew to perform extra work not specifically addressed elsewhere in these Contract Documents.

Measurement and Payment for Extra Work: Payment for furnishing a crew and equipment to perform extra work at the direction of Engineer shall be at the unit price per hour in accordance with the Bid Form.

BID ITEM VII-10: WATER SAMPLING

Description: The Contractor shall furnish all labor, materials, and equipment for water sampling and water quality testing work to be performed as specified in Section 02311, Water Quality Testing and Sampling.

Measurement and Payment for Water Sampling: Payment for all work, materials, and equipment specified in this section shall be at the Contract unit price in accordance with the Bid Form.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01152
REQUESTS FOR PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Submit Applications for Payment to the Project Manager or as directed at the preconstruction meeting, in accordance with the schedule established by Conditions of the Contract and Agreement between County and Contractor.

1.02 FORMAT AND DATA REQUIRED

A. Submit payment requests in the form provided by the County with itemized data typed in accordance with the Bid Form.

B. Provide construction photographs in accordance with Contract Documents.

1.03 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When the County requires substantiating data, Contractor shall submit suitable information with a cover letter.

B. Submit one copy of data and cover letter for each copy of application.

1.04 PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in application form as specified for progress payments.

1.05 SUBMITTAL PROCEDURE

A. Submit applications for payment at the times stipulated in the Agreement.

B. Number: Three copies of each application; all signed and certified by the Contractor

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01153
CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.01 DEFINITION

A. Change Order: Major change in contract scope or time that must be approved and executed by the Board before it becomes effective.

B. Administrative Change Adjustment: Minor change order under 10 percent of project cost or 20 percent time, does not have to be Board approved.

C. Field Directive Change: Change to contract quantity that does not require a change of scope or time extension.

1.02 REQUIREMENTS INCLUDED

A. The Contractor shall promptly implement change order procedures:

1. Provide full written data required to evaluate changes.
2. Maintain detailed records of work done on a time-and-material/force account basis.
3. Provide full documentation to County on request.

B. The Contractor shall designate a member of the Contractor's organization who:

1. Is authorized to accept changes to the Work.
2. Is responsible for informing others in the Contractor's employ of the authorized changes into the Work.

1.03 PRELIMINARY PROCEDURES

A. Project Manager may initiate changes by submitting a Request to Contractor. Request will include:

1. Detailed description of the change, products, costs and location of the change in the Project.
2. Supplementary or revised Drawings and Specifications.
3. The projected time extension for making the change.
4. A specified period of time during which the requested price will be considered valid.
5. Such request is for information only and is not an instruction to execute the changes, nor to stop work in progress.

B. Contractor may initiate changes by submitting a written notice to the Project Manager, containing:

1. Description of the proposed changes.
2. Statement of the reason for making the changes.
3. Statement of the effect on the Contract Sum and the Contract Time.
4. Statement of the effect on the work of separate contractors.
5. Documentation supporting any change in Contract Sum or Contract Time.

1.04 FIELD DIRECTIVE CHANGE

A. In lieu of a Change Order, the Project Manager may issue a Field Directive change for the Contractor to proceed with additional work within the original intent of the Project.

B. Field Directive change will describe changes in the work, with attachments of backup information to define details of the change.

C. Contractor must sign and date the Field Directive change to indicate agreement with the terms therein.

1.05 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump sum proposal and for each unit price which has not previously been established, with sufficient substantiating data to allow the County to evaluate the quotation.

B. On request, provide additional data to support time and cost computations:

1. Labor required.
2. Equipment required.
3. Products required.
    a. Recommended source of purchase and unit cost.
    b. Quantities required.
4. Taxes, insurance and bonds.
5. Credit for work deleted from Contract, similarly documented.
6. Overhead and profit.
7. Justification for any change in Contract Time.

C. Support each claim for additional costs and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal.

1. Name of the County's authorized agent who ordered the work and date of the order.
2. Date and time work was performed and by whom.
3. Time record, summary of hours work and hourly rates paid.

4. Receipts and invoices for:
    a. Equipment used, listing dates and time of use.
    b. Products used, listing of quantities.
    c. Subcontracts.

1.06 PREPARATION OF CHANGE ORDERS

A. Project Manager will prepare each Change Order.

B. Change Order will describe changes in the Work, both additions and deletions, with attachments as necessary to define details of the change.

C. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.07 LUMP SUM/FIXED PRICE CHANGE ORDER

A. Project Manager initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by the Contractor, or requests from the County, or both.

B. Once the form has been completed, all copies should be sent to Contractor for approval. After approval by Contractor, all copies should be sent to County for approval. The County will distribute executed copies after approval by the Board of County Commissioners.

1.08 UNIT CHANGE ORDER

A. Contents of Change Orders will be based on, either:

1. County's definition of the scope of the required changes.
2. Contractor's Proposal for a change, as approved by the County.
3. Survey of completed work.

B. The amounts of the unit prices to be:

1. Those stated in the Agreement.
2. Those mutually agreed upon between County and Contractor.

1.09 TIME AND MATERIAL/FORCE ACCOUNT CHANGE ORDER/ CONSTRUCTION CHANGE AUTHORIZATION

A. At completion of the change, Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this section.

B. County will determine the allowable cost of such work, as provided in General Conditions and Supplementary Conditions.

C. County will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.

D. County and Contractor will sign and date the Change Order to indicate their agreement therewith.

1.10 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Periodically revise Schedule of Values and Application for Payment forms to record each change as a separate item of work, and to record the adjusted Contract Sum.

B. Periodically revise the Construction Schedule to reflect each change in Contract Time. Revise sub schedules to show changes for other items of work affected by the changes.

C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01200
PROJECT MEETINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The County shall schedule the pre-construction meeting, periodic progress meetings and special meetings, if required, throughout progress of work.

B. Representatives of contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

C. The Contractor shall attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules.

1.02 PRE-CONSTRUCTION MEETING

A. Attendance:

1. County's Engineer.
2. County's Project Manager.
3. Contractor.
4. Resident Project Representative.
5. Related Labor Contractor's Superintendent.
6. Major Subcontractors.
7. Major Suppliers.
8. Others as appropriate.

B. Suggested Agenda:

1. Distribution and discussion of:
   a. List of major subcontractors.
   b. Projected construction schedules.
   c. Coordination of utilities.
2. Critical work sequencing.
3. Project Coordination:
   a. Designation of responsible personnel.
   b. Emergency contact persons with phone numbers.
4. Procedures and processing of:
   a. Field decisions.
   b. Submittals.
   c. Change Orders.
   d. Applications for Payment.

5. Procedures for maintaining Record Documents.
6. Use of Premises:
    a. Office, work and storage areas.
    b. County's requirements.
7. Temporary utilities.
8. Housekeeping procedures.
9. Liquidated damages.
10. Equal Opportunity Requirements.
11. Laboratory testing.
12. Project/Job meetings: Progress meeting, other special topics as needed.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01300
SUBMITTALS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Requirements and procedures necessary for scheduling, preparation, and submission of submittals.

B. Requirements for preparation of progress schedules.

1.02 RELATED WORK SPECIFIED UNDER OTHER SECTIONS

A. Individual Specification sections in these Contract Documents contain additional and special submittal requirements. Individual sections shall take precedence in the event of a conflict with this section.

1.03 SUBMITTALS PROCEDURE

A. Owner reserves the right to modify the procedures and requirements for submittals, as necessary to accomplish the specific purpose of each submittal. Direct inquiries to Engineer regarding the procedure, purpose, or extent of any submittal.

B. Review, acceptance, or approval of substitutions, schedules, Shop Drawings, lists of materials, and procedures submitted or requested by Contractor shall not add to the Contract amount, and additional costs which may result shall be solely the obligation of Contractor.

C. Owner is not precluded by virtue of review, acceptance, or approval, from obtaining a credit for construction savings resulting from allowed concessions in the work or materials used to complete the work.

D. Owner is not responsible to provide engineering or other services to protect Contractor from additional costs accruing from submittals.

E. Submittals processed by Engineer do not become Contract Documents and are not Change Orders; the purpose of submittal review is to establish a reporting procedure and is intended for Contractor's convenience in organizing the work and to permit Engineer to monitor Contractor's progress and understanding of the design.

F. Delays caused by the need for re-submittal shall not constitute basis for claim.

G. After checking and verifying all field measurements, Contractor shall make submittals to Engineer, in accordance with the schedule of submittals for review.

1. Submittals shall bear a stamp or specific written indication that Contractor has satisfied its responsibilities under the Contract Documents with respect to the review of the submittal.
2. Data shown shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to enable Engineer to review the information.

H. Contractor shall check samples, and accompany with specific written indication that Contractor has satisfied requirements under the Contract Documents with respect to review of submittals, and identify clearly as to material, supplier, pertinent data such as catalog numbers, and the intended use.

I. Before submission of each submittal, Contractor shall determine and verify quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto; review and coordinate each submittal with other submittals, requirements of the Work, and the Contract Documents.

J. At the time of each submission, Contractor shall give Engineer specific written notice of each variation that the submittal may have from the requirements of the Contract Documents; in addition, make specific notation on each Shop Drawing submitted to Engineer for review and approval of each such variation.

K. Engineer's review will be only for conformance with the design concept of the project and for compliance with the information given in the Contract Documents, not extending to means, methods, techniques, sequences, or procedures of construction (except where a specific means, method, technique, sequence, or procedure of construction is indicated in or required by the Contract Documents) nor to safety precautions or programs incident thereto. Review of a separate item as such will not indicate review of the assembly in which the item functions.

L. Where a Shop Drawing or sample is required by the Specifications, related work performed prior to Engineer's review and approval of the pertinent submission shall be the sole expense and responsibility of Contractor.

1.04 ADMINISTRATIVE SUBMITTALS

The Contractor shall:

A. Provide administrative submittals required by the Bidding Requirements, General Conditions, Supplementary Conditions, and as may be specifically required in other parts of the Contract Documents.

B. Make required submittals promptly to the applicable federal, state, or local agency, as required by law. Failure to comply with this requirement may result in withholding of progress payments and make Contractor liable for other prescribed action and sanctions.

C. Submit to Owner a copy of letters relative to the Contract including notifications, reports, certifications, and the like that are submitted directly to a federal, state, or other governing agency.

1.05 SCHEDULES

The Contractor shall:

A. General:

1. Submit estimated progress schedule and preliminary schedule of submittals to Engineer prior to any drilling activities at the site.
2. Revise and resubmit as specified, and identify all changes made from previous schedule submittal.

B. Progress Schedule:

1. Submit preliminary progress schedule within 20 days of award.
2. Show complete sequence of construction by activity, identifying work of separate parts and pay items as outlined in the Bid Schedule, and other logically grouped activities.
3. Indicate submittal dates and product manufacture and delivery dates.
4. Update progress schedule monthly and submit with payment application. Payment application will not be reviewed without such schedule.
5. Claims for Adjustment of Contract Times: Where Engineer has not yet rendered formal decision on Contractor's claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in progress schedule, Contractor shall reflect that amount of time adjustment in progress schedule as Engineer may accept as appropriate for the interim. It is understood and agreed that such interim acceptance by Engineer will not be binding and will be made only for purpose of continuing to schedule Work, until such time as formal decision as to an adjustment, if any, of the Contract Times acceptable to Engineer has been rendered. Contractor shall revise

progress schedule prepared thereafter in accordance with Engineer's formal decision.

C. Schedule of Submittals, Preliminary Schedule of Submittals: Indicate submittals required by Specification section number with brief description, starting and completion dates for respective submittal preparation, and submittal review by Engineer.

1.06 SHOP DRAWINGS

A. General:

1. Shop Drawings, as defined herein, consist of all Drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by Contractor to illustrate some portion of the work; and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other information prepared by a manufacturer and submitted by Contractor to illustrate material or equipment for distinct portions of the work. All submissions will be legible and in English (certified translation to English is acceptable).
2. Submittal of incomplete or unchecked Shop Drawings will not be acceptable. Shop Drawing submittals which do not clearly show Contractor’s review stamp or specific written indication of Contractor review will be returned to Contractor for resubmission.
3. Submittal of Shop Drawings not required under these Contract Documents and not shown on the schedule of submittals will be returned to Contractor unreviewed and unstamped by Engineer.

B. Procedures - Contractor shall:

1. Submit to Engineer for review and approval in accordance with the accepted schedule of submittals, three copies, including one reproducible copy, of Shop Drawings.
2. Combine submittals specified in each Specification section into a single package. Partial packages will not be reviewed until all submittals required for the section have been received.
3. Transmit each submittal on Engineer accepted form.
4. Sequentially number the transmittal forms; re-submittals to have original number with an alphabetic suffix.
5. Identify project, Contractor, Specification section number, pertinent drawing sheet and detail number(s), products, units and assemblies, and the system or equipment identification or tag number as shown.
6. Apply Contractor’s stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with requirements of the Contract Documents.

7. Transmit submittals in accordance with finalized schedule of submittals, and deliver as follows:

   Submittals to Owner:

   Manatee County Public Works, 1022 26th Avenue East
   Bradenton, FL 34208, Attn: Antony Russo, P.E.

   Submittals to Engineer:

   CH2M HILL Engineers Inc., 4350 West Cypress St. Suite 600,
   Tampa, Florida, 33607, Attn: Niel Postlethwait, P.E.

8. Provide space for Engineer's review stamp.
9. Revise and resubmit submittals as required; identify all changes made since previous submittal.

C. Submittals will be acted upon by Engineer and transmitted to Contractor not later than 10 working days after receipt by Engineer.

D. When Shop Drawings have been reviewed by Engineer, two copies will be returned to Contractor appropriately annotated. If major changes or corrections are necessary, Shop Drawing may be rejected and two sets will be returned to Contractor with such changes or corrections indicated. Correct and resubmit the Shop Drawings in the same manner and quantity as specified for the original submittal. One digital copy will be provided to the Owner.

E. Material and Equipment Colors: Engineer will provide a schedule of selected colors within 30 days after approval of submittals and after receiving samples of the manufacturers' standard AWWA pipe colors for those items requiring Owner's selection.

1.07 SAMPLES AND TEST SPECIMENS

A. Where required in the Specifications, and as determined necessary by Engineer, submit test specimens or samples of materials, appliances, and fittings to be used or offered for use in connection with the work. Include information as to their sources and prepay cartage charges and submit such quantities and sizes for proper examination and tests to establish the quality or equality thereof, as applicable.

B. The Contractor shall submit samples and test specimens in ample time to enable Engineer to make tests or examinations necessary, without delay to the work.

C. The Contractor shall submit additional samples as required by Engineer to ensure equality with the original approved sample and/or for determination of Specification compliance.

D. Tests required by the Specifications to be performed by an independent laboratory shall be made by a laboratory licensed or certified in accordance with State statutes.

E. Samples and laboratory services shall be at the expense of Owner unless otherwise included in the unit prices bid for the associated work.

F. Approved sample items (centralizers, hardware, etc.) may be incorporated into the work upon approval and when no longer needed by Engineer for reference.

1.08 QUALITY CONTROL SUBMITTALS

A. Manufacturers' Certification of Proper Installation: Where manufacturer's certification is required in the Specifications, the manufacturer shall provide certification stating the following:

1. The product or system has been installed in accordance with the manufacturer's recommendations.
2. The product or system has been inspected by a manufacturer's authorized representative.
3. The product or system has been serviced with the proper lubricants.
4. Applicable safety equipment has been properly installed.
5. Proper electrical and mechanical connections have been made.
6. Proper adjustments have been made and the product or system is ready for functional testing, plant startup, and operation.

B. Certification of Compliance:

1. Where specified, Contractor shall furnish certification of compliance for products specified to a recognized standard or code prior to the use of such products in the work. Certifications shall be signed by the manufacturer of the product; state that the components involved comply in all respects with the requirements of the Specifications. Furnish certification of compliance with each lot delivered to the job site and clearly identify the lot so certified.
2. Products used on the basis of a certification of compliance may be sampled and tested at any time. The fact that a product is used on the basis of a certification of compliance shall not relieve Contractor of responsibility for incorporating products in the work which conforms to requirements of the Contract Documents. Products not conforming to such requirements will be subject to rejection whether in-place or not.
3. Engineer reserves the right to refuse permission for use of products on the basis of a certification of compliance.

C. Functional Test Certification: Where a certification of functional testing is specified for certain equipment, Contractor (as applicable to the equipment furnished) shall state in writing that:

1. Necessary test pump equipment has been successfully tested.
2. Necessary equipment systems have been checked for proper installation, started, and successfully tested to indicate they are operational.
3. Adjustments and calibrations have been made.
4. The systems and subsystems are capable of performing their intended functions.
5. The facilities are ready for performance testing, or for startup and intended operation, as applicable.
6. Where several manufacturers have furnished equipment in a system, obtain each manufacturer's review and acknowledgment of its respective equipment as part of a functional test for the overall system.

D. Performance Test Reports: Contractor shall prepare and submit performance test reports where specified for equipment and systems.

1.09 OPERATION AND MAINTENANCE (O & M) MANUALS

A. No O&M manuals are anticipated for this portion of the Project.

1.10 CONTRACT CLOSE-OUT SUBMITTALS

A. Record Drawings: Each month, or as otherwise agreed, submit to Engineer a current listing and description of each change incorporated into the work since the preceding submittal. Engineer will prepare a set of record drawings for project which will include changes made in materials, locations, and dimensions of the work.

1.11 CONSTRUCTION PHOTOGRAPHS

A. The Contractor shall photograph the preconstruction and post-construction site for its records.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01310
CONSTRUCTION SCHEDULE AND PROJECT RESTRAINTS

PART 1 GENERAL

1.01 GENERAL

A. Construction under this contract must be coordinated with the County and accomplished in a logical order to maintain utilization and flow through existing facilities and public properties and rights-of-way and to allow construction to be completed within the time allowed by Contract Documents and in the manner set forth in the Contract.

1.02 CONSTRUCTION SCHEDULING GENERAL PROVISIONS

A. No work shall be done between 7:00 p.m. and 7:00 a.m. (unless alternate schedule is approved) nor on weekends or legal holidays without written permission of the County. However, emergency work may be done without prior permission.

B. Night work may be established by the Contractor as regular procedure with the written permission of the County. Such permission, however, may be revoked at any time by the County if the Contractor fails to maintain adequate equipment and supervision for the proper execution and control of the work at night.

C. Due to potential health hazards and requirements of the State of Florida and the U.S. Environmental Protection Agency, existing facilities must be maintained in operation.

D. The Contractor shall be fully responsible for providing all temporary piping, plumbing, electrical hook-ups, lighting, temporary structure, or other materials, equipment and systems required to maintain the existing facility's operations. All details of temporary piping and temporary construction are not necessarily shown on the Drawings or covered in the Specifications. However, this does not relieve the Contractor of the responsibility to insure that construction will not interrupt proper facility operations.

E. The Contractor shall designate an authorized representative of his firm who shall be responsible for development and maintenance of the schedule and of progress and payment reports. This representative of the Contractor shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the commitments of the Contractor's schedule.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. The Contractor shall submit a critical path schedule as described herein.

B. The planning, scheduling, management and execution of the work is the sole responsibility of the Contractor. The progress schedule requirement is established to allow County to review Contractor's planning, scheduling, management and execution of the work; to assist County in evaluating work progress and make progress payments and to allow other contractors to cooperate and coordinate their activities with those of the Contractor.

2.02 FORM OF SCHEDULES

A. Prepare schedules using the latest version of Microsoft Project, or other County approved software, in the form of a horizontal bar chart diagram. The diagram shall be time-scaled and sequenced by work areas. Horizontal time scale shall identify the first work day of each week.

B. Activities shall be at least as detailed as the Schedule of Values. Activity durations shall be in whole working days. In addition, man-days shall be shown for each activity or tabulated in an accompanying report.

C. Diagrams shall be neat and legible and submitted on sheets at least 11 inches by 17 inches suitable for reproduction. Scale and spacing shall allow space for notations and future revisions.

2.03 CONTENT OF SCHEDULES

A. Each monthly schedule shall be based on data as of the last day of the current pay period.

B. Description for each activity shall be brief, but convey the scope of work described.

C. Activities shall identify all items of work that must be accomplished to achieve substantial completion, such as items pertaining to Contractor's installation and testing activities; items pertaining to the approval of regulatory agencies; contractor's time required for submittals, fabrication and deliveries; the time required by County to review all submittals as set forth in the Contract Documents; items of work required of County to support pre-operational, startup and final testing; time required for the relocation of utilities. Activities shall also identify interface milestones with the work of other contractors performing work under separate contracts with County.

D. Schedules shall show the complete sequence of construction by activities. Dates for beginning and completion of each activity shall be indicated as well as projected percentage of completion for each activity as of the first day of each month.

E. Submittal schedule for Shop Drawing review, product data, and samples shall show the date of Contractor submittal and the date approved submittals will be required by the County, consistent with the time frames established in the Specifications.

F. For Contract change orders granting time extensions, the impact on the Contract date(s) shall equal the calendar-day total time extension specified for the applicable work in the Contract change orders.

G. For actual delays, add activities prior to each delayed activity on the appropriate critical path(s). Data on the added activities of this type shall portray all steps leading to the delay and shall further include the following: separate activity identification, activity description indicating cause of the delay, activity duration consistent with whichever set of dates below applies, the actual start and finish dates of the delay or, if the delay is not finished, the actual start date and estimated completion date.

H. For potential delays, add an activity prior to each potentially delayed activity on the appropriate critical path(s). Data for added activities of this type shall include alternatives available to mitigate the delay including acceleration alternatives and further show the following: separate activity identification, activity description indicating cause of the potential delay and activity duration equal to zero work days.

2.04 SUPPORTING NARRATIVE

A. Status and scheduling reports identified below shall contain a narrative to document the project status, to explain the basis of Contractor's determination of durations, describe the Contract conditions and restraints incorporated into the schedule and provide an analysis pertaining to potential problems and practical steps to mitigate them.

B. The narrative shall specifically include:

1. Actual completion dates for activities completed during the monthly report period and actual start dates for activities commenced during the monthly report period.
2. Anticipated start dates for activities scheduled to commence during the following monthly report period.
3. Changes in the duration of any activity and minor logic changes.
4. The progress along the critical path in terms of days ahead or behind the Contract date.

5. If the Monthly Status Report indicates an avoidable delay to the Contract completion date or interim completion dates as specified in the Agreement, Contractor shall identify the problem, cause and the activities affected and provide an explanation of the proposed corrective action to meet the milestone dates involved or to mitigate further delays.
6. If the delay is thought to be unavoidable, the Contractor shall identify the problem, cause, duration, specific activities affected and restraints of each activity.
7. The narrative shall also discuss all change order activities whether included or not in the revised/current schedule of legal status. Newly introduced change order work activities and the CPM path(s) that they affect, must be specifically identified. All change order work activities added to the schedule shall conform with the sequencing and Contract Time requirements of the applicable Change Order.
8. Original Contract date(s) shall not be changed except by Contract change order. A revision need not be submitted when the foregoing situations arise unless required by County. Review of a report containing added activities will not be construed to be concurrence with the duration or restraints for such added activities; instead the corresponding data as ultimately incorporated into the applicable Contract change order shall govern.
9. Should County require additional data, this information shall be supplied by Contractor within 10 calendar days.

2.05 SUBMITTALS

A. Contractor shall submit estimated and preliminary progress schedules (as identified in the Terms and Conditions of the Contract and the General Conditions), monthly status reports, a startup schedule and an as-built schedule report all as specified herein.

B. All schedules, including estimated and preliminary schedules, shall be in conformance with the Contract Documents.

C. The finalized progress schedule discussed in the Contract Documents shall be the first monthly status report and as such shall be in conformance with all applicable specifications contained herein.

D. Monthly status report submittals shall include a time-scaled (days after notice to proceed) diagram showing all contract activities and supporting narrative. The initial detailed schedule shall use the notice to proceed as the start date. The finalized schedule, if concurred with by County, shall be the work plan to be used by the contractor for planning, scheduling, managing and executing the work.

E. The schedule diagram shall be formatted as above. The diagram shall include (1) all detailed activities included in the preliminary and estimated schedule submittals, (2) calendar days prior to substantial completion, (3) summary activities for the remaining days. The critical path activities shall be identified, including critical paths for interim dates, if possible.

F. The Contractor shall submit progress schedules with each application for payment.

2.06 MONTHLY STATUS REPORTS

A. Contractor shall submit detailed schedule status reports on a monthly basis with the Application for Payment. The first such status report shall be submitted with the first Application for Payment and include data as of the last day of the pay period. The Monthly Report shall include a "marked-up" copy of the latest detailed schedule of legal status and a supporting narrative including updated information as described above. The Monthly Report will be reviewed by County and Contractor at a monthly schedule meeting and Contractor will address County's comments on the subsequent monthly report. Monthly status reports shall be the basis for evaluating Contractor's progress.

B. The "marked-up" diagram shall show, for the latest detailed schedule of legal status, percentages of completion for all activities, actual start and finish dates and remaining durations, as appropriate. Activities not previously included in the latest detailed schedule of legal status shall be added, except that contractual dates will not be changed except by change order. Review of a marked-up diagram by County will not be construed to constitute concurrence with the time frames, duration, or sequencing for such added activities; instead the corresponding data as ultimately incorporated into an appropriate change order shall govern.

2.07 STARTUP SCHEDULE

A. At least 60 calendar days prior to the date of substantial completion, Contractor shall submit a time-scaled (days after notice to proceed) diagram detailing the work to take place in the period between 60 days prior to substantial completion, together with a supporting narrative. County shall have 10 calendar days after receipt of the submittal to respond. Upon receipt of County's comments, Contractor shall make the necessary revisions and submit the revised schedule within 10 calendar days. The resubmittal, if concurred with by County, shall be the Work Plan to be used by Contractor for planning, managing, scheduling and executing the remaining work leading to substantial completion.

B. The time-scaled diagram shall use the latest schedule of legal status for those activities completed ahead of the last 60 calendar days prior to substantial completion and detailed activities for the remaining 60-day period within the time frames outlined in the latest schedule of legal status.

C. Contractor will be required to continue the requirement for monthly reports, as outlined above. In preparing this report, Contractor must assure that the schedule is consistent with the progress noted in the startup schedule.

2.08 REVISIONS

A. All revised schedule submittals shall be made in the same form and detail as the initial submittal and shall be accompanied by an explanation of the reasons for such revisions, all of which shall be subject to review and concurrence by County. The revision shall incorporate all previously made changes to reflect current as-built conditions. Minor changes to the approved submittal may be approved at monthly meetings; a minor change is not considered a revision in the context of this paragraph.

B. A revised schedule submittal shall be submitted for review when required by County.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01340
SHOP DRAWINGS, PROJECT DATA AND SAMPLES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall submit to the County for review and approval: working drawings, Shop Drawings, test reports and data on materials and equipment (hereinafter in this section called data), and material samples (hereinafter in this section called samples) as are required for the proper control of work, including, but not limited to those working drawings, Shop Drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.

B. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the County. This log should include the following items:

1. Submittal description and number assigned.
2. Date to County.
3. Date returned to Contractor (from County).
4. Status of submittal (No exceptions taken, returned for confirmation or resubmittal, rejected).
5. Date of resubmittal and return (as applicable).
6. Date material released (for fabrication).
7. Projected date of fabrication.
8. Projected date of delivery to site.
9. Projected date and required lead time so that product installation does not delay contact.
10. Status of O&M manuals submitted.

1.02 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the Contractor to check all Drawings, data and samples prepared by or for him before submitting them to the County for review. Each and every copy of the Drawings and data shall bear Contractor's stamp showing that they have been so checked. Shop Drawings submitted to the County without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop Drawings shall indicate any deviations in the submittal from requirements of the Contract Documents.

B. Determine and verify:

1. Field measurements.
2. Field construction criteria.

3. Catalog numbers and similar data.
4. Conformance with Specifications and indicate all variances from the Specifications.

C. The Contractor shall furnish the County a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.

D. The Contractor shall not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the County, with No Exceptions Taken or Approved as Noted.

E. The Contractor shall submit to the County all Drawings and schedules sufficiently in advance of construction requirements to provide no less than 21 calendar days for checking and appropriate action from the time the County receives them.

F. All material and product submittals, other than samples, may be transmitted electronically as a pdf file. All returns to the contractor will be as a pdf file only unless specifically requested otherwise.

G. The Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by County of the necessary Shop Drawings.

1.03 COUNTY'S REVIEW OF SHOP DRAWINGS AND WORKING DRAWINGS

A. The County's review of drawings, data, and samples submitted by the Contractor shall cover only general conformity to the Specifications, external connections and dimensions which affect the installation.

B. The review of drawings and schedules shall be general and shall not be construed:

1. As permitting any departure from the Contract requirements.
2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.
3. As approving departures from details furnished by the County, except as otherwise provided herein.

C. If the Drawings or schedules as submitted describe variations and show a departure from the Contract requirements which the County finds to be in the interest of the County and to be so minor as not to involve a change in Contract Price or time for performance, the County may return the reviewed drawings without noting any exception.

D. When reviewed by the County, each of the Shop and Working Drawings shall be identified as having received such review being so stamped and dated. Shop Drawings stamped "REJECTED" and with required corrections shown shall be returned to the Contractor for correction and resubmittal.

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals, the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the County on previous submissions. The Contractor shall make any corrections required by the County.

F. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the County.

G. The County shall review a submittal/resubmittal a maximum of three times after which cost of review shall be borne by the Contractor. The cost of engineering shall be equal to the County's actual payroll cost.

H. When the Shop and Working Drawings have been completed to the satisfaction of the County, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the County.

I. No partial submittals shall be reviewed. Incomplete submittals shall be returned to the Contractor and shall be considered not approved until resubmitted.

1.04 SHOP DRAWINGS

A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, drawings, setting drawings, schedule drawings, manufacturer's scale drawings and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above.

B. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the County and shall bear the Contractor's stamp of approval and original signature as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval and original signature shall be returned to the Contractor for resubmission.

C. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:

1. Number and title of the Drawing.
2. Date of Drawing or revision.
3. Name of project building or facility.
4. Name of contractor and subcontractor submitting drawing.
5. Clear identification of contents and location of the work.
6. Specification title and number.

D. If Drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility of executing the work in accordance with the Contract, even though such Drawings have been reviewed.

E. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.

F. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.

G. All manufacturers or equipment suppliers who proposed to furnish equipment or products shall submit an installation list to the County along with the required Shop Drawings. The installation list shall include at least five installations where identical equipment has been installed and have been in operation for a period of at least 1 year.

H. Only the County will utilize the color "red" in marking Shop Drawing submittals.

1.05 WORKING DRAWINGS

A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's fabrication and erection drawings for structures such as roof trusses, steelwork, precast concrete elements, bulkheads, support of open cut excavation, support of utilities, groundwater control systems, forming and false work; underpinning; and for such other work as may be required for construction of the project.

B. Copies of working drawings as noted above, shall be submitted to the County where required by the Contract Documents or requested by the County and shall be submitted at least 30 days (unless otherwise specified by the County) in advance of their being required for work.

C. Working drawings shall be signed by a registered professional engineer, currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the County, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor; the County and Engineer shall not have responsibility therefor.

1.06 SAMPLES

A. The Contractor shall furnish, for the review of the County, samples required by the Contract Documents or requested by the County. Samples shall be delivered to the County as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until reviewed by the County.

B. Samples shall be of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of the product, with integrally related parts and attachment devices.
2. Full range of color, texture and pattern.
3. A minimum of two samples of each item shall be submitted.

C. Each sample shall have a label indicating:

1. Name of product.
2. Name of Contractor and subcontractor.
3. Material or equipment represented.
4. Place of origin.
5. Name of producer and brand (if any).

6. Location in project.
   (Samples of finished materials shall have additional markings that will identify them under the finished schedules.)
7. Reference specification paragraph.

D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the County. Review of a sample shall be only for the characteristics or use named in such and shall not be construed to change or modify any Contract requirements.

E. Reviewed samples not destroyed in testing shall be sent to the County or stored at the site of the work. Reviewed samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the reviewed samples. If requested at the time of submission, samples which failed testing or were rejected shall be returned to the Contractor at his expense.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01370
SCHEDULE OF VALUES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall submit to the County a Schedule of Values allocated to the various portions of the work, within 10 days after date of Notice to Proceed.

B. Upon request of the County, the Contractor shall support the values with data which will substantiate their correctness.

C. The Schedule of Values shall be used only as the basis for the Contractor's Applications for Payment.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Schedule of Values will be considered for approval by County upon Contractor's request. Identify schedule with:

1. Title of Project and location.
2. Project number.
3. Name and address of Contractor.
4. Contract designation.
5. Date of submission.

B. Schedule of Values shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Follow the table of contents for the Contract Document as the format for listing component items for structures:

1. Identify each line item with the number and title of the respective major section of the Specification.
2. For each line item, list sub values of major products or operations under item.

D. Follow the bid sheets included in this Contract Documents as the format for listing component items for pipe lines.

E. The sum of all values listed in the schedule shall equal the total Contract sum.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01380
CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall employ a competent photographer to take construction record photographs or perform video, recording including furnishing all labor, materials, equipment and incidentals necessary to obtain photographs and/or video recordings of all construction areas.

B. Preconstruction record information shall consist of video recordings on digital video disks (DVD).

C. Construction progress information shall consist of photographs and digital photographs on a recordable compact disc (CD-R).

1.02 QUALIFICATIONS

A. All photography shall be done by a competent camera operator who is fully experienced and qualified with the specified equipment.

B. For the video recording, the audio portion should be done by a person qualified and knowledgeable in the specifics of the Contract, who shall speak with clarity and diction so as to be easily understood.

1.03 PROJECT PHOTOGRAPHS

A. Provide one print of each photograph with each pay application.

B. Provide one recordable compact disc with digital photographs with each pay application.

C. Negatives:

1. All negatives shall remain the property of photographer.
2. The Contractor shall require that photographer maintain negatives or protected digital files for a period of two years from date of substantial completion of the Project.
3. Photographer shall agree to furnish additional prints to County at commercial rates applicable at time of purchase. Photographer shall also agree to participate as required in any litigation requiring the photographer as an expert witness.

D. The Contractor shall pay all costs associated with the required photography and prints. Any parties requiring additional photography or prints shall pay the photographer directly.

E. All project photographs shall be a single weight, color image. All finishes shall be smooth surface and glossy and all prints shall be 8 inches by 10 inches.

F. Each print shall have clearly marked on the back, the name of the Project, the orientation of view, the date and time of exposure, name and address of the photographer and the photographers numbered identification of exposure.

G. All project photographs shall be taken from locations to adequately illustrate conditions prior to construction, or conditions of construction and state of progress. The Contractor shall consult with the County at each period of photography for instructions concerning views required.

1.04 VIDEO RECORDINGS

A. Video, recording shall be done along all routes that are scheduled for construction. Video, recording shall include full, recording of both sides of all streets and the entire width of easements plus 10 feet on each side on which construction is to be performed. All video recording shall be in full color.

B. A complete view, in sufficient detail with audio description of the exact location shall be provided.

C. The engineering plans shall be used as a reference for stationing in the audio portion of the recordings for easy location identification.

D. Two complete sets of video recordings shall be delivered to the County on digital video disks (DVD) for the permanent and exclusive use of the County prior to the start of any construction on the project.

E. All video recordings shall contain the name of the project, the date and time of the video, recording, the name and address of the photographer and any other identifying information required.

F. Construction shall not start until preconstruction video recordings are completed, submitted and accepted by the County. In addition, no progress payments shall be made until the preconstruction video recordings are accepted by the County.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01410
TESTING AND TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. County shall employ and pay for the services of an independent testing laboratory to perform testing specifically indicated on the Contract Documents or called out in the Specifications. County may elect to have materials and equipment tested for conformity with the Contract Documents at any time.

1. Contractor shall cooperate fully with the laboratory to facilitate the execution of its required services.
2. Employment of the laboratory shall in no way relieve the Contractor's obligations to perform the work of the Contract.

B. Reference Section 02311, Water Quality Testing and Sampling for water quality testing and testing laboratory services.

C. Reference Section 02676, Coring for Coring testing and testing laboratory services.

1.02 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.
2. Approve or accept any portion of the Work.
3. Perform any duties of the Contractor.

1.03 CONTRACTOR’S RESPONSIBILITIES

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

B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes which require control by the testing laboratory.

D. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. The County may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor and no extra charge to the County shall be allowed on account of such testing and certification.

E. Furnish incidental labor and facilities:

1. To provide access to work to be tested.
2. To obtain and handle samples at the project site or at the source of the product to be tested.
3. To facilitate inspections and tests.
4. For storage and curing of test samples.

F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

1. When tests or inspections cannot be performed due to insufficient notice, Contractor shall reimburse County for laboratory personnel and travel expenses incurred due to Contractor's negligence.

G. Employ and pay for the services of the same or a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required for the Contractor's convenience and as approved by the County.

H. If the test results indicate the material or equipment complies with the Contract Documents, the County shall pay for the cost of the testing laboratory. If the tests and any subsequent retests indicate the materials and equipment fail to meet the requirements of the Contract Documents, the contractor shall pay for the laboratory costs directly to the testing firm or the total of such costs shall be deducted from any payments due the Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01500
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Temporary utilities required during construction.

B. Temporary construction facilities, including field offices.

C. Requirements for security and protection of facilities and property.

D. Requirements for traffic regulation and access to the work.

E. Temporary controls for protection of environment.

1.02 SUBMITTALS

A. Safety and Protection Submittals: Copies of permits or approvals for construction activities from governing safety authorities.

1.03 MOBILIZATION

The Contractor shall:

A. Use only the area designated for Contractor's temporary facilities. Arrange for additional area if needed for construction operations, as acceptable to Owner, and Engineer.

B. Notify Engineer of obstructions not shown or not readily apparent by visual inspection of the staging area. If such obstructions adversely affect Contractor's operations, proper adjustment to Contract will be considered. Do not remove obstructions without Owner's prior consent.

1.04 TEMPORARY UTILITIES

A. Costs After Substantial Completion: Upon acceptance of the work or a portion of the work defined and certified as substantially complete by Engineer, and Owner commences full-time successful operation of the facility or portion thereof, the Owner will bear the cost for utilities used for Owner's operation. Contractor shall continue to pay for utilities used for their operation until final acceptance of the Work, except as provided herein.

B. Electric Power:

1. Electric power will not be available for the construction trailer. Electrical needs will be incurred and paid for by the Contractor. Contractor shall determine the type and amount available and make arrangements for obtaining temporary electric service at the site.
2. Contractor shall provide the necessary temporary electrical service required for drilling and construction operations, with branch wiring and distribution boxes located to allow service and lighting with construction type power cords.
3. Temporary electric power shall meet construction safety requirements of OSHA, State, and other governing agencies.

C. Water:

1. Water supply and transport for drilling operations is the responsibility of Contractor. The Contractor is responsible for the cost of water.
2. Water used by Contractor from Owner must be accounted for. Supply totalizing flow meter for Contractor use. Contractor will be responsible for conveyance of water from Owner supply to construction site.
3. Contractor shall not use fire hydrants for water supply unless the appropriate County supplied meter and backflow prevention is used.
4. During well acidization, a reduced pressure backflow preventer shall be installed by Contractor on any potable water supply sources.

D. Sewage:

1. Provide and maintain in sanitary condition at all times chemical toilets for Contractor's employees and subcontractors' employees that comply with regulations of local and State health departments. They shall be of watertight construction so that no contamination of the area can result from their use. Contractor shall make arrangements for frequent emptying of toilets with local sewage treatment authority. Upon completion of the work, remove toilets and restore area to original condition.
2. Use of Owner's existing sanitary facilities by construction personnel will not be allowed.

E. Field Offices:

1. In addition to Contractor's field office, Contractor shall furnish and maintain a separate temporary field office for Engineer at a designated location. The field office shall be an office trailer, as approved, and shall be not less than 300 square feet of floor space with an enclosed office room at one end. The office shall be situated in a location acceptable to Engineer. The office shall be watertight and weather-proof, with screened windows and a solid door with a lock and four keys. The office

shall be provided with electrical services for the duration of the contract. The office shall have any necessary equipment adequate to maintain a temperature of 72 degrees F under all conditions. The office shall be equipped with a plumbing system with drains including a separate room with lavatory, water closet, sink, wall cabinet, mirror, hand soap, and paper towels. A portable outside toilet is not acceptable. All utilities shall be provided and maintained by Contractor. No wastewater hookups to existing plant operations will be allowed. Trailer waste disposal tanks shall be pumped out by Contractor on a regular basis throughout the project duration as required to maintain clean and sanitary conditions.

2. Contractor shall supply a water cooler or refrigerator with bottled water and maintain an adequate supply throughout construction.
3. The office shall be situated such to give a clear, unobstructed view of the drilling rig. The floor of the office shall be covered with linoleum or tile and shall be furnished with:
    a. Two 30-inch by 60-inch desks with drawers and two office chairs.
    b. Folding table(s) and chairs to seat ten people.
    c. One four-drawer legal size file cabinet with lock and keys.
    d. One 7-foot by 12-inch by 3-foot steel utility shelving unit assembled.
    e. One bookshelf.
    f. One 3-foot by 4-foot bulletin board, mounted.
    g. One 3-foot by 4-foot dry erase board, mounted.
    h. One first-aid kit.
    i. Two fire extinguishers, non-toxic, dry chemical, meeting UL for Class A, B and C fires.
    j. Two waste baskets.
    k. One plain paper copier with scanning capabilities and with enlargement and reduction capabilities and automatic feeder, as approved by Engineer. Contractor shall furnish and maintain all copier supplies during the contract.
    l. A high speed wireless internet connection for Engineer’s use for the duration of the Project.

1.05 REMOVAL OF TEMPORARY FACILITIES

A. Contractor shall remove temporary facilities after substantial completion, as directed by Engineer and prior to Final Completion inspection, and return area used by temporary facilities to same or better condition than originally provided.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 TEMPORARY CONSTRUCTION

A. Access Roads and Parking:

1. Temporary construction access roads will be made available to Contractor as necessary to execute the work. Maintain in good condition throughout the Project and leave the area in a condition satisfactory to the Owner.
2. Contractor shall use area designated within Contractor's temporary facilities and as agreed upon by Engineer and Owner, for parking of Contractor's employee vehicles. No personal vehicles will be allowed in the construction area or plant site outside of the designated construction and parking areas. Subcontractor vehicles required to be on site will be escorted to the site by Owner or Engineer.

B. Storage Yards and Buildings:

1. The Contractor shall:
   a. Construct temporary storage yards for the storage of products that are not subject to damage by weather conditions. Materials such as pipe and reinforcing and structural steel shall be stored on pallets or racks, off the ground, and in a manner to allow ready access for inspection and inventory. Temporary gravel surfacing of storage yards must be approved by Engineer.
   b. Store combustible materials (paints, solvents, fuels, etc.) in a well-ventilated building remote from other buildings.

C. Fencing and Barricades:

1. Security Fence: Use of security fences by Contractor is permissible. Do not modify existing fencing at location without prior authorization and approval by Owner.
2. Barricades: Contractor shall provide barricades as necessary to prevent unauthorized entry to construction areas, both inside and outside of fenced area. Also provide barricades to protect existing facilities and adjacent properties from potential damage. Locate barriers to enable access by facility operators and property owners.

3.02 SAFETY AND PROTECTION

A. Examination of Existing Facilities:

1. After the Contract is awarded and before the commencement of work, Contractor shall make a thorough examination of all existing buildings, structures, and other improvements in the vicinity of the work, as applicable, which might be damaged by construction operations.
2. Periodic examinations of existing buildings, structures, and other improvements in the vicinity of the work shall be made jointly by authorized representatives of Contractor, Engineer, and Owner. The scope of examination will include cracks in structures, settlement, leakage, and similar conditions.
3. Records in triplicate of all observations shall be prepared by the authorized representative of Owner and of Contractor. Photographs, as requested by Owner, shall be made by the Contractor. One signed copy of every document and photograph will be kept on file in the office of Engineer. Contractor will also be responsible for videotaping the site prior to mobilization of drilling equipment and will submit two approved copies to Engineer prior to mobilizing equipment to the Site.
4. These records and photographs are intended for use as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and are for protection of adjacent property owners, Contractor, and Owner.

B. Safety Requirements:

1. Contractor shall do whatever work is necessary for safety and be solely and completely responsible for conditions of the job site, including safety of all persons (including employees) and property during the Contract period. This requirement shall apply continuously and not be limited to normal working hours.
2. Safety provisions shall conform to Federal and State Departments of Labor Occupational Safety and Health Act (OSHA), and other applicable federal, state, county, and local laws, ordinances, codes, requirements set forth herein, and regulations that may be specified in other parts of these Contract Documents. Where these are in conflict, the more stringent requirement shall be followed. Contractor shall become thoroughly familiar with governing safety provisions and shall comply with the obligations set forth therein.
3. Contractor shall develop and maintain for the duration of the Contract a safety program that will effectively incorporate and implement required safety provisions. Contractor shall appoint a qualified employee who is authorized to supervise and enforce safety program compliance.

4. Engineer's duty to conduct construction review of Contractor's performance is not intended to include a review or approval of the adequacy of Contractor's safety supervisor, safety program, or safety measures taken on or near the construction site.
5. As part of safety program, Contractor shall maintain at its office or other well-known place at the jobsite safety equipment applicable to the work as prescribed by the governing safety authorities and articles necessary for administering first-aid. Establish procedures for the immediate removal to a hospital or a doctor's care of persons who may be injured on the job site.
6. Contractor shall comply with Owner's safety rules while on Owner's property.
7. If death or serious injuries or damages occur, the accident shall be reported immediately by telephone or messenger to Engineer. In addition, Contractor shall promptly report in writing all accidents whatsoever arising out of, or in connection with, the performance of the work whether on or adjacent to the site, giving full details and statements of witnesses.
8. If claim is made by anyone against Contractor or any subcontractor on account of accident, Contractor shall promptly report the facts in writing, giving full details of the claim.

C. Traffic Safety and Access: Contractor shall comply with rules and regulations of the city, state, and county authorities regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by written permission of the proper authority. Ensure the least possible obstruction to traffic, both onsite and offsite, and normal commercial pursuits. Traffic control procedures and devices used on all local, county, and state rights-of-way shall meet the requirements of the applicable current laws and regulations for traffic control.

D. Fire Prevention: Contractor shall perform all work in a firesafe manner. Furnish and maintain on the site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable federal, local, and state fire prevention regulations. Where these regulations do not apply, follow applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241).

E. Use of Explosives: No blasting or use of explosives will be allowed on the job site.

F. Protection of Work and Property:

1. General: Contractor shall employ such means and methods necessary to adequately protect public property and property of the Owner against damage. In the event of damage to such property, immediately restore the property to a condition equal to its original condition and to the satisfaction of Engineer and property owner, and bear all costs thereof.
2. Finished Construction:
    a. Contractor shall assume the responsibility for protection of finished construction and shall repair and restore any and all damage to finished work to its original or better condition, until the project has been deemed complete by Owner.
    b. At such time temporary facilities and utilities are no longer required for the work, Contractor shall notify Engineer of intent and schedule for their removal. Remove temporary facilities and utilities from the site as Contractor's property and leave the site in such condition as specified, as shown on the Drawings or as directed by Owner.
    c. In unfinished areas, Contractor shall leave the site evenly graded, sodded, or planted as necessary, in a condition that will restore original drainage, and with an appearance equal to or better than original.

3.03 ENVIRONMENTAL CONTROLS

A. General:

1. Contractor in executing the work shall maintain affected areas within and outside project boundaries free from environmental pollution that would be in violation of federal, state, or local regulations.
2. Do not impair operation of existing sewer systems. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other water or wastewater treatment facility structures. Maintain original site drainage wherever possible.

B. Waste Pollution Control:

1. The Contractor shall:
    a. Comply with laws, rules, and regulations of the State of Florida and agencies of the United States Government prohibiting the pollution of lakes, wetlands, streams, or river waters from the dumping of refuse, rubbish, or debris.

b. Comply with the procedures and guidance outlined by the U.S. Environmental Protection Agency, the Florida Department of Environmental Protection, Manatee County, and the Southwest Florida Water Management District for erosion, and sediment control and control of turbidity in all discharges and obtain any necessary permits required for compliance.

C. Waste Material Disposal:

1. Excavated material, drilling additives, and other waste material must be disposed of by Contractor in accordance with the State of Florida and Manatee County Regulations in licensed landfills or at other sites for which approval is obtained. Contractor shall submit the proposed haul route(s) for each site intended to be used and shall bear all costs associated with the disposal of the waste. The site must be approved by FDEP prior to drilling activities. Provide watertight conveyance for liquids, semi-liquids, or saturated solids that tend to bleed during transport. A manifest must be obtained by Owner prior to removal to disposal site. Disposal costs for hazardous waste materials are the responsibility of Contractor.
2. Contractor shall maintain areas covered by the contract and affected public properties free from accumulations of waste, debris, and rubbish caused by construction operations. Remove excavated materials from the site in a manner approved by Engineer.

D. Air Pollution Control: Contractor shall minimize air pollution likely to occur from construction operations by wetting down bare soils during windy conditions, requiring proper combustion emission control devices on construction vehicles and equipment, and by shutdown of motorized equipment not in use. Trash burning will not be permitted on the construction site.

E. Noise Control: Contractor shall minimize noise by executing work using appropriate construction methods and equipment. If necessary, provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels. No drilling activities or other operations will be permitted outside the normal work hours without prior approval of Owner, which may require additional noise control methods.

END OF SECTION

SECTION 01505
MOBILIZATION/DEMOBILIZATION/SITE WORK

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary to transport to the site all personnel, supplies, and equipment; setup workover and drill rigs and temporary facilities; equipment referenced in other sections; and temporary power, water, and per diem. This section also covers the work necessary to remove from the site all personnel, supplies, and equipment; remove workover and drill rigs and temporary facilities; equipment referenced in other sections; and site restoration and cleanup. Time is of the essence. Demobilization shall be completed within two weeks after substantial completion of other site work.

PART 2 PRODUCTS

2.01 GENERAL

A. Contractor shall provide all materials and equipment required to accomplish the work as specified.

2.02 SECURITY

A. Contractor shall provide secured protection for equipment or materials stored at the site or locations designated and approved by Owner. Contractor shall assume full responsibility for all supplies, materials, and equipment required by it for the contracted work, whether furnished by itself or other parties, until the wells have been installed and accepted by Engineer and Owner.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. Install temporary facilities in accordance with Section 01500, Construction Facilities and Temporary Controls. Construct temporary drilling pad in accordance with Specifications and Drawings. Design of temporary drilling pad must be approved by FDEP. Contractor shall provide Engineer 5 normal working days notice prior to mobilization to the drilling site. Engineer will inform FDEP and SWFWMD of the Contractor's schedule.

B. Contractor shall set up all equipment at the site designated by Engineer. Confine work to designated work areas.

C. Clearing and grubbing of the site will not be performed by Owner prior to mobilization to site. Some obstructions may not be shown on the site plan. Contractor is advised to carefully inspect the site and existing facilities before bidding on or beginning any work at the site. The removal of minor obstructions shall be anticipated and accomplished, even though not shown or specifically mentioned.

D. Contractor is responsible for providing physical access to all work areas for all vehicles necessary for well construction and testing. Engineer accepts no liability for costs incurred due to Contractor's failure to thoroughly examine the site and review existing site plans, data, and these Specifications.

3.02 CONTAMINATION PRECAUTIONS

A. Avoid contamination of the project area. Do not dump waste oil, rubbish, or other similar materials on the ground. Cleanup of any contamination by Contractor or his subcontractors shall be performed by Contractor at his sole expense.

B. Avoid spillage of brackish water produced during drilling operations. Contractor shall be responsible for all remediation, including additional monitoring that may be required, related to releases to the surficial aquifer caused by his personnel, equipment, and/or materials.

3.03 SUBGRADE PREPARATION FOR AREA OF TEMPORARY PAD

A. Prior to fill replacement for area, proof-roll the subgrade with a loaded dump truck or similar heavy wheeled vehicle to detect soft or loose zones. Notify Engineer prior to commencement of proof-rolling. If soft or loose zones are found, excavate the soft or loose material to a depth accepted by Engineer, then fill with granular fill compacted as specified for such fill. Compact the upper 12 inches of the subgrade to 95 percent of relative compaction.

3.04 FLEXIBLE MEMBRANE LINER POLYVINYL CHLORIDE (PVC)

A. The PVC liner shall have a minimum thickness of 20 mils. The following manufacturers, or equal, are acceptable:

1. Water Saver, Denver, CO.
2. Staff Industries, Detroit, MI; or equal.

3.05 CLEANUP OF CONSTRUCTION AREAS

A. Contractor shall avoid defacing of the site area. Do not dump waste oil, fuel, rubbish, or other materials on the ground. Restore the site to original or better condition when work is complete.

B. Replace or repair any facility, equipment, buildings, fencing, etc. damaged during work. Site cleanup shall be completed to the satisfaction of Owner. Waste material and construction debris, including; subsurface fluids, drill cuttings, wood, pipe, hoses, etc. shall be contained so that it shall not migrate from areas designated by Engineer. Materials shall be segregated and identified and removed and disposed of offsite, as approved by Engineer. The replacement of minor obstructions and restoration of physical features, even though not specifically mentioned shall be anticipated and accomplished.

C. Upon leaving the site at the completion of the work, Contractor shall clean equipment and materials of surface and subsurface materials contacted at the site.

3.06 HORIZONTAL AND VERTICAL CONTROL

A. Prior to initiating drilling of the recharge well, Contractor shall survey the site to establish horizontal and vertical control of all wells including pad monitor wells, piping, and equipment. Contractor shall provide four certified copies and electronic copy in Adobe Acrobat format of survey upon initiation of work.

END OF SECTION

SECTION 01510
TEMPORARY AND PERMANENT UTILITIES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall be responsible for furnishing all requisite temporary utilities, i.e., power, water, sanitation, etc. The Contractor shall obtain and pay for all permits required as well as pay for all temporary usages. The Contractor shall remove all temporary facilities upon completion of work.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with federal, state and local codes and regulations and with utility company requirements.

C. Comply with County Health Department regulations.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

A. Materials for temporary utilities may be "used". Materials for electrical utilities shall be adequate in capacity for the required usage, shall not create unsafe conditions and shall not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

A. Arrange with the applicable utility company for temporary power supply. Provide service required for temporary power and lighting and pay all costs for permits, service and for power used.

2.03 TEMPORARY WATER

A. The Contractor shall arrange with Manatee County Utilities Customer Service office to provide water for construction purposes, i.e., meter, pay all costs for installation, maintenance and removal, and service charges for water used.

B. The Contractor shall protect piping and fitting against freezing.

2.04 TEMPORARY SANITARY FACILITIES

A. The Contractor shall provide sanitary facilities in compliance with all laws and regulations.

B. The Contractor shall service, clean and maintain facilities and enclosures.

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall maintain and operate systems to assure continuous service.

B. The Contractor shall modify and extend systems as work progress requires.

3.02 REMOVAL

A. The Contractor shall completely remove temporary materials and equipment when their use is no longer required.

B. The Contractor shall clean and repair damage caused by temporary installations or use of temporary facilities.

END OF SECTION

SECTION 01570
TRAFFIC REGULATION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall be responsible for providing safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the Contractor and which interfere with the driving or walking public.

B. The Contractor shall remove temporary equipment and facilities when no longer required, restore grounds to original or to specified conditions.

1.02 TRAFFIC CONTROL

A. The necessary traffic control shall include, but not be limited to, such items as proper construction warning signs, signals, lighting devices, markings, barricades, channelization and hand signaling devices. The Contractor shall be responsible for installation and maintenance of all devices and detour routes and signage for the duration of the construction period. The Contractor shall utilize the appropriate traffic plan from the FDOT Maintenance of Traffic Standards, Series 600 of the FDOT Roadway and Traffic Design Standards, Latest Edition.

B. Should there be the necessity to close any portion of a roadway carrying vehicles or pedestrians the Contractor shall submit a traffic control plan (TCP) at least 5 days before a partial or full day closure, and at least 8 days before a multi-day closure. TCP shall be submitted, along with a copy of their accreditation, by a certified IMSA or ATSA Traffic Control Specialist.

1. At no time will more than one lane of a roadway be closed to vehicles and pedestrians without an approved road closure from the County Transportation Department. With any such closings, adequate provision shall be made for the safe expeditious movement of each.
2. All traffic control signs must be in place and inspected at least 1 day in advance of the closure. Multi-day closures notification signs shall be in place at least 3 days in advance of the closure. All signs must be covered when no in effect, and checked twice a day by the Worksite Traffic Supervisor when they are in effect.

C. The Contractor shall be responsible for removal, relocation, or replacement of any traffic control device in the construction area which exists as part of the normal preconstruction traffic control scheme. Any such actions shall be performed by the Contractor under the supervision and in accordance with the instructions of the applicable highway department unless otherwise specified.

D. The Contractor will consult with the County immediately on any vehicular or pedestrian safety or efficiency problem incurred as a result of construction of the Project.

E. The Contractor shall provide ready access to businesses and homes in the project area during construction. The Contractor shall be responsible for coordinating this work with affected homeowners.

F. When conditions require the temporary installation of signs, pavement markings and traffic barriers for the protection or workers and traffic, the entire array of such devices shall be depicted on working drawings for each separate stage of work. These drawings shall be submitted to the County for review and approval prior to commencement of work on the site.

G. Precast concrete traffic barriers shall be placed adjacent to trenches and other excavations deeper than 6 inches below the adjacent pavement surface.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01600
MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Material and equipment incorporated into the work:

1. Conform to applicable specifications and standards.
2. Comply with size, make, type and quality specified, or as specifically approved in writing by the County.
3. Manufactured and Fabricated Products:
   a. Design, fabricate and assemble in accordance with the best engineering and shop practices.
   b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
   c. Two or more items of the same kind shall be identical and manufactured by the same manufacturer.
   d. Products shall be suitable for service conditions.
   e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
4. Do not use material or equipment for any purpose other than that for which it is specified.
5. All material and equipment incorporated into the project shall be new.

1.02 MANUFACTURER'S INSTRUCTIONS

A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to County. Maintain one set of complete instructions at the job site during installation and until completion.

B. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions and in conformity with specified requirements. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with County prior to proceeding. Do not proceed with work without clear instructions.

1.03 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site.

1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals and that products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.04 SUBSTITUTIONS AND PRODUCTS

A. Contractor’s Options:

1. For products specified only by reference standard, select any product meeting that standard.
2. For products specified by naming one or more products or manufacturers and "or equal," Contractor must submit a request for substitutions of any product or manufacturer not specifically named in a timely manner so as not to adversely affect the construction schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01620
STORAGE AND PROTECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Provide secure storage and protection for products to be incorporated into the work and maintenance and protection for products after installation and until completion of Work.

1.02 STORAGE

A. Store products immediately on delivery and protect until installed in the Work, in accord with manufacturer's instructions, with seals and labels intact and legible.

B. Exterior Storage:

1. Provide substantial platform, blocking or skids to support fabricated products above ground to prevent soiling or staining.
    a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
    b. Prevent mixing of refuse or chemically injurious materials or liquids.

C. Arrange storage in manner to provide easy access for inspection.

1.03 MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continuing basis.
3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings and finishes is not acceptable under requirements of these Contract Documents.

B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1. Equipment shall not be shipped until approved by the County. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the County.
2. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the County until such time as the equipment is to be installed.
3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
4. Moving parts shall be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
5. Lubricants shall be changed upon completion of installation and as frequently as required, thereafter during the period between installation and acceptance.
6. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

1.04 PROTECTION AFTER INSTALLATION

A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the work.

1.02 SUBSTANTIAL COMPLETION

A. The Contractor shall submit the following items when the Contractor considers the work to be substantially complete:

1. A written notice that the work, or designated portion thereof, is substantially complete.
2. A list of items to be completed or corrected.

B. Within a reasonable time after receipt of such notice, the County shall make an inspection to determine the status of completion.

C. Project record documents and operations and maintenance manuals must be submitted before the project shall be considered substantially complete.

D. If the County determines that the work is not substantially complete:

1. The County shall notify the Contractor in writing, stating the reasons.
2. The Contractor shall remedy the deficiencies in the work and send a second written notice of substantial completion to the County.
3. The County shall reinspect the work.

E. When the County finds that the work is substantially complete:

1. The Engineer shall prepare and deliver to the County a tentative Certificate of Substantial Completion (Manatee County Project Management Form PMD-8) with a tentative list of the items to be completed or corrected before final payment.
2. The Engineer shall consider any objections made by the County as provided in Conditions of the Contract. When the Engineer considers the work substantially complete, he will execute and deliver to the County a definite Certificate of Substantial Completion (Manatee County Project Management Form PMD-8) with a revised tentative list of items to be completed or corrected.

1.03 FINAL INSPECTION

A. When the Contractor considered the work to be complete, he shall submit written certification stating that:

1. The Contract Documents have been reviewed.
2. The work has been inspected for compliance with Contract Documents.
3. The work has been completed in accordance with Contract Documents.
4. The equipment and systems have been tested in the presence of the County's representative and are operational.
5. The work is completed and ready for final inspection.

B. The County shall make an inspection to verify the status of completion after receipt of such certification.

C. If the County determines that the work is incomplete or defective:

1. The County shall promptly notify the Contractor in writing, listing the incomplete or defective work.
2. The Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to County that the work is complete.
3. The County shall reinspect the work.

D. Upon finding the work to be acceptable under the Contract Documents, the County shall request the Contractor to make closeout submittals.

E. For each additional inspection beyond a total of three inspections for substantial and final completion due to the incompleteness of the work, the Contractor shall reimburse the County's fees.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO COUNTY

A. Project Record Documents (prior to substantial completion).

B. Operation and maintenance manuals (prior to substantial completion).

C. Warranties and Bonds.

D. Evidence of Payment and Release of Liens: In accordance with requirements of General and Supplementary Conditions.

E. SWFWMD Well Completion Forms.

F. FDEP Well Completion Forms.

G. Certificate of insurance for products and completed operations.

H. Final Reconciliation, Warranty Period Declaration, and Contractor's Affidavit (Manatee County Project Management Form PMD-9).

1.05 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the County.

B. Statement shall reflect all adjustments to the Contract Sum:

1. The original Contract Sum.
2. Additions and deductions resulting from:
    a. Previous Change Orders.
    b. Unit prices.
    c. Penalties and bonuses.
    d. Deductions for liquidated damages.
    e. Other adjustments.
3. Total Contract Sum, as adjusted.
4. Previous payments.
5. Sum remaining due.

C. Project Management shall prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.06 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01710
CLEANING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Execute cleaning during progress of the work and at completion of the work, as required by the General Conditions.

1.02 DISPOSAL REQUIREMENTS

A. Conduct cleaning and disposal operations to comply with all federal, state and local codes, ordinances, regulations and anti-pollution laws.

PART 2 PRODUCTS

2.01 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

A. Execute periodic cleaning to keep the work, the site and adjacent properties free from accumulation of waste materials, rubbish and wind-blown debris, resulting from construction operations.

B. Provide on-site containers for the collection of waste materials, debris, and rubbish.

C. Remove waste materials, debris and rubbish from the Site periodically and dispose of at legal disposal areas away from the Site.

3.02 DUST CONTROL

A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.

B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

3.03 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

C. Prior to final completion or County occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire work is clean.

END OF SECTION

SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall maintain at the site for the County one record copy of:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. County's field orders or written instructions.
6. Approved shop drawings, working drawings and samples.
7. Field test records.
8. Construction photographs.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for inspection by the County.

1.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by the County.

1.04 RECORDING

A. Label each document "PROJECT RECORD" in neat large printed letters.

B. Record information concurrently with construction progress.

C. Do not conceal any work until required information is recorded.

D. Drawings; Legibly mark to record actual construction:

1. Field changes of dimensions and detail.
2. Changes made by Field Order or by Change Order.
3. Details not on original contract drawings.
4. Equipment and piping relocations.

E. Specifications and Addenda; Legibly mark each section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
2. Changes made by Field Order or by Change Order.

F. Shop Drawings (after final review and approval): Five sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

1.05 SUBMITTAL

A. Prior to substantial completion and prior to starting the bacteria testing of water lines, deliver signed and sealed Record Documents and Record Drawings to the County. These will be reviewed and verified by the inspector. If there are any required changes or additions, these shall be completed and the entire signed and sealed set resubmitted prior to final pay application.

B. The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings. Record drawings shall be certified by the professional(s) (Engineer or Surveyor licensed in Florida), as stipulated by the Land Development Ordinance and submitted on signed and sealed paper drawings, signed and dated Mylar drawings together with an AutoCAD version on a recordable compact disk (CD).

C. The CD shall contain media in AutoCad Version 2004 or later, or in any other CAD program compatible with AutoCad in DWG or DXF form. All fonts, line types, shape files or other pertinent information used in the drawing and not normally included in AutoCad shall be included on the media with a text file or attached noted as to its relevance and use.

D. Accompany submittal with transmittal letter, containing:

1. Date.
2. Project title and number.
3. Contractor’s name and address.
4. Title and number of each Record Document.
5. Signature of Contractor or his authorized representative.

Note: The data required to properly prepare these record drawings shall be obtained at the site, at no cost to the County by the responsible design professional or his/her duly appointed representative. The appointed representative shall be a qualified employee of the responsible design professional or a qualified inspector retained by the responsible design professional on a project-by-project basis

PART 2 STANDARDS

2.01 MINIMUM RECORD DRAWING STANDARDS FOR ALL RECORD DRAWINGS SUBMITTED TO MANATEE COUNTY

A. Record drawings shall be submitted to at least the level of detail in the Contract Documents. It is anticipated that the original Contract Documents shall serve as at least a background for all record information. Original drawings in CAD format may be requested of the County.

B. Drawings shall meet the criteria of Article Recording, paragraph D above.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01740
WARRANTIES AND BONDS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile specified warranties and bonds.

B. Compile specified service and maintenance contracts.

C. Co-execute submittals when so specified.

D. Review submittals to verify compliance with Contract Documents.

E. Submit to County for review and transmittal.

1.02 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two each.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product or work item.
2. Firm, with name of principal, address and telephone number.
3. Scope.
4. Date of beginning of warranty, bond or service and maintenance contract.
5. Duration of warranty, bond or service maintenance contract.
6. Provide information for County's personnel:
   a. Proper procedure in case of failure.
   b. Instances which might affect the validity of warranty or bond.
7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2 inch by 11-inch punched sheets for standard 3-ring binder. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:
   a. Title of Project.
   b. Name of Contractor.

C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.04 TIME OF SUBMITTALS

A. Make submittals within 10 days after date of substantial completion and prior to final request for payment.

B. For items of work, where acceptance is delayed materially beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.05 SUBMITTALS REQUIRED

A. Submit warranties, bonds, and service and maintenance contracts as specified in respective sections of Specifications.

B. Approval by the County of all documents required under this section is a pre-requisite to requesting a final inspection and final payment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

DIVISION 2

SITE WORK

SECTION 02221
TRENCHING, BEDDING AND BACKFILL FOR PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals necessary to perform all excavation, backfill, fill, grading, trench protection or other related work required to complete the piping work shown on the Drawings and specified herein. The work shall include, but not be limited to: vaults; concrete equipment pads; duct conduit; pipe; roadways and paving; backfilling; required fill or borrow operations; grading; disposal of surplus and unsuitable materials; and all related work such as sheeting, bracing and dewatering.

B. Prior to commencing work, the Contractor shall examine the site and review test borings if available, or undertake his own subsurface investigations and take into consideration all conditions that may affect his work.

C. The Contractor is responsible for the protection of every tree which is scheduled to remain in the project area. This includes trees which may or may not be shown on the Drawings. Every tree shall be adequately protected in place at no additional cost to the County. This includes, but is not limited to protecting the root systems and adjusting grades as necessary for tree/root protection.

D. Excavate in accordance with F.S. Title XXXIII, Chapter 553, Part III, Trench Safety Act.

1.02 PROTECTION

A. Sheeting and Bracing in Excavations:

1. In connection with construction of underground structures, the Contractor shall properly construct and maintain cofferdams. These shall consist of: Sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction and to protect adjacent structures, existing yard pipe and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

2. Trench sheeting for pipes: No sheeting is to be withdrawn if driven below, mid-diameter of any pipe and no wood sheeting shall be cut off at a level lower than 1 foot above the top of any pipe unless otherwise directed by the County. During the progress of the work, the County may direct the Contractor in writing to leave additional wood sheeting in place. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given for an alternate method of removal.
3. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. Unless otherwise approved or indicated on the Drawings or in the Specification, all sheeting and bracing shall be removed after completion of the piping or structure, care being taken not to disturb or otherwise injure the pipeline or finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools specifically made for that purpose, by watering, or as may otherwise be directed.
4. The Contractor shall construct, to the extent he deems it desirable for his method of operation, the cofferdams and sheeting outside the neat lines of the pipeline trench or foundation unless otherwise indicated on the Drawings or directed by the County. Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing and cofferdams shall be adequate to withstand all pressures to which the pipeline or structure will be subjected. Pumping, bracing and other work within the cofferdam shall be done in a manner to avoid disturbing any construction of the pipeline or the enclosed masonry. Any movement or bulging which may occur shall be corrected by the Contractor at his own expense so as to provide the necessary clearances and dimensions.
5. Drawings of the cofferdams and design computations shall be submitted to the County and approved prior to any construction. However, approval of these Drawings shall not relieve the Contractor of the responsibility for the cofferdams. The Drawings and computations shall be prepared and stamped by a Registered Professional Engineer in the State of Florida and shall be in sufficient detail to disclose the method of operation for each of the various stages of construction, if required, for the completion of the pipeline and substructures.

B. Dewatering, Drainage and Flotation:

1. The Contractor shall construct and place all pipelines, concrete work, structural fill, bedding rock and limerock base course, in-the-dry. In addition, the Contractor shall make the final 24 inches of excavation for this work in-the-dry and not until the water level is a minimum of 6 inches below proposed bottom of excavation.

2. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavation and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.
3. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
4. Wellpoints may be required for dewatering the soil prior to final excavation for deeper in-ground structures or piping and for maintaining the lowered groundwater level until construction has been completed to avoid the structure, pipeline, or fill from becoming floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from wellpoints shall be continuous and standby pumps shall be provided.
5. The Contractor shall furnish all materials and equipment to perform all work required to install and maintain the proposed drainage systems for handling groundwater and surface water encountered during construction of structures, pipelines and compacted fills.
6. Where required, the Contractor shall provide a minimum of two operating groundwater observation wells at each structure to determine the water level during construction of the pipeline or structure. Locations of the observation wells shall be at structures and along pipelines as approved by the County prior to their installation. The observation wells shall be extended to 6 inches above finished grade, capped with screw-on caps protected by 24-inch by 24-inch wide concrete base and left in place at the completion of this Project.
7. Prior to excavation, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions to the County for approval. Such approval shall not relieve the Contractor of the responsibility for the satisfactory performance of the system. The Contractor shall be responsible for correcting any disturbance of natural bearing soils for damage to pipeline or structures caused by an inadequate dewatering system or by interruption of the continuous operation of the system as specified.
8. As part of his request for approval of a dewatering system, the Contractor shall demonstrate the adequacy of the proposed system and wellpoint filter sand by means of a test installation. Discharge water shall be clear, with no visible soil particles in a one quart sample. Discharge water shall not flow directly into wetlands or Waters of the State as defined by FDEP and SWFWMD.
9. During backfilling and construction, water levels shall be measured in observation wells located as directed by the County.

10. Continuous pumping will be required as long as water levels are required to be below natural levels.

PART 2 PRODUCTS

2.01 MATERIALS

A. General:

1. Materials for use as fill and backfill shall be described below. For each material, the Contractor shall notify the County of the source of the material and shall furnish the County, for approval, a representative sample weighing approximately 50 pounds, at least 10 calendar days prior to the date of anticipated use of such material.
2. Additional materials shall be furnished as required from off-site sources and hauled to the site.

B. Structural Fill:

1. Structural fill in trenches shall be used below spread footing foundations, slab-on-grade floors and other structures as backfill within 3 feet of the below grade portions of structures.
2. Structural fill material shall be a minimum of 60 percent clean sand, free of organic, deleterious and/or compressible material. Minimum acceptable density shall be 98 percent of the maximum density as determined by AASHTO T-180. Rock in excess of 2-1/2 inches in diameter shall not be used in the fill material. If the moisture content is improper for attaining the specified density, either water shall be added or material shall be permitted to dry until the proper moisture content for compaction is reached.

C. Common Fill:

1. Common fill material shall be free from organic matter, muck or marl and rock exceeding 2-1/2 inches in diameter. Common fill shall not contain broken concrete, masonry, rubble or other similar materials. Existing soil may be used to adjust grades over the site with the exception of the construction area. Compact to 98 percent per AASHTO T-180.
2. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the County, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials by the Contractor.

D. Crushed Stone:

1. Crushed stone may be used for pipe bedding, manhole bases, as a drainage layer below structures with underdrains and at other locations indicated on the Drawings.
2. Crushed stone shall be size No. 57 with gradation as noted in Table 1 of Section 901 of Florida Department of Transportation, Construction of Roads and Bridges.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION AND BACKFILLING

A. Excavation for all trenches required for the installation of pipes and electrical ducts shall be made to the depths indicated on the Drawings and in such manner and to such widths as will give suitable room for laying the pipe or installing the ducts within the trenches.

B. Rock shall be removed to a minimum 6-inch clearance around the bottom and sides of all the pipe or ducts being laid.

C. Where pipes or ducts are to be laid in limerock bedding or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

D. Where the pipes or ducts are to be laid directly on the trench bottom, the lower part of the trenches shall not be excavated to grade by machinery. The last of the material being excavated manually, shall be done in such a manner that will give a flat bottom true to grade so that pipe or duct can be evenly supported on undisturbed material. Bell holes shall be made as required.

E. Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed and inspected and the trench filled with suitable compacted material to the mid-diameter of the pipe.

F. Backfilling over ducts shall begin not less than three days after placing concrete encasement.

G. All backfilling shall be prosecuted expeditiously and as detailed on the Drawings.

H. Any space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth, free from stones having a diameter greater than 2 inches and thoroughly compacted with a tamper as fast as placed, up to a level of one foot above the top of the pipe.

I. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.

J. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted by rolling, ramming, or puddling, as the County may direct, sufficiently to prevent subsequent settling.

END OF SECTION

SECTION 02311
WATER QUALITY TESTING AND SAMPLING

PART 1 GENERAL

1.01 WORK INCLUDED

This section describes the water sampling and water quality testing work to be performed under this Contract. Contractor will pay for the services of Benchmark Laboratories, a local Florida Department of Environmental Protection (FDEP) certified water laboratory contracted by Manatee County to perform water quality testing.

1.02 SUBMITTALS

A. Contractor shall submit a statement of qualifications of Benchmark Laboratories with an FDEP-approved quality assurance and quality control plan to Engineer for approval prior to sampling.

PART 2 PRODUCTS

2.01 WATER QUALITY SAMPLING PARAMETERS

A. Contractor shall assist Engineer with collecting and shall coordinate and pay all associated laboratory costs for samples listed in Table 02311-1.

1. During reverse-air drilling of IW-1, IW-2 and IW-3 at 90-foot intervals, as described in Section 02673, Drilling: List A in Table 02311-1.
2. During packer testing, as described in Section 02987, Packer Testing: List B in Table 02311-1.
3. Final background analysis upon completion and development of IW-1, IW-2, IW-3, DZMW-1, DZMW-2, DZMW-3, and APMW-1 as described in Section 02673, Drilling: List C in Table 02311-1.

PART 3 EXECUTION

3.01 LABORATORY DUTIES

A. Provide water quality analysis as described in paragraph 2.01, Water Quality Sampling Parameters above, in a timely manner as to permit data to be used to determine casing setting depths. Results are needed as quickly as possible for water quality samples as described above in order not to delay Contractor. A 1-week turnaround time is required for all sample results except for the final background sample for each well. No standby time will be paid to Contractor for downtime resulting from Engineer waiting on laboratory results.

B. Perform background water sample collection using properly trained personnel for water samples after development of each well.

C. Promptly notify Engineer and Contractor of any irregularities in sample.

D. Submit electronic copy in Adobe Acrobat PDF format of test results immediately after completion of testing. Reports must follow FDEP Standard Operating Protocols and shall include, as a minimum, the following information:

1. Well identification.
2. Water sample identification showing sample depth.
3. Time and date of sample.
4. Laboratory name/telephone/address/QA-QC contact person.
5. Signature of inspector.
6. Methods of test.
7. Chain-of-custody receipts.

3.02 WATER SAMPLES – IW-1, IW-2, IW-3, DZMW-1, DZMW-2, DZMW-3

A. During reverse-air drilling through the UFA (between approximately 350 and 1,600 feet bls), Contractor shall collect representative water samples every 90 feet for field water quality analysis by Engineer. Samples shall be collected in clean plastic bottles, supplied by Contractor, with nonmetallic caps and of a capacity of not less than 16 fluid ounces. Each bottle and cap shall be rinsed twice with the water to be sampled before collecting the corresponding sample. Sample bottles for field water quality analysis shall be clearly labeled in an indelible way with the well identification, depth, time, and date. It shall be Contractor's sole responsibility to collect, protect, and deliver the water samples, properly labeled and stored after collection, to Engineer.

B. In addition to samples collected every 90 feet for field water quality analysis by Engineer, a duplicate set of representative water samples will be collected every 90 feet for laboratory analysis as described above. Samples shall be collected in perfectly clean plastic bottles, supplied by the Contractor, with nonmetallic caps and of a capacity of at least 16 fluid ounces. Unless preserved, each bottle and cap shall be rinsed twice with water to be sampled before collecting the corresponding sample. Contractor is responsible for delivery to and compensation to the prescribed laboratory for all analytical services.

C. Sample bottles for laboratory water quality analyses shall be clearly labeled in an indelible way with the well identification, depth, time, and date. It shall be Contractor's sole responsibility to collect, protect, and deliver the water samples, properly labeled and stored after collection, to the approved water testing laboratory in a timely manner.

D. After completion of drilling and after development of IW-1, IW-2, and IW-3, DZMW-1, DZMW-2 and DZMW-3, Contractor shall collect background water samples from the wells and arrange for analysis by the approved water laboratory (Benchmark). Samples shall be collected at the end of well development as directed by Engineer. Contractor shall notify Engineer and the laboratory 48 hours prior to the sampling event. Parameters analyzed for the determination of background water quality are listed in Table 02311-1 at the end of this section.

3.03 WATER SAMPLES – PAD MONITORING WELLS

A. Contractor shall obtain water samples and levels each week from the water table monitoring wells during the course of all drilling and testing operations. Contractor is responsible for supplying any equipment needed for the sampling, including power. The wells shall be purged a minimum of three well volumes by Contractor prior to sampling. Contractor will be responsible for field testing the samples for specific conductance, pH, temperature, chloride, and water level. Samples shall be collected in clean plastic bottles, supplied by Contractor, with nonmetallic caps and with a capacity of at least 16 fluid ounces. Each bottle and cap shall be rinsed twice with the water to be sampled before collecting the corresponding sample. Contractor shall be responsible for supplying conductivity/ temperature meter, pH meter, and chloride titration kit such as LaMotte or equivalent to complete this work. Laboratory samples for total dissolved solids are required for 1 month (4 weekly samples) for the pad wells.

B. Sample bottles shall be clearly labeled in an indelible way with the well identification, sample depth, sample time, and date.

Table 02311-1
Standard Water Quality Sampling Parameters

List A	List B	List C[5]
Chloride	All parameters in List A	All parameters in List A and B
Total dissolved solids (TDS)	Iron	State primary DWSs[1]
Sulfate	Calcium	State secondary DWSs[1]
Conductivity[2]	Magnesium	Other Parameters[4]
Temperature[2]	Total alkalinity	
	Total and non-carbonate hardness[3]	
	Total nitrogen	
	Ammonia nitrogen	
	pH[2]	
	Oxidation Reduction Potential (ORP)[2]	
	Dissolved Oxygen (DO)[2]	

[1] Drinking water standards (DWSs), including FAC 62-550 Table 1, Table 3, Table 4, Table 5, Table 6, Gross Alpha, Uranium, Radium 226 and 228, Total and Fecal Coliform. Excluding Asbestos and Dioxin.

[2] Parameters measured in the field.

[3] Non-carbonate hardness to be developed through an ion balance. Engineer will perform this service.

[4] Any additional parameters listed in FDEP well construction permit that will require future monitoring at this location (this permit is anticipated to be issued following the initial exploratory drilling phase and before completion of the first injection well).

[5] Background sample for IW-2 and IW-3 only require DWS Table 1 and Table 2.

END OF SECTION

SECTION 02575
MECHANICAL INTEGRITY TEST

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary to perform mechanical integrity testing of injection wells IW-1, IW-2, and IW-3. The following test will be conducted to determine that the wells have mechanical integrity (MI):

1. Pressure test of IW-1 and IW-2 final 12-inch diameter steel casings and IW-3 16-inch diameter steel casing and 9-inch nominal diameter FRP casing. Each pressure test will include successful preliminary and final pressure tests.

B. Purpose: The purpose of the MI testing shall be to demonstrate that the well has adequate MI. Mechanical integrity shall be established as follows:

1. Determine the absence of any well casing leaks by assessing internal mechanical integrity.

1.02 SUBMITTALS

A. Contractor shall submit certification that the pressure testing gauge has been calibrated within 60 days prior to testing. Calibration data shall accompany the certification and shall be provided to Engineer 10 days prior to MI testing.

PART 2 PRODUCTS

2.01 PRESSURE TEST SETUP

A. Furnish header sufficient to seal the drill pipe and wellhead prior to running the pressure test. Contractor's wellhead setup shall be approved by Engineer prior to use. Furnish a pressure testing gauge calibrated in 1 psi increments for pressure test. The gauge supplied shall have a calibrated range from 0 to 250 psi with an accuracy of plus or minus 1/2 percent. Contractor's pressure gauge shall be approved by Engineer prior to use.

PART 3 EXECUTION

3.01 GUIDELINES

A. Pressure testing shall be conducted no less than 48 hours after casing cementing.

B. All pressure tests will be conducted as specified in paragraph 3.02, Pressure Testing.

3.02 PRESSURE TESTING

A. MI Testing:

1. Perform pressure test following cementing final injection casing. Utilize cement plug in base of well prior to drilling out open-hole interval below. If the cement plug is not satisfactory to pass the test, the Contractor shall install an inflatable packer near the base of the casing at their own expense. For the FRP casing, an inflatable packer will be used to conduct the pressure test.
2. Install header assembly and pressure gauges on the well. The pressure gages shall be calibrated within 60 days prior to testing and shall be capable of indicating pressure within 1.0 psi of anticipated testing pressures.
3. Run pressure test at between approximately 150 to 200 psi or as directed by Engineer for a 1-hour duration and monitor wellhead pressure within the casing. If less than a 5 percent (plus or minus) change occurs over the 1-hour testing period, the well has demonstrated internal MI. If the pressure change exceeds 5 percent (plus or minus), the Contractor shall locate the leak and make repairs or corrective actions in a manner satisfactory to the Engineer and the pressure test will be re-run until it passes.

END OF SECTION

SECTION 02615
DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install ductile iron pipe and restrained joint ductile iron pipe and cast iron or ductile iron restrained joint fittings, complete, as shown on the Drawings and specified in these Standards.

B. Fittings are noted on the Drawings for the Contractor's convenience and do not relieve him from laying and jointing different or additional items where required.

C. The Contractor shall furnish all labor, materials, equipment and incidentals required to install push-on joint or restrained joint ductile iron pipe, complete as shown on the Drawings and Specifications.

D. Newly installed pipe shall be kept clean and free of all foreign matter. All ductile iron pipe installed underground shall be poly wrapped unless noted otherwise on the Drawings.

1.02 SUBMITTALS

A. The Contractor shall submit to the County, within 10 days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate Shop Drawings for all ductile iron pipe and fittings.

B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ductile iron pipe shall conform to ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51. Thickness of pipe shall be pressure Class 350. All pipe not buried shall be Thickness Class 53. All ductile iron pipe shall be clearly marked on the outside of the barrel to readily identify it from cast iron.

B. Use stainless steel nuts, bolts, washer in above ground flanged piping.

C. Unrestrained joint pipe shall be supplied in lengths not to exceed 21 feet. Unless otherwise called for in the Contract Documents, unrestrained joint pipe shall be either the rubber-ring type push-on joint or standard mechanical joint pipe as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company, or approved equal.

D. All mechanical joint fittings shall be pressure rated for 350 psi and meet the requirement of AWWA C110 or AWWA C153 except flanged fittings shall be rated for 250 psi. Rubber gaskets shall conform to AWWA C111 for mechanical and push-on type joints and shall be EPDM (Ethylene-Propylene Diene Monomer) rubber for potable water and reclaimed water pipelines. Standard gaskets shall be such as Fastite as manufactured by American Cast Iron Pipe Company, or an approved equal. Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non-chlorinated organic solvents or non-aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used where both classes of contaminates are found.

E. Reclaimed Water Main Coatings: All ductile iron pipe used in reclaimed water systems shall have a standard thickness cement lining on the inside in accordance with AWWA C104 and a standard 1-mil asphaltic exterior coating per AWWA C151. All ductile iron or gray iron fittings used in reclaimed water systems shall have standard thickness cement linings on the inside per AWWA C104 and an asphaltic exterior.

F. Restrained joints shall be provided at all horizontal and vertical bends and fittings, at casings under roads and railroads and at other locations shown on the Contract Drawings. Restraint devices shall be either concrete thrust blocks or restraining glands as manufactured by Star Pipe Products, Stargrip 3000 and 3100, Allgrip 3600, or as manufactured by EBAA Iron Sales, Megaflange, 2000 PV, or other approved equal restraining gland products. Restrained joints, where used, shall be installed at bend and fitting locations and at pipe joint locations both upstream and downstream from the bends or fittings at distances as required. Restrained joint pipe fittings shall be designed and rated for the following pressures: 350 psi for pipe sizes up to and including 24-inch diameter; 250 psi for pipe sizes 30-inch diameter and above.

2.02 IDENTIFICATION

A. Each length of pipe and each fitting shall be marked with the name of the manufacturer, size and class and shall be clearly identified as ductile iron pipe. All gaskets shall be marked with the name of the manufacturer, size and proper insertion direction.

B. Pipe shall be polyethylene-wrapped blue for water mains, purple (Pantone 522 C) for reclaimed water mains and green for sewer mains, per AWWA C105.

C. All above ground reclaimed water pipes and appurtenances shall be painted purple (Pantone 522C) with the following system.

1. Factory applied epoxy primer for ferrous metal:
   a. Anticorrosive, converted epoxy primer containing rust-inhibitive pigments.
   b. 1 coat, 2.5 mils minimum dry film thickness (MDFT).
2. First coat: High build epoxy.
   a. Polyamidoamine epoxy, minimum 69 percent volume solids, capability of 4 to 8 MDFT per coat.
   b. 1 coat, 4 MDFT.
3. Second coat: Polyurethane Enamel:
   a. Two-component, aliphatic or acrylic based polyurethane; high gloss finish.
   b. 1 coat, 3 MDFT.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 02617
INSTALLATION AND TESTING OF PRESSURE PIPE

PART 1 GENERAL

1.01 INSTALLING PIPE AND FITTINGS

A. The Contractor shall install all pipe in accordance with the recommendations of the pipe manufacturer and as specified herein.

B. The Contractor shall take care in handling, storage and installation of pipe and fittings to prevent injury to the pipe or coatings. All pipe and fittings shall be examined before installation and pipe which is deemed to be defective by the County shall not be installed.

C. The Contractor shall thoroughly clean and keep thoroughly clean, all pipe and fittings prior to during and after installation.

D. The Contractor shall lay the pipe to the lines and grades shown on the Contract Drawings with bedding and backfill as shown on the Drawings or called out in the Contract Documents. Blocking under the pipe shall not be permitted except through casing sleeves.

E. Depth of bury shall be no less than 3 feet or more than 6 feet.

F. Thrust blocks shall be made of 3,000 psi concrete. No precast blocks are allowed.

G. The Contractor shall keep the open ends of all pipe closed with a tightly fitting plug when installation is not in progress or the potential exists for dirt or debris to enter the pipe.

H. The pipe or accessories shall not be dropped into the trench under any circumstances.

I. The Contractor shall construct all water mains pursuant to the provisions of "Recommended Standards for Water Works", Part 8, incorporated by reference in Rule 62-555.330(3), F.A.C.

J. As a marker for the Surveyor, a PVC pipe marker or 2-inch by 4-inch marker shall be inserted by the Contractor on the top of pipe for potable water mains, reclaimed water mains and sanitary force mains at intervals no greater than 200 feet apart and at locations where there is a substantial grade change. The pipe markers shall indicate the pipe diameter and shall be labeled PWM in “safety” blue, RWM in purple, and FM in green, for potable water mains, reclaimed water mains and sanitary force mains, respectively. As a marker for the Surveyor, a PVC pipe marker or 2-inch by 4-inch marker shall

be inserted by the Contractor on the top of all pipe fittings (other than sanitary sewer service wyes, potable water saddles and reclaimed water saddles). The markers for fittings shall indicate the type of fitting and shall be labeled PWF in "safety" blue, RWF in purple, and FMF in green, for potable water fittings, reclaimed water fittings, and sanitary force main fittings, respectively. The Contractor is responsible for making the aforementioned markers available to the Surveyor. The Contractor shall field locate the mains and fittings when markers are not made available to the Surveyor.

K. A PVC pipe marker or 2-inch by 4-inch marker shall be inserted by the Contractor at the beginning and end of each horizontal directional drill (HDD). The HDD Contractor shall provide a certified report and bore log indicating the horizontal and vertical location every 25 linear feet or less along the pipe.

L. A 2-inch PVC pipe marker with a painted end cap shall be inserted by the Contractor at the ROW line indicating each individual new service location or stub out. The marker shall be a 6-foot length of PVC pipe inserted 2 feet into the ground and shall be painted "safety" blue for potable water, purple for reclaimed water, and green for sewer.

1.02 PROCEDURE FOR TESTING WATER LINES, FORCE MAINS AND RECLAIMED WATER LINES

A. A minimum of 2 full work day notice is needed prior to testing. A letter stating the reasons testing should be scheduled ahead of other jobs must accompany all emergency testing requests. Schedule on week days during normal working hours.

B. County and Contractor must be present for all testing, including for testing tapping valves and sleeves.

C. All pressure pipe lines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipe lines shall be subjected to a hydrostatic pressure test for 2 hours at full working pressure, but not less than 180 psi for water/reclaimed (150 psi for force main). Maximum length of pipe to be tested at one time is 2,600 feet. If line is longer than 2,600 feet and cannot be sectioned in 2,600 feet (maximum) lengths, the allowable leakage will be figured at 2,600 feet.

D. Allowable leakage shall be determined by AWWA C600 table for hydrostatic tests. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof; to maintain the test pressure after the air in the pipe line has been expelled and the pipe has been filled with water.

E. All digging on the jobsite in the right-of-way must be completed before any testing of water or sewer. Any digging or boring across water or sewer lines after they have been tested may result in a retest of the lines at the County's request.

F. If any revisions or changes are made after initial testing, lines will be re-tested at the County's request.

G. Disconnect water supply during test.

H. All force mains will be tested from the valves in the valve vault at the lift station to the point of connection whether it be against a valve on another force main or into a manhole.

I. All services to be aboveground during test. The services should be the correct length so they will be 1 foot inside right-of-way line.

J. All fire hydrant gate valves to be open during test.

K. All visible leaks are to be repaired, regardless of the amount of leakage.

L. Check gauge pressure periodically during test. If test pressure drops to 175 psi for water/reclaimed lines or to 145 psi for force mains during test, the line must be repumped back to 180 psi for water/reclaimed (150 psi force mains) and the amount of leakage measured. The test will continue on with the remaining time left. At the end of the test, the line must be repumped again back to 180 psi (150 psi for force main) and the amount of leakage measured and added to any previous leakage determined earlier in the test.

M. After the line passes the test, the pressure will be blown off from the opposite end of line from the gauge location. Fire hydrants, services and end-of-line blow offs will be opened to demonstrate they were on line during the test.

N. At end of test, the test gauge must return to zero. The pressure gauge must read 0 psi to a maximum of 300 psi in 5 psi increments.

O. The section of line being tested must be identified on the charge sheet. The length and size of pipe, the exact area being tested and the valves being tested against, must be identified. Use Station numbers if available.

P. A punch list must be made at the end of all tests.

Q. A copy of the charge sheet will be given to the County and the Contractor at the end of the test.

1.03 DETECTION

A. Direct buried pipe shall have 3-inch detectable metallic tape of the proper color placed directly above the pipe and 12 inches below finished grade or 6-inch detectable tape between 12 inches and 24 inches below finished grade.

B. Direct buried non-metallic pipe shall also have tracer wire installed along the pipe alignment. The tracer wire to be used shall be a solid, 10-gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.

END OF SECTION

SECTION 02620
POLYETHYLENE (PE) PRESSURE PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install polyethylene pressure pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents and these Standards.

B. Newly installed pipe shall be kept clean and free of all foreign matter and gouges.

C. All pipe shall be correctly color coded/identified.

1.02 QUALIFICATIONS

A. All polyethylene pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

1.03 SUBMITTALS

A. The Contractor shall submit to the County, within ten days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate Shop Drawings for all polyethylene pipe and fittings.

B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.

C. The Contractor shall submit Shop Drawings showing installation method and the proposed method and specialized equipment to be used.

PART 2 PRODUCTS

2.01 POLYETHYLENE PRESSURE PIPE

A. Polyethylene pipe 4-inch diameter and larger shall be high-density bimodal PE4710 polyethylene resin with a minimum cell classification of 445574C per ASTM D3350, Pressure Class 200 psi, DR 11, Performance Pipe DriscoPlex 4000, or an approved equal, meeting the requirements of AWWA C906. Outside diameters of reclaimed water HDPE pipes shall be ductile-iron sizing system (DIPS).

2.02 JOINTS

A. Where PE pipe is joined to PE pipe, it shall be by thermal butt fusion. Thermal fusion shall be accomplished in accordance with the written instructions of the pipe manufacturer and fusion equipment supplier. The installer of the thermal butt fused PE pipe shall have received training in heat fusion pipe joining methods and shall have had experience in performing this type of work.

B. Where thermal butt fusion cannot be used, or when specifically called for on the plans, electro-fused couplings may be used. Fusion shall be in accordance with the written instructions of the fitting manufacturer.

C. Flanged joints, mechanical joints, tapping saddles, and molded fittings shall be in accordance with AWWA C901, C906 or C909, ASTM D3350 and D3140, as applicable. Fusion and mechanical connections are allowed, chemical (solvents, epoxies, etc.) are not allowed.

D. All joints shall be restrained.

2.03 DETECTION

A. Direct buried HDPE pipe shall have 3-inch detectable metallic tape of the proper color placed directly above the pipe and 12 inches below finished grade or 6-inch detectable tape between 12 inches and 24 inches below finished grade.

B. Direct buried or horizontal directional drilled HDPE pipe shall also have tracer wire installed along the pipe alignment. The tracer wire to be used shall be a solid, 10-gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.

2.04 IDENTIFICATION

A. Pipe shall bear identification markings in accordance with AWWA C906.

B. Pipe shall be color coded purple (Pantone 522 C) for reclaimed water using a solid pipe color or embedded colored stripes. Where stripes are used, there shall be a minimum of three stripes equally spaced.

PART 3 EXECUTION

3.01 INSTALLING POLYETHYLENE PRESSURE PIPE AND FITTINGS

A. All polyethylene pressure pipe shall be installed by direct bury, directional bore, or a method approved by the County prior to construction.

3.02 INSPECTION AND TESTING

A. All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak test per Section 02617, Installation and Testing of Pressure Pipe and the procedures described below.

B. Pipeline Hydrostatic Test:

1. General:
    a. Notify Engineer in writing 5 days in advance of testing. Perform testing in presence of Engineer.
    b. Furnish testing equipment and perform tests in manner satisfactory to Engineer. Testing equipment shall provide observable and accurate measurements of initial service leak and allowable makeup water volume under specified conditions.
    c. Test newly installed pipelines.
    d. Isolate new pipelines that are connected to existing pipelines.
    e. Using water as test medium, pipes shall successfully pass a hydrostatic test prior to acceptance.
    f. Conduct field hydrostatic test on buried piping after trench has been completely backfilled. Testing may, as approved by Engineer, be done prior to placement of asphaltic concrete or roadway structural section.
    g. Contractor may, if field conditions permit and as determined by Engineer, partially backfill trench and leave joints open for inspection and conduct initial service leak test. Final field hydrostatic test shall not be conducted until backfilling has been completed as specified above.
2. Preparation:
    a. Install temporary thrust blocking or other restraint as necessary to prevent movement of pipe and protect adjacent piping or equipment. Make necessary taps in piping prior to testing.
    b. Wait 5 days minimum after concrete thrust blocking or designed thrust collars are installed to perform pressure tests. If high-early strength cement is used for thrust blocking, wait may be reduced to 2 days.
    c. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
    d. New Piping Connected to Existing Piping: Isolate new piping with grooved-end pipe caps, blind flanges, or other means as acceptable to Engineer.

3. Procedure:
    a. Test pressure shall be 150 psi.
    b. Maximum filling velocity shall not exceed 0.25 feet per second, calculated based on full area of the pipe.
    c. Expel air from pipe system during filling.
    d. Test procedure shall be in accordance with ASTM F2164.
        1) Initial Expansion Phase: Add water as required to maintain test pressure for 4 hours.
        2) Test Phase: Reduce pressure by 10 psi and start pressure test.
        3) Test is successful if pressure says within 5 percent of initial value for 1 hour.
    e. If test is not completed because of leakage, equipment failure, or other reasons, depressurize test section and allow it to relax for at least 8 hours before retesting.
    f. If there is leakage, repair defective pipe section and repeat hydrostatic test.

END OF SECTION

SECTION 02640
VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.

B. All valves and appurtenances shall be of the size shown on the Drawings and, to the extent possible, all equipment of the same type on the Project shall be from one manufacturer.

C. All valves and appurtenances shall have the name of the manufacturer and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

D. All valves shall have a factory applied, fusion bonded epoxy coating on interior and exterior unless noted otherwise in the Drawings or this Specification.

E. All valves are to be holiday free and have current testing certification papers stating the valve passed holiday free testing.

F. The equipment shall include, but not be limited to, the following:

1. Gate valves.
2. Pressure Sustaining and Check Valves.
3. Ball Valves.
4. Butterfly Valves.
5. Plug Valves.
6. Valve Actuators.
7. Air Release Valves.
8. Valves Boxes.
9. Corporation Cocks.
10. Flange Adapter Couplings.
11. Flexible Couplings.
12. Hose Bibs.
13. Slow Closing Air and Vacuum Valves.
14. Surge Anticipator Valve.
15. Check Valves.
16. Hydrants.

17. Restrained Joints.
18. Tapping Sleeves and Tapping Valves.
19. Single Acting Altitude Valves.

1.02 DESCRIPTION OF SYSTEMS

A. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of potable water, reclaim water, wastewater, etc., depending on the applications.

1.03 QUALIFICATIONS

A. All of the types of valves and appurtenances shall be products of well established reputable firms who are fully experienced and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable. Valves shall be as covered under mechanical devices in Section 8 of ANSI/NSF Standard 61.

1.04 SUBMITTALS

A. Submit to the County within 30 days after execution of the contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

B. Complete Shop Drawings of all valves and appurtenances shall be submitted to the County for approval in accordance with the Specifications.

1.05 TOOLS

A. Special tools, if required for normal operation and maintenance shall be supplied with the equipment.

PART 2 PRODUCTS

2.01 GATE VALVES

A. All buried valves shall have cast or ductile iron three piece valve bodies.

B. Where indicated on the Drawings or necessary due to locations, size, or inaccessibility, chain wheel operators shall be furnished with the valves. Such operators shall be designed with adequate strength for the valves with which they are supplied and provide for easy operation of the valve. Chains for valve operators shall be galvanized.

C. Where required, gate valves shall be provided with a box cast in a concrete slab and a box cover. Length of box shall include slab thickness. Box cover opening shall be for valve stem and nut. Valve wrenches and extension stems shall be provided by the manufacturer to actuate the valves. The floor box and cover shall be equal to those manufactured by Rodney Hunt Machine Company, Orange, Massachusetts, Clow, DeZurik or approved equal.

D. Gate valves with 3-inch - 20-inch diameters shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 or C515 and UL/FM of latest revision and in accordance with the following specifications. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.

E. The valves shall have a non-rising stainless steel stem to eliminate lead content. All bolts, nuts and washers shall be stainless steel to eliminate exterior corrosion and maintain fastener strength. Manufacturer shall use Never-Seez or equivalent during assembly of bolt and nut sets to prevent galling of similar metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the thrust collar. Valves that are located above grade and located in valve vaults shall be OS&Y with flanged joints.

F. The wedge shall be ductile iron fully encapsulated with an EPDM rubber. The Elastomer type shall be permanently indicated on the disc or body of the valve. The resilient sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.

G. Wrench nut shall be provided for operating the valve.

H. Gate valves meeting AWWA C509 requirements shall be rated for an operating pressure of 200 psi and shall be tested in accordance with AWWA C509. Valves meeting AWWA C515 requirements shall be rated for an operating pressure of 250 psi and shall be tested in accordance with AWWA C515.

I. All bonnet bolts, nuts and studs shall be stainless steel.

J. The valves shall be covered by a Manufacturer’s 10 year warranty on manufacturer’s defects and reasonable labor costs for replacement. Warranty shall become effective from the date of purchase by the end user and delivered within 30 days from the receipt of the purchase order. For publicly owned and maintained utilities, the end user is Manatee County Government.

K. Gate valves shall be assembled and tested in a certified ISO 9001:2000 manufacturing facility within the United States and provide their certification of meeting internationally recognized quality control procedures.

2.02 BALL VALVES

A. Ball valves for water and reclaimed water, in sizes 3/4-inch through 2-inch, shall be brass body, stem and ball per ASTM B 62, alloy 85-5-5-5, full port, full flow, 1/4-turn check, ball curb valves, rated for 300 psi, Mueller 300 (as specified in the table below), Ford B-Series, or approved equal, with compression, pack joint, flare, threaded or flanged ends as required. Ball valves for wastewater, 2-inch through 3-inch, shall be Type 316 stainless steel body, cap, stem and ball per ASTM A351, full port, full flow, 1/4-turn check, ball valves, steam rated for 150 psi, pressure rating 1,000 psi CWT, Apollo 76F or approved equal, with threaded or flanged ends as required.

B. All valves shall be mounted in such a position that valve position indicators are plainly visible. Above grade ball valves shall have a vinyl coated lever handle. Lever handle, handle nut, and lever packing gland shall be Type 304 or Type 316 stainless steel.

2.03 BUTTERFLY VALVES

A. Butterfly valves shall conform to the AWWA Standard Specifications for Rubber Seated Butterfly Valves, Designated C504, except as hereinafter specified. Valves shall be Class 250 and equal to those manufactured by Henry Pratt Company, DeZurik, Mueller, or approved equal. M&H/Kennedy/Clow are not approved equals. Ductile iron conforming to ASTM A536, Grade 65-45-12 shall be provided. All valves shall be leak tested at 200 psi. Leak-tight in both directions.

B. The face-to-face dimensions of flanged end valves shall be in accordance with Table 1 of above mentioned AWWA Specification for short-body valve. Adequate two-way thrust bearings shall be provided. Flange drilling shall be in accordance with ANSI B16.1.

C. Valve seats shall be an EPDM elastomer. Valve seats 24 inches and larger shall be field adjustable and replaceable without dismounting operator disc or shaft and without removing the valve from the line. All retaining segments and adjusting devices shall be of corrosion resistant material with stainless Nylock screws and be capable of the 1/8-inch adjustment. Valves 20 inches and smaller shall have bonded or mechanically restrained seats as outlined in AWWA C 504. Where the EPDM seat is mounted on the valve body, the mating edge of the valve disc shall be 18-8 stainless steel or Nickel-Chrome, 80-20 percent. Where the EPDM seat is mounted on the valve disc, the valve body shall be fitted with an 18-8 stainless steel seat offset from the shaft, mechanically restrained and covering 360 degrees of the peripheral opening or seating surface.

D. The valve body shall be constructed of ductile iron or close grain cast iron per ASTM A126, Class B with integrally cast hubs for shaft bearing housings of the through boss-type. Butterfly valves of the "wafer" or "spool" type will not be accepted.

E. The valve shaft shall be turned, ground, and polished constructed of 18-8, ASTM A276, Type 304 stainless steel and designed for both torsional and shearing stresses when the valve is operated under its greatest dynamic or seating torque. Shaft shall be of either a one piece unit extending full size through the valve disc and valve bearing or it may be of a stub shaft design. Shaft bearings shall be teflon or nylon, self-lubricated type.

F. All valves shall be subject to hydrostatic and leakage tests at the point of manufacture. The hydrostatic test shall be performed with an internal hydrostatic pressure equal to 500 psi applied to the inside of the valve body of each valve for a period of five minutes. During the hydrostatic test, there shall be no leakage through the metal, the end joints or the valve shaft seal. The leakage test shall be performed at a differential pressure of 230 psi and against both sides of the valve. No adjustment of the valve disc shall be necessary after pressure test for normal operation of valve.

G. In general, the butterfly valve operators shall conform to the requirements of section 3.8 of the AWWA Standard Specifications for Rubber Seated Butterfly Valves, Designation C504, insofar as applicable, and as herein specified.

H. Gearing for the operators shall be totally enclosed in a gear case in accordance with paragraph 3.8.3 of the above mentioned AWWA Standard Specification.

I. Operators shall be capable of seating and unseating the disc against the full design pressure of velocity, as specified for each class, into a dry system downstream and shall transmit a minimum torque to the valve. Operators shall be rigidly attached to the valve body.

J. The manufacturer shall certify that the required tests on the various materials and on the completed valves have been satisfactory and that the valves conform with all requirements of this Specification and the AWWA standard.

K. Where indicated on the Drawings, extension stems, floor stands, couplings, stem guides, and floor boxes as required shall be furnished and installed.

2.04 VALVE ACTUATORS

A. General:

1. All valve actuators shall conform to section 3.8 of the AWWA Standard Specification.

2. Actuators shall be capable of seating and unseating the disc against the full design pressure and velocity, as specified for each class, into a dry system downstream, and shall transmit a minimum torque to the valve. Actuators shall be rigidly attached to the valve body.
3. Butterfly valve actuators shall conform to the requirements of section 3.8 of the AWWA Standard specifications for Rubber Seated Butterfly Valves, Designated C504, insofar as applicable and as herein specified.

B. Manual Actuators:

1. Manual actuators shall have permanently lubricated, totally enclosed gearing with handwheel and gear ratio sized on the basis of actual line pressure and velocities. Actuators shall be equipped with handwheel, position indicator, and mechanical stop-limiting locking devices to prevent over travel of the disc in the open and closed positions. They shall turn counter-clockwise to open valves. Manual actuators shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Actuators shall be fully enclosed and designed to produce the specified torque with a maximum pull of 80 pounds on the handwheel or chainwheel. Actuator components shall withstand an input of 450-foot pounds for 30 inches and smaller and 300-foot pounds for larger than 30-inch size valves at extreme actuator positions without damage. Valves located above grade shall have handwheel and position indicator, and valves located below grade shall be equipped with an 2-inch square AWWA operating nut located at ground level and cast iron extension type valve box. Valve actuators shall conform to AWWA C504, latest revision.

2.05 VALVE BOXES

A. Buried valves shall have adjustable cast iron or HDPE valve boxes. Lids shall be cast iron drop type, and shall have “WATER”, “SEWER”, or “RECLAIM”, as applicable, cast into the top. Lids will be painted “safety” blue for potable, purple for reclaimed, and green for sanitary sewer.

B. Cast iron boxes shall be two-piece, or three-piece, as required, screw type, Tyler Pipe, 6850 Series, Box 461-S through 668-S, with extensions, as required to make the desired box length, or an approved equal. Bottom barrel shall be 5-1/4 inches inside diameter, with a flanged bottom with sufficient bearing area to prevent settling.

C. HDPE boxes shall be two-piece, adjustable, 1/4-inch thick minimum heavy wall, high-density polyethylene, with cast iron top and galvanized steel adjustable stem, Trench Adapter, as manufactured by American Flow Control, or an approved equal. Bottom barrel shall have flanged bottom to prevent settling. All bolts, screws and pins shall be stainless steel.

D. Reclaimed Valve Boxes shall be square 9-inch by 9-inch load bearing marked "Reclaimed Water" and painted Pantone 522C purple.

E. All valves shall either have operating nuts within 4 feet below the top of the lid or shall have extension stems with centering guides to provide an extended operating nut within 4 feet below the lid. Extension stems shall be fixed to the valve operating nut with a stainless steel fastener.

F. All potable water, sewer, and reclaimed water grade-adjustment risers shall be cast iron material just like the valve box.

G. A centering device AFC part No. B 59434 or equal shall be installed in the valve box.

H. Stand pipe shall match color code of the system being installed, (blue for potable, Pantone purple 522 C for reclaimed, and green for sanitary sewer).

2.06 FLANGE ADAPTER COUPLINGS

A. Plain end couplings and adapters shall be fusion-bonded epoxy coated carbon steel with Ethylene Propylene Diene Monomer (EPDM) rubber gaskets and stainless steel nuts, bolts and spacers. Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non-chlorinated organic solvents or non-aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used for potable water mains if the soil is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons, and is also contaminated with low molecular-weight petroleum products or organic solvents. Couplings shall be Dresser Style 38, or another approved equal. Flange adapters shall have a plain end compression seal similar to the Style 38, with an ANSI 125 Class flange on the opposite end, and shall be Dresser Style 128W or an approved equal. Stainless steel backup rings shall be used for force mains that are located in corrosive environments including wet wells and valve vaults.

2.07 SLOW CLOSING AIR AND VACUUM VALVES

A. The Contractor shall furnish and install slow closing air and vacuum valves as shown on the Drawings which shall have two independent valves bolted together. The air and vacuum valve shall have all stainless steel float, guided on both ends with stainless shafts. The air and vacuum valve seat shall be Buna-N to insure drop tight closure. The Buna-N seat shall be fastened to the cover stainless shoulder screws in a manner to prevent distortion of the seat. The float shall be guided at both ends with stainless steel bushings.

B. The valve cover shall have a male lip designed to fit into the body register for accurate alignment of the float into the Buna-N seat. The valve cover shall have 250-pound class flanged outlet connection.

C. The surge check valve shall be bolted to the inlet of the air and vacuum valve and consist of a body, seat, disc, and compression spring. A surge check unit shall operate on the interphase between the kinetic energy and relative velocity flows of air and water, so that after air passes through, and water rushes into the surge check, the disc starts to close, reducing the rate of flow of water into the air valve by means of throttling orifices in the disc to prevent water hammer in the air valves. The surge check orifices must be adjustable type for regulation in the field to suit operating conditions. Valve shall be rated for 250-pound class working pressure.

D. The complete slow closing air and vacuum valve with air release valve shall have been flow tested in the field, substantiated with test data to show reduction of surge pressure in the valve. Flow test data shall be submitted with initial Shop Drawings for approval.

E. Valve exterior to be painted Red Oxide, Phenolic TT-P86, Primer or approved equal for high resistance to corrosion.

F. All materials of construction shall be certified in writing to conform to ASTM specifications as follows:

Air Valve Cover, Body, and Surge Check Body	Cast Iron	ASTM A48, Class 30
Float	Stainless Steel	ASTM A240
Surge Check Seat and Disc	Stainless Steel	ASTM A582
Air Valve Seat	Buna-N	
Spring	Stainless Steel	T302

2.08 RESTRAINED JOINTS

A. Pipe joints shall be restrained by poured-in-place concrete thrust blocks or by other mechanical methods, including stainless steel tie rods, Stargrip and Allgrip, as manufactured by Star Pipe Products or Megaflange and 2000 PV, as manufactured by EBAA Iron Sales. Flanged joints may be used above ground.

B. Restrained joints may also be Lok-Ring, as manufactured by American Cast Iron Pipe Company, or an approved equal.

C. Restrained joint designs which require wedges and/or shims to be driven into the joints in order to disassemble the pipe shall not be allowed.

2.09 TAPPING SLEEVES AND VALVES

A. Tapping valves shall meet the requirements of AWWA C509/C515 with ductile iron body and shall be rated for a pressure of 250 psi. The valves shall be flanged with alignment ring by mechanical joint with a nonrising stainless steel stem. All bolts, nuts and washers shall be stainless steel. Manufacturer shall use Never-Seez or equivalent during assembly of bolt and nut sets to prevent galling of similar metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the valve's thrust collar. Valve shall be designed for vertical burial and shall open counterclockwise. Operating nut shall be AWWA standard 2-inch square for valves 2 inches and up. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve to accommodate full size shell cutter. Gaskets shall cover the entire area of the flange surface and be 1/8-inch minimal thickness of red rubber. The wedge shall be ductile iron fully encapsulated with EPDM rubber. All bolts, nuts and washers between the sleeve and valve shall be stainless steel.

B. Tapping sleeves and saddles shall seal to the pipe by the use of a confined "O" ring gasket, and shall be able to withstand a pressure test of 180 psi for water lines or 150 psi for sewer force mains for one hour with no leakage in accordance with AWWA C110. A stainless steel 3/4-inch NPT test plug shall be provided for pressure testing. All bolts joining the two halves shall be stainless steel and shall be included with the sleeve or saddle. Sleeves and saddles shall be fusion applied epoxy coated, or be made of 18-8 Type 304 stainless steel. Saddle straps shall be 18-8 Type 304 stainless steel.

PART 3 EXECUTION

3.01 INSTALLATION

A. All valves and appurtenances shall be installed in the location shown, true to alignment and rigidly supported. Any damage occurring to the above items before they are installed shall be repaired to the satisfaction of the County.

B. After installation, all valves and appurtenances shall be tested at least two hours at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the County.

C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.

D. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections.

E. Flanged joints and mechanical joints shall be made with high strength, low alloy Corten or Type 316 stainless steel bolts, nuts and washers.

F. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.

G. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8 inches. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6 inches from the end.

H. Valve boxes with concrete bases shall be installed as shown on the Drawings. Mechanical joints shall be made in the standard manner. Valve stems shall be vertical in all cases. Place cast iron box over each stem with base bearing on compacted fill and the top flush with final grade. Boxes shall have sufficient bracing to maintain alignment during backfilling. Knobs on cover shall be parallel to pipe. Remove any sand or undesirable fill from valve box.

3.02 SHOP PAINTING

A. Ferrous surfaces of valves and appurtenances shall receive a coating of rust-inhibitive primer. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

3.03 FIELD PAINTING

A. All metal valves and appurtenances specified herein and exposed to view shall be painted.

B. All above ground reclaimed water valves shall be painted purple (Pantone 522 C).

3.04 INSPECTION AND TESTING

A. Completed pipe shall be subjected to hydrostatic pressure test for 2 hours at 180 psi. All leaks shall be repaired and lines retested as approved by the County. Prior to testing, the pipelines shall be supported in an approved manner to prevent movement during tests.

END OF SECTION

SECTION 02671
PAD MONITORING WELLS

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary to construct four pad (water table) monitoring wells, complete, near each corner of six drilling pads (IW-1, IW-2, IW-3, DZMW-1, DZMW-2, and DZMW-3).

B. Contractor shall furnish all labor, materials, tools, and equipment necessary to drill and complete the wells, including drilling, casing, sealing, gravel pack, completion of wellhead, vault, and all other work required to complete the work as specified herein and as shown on the Drawings.

C. The total depth of the well is anticipated not to exceed 20 feet.

D. When complete, this project will provide Owner with four wells around each temporary drilling pad at IW-1, IW-2, IW-3, DZMW-1, DZMW-2, and DZMW-3 (24 total monitoring wells) to enable water level and water quality monitoring of the water table at the site.

1.02 SUBMITTALS

A. Contractor shall furnish, as a minimum, the manufacturer's specifications on the PVC casing and screen used for the water table monitoring wells. Contractor shall deliver submittals to Engineer in accordance with Section 01300, Submittals.

PART 2 PRODUCTS

2.01 PVC PIPE

A. PVC pipe shall be the size shown on the Drawings and meet all the requirements of Schedule 80 PVC pipe in ASTM D1785. The screen sections of 2-inch PVC pipe shall have three slots perpendicular to the pipe axis on 120-degree centers. Slot size of screen shall be 0.010-inch, horizontal slotted. Screens shall be 5 feet in length. Casing shall be made available in 2-, 5-, and 10-foot lengths so that the proper amount can be installed without cutting.

2.02 PVC PIPE JOINTS

A. PVC pipe joints shall be flush joint, threaded, leakproof with machined ends. No solvent cements shall be used.

2.03 SAND (GRAVEL) PACK

A. Sand for packing around the PVC pipe shall be free from roots, trash, and other deleterious material. Sand shall be purchased in sealed bags, unopened until placed in the well. Sand size shall be 20/30. The material shall be reasonably well graded.

2.04 BENTONITE

A. Bentonite required for sealing of the well shall be in a pellet form and shall be those commonly used as seals in monitoring wells. A fine sand seal may be used with concurrence by Engineer.

2.05 CEMENT

A. Cement must conform to ASTM C150, Type II. The proportion of cement to water shall be five bags cement per cubic yard of grout to not more than 6 gallons of water per bag of cement.

2.06 WELLHEAD COMPLETION

A. All pad monitoring wells are to be completed with above grade completion with protective steel casing or flush-mount and concrete pad completion, at the discretion of the Engineer.

PART 3 EXECUTION

3.01 WELL DRILLING

A. The pad monitoring wells shall be drilled to the approximate depth and diameter shown on the Drawings, and as designated by Engineer. The wells shall be drilled by the hollow stem auger method or by alternative method as approved by Engineer. The well shall be field located by Engineer.

B. The depth of the monitoring wells as shown on the Drawings has been determined using the best information available. Engineer shall determine the screen depth interval and reserves the right to increase or decrease the depths slightly as field conditions dictate. The wells shall be installed prior to any drilling activities at all wells as contained herein.

3.02 PVC CASING/SCREEN ASSEMBLY INSTALLATION

A. Following completion of the borehole to its total depth, the casing/screen assembly shall be installed. The casing/screen assembly shall be centered in the borehole. The assembly shall be suspended above the bottom of the hole so that it does not sit on the bottom. The casing sections shall be jointed watertight by use of flush-joint threaded pipe.

3.03 INSTALLATION OF SAND PACK

A. Sandpack material shall be placed in the annular space gradually by slowly pouring one sack at a time, or in an approved alternate manner to prevent bridging. Sandpack material shall be placed to an elevation approximately 3 feet above the uppermost perforation in the well screen as approved by Engineer. The top of the sandpack depth shall be recorded by Contractor.

3.04 INSTALLATION OF BENTONITE SEAL

A. The bentonite pellets shall be placed in the annular space by Contractor in a manner that shall produce a minimum 6-inch thick bentonite seal to isolate the sandpack below from the cement grout above. If a fine sand seal is used, the sand shall be a minimum of 12 inches thick.

3.05 INSTALLATION OF CEMENT GROUT

A. Following placement of the bentonite seal, neat cement grout shall be tremied in the annular space from the bottom of the remaining annulus to the land surface in such a manner as shall ensure the complete filling of the annular space in one operation in accordance with Section 02677, Grout Seal.

3.06 WELL DEVELOPMENT

A. Following placement of the casing screen assembly and gravel pack, the well shall be developed by Contractor by airlift pumping or an alternative method approved by Engineer. Development shall continue until clean, uncontaminated formation water is being produced from the well. Engineer will be the sole judge of when this condition is met.

END OF SECTION

SECTION 02673
DRILLING

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work, materials, and equipment necessary for drilling and sampling of boreholes by the rotary method, complete, during the drilling activities.

PART 2 PRODUCTS

2.01 GENERAL

A. All equipment shall be in good operating condition and operated and maintained in strict conformance with manufacturer's recommendations.

B. Contractor shall provide a drilling pad to control all fluids from discharge on site during drilling operations. The pad design shall be proposed by Contractor and approved by Engineer prior to commencing with drilling activities. No mud pits will be allowed onsite.

2.02 DRILLING EQUIPMENT

A. Contractor shall provide appropriate rotary drilling rig(s) capable of completing the wells as described in these specifications and as shown on the Drawings. Provide tools, bits, and all other necessary equipment for drilling. The head on the well shall be controlled by Contractor at all times during all drilling phases. All drilling shall be through a blow-out preventer (BOP) upon penetration of the UFA.

B. Standard Mud Rotary and Reverse-air drilling techniques are acceptable. Other drilling techniques shall require Engineer’s approval prior to use.

2.03 DRILLING FLUID

A. Bentonite drilling mud, and other additives as approved by Engineer, shall be used to advance the borehole. Water used by Contractor during drilling must be from an Engineer-approved potable water source. Additives and fluids are also subject to approval by the regulatory agencies.

B. Contractor shall use only drilling fluids and additives specifically recommended by the manufacturer for use in water well drilling. Avoid contamination of the samples or the aquifer. Do not introduce muds, clays, or drilling aids into the well or use lime, cement, organic matter, or other material to stop circulation losses of the drilling fluid, without reviewing the proposed program with Engineer.

C. Off-site discharges of fluids during the well construction and testing shall be controlled by Contractor at all times. Drilling mud and cuttings generated during mud rotary drilling shall be retained within steel mud tubs. Unlined or plastic lined pits shall not be allowed. Reverse-air drilling fluids and development water shall be re-circulated into the well.

D. Water will require settling to reduce turbidity prior to re-circulation of water into the well. Engineer must approve methods of settling excess suspended solids from water generated during drilling prior to re-circulating into the well. No discharges are allowed without the Engineer's approval.

2.04 TEST AND SAMPLING EQUIPMENT

A. The Contractor shall:

1. Provide equipment for measuring drilling fluid properties.
2. Provide approved sampling bags or containers for formation samples. Duplicate samples will be collected from each well. Contractor will deliver one set to the Florida Geological Survey (FGS).
3. Provide approved one-liter clean plastic sample containers for groundwater sampling during drilling and testing.
4. Provide equipment for measuring flow rates and water levels during the short-term specific capacity tests.

PART 3 EXECUTION

3.01 DRILLING

A. Contractor shall notify the Engineer five working days (Saturdays, Sundays, and federal holidays excepted) prior to drilling.

B. Contractor shall provide at all times a thoroughly experienced, competent, and licensed driller during all drilling operations at the site. Contractor's drilling superintendent shall be onsite during all phases of drilling and testing activities.

C. Contractor shall construct the well in strict conformance with all laws, rules, regulations, and standards related to the construction of the wells in the State of Florida, Manatee County, and SWFWMD. All other required construction permits shall be the responsibility of and obtained by Contractor prior to initiating drilling.

D. Contractor shall coordinate all drilling and sampling equipment prior to initiation of drilling. Drill the boreholes to the dimensions described in these Specifications or as approved by Engineer. Final well depths shall be determined by Engineer in the field.

E. Contractor shall drill the boreholes so as to permit the installation of the casing straight and plumb, to the tolerances specified in Section 02674, Casing.

F. Contractor shall take all necessary precautions to prevent contaminated water, gasoline, or other deleterious substances from entering the well, either through the opening or by seepage through the ground surface. Maintain precautions during and after construction of the well until accepted by the Owner.

G. The wells shall be drilled by the rotary method using mud rotary circulation through the unconsolidated formations to a depth of approximately 350 feet. Reverse-air closed circulation shall be used below the depth of approximately 350 feet to total depth of the wells unless otherwise approved by Engineer.

H. Borehole Preparation for Geophysical Logging shall include, but is not limited to: 1) continuation of circulation until drill cuttings have been removed from the borehole and 2) circulation of the drilling mud in the borehole until it is uniform and the drill pipe has been removed from the borehole.

I. The Contractor must make all reasonable efforts to leave the borehole free from obstructions in preparation for geophysical logging.

J. Drill the boreholes to the dimensions and at the approximate location shown on the well construction drawings. The exact location will be determined by Engineer in the field.

K. Reaming of the pilot holes shall be done with a stepped bit reamer with a lead bit the size of the pilot hole bit and progressively larger diameter bits up to the reamer size required. Each bit shall be a minimum of 2 feet apart in the reamer bit assembly to ensure that the reamer assembly follows the pilot hole. Other reaming assemblies must be approved by the Engineer.

L. Pilot holes through confining intervals will be back plugged with cement prior to reaming as specified in Sections 01010, Summary of Work and 02677, Grout Seal.

M. When re-circulating formation water during closed-circulation reverse-air drilling, Contractor shall allow proper settlement time to prevent cuttings from entering the well as directed by Engineer.

N. A blowout preventer (BOP), capable of containing artesian pressure in the well, shall be placed at the wellhead ready for service at all times when drilling in zones with artesian flow. The Contractor shall demonstrate proficiency in using the BOP to the satisfaction of the Engineer. The BOP shall be capable of closing in the well in such time as to prevent any discharge of fluids from the drilling pad.

O. It is the intent of this Contract that no drilling fluids or waters developed during construction be allowed to escape the confines of the drilling pad. The pad sump drain must be capped off until completion of the well.

P. During reverse-air drilling, Contractor shall establish a static water level prior to commencement of drilling operations each day. Water level shall be monitored periodically and recorded on the daily drilling report.

3.02 DRILLING LOGS

A. The Contractor shall:

1. Furnish Engineer daily with a field activity report (FAR). The FAR shall include tabulation of quantities for each unit price pay item and a description of all approvals made by Engineer. The report shall accurately describe the geologic materials and depths encountered; the location of lost-circulation zones and methods of regaining circulation; water producing zones; drilling rates; diameters and lengths of casing installed; and time, depth, and description of any unusual occurrences or problems during drilling. The report shall give number of hours on the job, shutdown and standby time with explanation, the water level at the beginning of daily operations, types and diameters of bits used, and such other pertinent data as may be requested by Engineer. Include full names of Contractor employees and Specialty Subcontractors working at or visiting the site. Use copies of the FAR located at the end of this section, or approved equal.
2. Keep a copy of the FAR at the drill site for inspection by the Engineer. Keep the report up-to-date with the progress of drilling and other activities. The report shall be signed by the Contractor at the completion of each day's drilling. Failure to keep this record up-to-date shall be grounds for the Engineer to stop drilling operations without compensation or additional contract time awarded to the Contractor. Assist Engineer with weekly submittals of drilling reports to FDEP as required by the Injection Well Construction Permit.

3. If requested by Engineer, furnish, maintain, and operate a continuous strip-chart for drilling rate, bit weight, and footage recorder such as a Geographical recorder, or equal, on the drilling rig. Submit copies of the strip charts to Engineer daily.
4. File all drilling and well records and reports with the proper agencies required by federal, state, and local permits, codes, or regulations. Assist Engineer, as necessary, with any additional well completion reports required by the regulatory agencies.

3.03 BOREHOLE TESTING AND SAMPLING

A. Contractor shall drill boreholes of the diameters and to the total depth of the well as determined in the field by Engineer. Sampling shall be conducted on the nominal 8 to12-inch diameter pilot holes drilled during each phase of the well construction, or as otherwise determined by Engineer.

B. Formation samples shall be logged and circulated from the borehole so to provide representative samples to the extent possible during advancement of the borehole. Contractor shall control advancement and reveal the rate of penetration information and hydraulic information to Engineer periodically and at changes in the drilling response. Contractor shall not be compensated for cores or other samples that are conducted at the Contractor's discretion to assist with drilling operations that are outside of the scope of work and direction of the Engineer.

C. Representative formation samples shall be collected between 10 feet bls to the total depth of each well drilled. Duplicate samples shall be collected at each 10-foot interval and at each change in formation or material type. The method must yield samples that are representative of the actual depth to which drilling has progressed. Each formation sample shall be approximately one pint in volume. Contractor shall place each sample in a container labeled with the date, well identification, and depth interval from which the sample was taken clearly marked on the container using indelible ink. Submit one set of samples to Engineer's construction trailer immediately upon collection. The second set of formation samples shall be kept in cloth bags which will be secured by Contractor for the FGS. After being put in containers and properly labeled, Contractor shall deliver one set to the FGS (903 W. Tennessee Street, Tallahassee, FL 32304) upon completion of each well.

D. Contractor shall collect a representative water quality sample approximately every 90 feet between samples during reverse-air drilling operations, as approved by Engineer. Contractor shall conduct a short-term (approximately 15 to 60-minute duration) air-lift, specific capacity test prior to each water sample collected during reverse-air drilling operations. A flow measuring device shall be installed by Contractor to monitor discharge quantities during drilling operations to within 10 percent of actual values. Contractor is

responsible for measuring and recording pumping rate and well water level drawdown during tests. It is anticipated that each specific capacity test will take approximately 15 to 60 minutes. Water level instrumentation must be capable of measuring pressures of 50 feet above or 200 feet below the drilling table during the specific capacity testing. Tests shall be conducted in presence and under the direction of Engineer unless otherwise directed by Engineer.

E. Contractor shall make available access to each well during construction for water level measurements by Engineer when requested. No daily drilling activities shall commence until static water level has been obtained to the satisfaction of Engineer.

3.04 DISPOSAL OF CUTTINGS AND WATER

A. Contractor shall remove from the drill site all cuttings, mud rotary drilling fluid, and other material removed by drilling operations which are required to complete the Work. Dispose of such material at a location and in a manner approved by Engineer. Solid materials shall be disposed of by hauling to an FDEP approved site. Contractor shall submit to Engineer a letter from the disposal facility stating FDEP approval.

B. Tanks shall be of sufficient size to allow for specific capacity testing and packer testing without the re-introduction of fluids into the well during such testing. A minimum of 100,000 gallons of storage is required during all drilling testing activities unless otherwise approved by Engineer. No discharge to land surface of drilling fluid or saltwater will be allowed at the site.

C. Contractor shall be responsible for providing, installing, and maintaining all necessary tank trucks, pipe, pumps, and equipment necessary to pump and haul excess pad drainage, drilling fluid and pumped water to an FDEP-approved predetermined disposal site, in accordance with federal, state, and local regulations.

D. Contractor shall drill using closed circulation techniques during reverse-air drilling. Any exceptions must be pre-approved by Engineer.

E. During closed circulation drilling below the final casing setting depth, Contractor shall take precautions to minimize suspended solids from re-entering the well.

3.05 ALIGNMENT REQUIREMENTS

A. Pilot holes and reamed holes shall be drilled round and straight throughout.

B. A mechanical drift indicator shall be run in pilot holes and reamed holes at intervals not greater than 90 feet. Tool scale shall clearly delineate 10 minutes or less. Any deviation in plumbness greater than 1 degree shall be corrected by Contractor at his own expense.

C. Engineer may modify the requirements for plumbness and straightness if, in his judgment:

1. Deviations are due to subsurface conditions and Contractor has exercised all possible care to avoid deviations; and
2. The deviations will not materially affect the usefulness or performance of the well or further drilling operations, pumps, and future testing.

3.06 SUPPLEMENTS

A. The supplement listed below, following "End of Section," is part of this Specification:

1. Field Activity Report (IW-1, IW-2, IW-3, DZMW-1, DZMW-2, and DZMW-3).

END OF SECTION

FIELD ACTIVITY REPORT (IW-1, IW-2, IW-3, DZMW-1, DZMW-2, and DZMW-3**)**

Date: _____ Owner: Manatee County Utilities
Contractor_____ Well No.: _____

Casing/Hole Diameter: _____-inch

Depth of Well:
Start of Shift _____ feet
End of Shift _____ feet

Depth to Water (below ground):
Start of Shift _____ feet
End of Shift _____ feet

Log of Materials Encountered

Description	Depth	
	From	To

Daily Materials Used

Description	Quantity	Units

Remarks: (Drilling characteristics, hours on job, stand-by time, quantities delivered to site, etc.)

_____

_____

_____

CONTRACTOR: _____ Driller: _____
ENGINEER: _____ Helpers: _____
(Use other side for more comments)

Additional Comments: Date: _____

CONTRACTOR: _____ ENGINEER: _____

SECTION 02674
CASING

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the Work, materials, and equipment necessary for furnishing and installing the well casing and all related fittings, appurtenances, and transition adapters, complete.

1.02 SUBMITTALS

A. The casing manufacturer's mill certificates shall be required for each joint of casing used during construction of the injection wells and monitoring wells before pipe is delivered to site. Any casing joint not having legible, traceable identification will be rejected. Contractor shall deliver submittals in accordance with Section 01300, Submittals.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide all materials and equipment necessary for joining and installing the casing and appurtenances as specified. Contractor shall provide all casing of the types, thicknesses, diameters, and weights as specified. All casing shall be of new, first quality material and free of defects in workmanship and handling. Casing sizes and thicknesses shall be as follows:

EXHIBIT 02674 - 1 CASING
Proposed Casing Selection for the Class I Injection Well System

Nominal Diameter (in.)	Casing and Interval	Approx. Total Length[1] (feet)	Inside Diameter (in.)	Outside Diameter (in.)	Wall Thickness (in.)	Weight (lb/ft)	Casing Material
Municipal Injection Wells (IW-1, IW-2)							
42	Pit Casing to isolate the unconsolidated surficial	TBD[2]	41.25	42.00	0.375	166.86	Carbon Steel
32	Surface Casing to Isolate the IAS	350	31.25	32.00	0.375	126.78	Carbon Steel
24	Intermediate Casing through the USDW and Avon Park High Permeability Zone	1,600	23.25	24.00	0.375	94.71	Carbon Steel
12	Final Injection Casing into LFA	2,000	11.75	12.75	0.500	65.42	Carbon Steel

Industrial Injection Well (IW-3)							
48	Pit Casing to isolate the unconsolidated surficial	TBD[2]	47.25	48.00	0.375	190.92	Carbon Steel
34	Surface Casing to Isolate the IAS	350	33.25	34.00	0.375	134.79	Carbon Steel
26	Intermediate Casing through the USDW and Avon Park High Permeability Zone	1,600	25.25	26.00	0.375	102.72	Carbon Steel
16	Final Injection Casing into LFA	2,000	15.0	16.0	0.500	82.77	Carbon Steel
9.625	FRP Tubing (Red Box 1500)	2,000	7.84	8.80	0.48	12.8	FRP
Deep Zone Monitor Wells (DZMW-1,2,3)							
24	Surface Casing to isolate the unconsolidated surficial	TBD[2]	23.25	24.00	0.375	94.71	Carbon Steel
16	Intermediate Casing Isolate the IAS	350	15.25	16.00	0.375	62.64	Carbon Steel
6	Final Casing to first permeable zone below base of USDW FRP (Red Box 1250)	1,500	5.43	5.97	0.27	5.1	FRP
Avon Park Monitor Well (APMW)							
4	Casing Liner (if required)	900	4.50	4.03	0.237	10.80	Carbon Steel

1 To be determined (TBD). Total length shall be determined in the field

2 Surface casing(s) depth will be determined by Drilling Contractor.

2.02 WELL CASING

A. Contractor may elect at his expense to install an additional shallow surface (pit) casing for the wells. The purpose of the pit casing is to prevent undermining of the drilling pad during initial drilling and casing setting activities. Contractor shall select the material, dimensions, and grade of pipe for this purpose; however, pipe selected is to be of sufficient strength to hold the drilled hole open until the first casing string is set and cemented. The pit casing may be driven or grouted into place at all wells. All surface casings shall be installed to such a depth as Contractor judges necessary to prevent washout or undermining of the drilling pad during construction of the wells. Contractor shall exercise care not to disturb existing structures adjacent to the work area.

B. All intermediate casings for all wells and the associated monitoring wells shall be new and unused carbon steel pipe, shall be seamless, electric resistance welded, or double submerged arc welded with one longitudinal seam, and shall conform to the latest revision of ASTM A139, Grade B. Final casing strings in the recharge well and monitoring wells shall be new and unused carbon steel pipe and shall be seamless, and shall conform to ASTM A53, and/or API 5L, Grade B, latest revision. Ends of plain end pipe shall be perfectly square and shall be furnished beveled for field V-notch butt welding.

C. Steel casings shall be equal to those manufactured by U.S. Steel Company; or equal. Casings shall be furnished uncoated, except that ends may be coated for protection.

D. Casing that is delivered to the site in a condition which will not yield an acceptable cement bond shall be sandblasted prior to installation. Engineer shall determine when the casing is suitable for installation.

E. Lengths of casing specified above are approximate. Exact lengths shall be determined in the field by Engineer.

2.03 FIBERGLASS REINFORCED PLASTIC (FRP) CASING

A. The Contractor shall provide all casing, new and unused, of the types, thicknesses, diameters, and weights as specified. All casing shall be of new first quality material and free of defects in material, workmanship, and handling.

B. The casing shall be manufactured by Future Pipe Industries, Inc., Burgess Well Company, Inc., Minden, NE, Tubular Fiberglass, or equal.

C. Casing shall be installed in accordance with manufacture specifications and installation instructions.

D. Casing shall be manufactured with a threaded joint using a “V” thread on a thread pattern of four threads per inch on a 4-degree taper using 3 inches of threads.

E. Threaded joint shall be rated at a maximum tensile strength according to wall thickness from tensile ratings chart and all joints must be pinned when total weight of casing string exceeds maximum rating.

F. Male and female threads are to be installed on casing in one process during manufacture of the casing joint.

G. Casing shall be manufactured in 20-foot lengths; 5- and 10-foot joints shall be manufactured by special order. Makeup in each threaded joint may vary by 0.250 inch.

H. Casing shall be tested and certified to ANSI/NSF Standard 61 and labeled with the NSF mark on each joint.

I. Casing classification under ASTM D2996 is Type 1, Grade 2, Class A. This means casing shall be nonlined in standard product line.

J. Casing shall be rated at a maximum internal pressure rating according to wall thickness from internal pressure ratings chart. Joint must be taped with not less than 2 mm of Teflon tape and caulked with a Teflon based pipe dope to meet required values on joint.

K. The nominal 6.625-inch diameter DZMW casing shall have the following design properties:

1. Minimum Inside Diameter: 5.43 inches.
2. Maximum Upset Diameter: 8.51 inches.
3. Minimum Rated Tensile Load: 72,500 pounds.
4. Minimum Rated Internal Pressure: 1,250 psi.
5. Collapse Pressure Resistance: 590 psi.

L. The nominal 9.625-inch diameter IW-3 tubing shall have the following design properties:

1. Minimum Inside Diameter: 7.84 inches.
2. Maximum Upset Diameter: 12.66 inches.
3. Minimum Rated Tensile Load: 140,500 pounds.
4. Minimum Rated Internal Pressure: 1,500 psi.
5. Collapse Pressure Resistance: 1,000 psi.

2.04 FITTINGS

A. Contractor shall provide all fittings, drive shoes, and centering guides as shown on the well construction drawings or as necessary to complete the well. All fittings, drive shoes, and centralizers will be constructed of the same material as casing.

B. Casings shall be provided with the following minimum accessories:

1. A full opening guide shoe.
2. Centralizers at 5 feet above the bottom end.
3. Centralizers at 25 feet above the bottom end.
4. Centralizers at 50 feet above the bottom end.
5. Centralizers at 100 feet above the bottom end.
6. Centralizers every 100 feet thereafter to nearest 100 feet from pad surface.

C. Casing centralizers shall be spaced at 90 degrees around the casing at each interval and shall be constructed of the same material as the casing attached. Their concave surface shall be against the casing. Centralizers shall be installed in a vertical line to facilitate the installation of tremie pipes for grouting.

D. Centralizers for steel casing shall be manufactured by Pathfinder Oil Tool, Lawton, OK; Halliburton Company, Duncan, OK; Dowell of Tulsa, OK; or approved equal; or may be fabricated in the field from the same material as the casing to which they are welded. Centralizers shall be aligned vertically to facilitate cementing of tubing and casing by tremie methods, allowing tremie lines to be installed near the targeted cementing depth.

PART 3 EXECUTION

3.01 GENERAL

A. All casing shall be installed by a method appropriate to the attached drawings, as selected by Contractor and approved by Engineer. The casing must be new, unused, and clean as approved by Engineer.

B. Casing lengths shall be flush joint and joined watertight by a method appropriate to the material used, as selected by Contractor and approved by Engineer, so that the resulting joint shall have the same structural integrity as the casing itself. Any couplings shall be API or equivalent, made up so that when tight, all threads shall be buried in the lip of the coupling. No solvent or fusion welding of plastic pipe shall be permitted.

C. Casing that fails, collapses, or separates during construction shall be removed from the hole and repaired or replaced at the Contractor's sole expense.

D. Pressure Test: Successfully perform pressure test on all wells in accordance with Section 02575, Mechanical Integrity Testing. Failure of Contractor to successfully pass the pressure test shall result in Contractor, at their sole expense, proposing an alternate method of demonstrating casing integrity, up to and including Contractor setting a packer at the base of the casing and re-running the test until a successful pressure test is passed. In the event that the specified pressure cannot be maintained, corrective measures shall be undertaken by Contractor until the test is satisfactorily accomplished. The casing pressure test shall be witnessed by Engineer or his representative and the FDEP.

3.02 WELDING PERFORMANCE QUALIFICATIONS

A. All welders and welding operators shall be certified at Contractor's sole expense by a qualified testing laboratory before performing any welding under this section. Qualification tests shall be in accordance with Section IX, Article III of the ASME Boiler and Pressure Vessel Code. Welders and operators shall be qualified for making groove welds in carbon steel and stainless steel pipe in positions 2G and 5G for each welding process to be used. Qualification tests may be waived if evidence of prior qualification is deemed suitable by Engineer. Contractor shall retest any welders at any time Engineer considers the quality of the welder's work substandard. When Engineer requests the retest of a previously qualified welder, the labor costs for the retest will be at Owner's expense if the welder successfully passes the test. If the welder fails the retest, all costs shall be at Contractor's expense.

3.03 END PREPARATION

A. Pipe ends shall be prepared preferably by machine shaping. Beveled ends for butt welding shall conform to ANSI B16.25.

3.04 CLEANING

A. Surfaces shall be clean and free of paint, oil, rust, scale, slag, or other material detrimental to welding.

3.05 ALIGNMENT AND SPACING

A. Align ends to be joined within existing commercial tolerances on diameters, wall thickness, and out-of-roundness. Root opening of the joint shall be as stated in the procedure specification.

B. The shielded metal-arc process shall be used for all carbon steel field welding.

C. No welding shall be performed if there is impingement of any rain or high wind on the weld area, or if the ambient temperature is below 32 degrees F. If the ambient temperature is less than 32 degrees F, local preheating to a temperature warm to the hand is required.

D. Tack welds, if not made by a qualified welder using the same procedure as for the completed weld, must be completely removed. Tack welds which are not removed shall be made with an electrode that is the same as, or equivalent to, the electrode to be used for the first weld pass. Tack welds that have cracked shall be removed.

E. Each layer of deposited weld metal shall be thoroughly cleaned prior to the deposition of each additional layer of weld metal, including the final pass, with a power-driven wire brush. Surface defects which will affect the soundness of weld shall be chipped out or ground out.

F. There shall be a minimum of three weld passes on pipe sizes 6 inches and larger. There shall be a minimum of a full root and second pass on all welded pipe 4 inches and under.

G. Welded joints shall be allowed to cool for not less than 30-minutes before weld is placed in contact with water. Contractor may lower the static water level in the well to prevent submersion of the weld while the next joint of pipe is being welded or may use temperature indicating sticks or non-contact IR temperature instruments to demonstrate the weld area is less than 400 degrees F before submersion.

END OF SECTION

SECTION 02676
CORING

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary to drill and collect, and test core samples, complete. Contractor shall pay core shipping costs and for laboratory testing of cores.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide all materials and equipment necessary for drilling, collecting, shipping, and storing the core samples as specified.

2.02 CORE BARREL AND BIT

A. Vertical Cores: The core barrel and bit shall be of the appropriate sizes to recover 4-inch diameter cores. Length of the core barrel shall not be less than 10 feet.

2.03 CORE BOXES

A. Cores shall be stored at the site in sturdy wooden boxes of the proper size for the diameter of core collected. Each core box shall hold no more than 10 feet of 4-inch core. Each core box shall be clearly and permanently labeled with the depth, the top, and the bottom of the core section contained therein. The box shall be prepared for shipping prior to delivery to Engineer.

B. In the event recovered material is not continuous, partitions shall be inserted into the core box to keep core material separate and in sequence. Such partitions shall have clearly labeled the depth and interval of the core specimen.

PART 3 EXECUTION

3.01 GENERAL

A. Cores of strata penetrated shall be taken during the drilling of pilot holes at selected depths determined by Engineer between the following approximate depths:

1. IW-1, IW-2, and IW-3 – Four to six cores apiece between depths of approximately 1600 and 3,500 feet.

B. The exact number, depths, and length of the interval to be cored may be changed by Engineer based on subsurface conditions.

C. The method of coring and the sequence of coring and reaming the hole to full diameter is subject to Engineer's approval and shall conform to the requirements stated in these Specifications.

D. Contractor shall obtain an acceptable core at each interval selected to be cored by Engineer before proceeding with the next drilling activity. Should less than 50 percent core recovery be achieved, the driller will be required to core again immediately below the previously cored zone until 50 percent recovery is achieved before proceeding to core into the next strata where coring is required.

E. Drilling of the pilot hole shall be stopped to collect these core samples, but no standby time shall be charged for coring. A core barrel shall be advanced by being rotated its full length into the undisturbed formation. Once the core barrel has penetrated the desired interval, it shall be withdrawn and the core recovered, stored, and delivered to the Engineer for analysis and evaluation prior to shipment at Contractor's expense to an approved laboratory for analysis. Two samples from each core will be analyzed at the laboratory.

F. The laboratory analysis of each core sample shall include the following: measurement of the specific horizontal and vertical water permeability, the total porosity, and specific gravity. The total laboratory costs shall be included in the unit rate for coring shown in the Bid Schedule. Shipping the cores to the lab shall be the responsibility of the Contractor.

G. A core laboratory such as Ardaman and Associates in Orlando Florida, or CORE LAB in Houston, TX; or equal will be acceptable. The proposed laboratory must be identified prior to coring for approval by Engineer. The Engineer, at its discretion, and at any time, may reject a core laboratory and request other choices of core laboratories.

H. Results from the core laboratory shall be obtained and given to Engineer as quickly as possible as to not delay drilling operations. It is Contractor's responsibility to forward the cores and keep track of the testing schedule of the cores so that drilling operations are not delayed. One electronic copy and five paper copies of the final core laboratory report are required.

END OF SECTION

SECTION 02677
GROUT SEAL

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work, materials, and equipment necessary for furnishing and installing the grout seal. Work covered by this section shall be performed by a service company specialized in the field of grout sealing and cementing of oil, water and wastewater wells. The service company shall provide onsite services of a technical representative during cementing operations with demonstrated experience in the field related to this project.

1.02 SUBMITTALS

A. Specifications on any grout used to cement the annular space.

B. Densometer charts, when requested by Engineer.

C. Contractor shall deliver submittals to Engineer in accordance with Section 01300, Submittals.

1.03 NOTIFICATIONS

A. Contractor shall be responsible for notifying all other agencies as required which may need to witness grouting. These may include FDEP, SWFWMD, Manatee County Natural Resources Department, local Health Departments, etc.

PART 2 PRODUCTS

2.01 GENERAL

A. Contractor shall provide grout, additives, bentonite, and any other materials and equipment necessary for placement of the grout as specified and as directed by Engineer. Drill pipe, tremie line, water source and other materials and equipment necessary to complete the work specified shall be provided by Contractor.

2.02 PORTLAND CEMENT

A. Must conform to ASTM C 150, Type II.

2.03 GRAVEL

A. Must conform in size to SWFWMD rules, regulations, or permit conditions for well abandonment and the borehole/casing diameter. Fine gravel or sand shall only be used during grouting activities if approved by Engineer.

2.04 BENTONITE AND OTHER ADDITIVES

A. Furnish all bentonite required for cementing in the proportions specified in the Bid Schedule and as directed by Engineer. Furnish other cementing additives formulated specifically for well cementing as required by Engineer.

PART 3 EXECUTION

3.01 CEMENT GROUT MIX

A. Contractor shall portion 1-ft^3 of cement (i.e., one sack) to not more than 5.8 gallons of potable water. All grout shall have zero percent free water when pumped.

3.02 ADDITIVES

A. The use of special cements or other admixtures (ASTM C494) to reduce permeability, increase fluidity, and/or control set time and the composition of the resultant slurry must be approved by Engineer. A high shear mixer shall be used by Contractor for additives and totally hydrated to a smooth slurry before adding cement. For each grout batch, about 5 to 10 percent of the mixing water shall precede the other components. Consistency and method of mixing shall be reviewed by Engineer prior to grouting.

B. Work covered under this Article, Additives shall be performed by a service company specialized in the field of grout sealing and cementing of oil, water, and wastewater wells. The service company shall provide on-site, during cementing operations, the services of a technical representative with demonstrated experience in the field and area related to this project. The cement service company shall be subject to approval by Engineer based upon their experience in Florida.

C. Contractor shall furnish all bentonite and other cementing additives required for cementing in the proportions specified in Contractor's Bid Schedule and as directed by Engineer.

D. A standard mud balance shall be used by Contractor to measure consistency of slurry density. Cool clean potable water shall be used to mechanically mix with cement at the site immediately before placement. Consistency and mixing shall be approved by Engineer.

3.03 PLACING

A. The method of grout placement must force grout from the bottom of the space to be grouted to the surface. The grouting shall be done continuously and in such a manner as shall ensure the entire filling of the borehole, well, and annular space and ensure a watertight seal around the well casing to avoid downward or upward movement of water along the casing annulus and borehole.

B. All cementing of casing shall be accomplished in the presence of Engineer or his representative. If cementing activities require observation by a SWFWMD, FDEP, or other regulatory agency representative, as determined by the Engineer, Contractor shall coordinate cementing activities to accommodate this requirement at no additional cost to Owner.

C. The pressure tremie method is required for all subsequent cement stages. The bottom of the tremie line shall initially be set within five feet of the top of the previous annular grout tag in the well, as approved by Engineer. Dual tremie pipes shall be used, and have an inside diameter of not less than 1.5 inches. Dual tremie pipes shall be withdrawn as the annulus is filled and before the cement has begun to set. A single tremie pipe with a larger diameter can be used in lieu of the dual tremie pipes if approved by Engineer.

D. Surface casing shall be grouted by pressure tremie, pressure cap, displacement plug, or grout shoe methods. Method of grouting must be approved by Engineer.

E. Staging and use of gravel, thixotropic, or other high-yield cement types with special additives shall be required through highly permeable intervals, if approved by Engineer and FDEP. The gravel shall be introduced at a metered uniform rate in the manner to be approved by Engineer and that shall allow even placement of the gravel. Every precaution shall be taken by Contractor to ensure placement without bridging of the materials as they are introduced into the well.

F. Engineer shall inform Contractor of the amount and type of cement to be used prior to each cementing operation. Contractor shall submit to Engineer 48 hours before cementing starts a detailed schedule for the complete operation including capacity of the pump and equipment to supply and mix cement slurry. During each cement stage pumped, grout samples shall be collected by Contractor and checked for density by a pressurized fluid density balance and by a recording Radiometric Densometer, or as otherwise approved by Engineer. These grout samples must be collected a minimum of three times for each cement batch pumped: before pumping, near the middle of the batch, and near the end of the batch. The slurry density determination shall be conducted in accordance with the latest edition of API Spec 10. Slurry density determined in the field shall be compared with the specified slurry density indicated on the mill certificate which results in zero percent free

water and shall be presented to Engineer prior to the start of cementing operations. No cement slurry shall be pumped until the specified slurry density is obtained.

G. Setting Time: No drilling operations shall be permitted until grout has cured. Setting time between stages shall be 12 hours or as approved by the Engineer. Longer time shall be necessary when high-yield cement is used. After cementing is completed on a casing, the well must remain undisturbed for at least 24 hours for setting of the cement prior to drilling out the cement plug in the well. Further setting requirements for the final casing strings on the well are contained in Section 02674, Casing.

H. Tag Depth: Contractor shall demonstrate the tag depths to the satisfaction of Engineer and regulatory inspector prior to grouting. The depth to the top of the existing grout or borehole shall be determined by washing out the annular space, if necessary, as approved by Engineer and regulatory inspector.

I. Contractor shall be solely responsible for any defect in the cementing work due to improper, or a lack of, equipment, technology, personnel or experience, either by Contractor or by any of its subcontractors. Contractor shall pay all costs necessary to correct such defects. Should Contractor fail to correct defects, Engineer may refuse to accept the well.

J. Throughout all cementing operations, Contractor shall exercise extreme care to prevent the collapse of casing. As a minimum, during placement of cement by the tremie method, a pressure-tight bulkhead shall be maintained on the casing being cemented and during cementing, and for 8 hours following placement of cement, a pressure of 100 psi shall be maintained in the casing. The heating and cooling of the cement may require that water be added or released from the casing to maintain the required pressure.

K. Drillable Bridge Plug: Contractor shall furnish equipment and personnel to install a commercial drillable bridge plug as approved by Engineer, or may construct a bridge plug in place using cuttings and a lift of at least 10 feet of Portland ASTM 150 Type II neat cement. Amount of cement and placement method shall be reviewed and approved by Engineer.

L. Pilot Hole Plugback: Contractor shall plugback open pilot holes with grout prior to reaming and prior to the installation of casing as directed by Engineer. Gravel shall be emplaced by the tremie method through highly permeable zones as approved by Engineer.

END OF SECTION

SECTION 02678
WELL DEVELOPMENT

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work, materials, and equipment necessary for the development of IW-1, IW-2, IW-3, DZMW-1, DZMW-2, and DZMW-3 complete.

B. Development of the wells shall be by closed circulation until all visible particulate matter has been removed from the well to the satisfaction of Engineer.

C. The total development time is estimated to be 16 to 24 hours per well. However, Engineer shall be the sole judge as to when development is complete and shall, therefore, increase or decrease the total development time.

1.02 SUBMITTALS

A. Contractor shall submit certification that the flow-meter has been calibrated within 60 days prior to development. Calibration data shall accompany the certification and shall be provided to Engineer 10 days prior to well development.

PART 2 PRODUCTS

2.01 AIR-LIFT EQUIPMENT

A. Contractor shall:

1. Provide an airline and compressor of adequate size and length to be able to surge the well with air. The airlift equipment shall be capable of pumping 1,000 gal/min for the injection wells, 200 gal/min for the monitoring wells, and a rate as limited by well yield for the pad monitor wells.
2. Furnish and install all necessary compressors, piping, tools, pumps, and any other equipment to develop the wells by airlifting to obtain a flow of 1,000 gal/min as stated above and as approved by Engineer.
3. Provide a tee with lateral outlet horizontal and all necessary piping to properly contain and measure the flow of water and dispose of it in accordance with these Specifications. Provide a seal on top outlet to prevent overflowing and a tee and pipe of the same diameter as the corresponding casing.

4. Be prepared for straight air development and or reverse air. Straight air development may require eductor piping lowered to the development zones to increase development action.

2.02 HIGH CAPACITY PUMPING EQUIPMENT

A. Contractor shall furnish a turbine pump and discharge equipment and piping for development of the well by pumping. Pump and appurtenances are specified in Section 02681, Pumping Tests.

2.03 STORAGE CONTAINMENT RECIRCULATION AND SETTLING EQUIPMENT

A. Contractor shall furnish a minimum of 100,000 gallons of onsite storage for development. The containment vessel will be cleaned of all sediment prior to initiating development activities. Multiple tanks, baffle systems, or filtering may be required to settle suspended solids prior to re-circulation into the well.

B. Contractor will provide all equipment and materials necessary to convey water from the well, through the settling containment system, and back into the well.

PART 3 EXECUTION

3.01 INITIAL DEVELOPMENT BY AIRLIFTING

A. The purpose of the development work is to remove effectively from the well, well walls, and the formation immediately adjacent to the well, material like mud, clay, cuttings, rock fragments, and any other type of loose or potentially loose materials. The injection well and monitoring wells shall be developed by the air development method as follows:

1. Development shall be done by utilization of a single pipe air pumping system using the casing or the borehole itself as the educator line. The compressors, air lines, hoses, fittings, etc., shall be of adequate size to pump the well by the airlift principle up to a maximum flow of 1,000 gal/min with air. Contractor shall initially pump the well with air until the well is developed to the point that it yields clear, sand-free water. He shall then shut off the air and allow water in the well to return to a static condition. He shall then reopen the valve and reintroduce air into the well until water is again brought to the surface by the airlift, at which time he shall close the air valve and allow the water to drop back down the well and return to a static condition. He shall repeat this lifting and dropping of the column of water until the water in the well becomes turbid at which time he shall continuously pump the well with air until it again yields clear sand-free water. Contractor shall repeat the above operations until the well no longer produces fine material when it is surged and backwashed as described above, or until Engineer is satisfied that development is complete.

2. The bottom of the airline shall be placed at different levels in order to facilitate development of all intake areas and multiple water producing zones, and the process repeated until all zones yield water free of turbidity when surged and backwashed, as directed by Engineer.

B. The pad monitoring wells shall be developed as described above except the quantity of water produced shall be as limited by well yield.

3.02 INSTALLATION OF PUMPING EQUIPMENT

A. After initial development of the injection well, the high capacity pump, flow measuring device(s), discharge piping, access pipe/air-line, and other necessary appurtenances shall be installed for development and testing as specified in Section 02681, Pumping Tests.

3.03 PUMPING DEVELOPMENT

A. Contractor shall operate the pumping development equipment continuously at such rates of discharge (between approximately 1,400 and 2,100 gal/min) and such periods of time as determined by Engineer. The well shall be pumped until the water is free from sand, silt, and turbidity and/or until no further improvement in turbidity and specific capacity can be observed, and in a manner that will contain all water produced. Engineer shall determine when development by high capacity pumping is complete.

B. The static water level in the well shall be allowed to recover for a time equal to the pumping development time, as a minimum, before start of the variable-rate specific capacity test.

3.04 RECIRCULATION OF DEVELOPMENT WATER

A. Contractor will be responsible for settling suspended solids from the development water prior to re-circulating back into the well. Water must have a turbidity measurement of 50 NTUs or less prior to re-circulating back into the well. This is anticipated to require multiple settling tanks, baffle systems, filtering, increased settling times, and periodic cleaning of sediment from tanks.

3.05 PUMP REMOVAL

A. Do not remove the pump and appurtenant equipment until the work is complete as specified in Section 02681, Pumping Tests and as approved by Engineer.

3.06 WATER SAMPLING

A. After the wells have been fully developed, as determined by Engineer, each well shall be sampled to determine background water quality. The sampling shall be conducted as specified in Section 02311, Water Quality Sampling and Testing, and Section 02673, Drilling.

END OF SECTION

SECTION 02679
GEOPHYSICAL LOGGING

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work, materials, and equipment necessary for geophysical logging of the borehole and wells.

B. Contractor is advised that the well is expected to be under artesian conditions and static logging will likely have to be accomplished through use of a standpipe or pack-off collar.

1.02 SUBMITTALS

A. Three field copies of each requested geophysical log shall be provided to Engineer by Contractor immediately upon the completion of each logging event.

B. Five final copies of each field geophysical log, including one electronic copy in Adobe Acrobat format and LAS (Log ASCII Standard) format, shall be provided to Engineer by Contractor upon Engineer's review of field copy for such items as accuracy, scale, reproducibility, etc.

C. Geophysical logging probe or sonde schematic for each downhole tool used.

PART 2 PRODUCTS

2.01 GENERAL

A. Contractor shall provide a sheave or other means from which the logging Subcontractor may hang geophysical logging equipment during logging events.

B. Logging Subcontractor shall be provided in Contractor's list of specialty subcontractors as stated in the Bid Package.

C. Contractor will provide continuous digital recording geophysical logging equipment capable of running the following:

1. Spontaneous potential log.
2. Natural gamma ray log.
3. X-Y caliper log.
4. Temperature and delta temperature logs.
5. Fluid resistivity log.

6. Flow meter (with flow interpretation analysis) log.
7. Dual induction log.
8. Borehole-compensated sonic log.
9. TDS Compilation Log.
10. Cement Bond Log.
11. Video survey with rotating head or borehole televiewer (on pilot hole only if poor visibility).

PART 3 EXECUTION

3.01 GENERAL

A. Geophysical logging shall be conducted in general accordance with the program outlined in Section 01010 Summary of Work.

B. A nominal 8 to 12-inch diameter pilot hole shall be drilled by Contractor to the depth determined by Engineer and prepared for geophysical logging. Borehole preparation shall include, but not be limited to: 1) continuation of circulation until drill cuttings have been removed from the borehole and 2) circulation of the drilling mud in the borehole until it is uniform and the drill pipe has been removed from the borehole. Contractor must make all reasonable efforts to leave the borehole free from obstructions in preparation for geophysical logging.

C. It is the Contractors sole responsibility to reduce the turbidity of the water in the reverse-air drilled pilot hole so that a clear video log can be obtained. No development time will be charged to clean the borehole in preparation of logging. No water will be permitted to be injected into the pilot hole to facilitate video clarity. A borehole televiewer log may be substituted for a video log on the pilot hole intervals, however a video must be completed on the final well.

D. Logging shall be performed by Contractor as soon as possible after drilling and preparation of each pilot hole. The logging interval shall be the total depth of the pilot hole or less as determined by Engineer.

E. Temperature logging shall be conducted following each stage of cementing on the final casing for the injection well. Contractor shall tag the cement fill in the annular space prior to performing each log. The temperature log will be conducted from land surface to within 20 feet of the base of the casing, or as otherwise approved by Engineer. The log shall be presented at scales of 1 inch equals 2 degrees F and 1 inch equals 25 degrees FF side-by-side on the same log. Contractor shall wait a minimum of 8 hours following cementing prior to logging, with a maximum of 16 hours prior to logging the well following each cement stage.

F. The top 200 feet of annulus shall remain un-cemented until performance of the cement bond log (CBL) to assist with tool calibration during logging. Cement the top 200 feet after performing the CBL.

G. Contractor shall provide access to the well for the purpose of water level measurements or otherwise as requested by Engineer during geophysical logging events.

H. Testing of the well may be conducted concurrent with geophysical logging events. It shall be Contractor's responsibility to assist Engineer as directed during logging events.

I. All logs shall be clearly labeled with all pertinent information regarding the well, location, depths, scales, etc. Repeat sections shall be run to verify logging tool performance on all logs. The repeat sections shall consist of 20 percent of the borehole length up to 200 feet in length. Engineer shall select the section of the borehole to perform the repeat section.

J. Color Video surveys of the borehole shall be recorded on DVD format. Contractor shall furnish Owner with a DVD of all runs, one field copy, and five copies of each survey.

K. All logs run on the pilot holes of the exploratory well shall be run with scales of 1 inch equals 100 feet; 2 inches equals 100 feet; and 5 inches equals 100 feet.

3.02 NOTIFICATION REQUIREMENTS

A. Regulatory agencies or other interested parties may require attendance at geophysical logging events. Contractor shall provide Engineer with a 24 hour notice prior to logging to facilitate coordination of the logging activities.

3.03 SUPPLEMENTS

A. The supplement listed below, following "End of Section," is part of this Specification:

1. Geophysical Logs, Exhibit.

END OF SECTION

EXHIBIT 02679-1

Proposed Geophysical Logging Program for the Manatee County Mater Reuse Wet Weather Management Well System

		Geophysical Logs											
											Temperature		
Well Configuration	**Interval**	**Caliper**	**NGR**	**DI with SP**	**Vid or BHT**	**BCS**	**RTS**	**TDS Compi-lation**	**Fluid Resist-ivity**	**Flow-Meter[1]**	**Well**	**Cement Stage**	**Cement Bond Log**
Injection Wells (IW-1,2,3)													
Pilot Hole	0 to 350	▲	▲	▲									
Reamed Hole	0 to 350	▲	▲										
Pilot Hole	0 to 1,800	▲	▲	▲	▲	▲		▲	▲ (S/D)	▲ (S/D)	▲ (S/D)		
Reamed Hole	0 to 1,600	▲	▲										
Pilot Hole	0 to 3,500	▲	▲	▲	▲	▲		▲	▲ (S/D)	▲ (S/D)	▲ (S/D)		
Reamed Hole	0 to 2,000	▲	▲										
Completed Well	0 to 3,500	▲	▲	▲	▲		▲		▲ (S/D)	▲ (S/D)	▲(S/D)	▲(FCI)	▲(FCI)
Deep Zone Monitor Wells (DZMW-1,2,3)													
Pilot Hole	0 to 350	▲	▲	▲									
Reamed Hole	0 to 350	▲	▲										
Pilot Hole	0 to 1,600	▲	▲	▲	▲	▲		▲	▲ (S/D)	▲ (S/D)	▲(S/D)		
Reamed Hole	0 to 1,500	▲	▲										
Completed Well	0 to 1,600	▲	▲	▲	▲	▲			▲ (S/D)	▲ (S/D)	▲(S/D)		▲(FCI)
Avon Park Monitor Well (APMW-1)													
Existing Well	0 to 1,015	▲	▲	▲	▲	▲			▲ (S/D)	▲ (S/D)	▲(S/D)		
Modified Well (if needed)	0 to 1,100	▲	▲	▲	▲	▲			▲ (S/D)	▲ (S/D)	▲(S/D)		▲(FCI)

Static (S); Dynamic (D); Following Casing Installation (FCI); Dual Induction (DI), Borehole Compensated Sonic (BCS); Spontaneous Potential (SP), Radioactive Tracer Survey (RTS) external and internal, Natural Gamma Radiation (NGR), Video Survey (Vid), Borehole Televiewer (BHT)

1 – Flowmeter log with interpretation

SECTION 02681
PUMPING TESTS

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work, materials, and equipment necessary for the well pumping tests, complete.

B. The estimated length of the variable-rate, step-drawdown pumping tests at the injection wells is 4 hours. Three to four different pumping rates shall be utilized during this test. The rates and time steps shall be determined by Engineer in the field. The pump shall be left undisturbed and in place during the recovery period, approximately equal to 50 percent of each pump test duration. However, Engineer shall be the sole judge as to length of the test and may increase or decrease the total pumping time of the test.

C. Water generated during pumping test will be storage on site and used during subsequent injection test. Containment of water will be provided by Contractor. Suspended solids will be settled and removed from water before discharging into well for injection test. Water must have a turbidity of 50 NTU or less prior to injection into the well.

1.02 SUBMITTALS

A. The Contractor shall submit certification that the flowmeter has been calibrated within 30 days prior to testing. Calibration data shall accompany the certification and shall be provided to the Engineer 10 days prior to injection test.

PART 2 PRODUCTS

2.01 TEST PUMP

A. Contractor shall:

1. Furnish and install a test pump and driver capable of pumping from 700 to 2,100 gal/min. The pump shall not be fitted with a foot valve.
2. Provide a gate valve, or equal, on the discharge side of the pump for adjustment of flow rate down to 700 gal/min. if the test pump engine cannot be sufficiently throttled.
3. Provide a pumping unit prime mover, controls, and appurtenances capable of being operated without interruption for a 24 hour period.
4. Furnish engine-driven equipment or make arrangements for power for well pumping tests.

5. Install the pump, motor, and discharge head for access to run geophysical logs while pumping, and to provide access for water level measurements by Engineer.

2.02 FLOW MEASURING DEVICE

A. Contractor shall provide machined orifice plate(s) and flowmeter(s) capable of measuring the pump discharge within plus or minus 5 percent of true flow for flow rates from 700 to 2,100 gal/min.

2.03 DISCHARGE PIPING

A. Contractor shall furnish, install, maintain, and operate discharge piping for the pump unit of sufficient size to convey pumped water to the designated discharge location as directed by Engineer.

2.04 ACCESS PIPE

A. Contractor shall provide and install a 1-1/2-inch minimum ID pipe to permit installation of an electronic water level measuring device furnished by Contractor. The pipe shall terminate approximately 2 feet above the pump bowls and be of sufficient strength to remain open for the duration of the test.

2.05 ACCESS PORTS

A. Contractor shall provide a 1-inch minimum ID port on the wellhead for connection of a manometer tubing to measure water levels above land surface.

B. Contractor shall provide a 1-1/2-inch minimum ID port on the wellhead for connection of a pressure transducer data logger furnished and installed by Contractor to a depth selected by Engineer.

2.06 WATER SAMPLING PORT

A. Contractor shall provide a spigot or other valved port on the discharge line to allow water quality sampling during the pumping test.

2.07 STORAGE CONTAINMENT RECIRCULATION AND SETTLING EQUIPMENT

A. Contractor shall furnish a minimum of 100,000 gallons of onsite storage for development. The containment vessel will be cleaned of all sediment prior to initiating development activities. Multiple tanks, baffle systems, or filtering may be required to settle suspended solids prior to re-circulation into the well.

B. Contractor will provide all equipment and materials necessary to convey water from the well, through the settling containment system, and back into the well.

PART 3 EXECUTION

3.01 INSTALLATION OF PUMPING EQUIPMENT

A. The pump, flow measuring device(s), discharge piping, access pipe, water sampling port, and other necessary appurtenances shall be installed for the well pumping tests.

3.02 PRELIMINARY CAPACITY PUMPING TEST

A. If requested, the Contractor shall run a preliminary pumping test prior to each pumping test. The preliminary pumping test shall be conducted to establish rates and evaluate equipment performance, including discharge capacity, and to estimate the production capacity of the well prior to implementation of the step drawdown test. Operate the pumping test equipment continuously at rates of discharge and for periods of time as determined by Engineer. Duration of such preliminary test shall be approximately 1 hour.

B. Unless otherwise approved by Engineer, the preliminary capacity pumping test shall be run on the day preceding the pumping test.

C. The static water level in the well shall be allowed to recover for a time equal to the duration of the preliminary test before start of well pumping test or longer as determined by Engineer.

3.03 PUMPING TEST

A. Contractor shall operate the variable-rate step-drawdown and aquifer performance pumping test equipment continuously at rates of discharge and for periods of time prescribed by Engineer. Contractor shall provide an operator during the entire time the pump is in operation, as required by Engineer, to operate the prime mover and to regulate discharge by the throttling device during the test pumping period.

B. At the completion of the pumping test, the pump bowls and column shall not be removed from the well for a time equal to 50 percent of the total pumping time to allow accurate water level recovery measurements to be taken, or less as determined by Engineer. No additional standby time or pumping time payment shall be awarded during this period.

3.04 FURTHER DEVELOPMENT

A. If considerable quantities of fines are pumped out of the well during the test, Contractor shall discontinue the test and resume well development. Engineer shall be the sole judge as to whether such additional development is necessary.

B. After completion of the test, Contractor shall sound the well and remove any sand or silt accumulated in the well as a result of the test.

3.05 DISPOSAL OF WATER

A. Disposal of water shall be the responsibility of Contractor. Water generated from pumping tests will be contained on site and re-circulated into the well or at the Contractors discretion and expense, disposed of offsite.

B. Water will require settling to reduce turbidity prior to disposal or recirculation into the well following the test. Engineer must approve methods of settling suspended solids prior to commencing each pumping test. Water re-circulated into the well shall have a turbidity of 50 NTU or less at all times. Up to 100,000 gallons of storage shall be required.

3.06 WATER LEVEL ACCESS

A. Contractor shall provide access at the wellhead for water level measurements in the well prior to and during the pumping test.

END OF SECTION

SECTION 02684
WELL ACIDIZATION

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary to acidize all injection wells as contained herein, complete, if directed by Engineer.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide all the materials and equipment required to accomplish the work as specified.

2.02 ACID STORAGE

A. All acid storage tanks will be of appropriate material and construction for storage of HCl at the specified concentrations. One tank will be required for the termination of the blow-off pipe from the wellhead to capture acid off-gassing in the event of a pressure release from the well. The Contractor will also provide container(s) for acid storage. The total volume for the storage container(s) is not specified so that the Contractor can propose options that are most suitable for the site. A combined use of onsite staging and acid delivery tankers is acceptable provided it does not delay the injection of the acid and batches of at least 5,000 gallons can be pumped continuously.

2.03 SECONDARY CONTAINMENT

A. The secondary containment will be of appropriate material and construction for storage of HCl. The secondary containment will encompass all areas containing chemicals including storage areas, pipeline to and from the well, pumps, and any other components that may be in contact with acid or soda ash or any other chemicals used in the well rehabilitation process. Secondary containment will be required regardless of whether the acid storage task(s) are placed on the cement well pad or not.

B. The Contractor will be responsible for controlling the flow from the well while removing the wellhead and setting up for acidization in accordance with the appropriate sections of these Documents.

C. Acid will be 32 percent inhibited hydrochloric acid (HCl) from a source and carrier approved by the Engineer. The HCl provided shall be approved for use in potable water wells, unless otherwise approved by the Engineer.

2.04 ACIDIZATION HEADER

A. Type of temporary acidization wellhead will be at the discretion of the Contractor but must be rated for a minimum working pressure of 250 psi or higher. The acidization wellhead must include, at a minimum, the following components: acid line capable of injection at the required rates, one 4-inch diameter blow-off (or equivalent), flanged tee for injection of water at high rates, and pressure gauge for the acid blow-off valve. The wellhead shall also be equipped with valves on each pipe line to control flows. Gauges shall be suitable for intended use and shall be calibrated from 0 to 250 psi. The temporary acidization wellhead schematic is provided in the Drawings.

B. Approximately 10,000 gallons of 32 percent HCl (per injection well) will be targeted to complete the acidization. Actual quantities used in the field shall be pre-approved by the Engineer. Certification from acid supplier will be required to verify materials and acid quantities at least 3 working days prior to acid delivery to site.

C. All piping from the wellhead to the blow-off containment tank will be of steel suitable for contact with 32 percent HCl. Flexible hoses may be used for the acid delivery lines to the wellhead as long as the hoses and hose connections are of appropriate material for handling 32 percent HCl and capable of withstanding operating pressures of at least 200 psi.

D. An approved inhibitor shall be added to the acid prior to emplacement of the acid in order to protect the wellhead and casing from the acid.

E. The inhibitor must be approved by the Engineer prior to their use.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. The Contractor shall be responsible for maintaining water levels below land surface when the wellhead is open to atmosphere and be capable of closing in the well and controlling flow at all times during all activities conducted under this contract. No unauthorized flow will be allowed from the well at any time.

1. Food grade salt is acceptable for lowering and maintaining the water level in the well. Other methods will require the approval of the Engineer.
2. The Contractor’s fluid control device shall be approved by the Engineer prior to mobilization.

B. Install 2-inch diameter acid injection pipe to the depth selected by the Engineer (the anticipated depth is 100 feet).

C. Setup wellhead at the well designated by the Engineer in accordance with the Drawings and the Specifications. The acidization lines shall be installed such that no leaks occur.

D. It is the intent that the emplacement of the acid will be done in one day in multiple batches. The general sequence for the acid injection is to pump the acid in batches, between approximately 500 to 5,000-gallons as determined by Engineer. The well will be flushed with approximately 2 to 3 casing volumes of water in between each batch at a rate of approximately 1,400 gpm. Following the final batch of acid at each well, water will be injected into the well for a period of up to 1 hour at a flow rate of approximately 1,400 gpm.

E. Inject water using water generated from the well and stored on site. Inject into the well at rates up to 1,400 gpm at head pressures of up to 100 psi. The flow rate will be measured with flow meter provided by the Contractor. An additional back-up water pump will be provided by the Contractor. The purpose of the pump is to serve as a backup in the event the primary pump fails so that acid can be cleared from the well. The pump shall be capable of maintaining a flow rate of 500 gal/min at head pressures of 100 psi at a minimum. The water supply for the injection will be groundwater generated from the well and stored on site by Contractor. The Contractor shall provide equipment, and up to 100,000 gallons of water storage containment to perform acidization.

F. Inject the acid through the acid line at a rate of approximately 100 gal/min. The HCl will be stored in a holding tank or containment system prior to injection. The tank shall be constructed of suitable material to retain the acid without leaks. The tank will be of sound construction and must not leak. The pump used to emplace the acid must be capable of pumping at a rate of approximately 100 gal/min. at head pressures of up to 100 psi. All pipe and pipe fittings for conveying acid shall be of rigid construction and constructed of suitable material approved by the Engineer.

G. After pumping of all acid is complete, continue water injection as described above. After water injection is complete, close all valves and allow well to remain undisturbed for a minimum 24-hour duration or as otherwise approved by Engineer.

H. Post-acidization development will be at the discretion of the Engineer and Owner. Discharge of water and spent acid from the well following acidization shall be to a suitable container at the site supplied by Contractor. The Contractor will neutralize the discharge water with a suitable buffer until it is demonstrated that the pH of the water is 7.0. Neutralized water will then be re-introduced into well following settling of solids. Contractor shall furnish install and operate all equipment required to perform post-acidization development.

END OF SECTION

SECTION 02686
STANDBY TIME AND DOWN TIME

PART 1 GENERAL

1.01 DEFINITIONS

A. Standby time shall be paid for shutdown time of the equipment and crew for any portion of the normal working day (7:00 a.m. to 7:00 p.m., Monday through Friday unless otherwise approved) when Engineer's representative orders Work to cease or when other activities at the site preclude work by Contractor, as approved by Engineer's representative. Standby time does not include time when Engineer's representative or a regulatory agency or other authority order Work to cease because of safety, lack of proper equipment or supplies, or violation of federal, state, or local rules, regulations, or statute.

B. Downtime shall mean that time, other than standby time, during which drilling could occur but does not or when machinery is broken down, proper materials or equipment as specified in this document are not available, or Contractor elects not to drill. Downtime includes adverse weather conditions and delayed arrival of regulatory inspectors.

C. Extra work shall mean that time, other than standby time, during which Contractor is directed to provide all equipment and a crew to perform extra work not specifically addressed in the Section 01001, General Requirements or elsewhere in these Contract Documents.

1.02 ENGINEER STANDBY TIME

A. Engineer must be given 24 hours' notice exclusive of weekends and holidays, prior to any testing or grouting activities. If Engineer is notified to be on site for these activities and Contractor is not ready, then Engineer shall be reimbursed by Contractor at the rate of $200.00 per hour, during normal working hours, starting at the time scheduled by Contractor and notified to Engineer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 02689
TEMPORARY WELLHEAD CAPPING AND VALVES

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary for furnishing and installing the well heads and various manually operated valves and check valves in the wellheads, complete.

1.02 GENERAL

A. Like items of equipment specified herein shall be the end products of one manufacturer in order to achieve standardization for operation, maintenance, spare parts, and manufacturer's service.

1.03 SUBMITTALS

A. Submittals shall be made in accordance with Section 01300, Submittals.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide all materials and equipment necessary for capping injection wells and monitoring wells as specified and shown in Drawing No. 5 and in accordance with these Specifications.

B. All valves shall be complete with all necessary operating handwheels, extension stems, worm and gear operators, operating nuts, chains, and wrenches which are required for the proper completion of the work included under this section.

C. Renewable parts including discs, packing, and seats shall be of types recommended by valve manufacturer for intended service.

D. All units shall have the name of the manufacturer and the size of the valve cast on the body or bonnet or shown on a permanently attached plate in raised letters.

E. For the purpose of designating the type and grade of valve desired, a manufacturer's name and list or figure number is given in the following specifications. Valves of equal quality by other manufacturers will be considered in accordance with the General Conditions.

2.02 DESIGN FEATURES

A. Provide all materials as specified on Drawing No. 5 for temporary wellhead, complete, whether or not materials are explicitly called out in this section.

B. Brass and Bronze Components:

1. Brass and bronze components of valves and appurtenances which have surfaces in contact with the water shall be alloys containing less than 16 percent zinc and 2 percent aluminum.
2. Approved alloys are of the following ASTM Designations: B61, B62, B98 (Alloy A, B, or D) B139 (Alloy A), B143 (Alloy 1-B), B164, B194, B292 (Alloy A), and B127. Type 304 or Type 316 stainless steel with inconell cladding on flow wetting parts may be substituted for bronze at the option of the manufacturer and with the approval of the Engineer.
3. All gland bolts on iron body valves shall be bronze and shall be fitted with brass nuts.

PART 3 EXECUTION

3.01 GENERAL

A. Bolt holes of flanged valves shall straddle the vertical centerline of the pipe run. Prior to installing flanged valves, the flange faces shall be thoroughly cleaned. After cleaning, insert gasket and bolts, and tighten the nuts progressively and uniformly. If flanges leak under pressure, loosen or remove the nuts and bolts, reseat or replace the gasket, retighten and/or reinstall the nuts and bolts, and retest the joints. Joints shall be watertight at test pressures before acceptance.

B. Thoroughly clean threads of screwed joints by wire brushing, swabbing, or other approved methods. Apply approved joint compound to threads prior to making joints. Joints shall be watertight at test pressures before acceptance.

3.02 PLACING

A. Generally, unless otherwise indicated on the Drawings, all valves installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above the finish floor or grade shall be installed with their operating stems vertical. Valves installed in horizontal runs of pipe having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above the finish floor or grade shall be installed with their operating stems horizontal. If adjacent piping prohibits this, the stems and operating hand wheel shall be installed above the valve horizontal centerline as close to horizontal as possible. Valves installed in vertical runs of pipe shall have their operating stems oriented to facilitate the most practicable operation.

3.03 PAINTING

A. Painting shall be executed and with materials as approved by Engineer.

END OF SECTION

SECTION 02985
INJECTION TEST

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work, materials and equipment necessary for the injection test, complete.

B. The estimated length of the injection test is 3 hours. Three to four different rates may be utilized during this test. The rates and time steps will be determined by the Engineer in the field. The well will be left undisturbed and in place after the injection period, for a minimum of 24 hours. However, the Engineer shall be the sole judge as to length of the tests and therefore may increase or decrease the total injection time of the tests.

C. Contractor shall supply piping and fittings as needed to conduct injection test using water generated during pumping test.

1.02 SUBMITTALS

A. The Contractor shall submit certification that the flowmeter has been calibrated within 60 days prior to testing. Calibration data shall accompany the certification and shall be provided to the Engineer 10 days prior to injection test.

PART 2 PRODUCTS

2.01 TEMPORARY PIPING

A. The Contractor shall supply and install temporary piping, including the necessary valves and fittings to be used during the injection test. The piping must be capable of allowing a flow rate of no less than 2,100 gpm with a velocity of no more than 7 feet per second.

2.02 BOOSTER PUMPING EQUIPMENT

A. The Contractor shall furnish and install temporary booster equipment as needed and requested by Engineer, to provide not less than 2,100 gpm flow rate down the well continuously for the duration of the Injection Test.

2.03 MONITORING EQUIPMENT

A. The Contractor shall furnish and install water level or pressure transducers and a data logger to monitor pressure levels in the injection well and in both the Deep-Zone Monitor Well and Avon Park Monitor Well.

B. The Contractor shall furnish and install a flowmeter to indicate and totalize the injected water into the injection well during the injection test. The indicator shall be capable of showing the flow being injected with divisions not greater than 100 gallons. The totalizer shall be capable to show the total amount of water injected at any time with a digital readout in hundreds of gallons. The totalizer shall be capable to show the total amount of water injected at any time with a digital readout in hundreds of gallons.

C. The Contractor shall remove all of the above equipment at the completion of the injection test to the satisfaction of the Engineer.

PART 3 EXECUTION

3.01 BACKGROUND MONITORING

A. After the deep injection well and monitor well are complete, as determined by the Engineer, and after development, the Contractor shall begin preparing for a 3-hour injection test. As part of the injection test, the Engineer shall be notified 3 days in advance of when the Contractor plans to conduct the test. During this 3-day period, the injection wells and monitoring wells are to be left undisturbed and are to be monitored continuously by installed pressure transducers in each monitoring well and injection well. The Contractor may use this time to prepare for the injection test and to do other site activities. In no event, shall the Contractor charge any part of the 3-day monitoring period as standby time.

B. A recording barometer shall be used to collect atmospheric pressure readings during the pre-injection, injection, and recovery periods.

C. The Contractor shall supply all monitoring equipment for the background data collection prior to the injection test.

D. The data shall be delivered to the Engineer as a Microsoft Excel® file.

E. Should any monitoring equipment fail during the 3-day background test, the monitoring period shall be extended to include readings for 3 continuous days. No extra time or payment for faulty equipment or operator error will be allowed.

3.02 PRELIMINARY CAPACITY INJECTION TEST

A. Run a preliminary capacity injection test prior to the injection tests. The preliminary capacity injection test will be conducted to establish rates and evaluate equipment performance, including discharge capacity, and to estimate the injection capacity of the well prior to implementation of the injection test. Operate the injection test equipment continuously at such rates and for such period of time as determined by the Engineer. Duration of such

preliminary test shall be approximately 1 hour. Flow rates shall be measured using a calibrated flowmeter.

B. The Contractor shall supply all monitoring equipment for the preliminary capacity test.

C. The data shall be delivered to the Engineer as a Microsoft Excel® file.

D. Unless otherwise approved by the Engineer, the preliminary capacity test will be conducted on the day preceding the injection test.

E. The static water level in the well shall be allowed to recover for a minimum time equal to the duration of the preliminary test before start of well injection test or longer as determined by the Engineer.

3.03 INJECTION TEST

A. The injection test will be conducted after the temporary injection well pipeline is installed and run for a period of approximately 3 hours at a rate of 2,100 gpm. Water generated from the well and stored onsite will be used for the injection test.

B. The Contractor shall be solely responsible for the data logging.

C. The Contractor shall provide pump(s) and install all necessary piping and valving to connect to the injection well. The booster pumps and associated piping etc., shall be of sufficient size as to allow at a constant rate of 2,100 gpm to the injection well.

D. The Contractor shall supply all monitoring equipment for the injection test.

E. The data shall be delivered to the Engineer as a Microsoft Excel® file.

F. It is imperative that the monitoring equipment be in proper working order, and recording data throughout the entire period of time of the injection test and recovery test. Should monitoring equipment fail during test period, the Contractor, at his own cost, shall restart the test, as directed by the Engineer. If the test must be restarted, the Contractor must wait for well recovery prior to reinitializing the test.

G. The Contractor shall provide an operator during the entire time the pump is in operation, as required by the Engineer, to operate the prime mover and to regulate the discharge by the throttling device during the test injection period.

H. At the completion of the injection test, the monitoring devices shall not be removed or disturbed for a minimum of 24 hours or as determined by the Engineer. No additional standby time or injection time payment shall be awarded during this period.

END OF SECTION

SECTION 02987
PACKER TESTING

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work, materials, and equipment necessary for performing the packer tests as specified in these Documents.

1.02 SUBMITTALS

A. Contractor shall furnish Engineer with packer schematic and manufacturers' recommended installation and operating information. This shall include at a minimum the recommended borehole size range of packer, the inflation pressures required to inflate the packer to its minimum and maximum diameter, recommended sealing pressure, inflation instructions detailing method of inflation (i.e., nitrogen, water, etc.), and methods for determining proper packer seating. Packer submittals shall be submitted to Engineer at least 5 working days prior to packer testing activities.

B. Contractor shall furnish Engineer with flow meter calibration certificate for flow meters used in the packer testing activities. All meters used shall have been calibrated within the previous 3 months prior to packer testing activities. Meters shall be capable of accurately showing flow rates from 5 to 200-gal/min within plus or minus 5 percent.

C. Contractor shall furnish Engineer with calibration certificate for the gauge used for packer inflation. The gauge shall have been calibrated within the last 3 months prior to packer testing activities and shall be capable of measuring pressures from 0 to 150 percent of required packer inflation pressure.

PART 2 PRODUCTS

2.01 PACKER

A. Straddle Packer: The packer shall be Baker, TAM J, Baski, or equal, straddle packer, of a diameter appropriate for the size of the hole as calipered by the geophysical logging. The packer shall seal tightly against the borehole walls to effectively isolate the interval between the packers. Engineer shall be the sole judge as to the effectiveness of the packer element's isolation of other sections of the borehole. Furnish drill pipe and all required fittings for running and setting the packer to the appropriate setting depth and as specified by the manufacturer. Packer element separations shall be between 10 and 100 feet in 2-foot increments as directed by Engineer.

B. Off-Bottom Packer: The packer shall be Baker, TAM J, Baski, or equal, open-hole single packer, or equal, of a diameter appropriate for the size of the hole as calipered by the geophysical logging. The packer shall seal tightly against the borehole walls to effectively isolate the interval below the packers. Engineer shall be the sole judge as to the effectiveness of the packer element's isolation of other section of the borehole. Furnish drill pipe and all required fittings for running and setting the packer to the appropriate setting depth and as specified by the manufacturer.

C. Off-bottom packer tests on the monitoring wells are intended to confirm specific capacity of the proposed monitoring zone prior to final casing installation. An annular pressure test will also be performed following the off-bottom test prior to releasing the packer to evaluate confinement above the proposed monitoring interval.

D. Packer shall be run on drill pipe or tubing having a minimum inside diameter of 6 inches from the surface to the appropriate testing depths.

E. Contractor shall furnish all storage containment and related equipment necessary to store, manage, and dispose of water generated from packer testing.

2.02 SUBMERSIBLE PUMP AND FITTINGS

A. Contractor shall:

1. Provide a 4-inch submersible pump and piping capable of being set a minimum of 200 feet below the static water level inside the drill pipe. For the annular test, the submersible pump must be set in the annulus.
2. Provide pump or pumps which have capacities which range from 200 gal/min at a total head of 200 feet, to not less than 5 gal/min at a total head of at least 200 feet. Contractor is advised that pump selection will be dependent upon formation being tested, and may result in changing to a larger or smaller capacity pump once testing has begun.
3. Provide pump discharge with 2-inch throttling valve to regulate flow from 5 to 200 gal/min or supply multiple pumps to meet this requirement.
4. Provide a flow meter to measure pump discharge to within 5 percent of true flow. A certificate of meter calibration within past 3 months is required.

2.03 WATER LEVEL DATA LOGGER

A. Contractor shall provide a data logger with two submersible transducers to be used during the packer testing. The data logger shall be approved by the Engineer.

B. Data from the logger will be given to Engineer in Microsoft Excel® format. Contractor shall retain a copy for their records.

C. Contractor is solely responsible for proper operation of the data logger. Should the data logger fail during the test, Contractor shall re-run the tests as needed, without additional charge, until such time that accurate data are collected. Engineer shall be the sole judge as to data integrity.

PART 3 EXECUTION

3.01 GENERAL

A. Contractor shall run packer pump-out tests in the intervals selected by Engineer as follows: Set packer assembly to the deepest interval selected for testing and open ports between packer (or below packer in the case of the off-bottom packer test) at the test interval determined by Engineer. Install submersible pump to a depth of 150 feet below the water level inside the tubing or drill pipe. For each off-bottom packer test, Contractor shall also install a submersible pump in the annulus and run a separate annulus test (testing the zone above the single off-bottom packer) as part of each off-bottom packer test setting.

B. The packer shall be inflated at a pressure recommended by the packer manufacturer or packer service company representative such that an effective hydraulic seal is maintained throughout the testing activities.

C. Contractor shall demonstrate to Engineer that packer is seated securely against borehole through increases in the observed total string weight during inflation or other string weight variations during testing activities.

D. Contractor shall provide and install one water level measuring transducer to a depth of up to 150 feet below the water level inside the tubing or drill pipe. Provide and install one water level measuring transducer outside the drill pipe, within the well bore 20 feet below static water level. The two transducers will be switched, including the corresponding depths, to run the annulus packer test.

E. The wellhead will be perfectly sealed so that above ground static water levels can be accurately measured.

F. Water level data per time for both transducers shall be recorded in log-cycle intervals or at an interval approved by Engineer during the packer pumping tests.

G. Contractor will provide a manometer for above ground water level readings and access for manual electronic tape water level readings throughout the test so that data logger readings can be verified.

H. Data from transducers must be recorded continuously, without interruption, and given to Engineer in Microsoft Excel® format.

I. Engineer may order a change in pumps if the first pump selected does not match the producing capability of the formation being tested. Changing pumps shall be included in the cost of each packer test.

J. Prior to commencing each packer test, Contractor shall, in the presence of Engineer, run a preliminary test to confirm that the packer has seated and that all equipment is functioning properly. Preliminary testing shall be run for up to one hour or until Engineer is satisfied that equipment is functioning properly.

K. If, in the opinion of Engineer, there is evidence of a leak in or around a packer element, or a malfunction in any way, Contractor shall release and reset the packers at a depth selected by Engineer. Up to four resets shall be included in the cost of each packer test. The Engineer may, at its discretion, require a Memory Gauge attached below the lowermost packer to document an adequate seal on the lower packer for straddle packer tests. The type of Memory Gauge and method of transferring data following the test shall be approved by Engineer.

L. Contractor shall assist Engineer in collecting water quality samples during the packer testing as described in Section 02673, Drilling, or as directed by Engineer.

M. Upon completion of the packer pump test, recovery data shall be collected for a time equal to the pumping time or for a minimum of one hour, whichever is greater, or as directed by Engineer.

N. Contractor shall remove water level measuring devices, submersible pump and associated equipment, deflate packers, and remove packers from well.

O. Water generated during the packer test will be stored onsite and returned to the packer test interval that it was pumped from.

END OF SECTION