CONTRACT DOCUMENTS

FOR

FORCE MAIN 1A, 2A, AND 16A REPLACEMENT PROJECT

BRADENTON, FLORIDA

PROJECT # 60522.80

November 2011 (Bid Documents)

PROJECT OWNER:

County of Manatee, Florida
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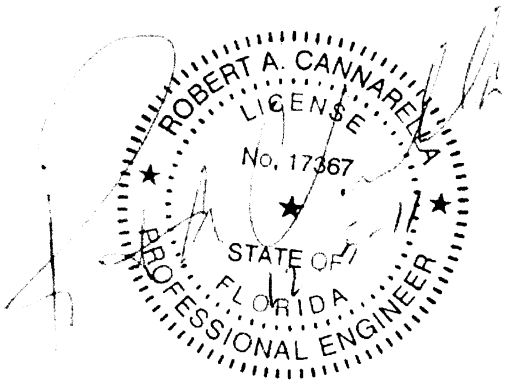

FORCE MAIN 1A, 2A AND 16A REPLACEMENT PROJECT

DIVISION 1 GENERAL REQUIREMENTS

DIVISION 2 SITE WORK

APPENDICES

DIVISION 1 GENERAL REQUIREMENTS

SECTION 01005 GENERAL REQUIREMENT

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

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 DEP permit and railroad permit which may have already been obtained. See appendix. 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 Engineer, 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 costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.

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 therefore.

The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his workmanship, materials and equipment, prior approval of the Engineer notwithstanding.

C. Public Utility Installations and Structures

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 whether owned or controlled by the Owner, other governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewage, drainage, water or other public or private property which may be affected by the work shall be deemed included hereunder.

The Contractor shall protect all public utility 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 Engineer. The Contractor shall so arrange his operations as to avoid any damage to these facilities. 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 Plans or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as approved by the Engineer.

No separate payment shall be made for such protection or repairs to public utility installations or structures.

Public utility installations or structures owned or controlled by the Owner 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 therefore.

It is the intent of this project that the work be constructed while minimizing impact to existing public utilities which may be located in the vicinity of new construction. The Contractor shall develop his work plan for executing the work to accommodate the protection of existing utilities which are shown on the drawings or which are inferred to be present within the ROW by the nature of the utility system in question. Inferred utility elements may include items such as sanitary sewer service lines, water services lines and other utility service elements which are expected to be present within the ROW given other available information about utility service in the work area. Where public utility installations or structures owned or controlled by the Owner or other governmental body are encountered during the course of the work, and are not indicated on the Plans or in the Specifications, and when, in the opinion of the Engineer, 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 Engineer, 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.

The Contractor shall give written notice to Owner and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight 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).

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 Engineer.

1.02 PLANS AND SPECIFICATIONS

A. Plans

When obtaining data and information from the Plans, 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 Plans and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.

C. Supplementary Drawings

When, in the opinion of the Engineer, 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 Engineer 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 Plans, Supplementary Drawings, Schedules, Specifications or other data received from the Engineer, 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 there from 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 Engineer, should such errors or omissions be discovered. All schedules are given for the convenience of the Engineer 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 contains General Requirements which govern the work. Products and Execution modify and supplement these by detailed requirements for the work and shall always govern whenever there appears to be a conflict.

F. Intent

All work called for in the Specifications applicable to this Contract, but not shown on the Plans 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 Plans 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.

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.

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

The names of proposed manufacturers, material men, suppliers and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Engineer for approval. Such approval must be obtained before shop drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. He shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or

subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.

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

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.

Spare parts shall be furnished as specified.

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.

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.

Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise by the Engineer 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.

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 Engineer and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.

The Contractor shall, at his own expense, 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.

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 300M.

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 Owner, such engineer or superintendent shall make all adjustments and tests required by the Engineer to prove that such equipment is in proper and satisfactory operating condition, and shall instruct such

personnel as may be designated by the Owner in the proper operation and maintenance of such equipment.

1.04 INSPECTION AND TESTING

A. General

Inspection and testing of materials will be performed by the Owner unless otherwise specified. 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 (3) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.

If, in the making of any test of any material or equipment, it is ascertained by the Engineer 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 Owner.

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.

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 Owner formally takes over the operation thereof.

B. Costs

All inspection and testing of materials furnished under this Contract will be performed by the Owner or duly authorized inspection engineers or inspections bureaus without cost to the Contractor, unless otherwise expressly specified.

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.

Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the Owner for compliance. The Contractor shall reimburse the Owner 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 Engineer, at least two 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 Engineer 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 Engineer 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

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 Engineer notifies the Contractor, in writing, that the results of such tests are acceptable.

Five copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the Engineer for approval.

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

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.

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 Owner. The Supplier shall assist in the final field tests as applicable.

H. Failure of Tests

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 Engineer 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 Owner, 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.

In case the Owner 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 Owner may, after the expiration of a period of thirty (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 Engineer 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 Engineer, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The Engineer 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 TEMPORARY SERVICES

A. 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 Plans, or as given by the Owner/Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

B. Safeguarding Marks

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 to removing without authorization such established points, stakes and marks.

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.

1.08 ADJACENT STRUCTURES AND LANDSCAPING

A. Responsibility

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 Plans, and the removal, relocation and reconstruction of such items called for on the Plans or specified shall be included in the various Contract Items and no separate payments will be made therefor. Where such public and private property, structures of any

kind and appurtenances thereto are not shown on the Plans and when, in the opinion of the Engineer, additional work is deemed necessary to avoid interference with the work, payment therefore will be made as provided for in the General Conditions.

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.

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 Owner and to the satisfaction of the Engineer. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the Engineer.

Prior to the beginning of any excavations, the Contractor shall advise the Engineer 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 Owner may order the Contractor, for the convenience of the Owner, to remove trees along the line or trench excavation. If so ordered, the Owner 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 in the manner described in the Workmanship and Materials Paragraph in Section 02485, Seeding & Sodding.

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 Engineer. 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, appropriately colored warning 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.

Except in the event of an emergency, no work shall be done between the hours of 7:00 P.M. and 7:00 A.M., or on weekends. If the proper and efficient prosecution of the work requires operations during the night or weekends, the written permission of the Owner shall be obtained before starting such items of the work.

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

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 Engineer and in accordance with the Plans 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 Engineer, 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

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.

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.

1.13 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 Engineer 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.

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. The completed Work will provide Owner with a new manifold force main system to replace existing force mains serving lift stations 1A, 2A and 16A within the Whitfield Estates area of the County. The work of this contract consists of: constructing approximately 2,860 linear feet of 10 inch, 2030 linear feet of 12 inch, 1,030 linear feet of 14 inch and 1,120 linear feet of 16 inch sanitary sewer force mains; constructing two new auger borings under 14th Street West (US 41); constructing a replacement force main under Bowlees Creek; removing and replacing existing public and private infrastructure necessary to construct the work; restoration of all public and private infrastructure impacted by the work; and related work at the locations shown on the Drawings. Replacement force mains will be installed by horizontal directional drilling (HDD), and open-cut construction methods where shown on the drawings.

B. The project pipeline design alignment and construction drawings have been prepared based upon the use of high density polyethene (HDPE) pipe and lined ductile iron fittings.

C. 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.

D. 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 Owner.

E. 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.

1.02 CONTRACTS

Construct all the Work under a single contract.

1.03 OWNER FURNISHED PRODUCTS

The Owner will provide new water meters for each water service associated with the project. The Contractor shall coordinate with the Owner to define the number, size and location of each meter that will be furnished by the Owner and installed by the Contractor as a part of this project.

1.04 WORK SEQUENCE

A. The Work to be completed under this contract involves the installation of replacement sanitary sewer force main pipelines within residential and commercial areas. The contractor shall schedule the work to not interrupt sanitary sewer service to County sewer customers during construction. All work shall be completed with a minimum of inconvenience to commercial areas and the residents of the neighborhoods within which the work is being performed and users of the sanitary sewer system. The Contractor shall coordinate his work with private property owners such that existing utility services are maintained to all users at all time during the project.

B. The methods, means, sequences and techniques used for construction of the work is the sole responsibility of the Contractor. The intent of the Owner is to have construction of this project completed in an orderly manner which meets the following objectives:

1. The Contractor shall develop a work plan that allows for systematic construction of the work while limiting impacts to County customers and project area residents and commercial property users. The Contractor's detailed work plan shall be presented to the Owner and the Engineer at the pre-construction conference for review and comment and must be approved by Manatee County.
2. The sequence of work plan shall incorporate full restoration of street segments disturbed by pipe installation in an ongoing manner. The Contractor shall perform all work within each street segment in a sequential manner that includes new pipe construction and restoration. The Contractor shall not accelerate the installation of new pipeline within street segments ahead of his ability to complete all construction within such street segments within a period of 2 to 3 weeks.
3. It would be the Counties preference that the Contractor develop a sequencing plan that would allow the period of construction for each street segment not exceed one month from commencement of construction to final restoration..
4. The sequence of work plan shall include a process by which the contractor provides advanced notice to street segment residents regarding the specific timing of work to be performed; construction activities that may impact access to private property, driving or pedestrian traffic, and the timing of short term interruption to any utility service. The Contractor shall hand deliver a project information document to each area resident who may be impacted by the work. The Contractor shall provide a draft of the project notice document to the Owner for review and comment.
5. All new force main piping and appurtenances shall be tested prior to connection to the existing system and being placed in service. The Contactor shall develop a specific plan and schedule for placing the new manifold force main system into service which provides for the continued operation of PS 1A, 2A and 16A. Connecting to and placing the new manifold force main system shall be complete sequentially. The Contractors plan should generally comply with the following sequence:
    i. Furnish, install, clean and test the new force main piping systems up to points of connection with existing PS 1A, 2A and 16A.
    ii. Furnish, install and test the new gravity sewer, connection to the existing discharge manhole and new discharge manhole on 69th Street West.
    iii. Pre-stage piping, valves and fittings for connections to each pumping station.
    iv. Sequentially transfer the discharge at each pumping station from the existing manifold force main system to the new force main system.
    v. Perform pump down testing for each pumping station, and for the manifold force main system, to confirm each pumping station is operating within hydraulic expectations.
    vi. Complete other project closeout activities.
6. The Contractor shall develop a specific sequence of work plan for construction and provide that plan to the owner for review and acceptance as a part of the pre-construction conference.

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

1.05 CONSTRUCTION AREAS

A. The work of this project is to take place within the public Right-of-Ways of Manatee County within the Whitfield Estates Neighborhood and Commercial areas. The Contractor shall not conduct construction activities on private property. The Contractor shall: Limit his use of the construction areas for work and for storage, to allow for:
   1. Work by other Contractors.
   2. Owner's Use.
   3. Public Use.

B. Coordinate use of work site under direction of Engineer or Owner's Representative.

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

D. The Contractor shall be fully responsible for the security and safekeeping of all materials, equipment and appurtenances required for construction of the work. The Contractor shall not store materials, equipment or appurtenances on the job site except for those items which are under the direct supervision of the Contractor's staff and which are necessary to the work being performed on the specific day in question. Move any stored products under the Contractor's control, which interfere with operations of the Owner or separate contractor.

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

1.06 OWNER 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 Owner, 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 Owner 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 Owner has the option of not accepting the entire work as a whole until it is completed, tested and approved by the Engineer and Owner.

1.07 PARTIAL OWNER OCCUPANCY

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01015 CONTROL OF WORK

PART 1 GENERAL

1.01 WORK PROGRESS

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 Engineer 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 Engineer 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

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

1.03 WORK LOCATIONS

Work shall be located substantially as indicated on the drawings, but the Engineer 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 UTILITY NOTIFICATION AND COORDINATION

Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during Work.

1. Manatee County Public Works Department:
   a. Contact Person: Anthony Benitez, PE. _Project Manager
      1022 26th Ave, EAST Bradenton, FL 34208
   b. Telephone: 941/708-7450 Ext 7333
      Fax 941-708-7431
2. Manatee County Public Works Department:
   a. Contact Person: Wayne Troxler, PE. _Utilities Engineering
      1022 26th Ave, EAST Bradenton, FL 34208
   b. Telephone: 941/782-8811 Ext 7650
   Fax 941-708-7431
3. Manatee County Utilities Department:
   a. Contact Person: William H, Elmore – Superintendent Sewer Collections Division
   b. Telephone: 941/792-8811 Ext.5010.
4. Manatee County Utilities Department:
   a. Contract Person: Jim Marble – Lift Station Superintendent Lift Stations Division
   b. Telephone: 941/755-1853 Ext. 5376.
5. Manatee County Utilities Department:
   a. Contract Person: Mike Hoey – Meter Services Superintendent
   b. Telephone: 941/792-18811 Ext. 5401.

6. Manatee County Health Department:
   a. Contract Person: Harry Messick
   b. Telephone: 941/748-0747 Ext. 1355.
7. Verizon Florida Inc. Telephone Company:
   a. Contract Person: Wayne Sumner.
   b. Telephone: 941/330-9203
8. Southwest Florida Water Management District:
   a. Contact Person: Daryl R. Flatt, PE.
   b. Telephone: 941/377-3722.
9. TECO Peoples Gas Company:
   a. Contact Person: Dan Shanahan.
   b. Telephone: 941/342-4030.
10. Florida Power and Light Company:
   a. Contact Person: Greg Coker.
   b. Telephone: 941/723-4444.
11. Department of Environmental Protection:
   a. Contact Person: Michelle Press.
   b. Telephone: 813/632-7600 Ext 430.
12. Southwest Florida Water Management District:
   a. Contact Person: Daryl R. Flatt, PE.
   b. Telephone: 941/377-3722.
13. Department of the Army
   Jacksonville District Corps of Engineers
   a. Contact Person: Charles Schnepel, Chief, Tampa Section
   b. Telephone: 813-769-7074.
14. Sunshine State Call One:
   a. Telephone: 800/432-4770.
15. Florida Department of Transportation
   a. Contact Person: Ed Giddens - Permits Manager.
   b. Telephone: 941/359-3713

1.05 FACILITY OPERATIONS

A. Continuous operation of Owner's sanitary sewer system is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.

B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner's operations.

C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping, access, and similar items to maintain continuous operations of Owner's system.

D. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and County Engineer. Such authorization will be considered within 48 hours after receipt of Contractor's written request.

E. Contractor shall develop his sequence of construction to maintain system operations at all times and to allow Owner's continuous occupancy and access to existing equipment during construction. The Contractor's work plan shall incorporate pre-staging and preliminary work activities that will result in a minimum shutdown time for each activity. The Contractor shall ensure that all materials, labor, and equipment are available at the Site for the work activity

intended. The following specific work activities are called to the attention of the Contractor and may require temporary shutdown of systems:

1. The Contractor shall coordinate with Manatee County when connecting to lift stations and gravity sewer lines under this project. The Contractor shall test all pipelines and verify the operation of all isolation valves and air relief valves prior to placing any new pipeline force main component into service.

F. Do not proceed with Work affecting the wastewater lift station operation without obtaining Owner's advance approval of the need for and duration of such Work.

1.06 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 Engineer 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.

1.07 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 Engineer 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 Engineer 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.

1.08 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 Engineer, permanent relocation of a utility owned by the Owner 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 Owner will notify the utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the Owner 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.

1.09 TEST PITS

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.

1.10 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 Engineer.

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 Engineer 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 Engineer. 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.

1.11 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 Engineer.

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 Engineer and Owner.

C. Detours around construction areas will be subject to the approval of the Owner and the Engineer. Where detours are permitted, the contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations and periods when traffic is being detoured, will be strictly controlled by the Owner.

1.12 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.

1.13 MAINTENANCE OF FLOW

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 Engineer and Owner well in advance of the interruption of any flow.

1.14 CLEANUP

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.

1.15 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 Engineer.

1.16 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 Engineer. 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 Engineer. 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 Owner.

1.17 CONSTRUCTION WITHIN RIGHT-OF-WAY

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.

1.18 CONSTRUCTION WITHIN UTILITY EASEMENTS

Where pipe lines are installed within utility easements, all pipe installation activities, excavation, backfill and compaction for the purpose of utility construction, reconstructing roadways and/or adjacent slopes contiguous thereto shall be conducted within the easement boundaries. The contractor shall establish right-of-way lines and easement lines in order to maintain construction activities within public right-of-way or Manatee County utility easements dedicated for construction of the work. The contractor shall obtain copies of permanent and temporary utility easement documentation from the owner prior to construction.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01020 GEOTECHNICAL CONDITIONS

PART 1 GENERAL

1.01 PURPOSE

The primary purpose of the defined subsurface conditions presented herein is to establish a contractual understand of the geotechnical conditions anticipated to be encountered during construction of the project. This information will provide a basis for bidding and assist in the resolution of questions that may arise over the subsurface conditions during construction. The geotechnical information contained herein also provides:

i. The geotechnical and construction conditions that formed the basis for the design.
ii. Provides information to assist the Contractor in determining the requirements for excavation and supporting the ground during construction.
iii. Provide the Contractor with information from which to determine if it is appropriate for the Contractor to perform supplemental geotechnical inspection or evaluations, at the Contactors expense as a part of the project, to more specifically define construction conditions.
iv. Provides guidance to the County and the Engineer in administering the Contact

The work of the project includes constructing underground utility systems including: Installing 10 inch, 12 inch, 14 inch and 16 inch force main pipeline using open cut and horizontal directional drilling technologies; Installing auger bore road crossings at two locations under a State Highway; Installing 14 inch force main pipeline by horizontal direction drilling under Bowless Creek.
The geotechnical conditions at the site shall be fully considered and evaluated by the Contractor in developing specific means, methods, sequences and techniques for construction of the work.

1.02 GEOTECHNICAL DATA

Geotechnical explorations in the form of Standard Penetration Test borings have be made at various locations throughout the project work area to compile information on the subsurface conditions at the project site that influenced may the design of the new force main systems and will influence the construction means, methods, sequences and techniques selected by the Contractor and required to complete construction of the new work. The location of each boring is shown on the construction drawings and boring logs for each boring are included at the end of these technical specifications for reference. Geotechnical field investigations and laboratory analysis were performed by Driggers Engineering Services, Incorporated.

The Engineer has used this information in developing the design of the open cut and horizontal directional drill of pipeline and the auger boring elements of the project. The Engineer applied judgment to interpolate between borings and extrapolate conditions between borings. The Engineer defined subsurface conditions for various elements of the project and they are included in subsequent paragraphs of this specification section. The Contactor should use the defined conditions along with Contractor personal knowledge of the project

work area, supplemental geotechnical investigations that the Contractor believes are necessary to define conditions at the site, and surface conditions which can be observed during a site visit as the basis for construction of the work. The Contractor shall retain the services of a geotechnical engineering geologist licensed in the State of Florida, as required, to assure a complete understanding of the geotechnical information available for this project as a part of bidding and constructing the work.

1.03 DEFINED SUBSURFACE CONDITIONS

The following summarizes the defined subsurface conditions that are interpreted from a review of the boring logs contained at the end of these technical specifications. Borings were made a various locations along the planned pipeline and Auger Bore alignments. The drawings show the location of borings.

Soil and rock conditions to be encountered during construction are presented in Tables 1 through 5. The tables define the subsurface conditions on which the Contractor shall base all bids and develop all schedules. The soils are classified according to the Unified Soil Classification System (USCS) in accordance with ASTM D2488, including fines content and particle size, and the relative density or consistency is based on the correlations presented in Table 6. In addition, for fine grained soils (clays and silts) the unconfined compressive strength is defined according to the consistency presented in Table 2.

Groundwater: The defined groundwater levels are shown in the applicable tables.

Table 1
Defined Subsurface Conditions –
Open Cut and Horizontal Directional Drilling Construction at all project locations with Exception to Bowlee's Creek Undercrossing
Conditions based upon Borings B-1 through B-17

Depth (ft)	Elevation (ft)	Relative Density/ Consistency	Soil/Rock Type
HDD 10 inch,12 inch, 14 inch and 16 inch Force Main (Groundwater Elevation: as shown on borings – at time of boring, verify at time of construction)			
0 to 15	varies	Loose to medium dense	Fine SAND (SP/SP-SM) with trace organics

Table 1 Defined Subsurface Conditions – Open Cut and Horizontal Directional Drilling Construction at all project locations with Exception to Bowlee's Creek Undercrossing Conditions based upon Borings B-1 through B-17			
Depth (ft)	**Elevation (ft)**	**Relative Density/ Consistency**	**Soil/Rock Type**
Construction Considerations: Open cut: maintain soil side slopes to no steeper than 1.75H to 1V, use sheeting and shoring or trench box construction as required, lower the groundwater to at least 2 feet below the excavation bottom.			

Table 2 Defined Subsurface Conditions – Bowlee's Creek Horizontal Directional Drilling Undercrossing (STA 27+60 to 33+00) Conditions based upon Borings B-7, B-8 and B-9			
Depth (ft)	**Elevation (ft)**	**Relative Density/ Consistency**	**Soil/Rock Type**
HDD 14 inch Force Main (Groundwater Elevation: 1.6 feet – at time of boring, verify at time of construction)			
0 to 18	7 to -11	Loose to medium dense	Fine SAND (SP) with trace organics and roots
18 to 33	-11 to -26	Very stiff to hard	CLAY (CL)
33 to 50	-26 to -43	-	Weathered LIMESTONE

Table 3 Defined Subsurface Conditions – US41 Auger Bore Crossing At Peal Avenue (STA 13+80 to 15+12) Conditions based upon Borings B-2 and B-3			
Depth (ft)	**Elevation (ft)**	**Relative Density/ Consistency**	**Soil/Rock Type**
Launch and Receiving Shafts (Groundwater Elevation: 8.5 feet – at time of boring, verify at time of construction)			
0 to 5	11 to 6	Loose to very loose	Fine SAND (SP) with trace organics and roots
5 to 12	6 to -1	Medium dense	Fine SAND (SP)
12 to 18	-1 to -7	Loose to very loose	Fine SAND (SP)
Tunnel drive will consist of 100 percent of loose to medium dense fine SAND (SP). The SP material will behave as running ground if unsupported. Groundwater elevation: 8.5 feet. Construction Considerations: Open cut: maintain soil side slopes to no steeper than 1.75H to 1V, use sheeting and shoring or trench box construction as required, lower the groundwater to at least 2 feet below the excavation bottom. Auger bore: lower the groundwater at launch and receiving shafts and along the bore alignment to at least 2 feet below the excavation bottom or pipe invert, use temporary ground support system for launch and receiving shafts (trench box or speed shores are not allowed).			

Table 4 Defined Subsurface Conditions – US41 Auger Bore Crossing At 69th Avenue (STA 22+40 to 23+95) Conditions based upon Borings B-15 and B-16			
Depth (ft)	**Elevation (ft)**	**Relative Density/ Consistency**	**Soil/Rock Type**
Launch and Receiving Shafts (Groundwater Elevation: 8.2 feet – at time of boring, verify at time of construction)			
0 to 5	12 to 7	Loose to very loose	Fine SAND (SP) with trace organics
5 to 12	7 to 0	Medium	Fine SAND (SP)

Table 4 Defined Subsurface Conditions – US41 Auger Bore Crossing At 69th Avenue (STA 22+40 to 23+95) Conditions based upon Borings B-15 and B-16			
Depth (ft)	**Elevation (ft)**	**Relative Density/ Consistency**	**Soil/Rock Type**
		dense	
12 to 18	-1 to -7	Loose	Fine SAND (SP)
Tunnel drive will consist of 100 percent of loose to medium dense fine SAND (SP). The SP material will behave as running ground if unsupported. Groundwater elevation: 8.2 feet. Construction Considerations: Open cut: maintain soil side slopes to no steeper than 1.75H to 1V, use sheeting and shoring or trench box construction as required, lower the groundwater to at least 2 feet below the excavation bottom. Auger bore: lower the groundwater at launch and receiving shafts and along the bore alignment to at least 2 feet below the excavation bottom or pipe invert, use temporary ground support system for launch and receiving shafts (trench box or speed shores are not allowed).			

Table 5 Defined Subsurface Conditions – US41 Auger Bore Crossing At Peal Avenue (STA 13+80 to 15+12) Conditions based upon Borings B-2 and B-3			
Depth (ft)	**Elevation (ft)**	**Relative Density/ Consistency**	**Soil/Rock Type**
Launch and Receiving Shafts (Groundwater Elevation: 8.5 feet – at time of boring, verify at time of construction)			
0 to 5	11 to 6	Loose to very loose	Fine SAND (SP) with trace organics and roots
5 to 12	6 to -1	Medium dense	Fine SAND (SP)
12 to 18	-1 to -7	Loose to very loose	Fine SAND (SP)

Table 5 Defined Subsurface Conditions – US41 Auger Bore Crossing At Peal Avenue (STA 13+80 to 15+12) Conditions based upon Borings B-2 and B-3			
Depth (ft)	**Elevation (ft)**	**Relative Density/ Consistency**	**Soil/Rock Type**
Tunnel drive will consist of 100 percent of loose to medium dense fine SAND (SP). The SP material will behave as running ground if unsupported. Groundwater elevation: 8.5 feet. Construction Considerations: Open cut: maintain soil side slopes to no steeper than 1.75H to 1V, use sheeting and shoring or trench box construction as required, lower the groundwater to at least 2 feet below the excavation bottom. Auger bore: lower the groundwater at launch and receiving shafts and along the bore alignment to at least 2 feet below the excavation bottom or pipe invert, use temporary ground support system for launch and receiving shafts (trench box or speed shores are not allowed).			

Table 6 Summary of Consistency or Relative Density			
Soil Type	**Description**	**SPT Blow Count (blows/ft)**	**Unconfined Compressive Strength (tons/ft^2)**
Cohesive (silts and clays)	Very Soft	0-2	<0.25
	Soft	3-4	0.25-0.50
	Firm	5-8	0.50-1.00
	Stiff	9-15	1.00-2.00
	Very Stiff	16-30	2.00-4.00
	Hard	>30	4.00-12.00
Noncohesive (sands and gravels)	Very Loose	0-4	Not Applicable
	Loose	5-10	
	Medium Dense	11-30	
	Dense	31-50	
	Very Dense	>50	

END OF SECTION

PART 1 GENERAL

1.01 PERMITS

Upon notice of award, the Contractor shall immediately apply for all applicable permits not previously obtained by the Owner to do the work from the appropriate governmental agency or agencies. No work shall commence until all applicable permits have been obtained and copies delivered to the Engineer. The costs for obtaining all permits shall be borne by the Contractor.

1.02 CONNECTIONS TO EXISTING SYSTEM

The Contractor shall perform all work necessary to locate, excavate and prepare for connections to the terminus of the existing systems all as shown on the Drawings or where directed by the Owner/Engineer. The cost for this work and for the actual connection to the existing systems shall be included in the price bid for the project and shall not result in any additional cost to the Owner. The termination point for each contract shall be as shown on the Contract Drawings.

1.03 RELOCATIONS

The Contractor shall be responsible for the coordination of the relocation of structures, including but not limited to light poles, power poles, signs, sign poles, fences, piping, conduits and drains that interfere with the positioning of the work as set out on the Drawings. No relocation of the items under this Contract shall be done without approval from the Engineer.

1.04 EXISTING UNDERGROUND PIPING, STRUCTURES AND UTILITIES

A. The attention of the Contractor is drawn to the fact that during excavation, the possibility exists of the Contractor encountering various water, sewer, gas, telephone, electrical, or other utility lines not shown on the Drawings. The Contractor shall exercise extreme care before and during excavation to locate and flag these lines as to avoid damage to the existing lines. Cost for relocation of all existing lines shall be included in the price bid for the project. Should damage occur to an existing line, the Contractor shall bear the cost of all repairs.

B. It is the responsibility of the Contractor to ensure that all utility or other poles, the stability of which may be endangered by the close proximity of excavation, are temporarily stayed in position while work proceeds in the vicinity of the pole and that the utility or other companies concerned be given reasonable advance notice of any such excavation by the Contractor.

C. The existing utility locations are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping to be encountered. The Contractor shall be responsible for notifying the various utility companies to locate their respective utilities in advance of construction in conformance with all requirements provided for in the Florida Underground Facilities Damage Prevention and Safety Act (Florida Statutes, Title XXXIII, Chapter 556).

D. The existing piping and utilities that interfere with new construction shall be rerouted as shown, specified, or required. Before any piping and utilities not shown on the Drawings are disturbed, the Contractor shall notify the Engineer of the location of the pipeline or utility and

shall reroute or relocate the pipeline or utility as directed. Cost for relocation of existing pipelines or utilities shall be included in the price bid for the project.

E. The Contractor shall exercise care in any excavation to locate all existing piping and utilities. All utilities which do not interfere with complete work shall be carefully protected against damage. Any existing utilities damaged in any way by the Contractor shall be restored or replaced by the Contractor at his expense as directed by the Engineer and/or the owner of the utility.

F. It is intended that wherever existing utilities such as water, sewer, gas, telephone, electrical, or other service lines must be crossed, deflection of the pipe within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated in the Drawings. However, when in the opinion of the Engineer this procedure is not feasible, he may direct the use of fittings for a utilities crossing as detailed on the Drawings. No deflections will be allowed in gravity sanitary sewer lines or in existing storm sewer lines.

1.05 SUSPENSION OF WORK DUE TO WEATHER

Refer to FDOT Standards and Specifications Book, Section 8.

1.06 HURRICANE PREPAREDNESS PLAN

A. Within 30 days of the date of Notice to Proceed, the Contractor shall submit to the Engineer and Owner a Hurricane Preparedness Plan. The plan should outline the necessary measures which the Contractor proposes to perform at no additional cost to the Owner in case of a hurricane warning.

B. In the event of inclement weather, or whenever Engineer shall direct, Contractor shall insure that he and his Subcontractors shall carefully protect work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any portion of work or materials is damaged due to the failure on the part of the Contractor or Subcontractors to protect the work, such work and materials shall be removed and replaced at the expense of the Contractor.

1.07 POWER SUPPLY

Electricity as may be required for construction and permanent power supply shall be secured and purchased by the Contractor.

1.08 SALVAGE

Any existing equipment or material, including, but not limited to, valves, pipes, fittings, couplings, etc., which is removed or replaced as a result of construction under this project may be designated as salvage by the Engineer or Owner and if so shall be protected for a reasonable time until picked up by the Owner. Any equipment or material not worthy of salvaging, as directed by the Engineer, shall be disposed of by the Contractor at no additional cost.

1.09 DEWATERING

A. The Contractor shall do all groundwater pumping necessary to prevent flotation of any part of the work during construction operations with his own equipment.

B. The Contractor shall pump out water and wastewater which may seep or leak into the excavations for the duration of the Contract and with his own equipment. He shall dispose of this water in an appropriate manner.

1.10 ADDITIONAL PROVISIONS

A. Before commencing work on any of the existing pipelines, structures or equipment, the Contractor shall notify the Engineer, in writing, at least 10 calendar days in advance of the date he proposes to commence such work.

B. The Contractor shall provide, at his own expense, all necessary temporary facilities for access to and for protection of, all existing facilities. The Owner's personnel must have ready access at all times to the existing facilities. The Contractor is responsible for all damage to existing structures, equipment and facilities caused by his construction operations and must repair all such damage when and as ordered by the Engineer.

1.11 CONSTRUCTION CONDITIONS

The Contractor shall strictly adhere to the specific requirements of the governmental unit(s) and/or agency(ies) having jurisdiction over the work. Wherever there is a difference in the requirements of a jurisdictional body and these Specifications, the more stringent shall apply.

1.12 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 #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 Engineer or County for excessive noise shall not relieve the Contractor of the other portions of this specification including, but not limited to contract time and contract price.

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

1.13 WARRANTIES

A. All material supplied under these Specifications shall be warranted by the Contractor and the manufacturers for a period of three (3) years. Warranty period shall commence on the date of Owner acceptance.

B. The material shall be warranted to be free from defects in workmanship, design and materials. If any part of the system should fail during the warranty period, it shall be replaced at no expense to the Owner.

The manufacturer's warranty period shall run concurrently with the Contractor's warranty or guarantee period. No exception to this provision shall be allowed. The Contractor shall be responsible for obtaining warranties from each of the respective suppliers or manufacturers for all the material specified under these contract specifications,

1. In the event that the manufacturer is unwilling to provide a three-year warranty commencing at the time of Owner acceptance, the Contractor shall obtain from the manufacturer a four (4) year warranty starting at the time of equipment delivery to the job site. This four-year warranty shall not relieve the Contractor of the three-year warranty starting at the time of Owner acceptance of the equipment.

1.14 FUEL STORAGE & FILLING

A. If the contractor is storing fuel on site, or doing his own fuel filling of portable equipment (other than hand-held equipment), he is responsible for any required response, clean-up or reporting required, at no additional cost to the county.

B. The Contractor shall prepare and submit a fuel storage / spill abatement plan prior to start of construction if required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01045 CUTTING AND PATCHING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall be responsible for all cutting, fitting and patching, including excavation and backfill, required to complete the work or to:
   1. Make its several parts fit together properly.
   2. Uncover portions of the work to provide for installation of ill-timed work.
   3. Remove and replace defective work.
   4. Remove and replace work not conforming to requirements of Contract Documents.
   5. Provide penetrations of non-structural surfaces for installation of piping and electrical conduit.

PART 2 PRODUCTS

2.01 MATERIALS

Comply with specifications and standards for each specific product involved.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect existing conditions of project, including elements subject to damage or to movement during cutting and patching.

B. After uncovering work, inspect conditions affecting installation of products, or performance of work.

C. Report unsatisfactory or questionable conditions to Engineer. Do not proceed with work until Engineer has provided further instructions.

3.02 PREPARATION

A. Provide adequate temporary support as necessary to assure structural value to integrity of affected portion of work.

B. Provide devices and methods to protect other portions of project from damage.

C. Provide protection from elements for that portion of the project which may be exposed by cutting and patching work and maintain excavations free from water.

3.03 PERFORMANCE

A. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.

B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.

C. Fit and adjust products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

D. Restore work which has been cut or removed; install new products to provide completed work in accordance with the requirements of the Contract Documents.

E. Replace surfaces airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

F. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.

END OF SECTION

SECTION 01050 FIELD ENGINEERING AND SURVEYING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall provide and pay for field surveying service required for the project.

B. The Contractor shall furnish and set all necessary stakes to establish the lines and grades as shown on the Contract Drawings and layout each portion of the Work of the Contract.

1. All survey work required in execution of Project.
2. All costs of construction layout shall be included in the unit and lump sum prices contained in the respective divisions of the Contract Bid Form.
3. Civil, structural or other professional engineering services specified or required to execute Contractor's construction methods.

1.02 QUALIFICATION OF SURVEYOR AND ENGINEER

All construction staking shall be conducted by or under the supervision of a Florida Registered Professional Surveyor and Mapper approved by the Owner. The Contractor shall be responsible for the layout of all such lines and grades, which will be subject to verification by the Engineer.

1.03 SURVEY REFERENCE POINTS

A. Existing basic horizontal and vertical control points for the Project are designated on the Contract Drawings.

B. Locate and protect all survey monumentation, property corners and project control points prior to starting work and preserve all permanent reference points during construction. All costs associated with the replacement of all survey monumentation, property corners and project control points shall be borne by the Contractor.

Make no changes or relocations without prior written notice to Engineer.

Report to Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

Require surveyor to replace project control points which may be lost or destroyed.

Establish replacements based on original survey control.

1.04 PROJECT SURVEY REQUIREMENTS

The Contractor shall establish temporary bench marks as needed, referenced to data established by survey control points.

1.05 RECORDS

Maintain a complete, accurate log of all control and survey work as it progresses.
The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings per Section 01720.

1.06 SUBMITTALS

A. Submit name and address of Professional Surveyor and Mapper to Engineer for Owner's approval.

B. Submit certificate signed by the Professional Surveyor and Mapper certifying that elevations and locations of improvements are in conformance, or nonconformance, with Contract Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01090 REFERENCE STANDARDS

PART 1 GENERAL

1.01 REQUIREMENTS

Abbreviations and acronyms used in Contract Documents to identify reference standards.

A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents, or applicable codes established stricter standards.

B. Publication Date: The most recent publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.

1.03 ABBREVIATIONS, NAMES AND ADDRESSES OR ORGANIZATIONS

Obtain copies of reference standards direct from publication source, when needed for proper performance of work, or when required for submittal by Contract Documents.

AA	Aluminum Association 818 Connecticut Avenue, N.W. Washington, DC 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capital Street, N.W. Washington, DC 20001
ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AISC	American Institute of Steel Construction 1221 Avenue of the Americas New York, NY 10020
AISI	American Iron and Steel Institute 1000 16th Street NW Washington, DC 20036
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 179l Tullie Circle, N.E. Atlanta, GA 30329
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017

ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
AWS	American Welding Society 2501 N.W. 7th Street Miami, FL 33125
CRSI	Concrete Reinforcing Steel Institute 180 North LaSalle Street, Suite 2110 Chicago, IL 60601
FDEP	Florida Department of Environmental Protection 3900 Commonwealth Blvd. Tallahassee, Florida 32399
FDOT	Florida Department of Transportation Standards Specifications for Road and Bridge Construction Maps & Publication Sales - Mail Station 12 605 Suwannee St. Tallahassee, FL 32399-0450
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, DC 20407
MCUOD	Manatee County Utility Operations Department 4410 66th St. W. Bradenton, FL 34210
MLSFA	Metal Lath/Steel Framing Association 221 North LaSalle Street Chicago, IL 60601
MMA	Monorail Manufacturer's Association 1326 Freeport Road Pittsburgh, PA 15238
NAAMM	National Association of Architectural Metal Manufacturers 221 North LaSalle Street Chicago, IL 60601
NEMA	National Electrical Manufacturer's Assoc. 2101 L Street N.W. Washington, DC 20037

OHSA	Occupational Safety and Health Assoc. 5807 Breckenridge Pkwy., Suite A Tampa, FL 33610-4249
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 20076
PCI	Prestressed Concrete Institute 20 North Wacker Drive Chicago, IL 60606
SDI	Steel Door Institute 712 Lakewood Center North Cleveland, OH 44107
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association 8224 Old Court House Road Vienna, VA 22180
SSPC	Steel Structures Painting Council 402 24th Street, Suite 600 Pittsburgh, PA 15213
SWFWMD	Southwest Florida Water Management District 2379 Broad Street Brooksville, FL 34604-6899
UL	Underwriter's Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062

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 shown in the Contractors Schedule of Quantities and Unit Price Bid Form provided with the Contractors bid.

B. It is the intent of the Owner to make payment for construction associated with the Project using the Pay Items in the Proposal, 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, County Standard Details, and other details pertaining to the Work.

C. Work not shown or called out in either the Plans 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), PMD-2 (Pay Application Schedule), PMD-3 (Pay Application Schedule of Stored Materials) 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.
   a. Submit request for final payment upon completion of all work required by the contract including infrastructure installation, restoration, as-built drawings and maintenance documentation, complete. 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. Materials that are specified for measurement by the cubic yard measured in the vehicle shall be hauled in vehicles of such type and size that actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. Vehicles shall be loaded to at least their water level capacity. Loads hauled in vehicles not meeting above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

B. Quantities to be paid will be based field measurements made by the Contractor and agreed to by the Owner. If field surveys are required to verify field measurements, they shall be at the cost of the Contractor.

1.05 ESTIMATED QUANTITIES

A. The quantities show 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. Final payment will be made only for satisfactorily completed quantity of each item.

1.06 WORK OUTSIDE AUTHORIZED LIMITS

A. No payment will be made for work constructed outside of authorized limits of the work.

1.07 AREA MEASUREMENTS

A. In the measurement of items to be paid for on the basis of area of finished work, the lengths and/or widths to be used in the calculations shall be the final dimensions measured along the surface of the completed work within the neat lines shown or designated.

1.08 MEASUREMENT AND PAYMENT

A. General:

1. The Contractor shall receive and accept the compensation provided in his Proposal 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 Contractors 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 and Manatee County Utility Standards March 2009.
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, including removal of sidewalks, driveways, curbs, curb and gutter, pavement and pavement base.
    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 01570.
    g. Protection, repair, replacement or relocation of existing utilities, including services laterals, not designated in the Contract Documents for relocation.
    h. Replacement of 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 outside of established pay limits.
    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, including but not limited to valve boxes and hydrants that need to be removed from abandoned water mains.

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 and placing system in operation, including re-mobilization for FDEP testing.
n. Any material and equipment required to be installed and used for the tests.
o. Maintaining the existing quality of service during construction.
p. Adjusting new or existing water meter boxes to grade which are affected by construction.
q. Appurtenant work as required for a complete and operable system.
r. Coordination with all Federal, State and Local agencies and utilities.
s. Cutting of existing or new pipe for purposes of abandonment or installation of new pipe, valves or fittings.
t. Tree trimming as required by Manatee County or any other agency.
u. Verification of pipe elevation and alignment.
v. Repair of private irrigation systems damaged during construction.
w. 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.
x. Maintaining red-line drawings of changes to construction plans, to be submitted to the Owner.

B. The Contractor's attention is again called to the fact that the quotations 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 Proposal or Contract Pay Items, he shall include the cost for that work in some other applicable bid item, so that his proposal 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 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
CY	CY	Cubic Yard—Field Measure by Owner within limits specified or shown
EA	Each	Each—Field Count by Owner
LF	Foot	Linear Foot—Field Measure by Owner
LS	One	Lump Sum—Unit is one; no measurement will be made
SF	Square Foot	Square Foot
SY	Square Yard	Square Yard
TON	0.1 Ton	Ton—Weight Measure by Scale (2,000 pounds)

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

1.09 BID ITEM DESCRIPTIONS

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:

A. Bid Item 1: MOBILIZATION-DEMOBILIZATION.

1. 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 and from the project site. Also include the costs of bonds, maintenance of traffic for pipe installation and other pre-construction and post-construction expenses necessary for the start and conclusion 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 1 shall not exceed 10% of the total value of the project.

2. Measurement and Payment for Mobilization/Demobilization: Shall be made at the Contract Lump Sum Bid Price in accordance with the following schedule:

Table No.1

Percent of Original Contract Amount Earned	Allowable Percent of the Lump Sum bid price for Mobilization/Demobilization
5 10 25 50	25 30 40 60
75 100	80 100

B. Bid Item 2A THROUGH 2H: FURNISH AND INSTALL PIPE

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for installing pipe of the various kinds and sizes called for on the project. Pipe material to be furnished and installed will include high density polyethylene pipe (HDPE). Installation shall be by horizontal direction drill (HDD) and open-cut as required by the drawings. The unit price shall include all costs necessary for: piping system construction installation design analysis and submittals: survey layout; pipe materials; pipe joint restraint accessories when required by the location of the pipeline; pipe installation equipment: excavating and backfilling; de-watering; sheeting; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; polyethylene encasement for ductile iron system components (and adjoining valves and fittings) ; tracer wires and appurtenances for non-metallic pipes; locator tape; flushing; testing; restoration of non-paved ground surfaces including grassing; connections to other sanitary force main and pumping station system components; record documentation and all other work necessary, complete.

2. Measurement: The quantities of pipe to be paid for under this item shall be the length in linear feet of pipe measured horizontally along the centerline of the pipe through valves and fittings in place, complete and accepted by the Owner.

3. Payment: Payment for pipe shall be at the unit price bid for each pipe size, method of installation and material. Payment shall be made under the following Bid Items:
    a. Bid Item 2A – Furnish and Install 10 Inch HDPE Pipe - HDD
    b. Bid Item 2B – Furnish and Install 10 inch HDPE Pipe – Open Cut
    c. Bid Item 2C – Furnish and Install 12 Inch HDPE Pipe – HDD
    d. Bid Item 2D – Furnish and Install 12 Inch HDPE Pipe – Open Cut
    e. Bid Item 2E – Furnish and Install 14 Inch HDPE Pipe - HDD
    f. Bid Item 2F – Furnish and Install 14 inch HDPE Pipe – Open Cut
    g. Bid Item 2G – Furnish and Install 16 Inch HDPE Pipe – HDD
    h. Bid Item 2H – Furnish and Install 16 Inch HDPE Pipe – Open Cut

C. Bid Item 3: FURNISH AND INSTALL PIPE FITTINGS – DUCTILE IRON

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for installing pipe fittings and accessories made of ductile iron for use with ductile iron and HDPE pipe of the various kinds and sizes called for on the project. The unit price shall include all costs necessary for: survey layout; fitting materials; fitting joint connection materials including restraining devices; excavating and backfilling; de-watering; sheeting; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; flushing; polyethylene encasement; connections to other sanitary force main system components; record documentation and all other work necessary, complete.
2. Measurement and Payment: The quantities of fittings to be paid for under this item shall be the weight of the fitting required in tons (2,000 pounds) without accessories, measured in place complete and accepted.

D. Bid Item 4A THROUGH 4D: FURNISH AND INSTALL VALVES

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for installing valves and appurtenances for use with HDPE pipe and connections to existing lift station piping of the various kinds and sizes called for on the project. The unit price shall include all costs necessary for: survey layout; valves; valve joint connection materials including restraining devices; valve boxes in accordance with County Standard detail US-12; excavating and backfilling; de-watering; sheeting; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; flushing; connections to other sanitary force main system components; record documentation and all other work necessary, complete.
2. Measurement and Payment: Payment for valves shall be at the unit price bid for each valve size, measured in place complete and accepted. Payment shall be made under the following Bid Items:
    a. Bid Item 4A – Furnish and Install 10 Inch Plug Valve
    b. Bid Item 4B – Furnish and Install 12 Inch Plug Valve
    c. Bid Item 4C - Furnish and Install 14 Inch Plug Valve
    d. Bid Item 4D – Furnish and Install 16 Inch Plug Valve

E. Bid Item 5A THROUGH 5D: FURNISH AND INSTALL NEW FORCE MAIN CONNECTIONS TO EXISTING PUMPING STATIONS AND NEW DISCHARGE MAINHOLE

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for installing connections between the new force mains, to be constructed under this project, with the existing County Pumping stations 1A, 2A and 16A and the new discharge manhole located on 69th Ave. West.

   Connections will involve the connection of new 10 inch, 12 inch and 16 inch diameter piping to existing piping or the new manhole on 69th Ave West where shown on the drawings. No separate payment for pipe, fittings and valves required by these connections will be made under other sanitary sewer force main infrastructure related bid items. The unit price for connections shall include all costs necessary for: survey layout; connection to the existing pumping station discharge piping and new discharge manhole; connection piping couplings; connection materials including restraining devices; excavating and backfilling; de-watering; sheeting; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; flushing; record documentation and all other work necessary, complete.

2. Measurement and Payment: Payment for new force main connections shall be at the unit price bid for each location installed, measured in place complete and accepted. Payment shall be made under the following Bid Items:
   a. Bid Item 5A – Furnish and Install Connection to Pumping Station 1A
   b. Bid Item 5B – Furnish and Install Connection to Pumping Station 2A
   c. Bid Item 5C – Furnish and Install Connection to Pumping Station 16A
   d. Bid Item 5D – Furnish and Install Connection to New Discharge Manhole

F. Bid Item 6: FURNISH AND INSTALL GRAVITY SEWER PIPE

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for installing gravity sewer pipe of the various kinds and sizes called for on the project. Pipe material to be furnished and installed shall be PVC pipe (PVC). Installation shall be by open-cut as required by the drawings. The unit price shall include all costs necessary for: piping system construction installation design analysis and submittals: survey layout; pipe materials; pipe joint restraint accessories when required by the location of the pipeline; pipe installation equipment: excavating and backfilling; de-watering; sheeting; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; flushing; testing; restoration of non-paved ground surfaces including grassing; connections to other sanitary sewer system components; record documentation and all other work necessary, complete.

2. Measurement and Payment: The quantities of pipe to be paid for under this item shall be the length in feet of pipe measured horizontally along the centerline of pipe to the connection points with manholes.

   a. Bid Item 6A – Furnish and Install 24 inch PVC Pipe.

G. Bid Item 7: FURNISH AND INSTALL GRAVITY SEWER MANHOLE

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for installing a gravity sewer manhole for turbulent flow, complete. The unit price shall include all costs necessary for: survey layout; manhole in accordance with County Standard detail US-3; excavating and backfilling;

de-watering; sheeting; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; flushing; testing; connections to other sanitary system components; record documentation and all other work necessary, complete.

2. Measurement and Payment: Payment for manholes shall be at the unit price bid for each manhole, measured in place complete and accepted.
   a. Bid Item 7A – Furnish and Install 4 foot diameter turbulent flow manhole.

H. Bid Item 8: FURNISH AND INSTALL AUGER BORING ROAD CROSSING (JACK AND BORE)

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for installing Auger Bore (Jack and Bore) road crossings of the various kinds and sizes called for on the project. Auger Bore crossings shall be provided at the locations shown on the drawings and as required by the project specifications and the Florida Department of Transportation Utility Accommodation Manual Appendix A, Section 556 Bore and Jack specifications . The unit price shall include all costs necessary for: auger bore construction installation design analysis and submittals: survey layout; auger bore casing materials and jointing; auger bore carrier pipe materials and jointing; carrier pipe spacers; excavating and backfilling; casing appurtenances; de-watering; sheeting; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; flushing; testing; restoration of non-paved ground surfaces including grassing; connections to other sanitary force main system components; record documentation and all other work necessary, complete.
2. Measurement and Payment: Payment for auger bore crossings shall be the length in feet of auger bore casing and carrier pipe installed measured horizontally along the centerline of the bore at the unit price bid for each location, complete and accepted. Payment shall be made under the following Bid Items:
   a. Bid Item 8A – Auger Bore 20 inch Casing w/10 inch Carrier Pipe - Pearl Street at US 41
   b. Bid Item 8B – Auger Bore 30 inch Casing w/16 inch Carrier Pipe – 69th Ave West at US41

I. Bid Item 9: AIR RELEASE ASSEMBLY

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for installing air release assemblies, complete. The unit price shall include all costs necessary for: survey layout; service saddle with corporation stop; piped connection to the air release enclosure; air release valve; air release enclosure; tracer wire and tracer wire test box; excavating and backfilling; de-watering; sheeting; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; flushing; connections to other force main system components; record documentation and all other work necessary, complete. All work shall be in accordance with Manatee County Standard detail US-25.

2. Measurement and Payment: Payment for meter boxes shall be at the unit price bid for each air release assembly, measured in place complete and accepted.

J. Bid Item 10A THROUGH 10C: GROUT ABANDONED PIPELINES

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for grouting existing sanitary force main pipelines, complete. The unit price shall include all costs necessary for: survey layout; cutting and plugging existing force mains to be removed from service; removing valves and valve boxes and installing pressure rated plugs and caps as necessary; pumping grout into existing pipelines to be abandoned evacuating air from the pipeline; excavating and backfilling; de-watering; sheeting; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; record documentation on the location of cut and plugged pipelines and pipes grouted and all other work necessary, complete.
2. Measurement and Payment: Payment for grouting abandoned pipelines shall be at the unit price bid for each size pipe, measured in place complete and accepted. The quantities of grouted pipe to be paid for under this item shall be the length in linear feet of pipe grouted measured horizontally along the centerline of the pipe through valves and fittings in place, complete and accepted by the Owner. Payment shall be made under the following Bid Items:
   a. Bid Item 10A – Grout 10 Inch Force Main
   b. Bid Item 10B – Grout 12 Inch Force Main
   c. Bid Item 10C – Grout 14 inch Force Main

K. Bid Item 11: DEMOLITION FORCE MAIN – BOWLEES CREEK CROSSING

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for demolishing the aerial 14 inch ductile iron force main crossing over Bowlees Creek, complete. The lump sum price shall include all costs necessary for: removing pipe, fittings and appurtenances as shown on the drawings; cutting and capping the existing force main on each side of the crossing below grade; re-supporting, with steel supports, the safety grill located on each side of the crossing; repainting the existing to remain water line crossing the creek and th the safteg grill on each side of the crossing; shoring; bracing; temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; record documentation and all other work necessary, complete.
2. Measurement and Payment: Payment for force main demolition shall be at the lump sum price bid for this item, measured in place complete and accepted.

L. Bid Item 12: TRENCH PAVEMENT RESTORATION

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for pavement repair and restoration, associated with the work on the project, complete. The unit price shall include all costs necessary for: survey layout; removing and disposing of existing pavement and sub-base materials; saw cutting existing pavement edges to un-disturbed sub-base; furnishing and placing new sub-base and base material, restoring existing pavement over the full length and width of the impacted area with type S-III asphalt with a thickness equal to the thickness of the pavement removed or 1 ½ inches completed thickness,

(which ever is greater). The work shall include temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; re-striping of paving if required, record documentation and all other work necessary, complete. All work shall be in accordance with Manatee County Standard detail UG-12. (All referenced requirements apply to this bid item as shown in UG-12 with the exception of the provision of asphaltic concrete overlay.

2. Measurement and Payment: Payment for trench pavement restoration shall be on the basis of the number of Square yards of trench pavement restored, measured in place complete and accepted.

M. Bid Item 13: PAVEMENT RESTORATION – MILLING AND OVERLAY

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for pavement milling and overlay, when authorized by the Owner, associated with the work on the project, complete. Milling and overlay will be performed over areas where previous trench pavement restoration has been completed in accordance with County standards. The unit price shall include all costs necessary for: survey layout; edge milling existing pavement and furnishing and placing 1 ½ inch S-III asphaltic concrete overlay with prime coat, re-striping of pavement if required and related work. The work shall include temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; record documentation and all other work necessary, complete. All work shall be in accordance with Manatee County Standard detail UG-12.
2. Measurement and Payment: Payment for pavement restoration – milling and overlay shall be on the basis of the number of square yards of pavement overlay placed, measured in place complete and accepted.

N. Bid Item 14: CURB RESTORATION

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for curb repair and restoration, associated with the work on the project, complete. The unit price shall include all costs necessary for: survey layout; removing and disposing of existing curb materials; saw cutting existing curb edges to receive new curb sections; furnishing and placing new concrete curb to match the curb profile of the existing curb; restoring existing pavement adjacent to the curb being replaced over the full length impacted area with type S-III asphalt with a thickness equal to the thickness of the pavement removed or 1 ½ inches completed thickness, (which ever is greater). The work shall include temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; record documentation and all other work necessary, complete. All work shall be in accordance with Manatee County Standard details.
2. Measurement and Payment: Payment for curb replacement shall be at the unit price bid per linear foot of curb restored, measured in place complete and accepted.

O. Bid Item 15A: DRIVEWAY RESTORATION

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for driveway repair and restoration, associated with the work on the project, complete. The unit price shall include all costs necessary for: survey layout; removing and disposing of existing driveway materials; furnishing and placing new driveway material and expansion joints to match the existing driveway; (driveway segments shall be restored back to the nearest existing construction joint in

the existing driveway unless otherwise approved in the filed by the homeowner and Owner. New driveway segments shall not be less than 10 feet wide.); restoring existing paved or grassed areas adjacent to the driveway being replaced. The work shall include temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; record documentation and all other work necessary, complete. All work shall be in accordance with Manatee County Standard details.

2. Measurement and Payment: Payment for driveway replacement shall be at the unit price bid per square yard of driveway restored, measured in place complete and accepted. Payment shall be made under the following bid items:
   a. Bid Item 15A – Concrete Driveway Restoration
   b. Bid Item 15B – Asphalt Driveway Restoration
   c. Bid Item 15C – Shell Driveway Restoration
   d. Bid Item 15D – Stone Driveway Restoration

P. Bid Item 16: SIDEWALK RESTORATION

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required for sidewalk repair and restoration, associated with the work on the project, complete. The unit price shall include all costs necessary for: survey layout; removing and disposing of existing sidewalk materials; furnishing and placing new driveway material and expansion joints to match the existing sidewalk system; and restoring existing paved or grassed areas adjacent to the sidewalk being replaced. The work shall include temporary barricades; temporary trench covers; right-of-way protection; record documentation and all other work necessary, complete. The work shall include temporary barricades; traffic and pedestrian control; temporary trench covers; right-of-way protection; record documentation and all other work necessary, complete. All work shall be in accordance with Manatee County Standard details.
2. Measurement and Payment: Payment for sidewalk replacement shall be at the unit price bid per square yard of sidewalk restored, measured in place complete and accepted.

Q. Bid Item 17: DISCRETIONARY WORK

1. Description: Under this contract Pay Item, the contractor shall furnish all labor, equipment and materials required to construct discretionary work as authorized by the Owner, complete. The type of and price for discretionary work shall agreed to by the Owner prior to commencing such work. The price shall include all costs necessary for completing the work authorized, complete. All work shall be in accordance with Manatee County Standard details that are applicable to the work being performed. Payment for all work under this Bid Item and listed in the bid form shall be made only at the Owner's discretion in to order to satisfactorily complete the project in accordance with the Plans and Specifications.
2. Measurement and Payment: Payment for discretionary work shall be at the price agreed to by the Owner and Contractor, measured in place complete and accepted.

R. Payment will Not be Made for Following:

1. Loading, hauling, and disposing of rejected material.
2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.

3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Restoration to pavement, drives, sidewalks and other surface features when the HDD construction method is used except as it relates to restoration at entry and exit excavations which shall be in accordance with the restoration payment items.
6. Damage caused by the HDD construction method to pavement, drives, sidewalks, curbs, utilities, and other surface and subsurface publically and privately owned features caused by or as a result of contractor operations, caving, fluid "frack-out", miss-direction of drilling tools, equipment operation and other HDD related construction factors.
7. Restoration to pavement, drives, sidewalks, curbs and other surface features not along the alignment of the new pipeline when the open-cut construction method is used.
8. Damage caused by the open-cut construction method to utilities, and all surface and subsurface publically and privately owned features caused by or as a result of contractor operations, caving, equipment operation and other open-cut related construction factors, except as provided in the restoration payment items.
9. Defective Work not accepted by Owner.
10. Material remaining on hand after completion of Work.

1.10 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings or preliminary operation and maintenance manuals are acceptable to Engineer.

B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

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

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 Owner and Contractor.

1.02 FORMAT AND DATA REQUIRED

A. Submit payment requests in the form provided by the Owner 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 Owner or the Engineer 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

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 (3) 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 by the Board.
B. Administrative Change Adjustment: Minor change order under 10% of project cost or 20% 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 Engineer 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.

C. The Board of County Commissioners executes all Change Orders.

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, as appropriate.

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 Engineer/Owner 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, plus additional information.
   1. Name of the Owner'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 Owner, 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 Owner for approval. The Owner will distribute executed copies after approval by the Board of County Commissioners.

1.08 UNIT PRICE CHANGE ORDER

A. Contents of Change Orders will be based on, either:
   1. Owner's definition of the scope of the required changes.
   2. Contractor's Proposal for a change, as approved by the Owner.
   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 Owner 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. Engineer will determine the allowable cost of such work, as provided in General Conditions and Supplementary Conditions.

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

D. Owner 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 Owner or Engineer 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. Owner's Engineer.
   2. Owner'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. Owner'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 01310 CONSTRUCTION SCHEDULE & PROJECT RESTRAINTS

PART 1 GENERAL

1.01 GENERAL

A. Construction under this contract must be coordinated with the Owner 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. nor on weekends or legal holidays without written permission of the Owner. 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 Owner. Such permission, however, may be revoked at any time by the Owner 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.

1.03 PROGRESS OF THE WORK

The work shall be executed with such progress as may be required to prevent any delay to the general completion of the work. The work shall be executed at such times and in or on such parts of the project and with such forces, materials and equipment to assure completion of the work in the time established by the Contract and in the manner set forth in the Contract.

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 Engineer to review Contractor's planning, scheduling, management and execution of the work; to assist Engineer 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 Owner 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 8-1/2 inches by 11 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 Engineer to review all submittals as set forth in the Contract Documents; items of work required of Owner 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 Owner.

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 Engineer, 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 Engineer. 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 Engineer 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 start-up 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 three copies of 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 Owner, 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 monthly progress schedules with each month's application for payment.

G. Contractor shall submit three monthly status reports which will be retained by the Owner and Engineer.

2.06 MONTHLY STATUS REPORTS

A. Contractor shall submit three copies of 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 Engineer and Contractor at a monthly schedule meeting and Contractor will address Engineer'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 Engineer 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. Engineer shall have 10 calendar days after receipt of the submittal to respond. Upon receipt of Engineer's comments, Contractor shall make the necessary revisions and submit the revised schedule within 10 calendar days. The resubmittal, if concurred with by Owner, 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 by Engineer and concurrence by Owner. 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 Engineer.

PART 3 EXECUTION (NOT USED)

END OF SECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall submit to the Engineer 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. Within thirty (30) calendar days after the effective date of the Agreement, the Contractor shall submit to the Engineer, a complete list of preliminary data on items for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified items and the date on which each Shop Drawing shall be submitted. Review of this list by the Engineer shall in no way relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Specifications. This procedure is required in order to expedite final review of Shop Drawings.

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

1. Submittal description and number assigned.
2. Date to Engineer.
3. Date returned to Contractor (from Engineer).
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.

1.03 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 Engineer 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 Engineer 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 Engineer 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 Engineer, with No Exceptions Taken or Approved As Noted.

E. The Contractor shall submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for checking and appropriate action from the time the Engineer receives them.

F. The Contractor shall submit five (5) copies of descriptive or product data submittals to complement shop drawings for the Engineer plus the additional copies if the Contractor requires more than 1 being returned. The Engineer shall retain four (4) sets.

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 Engineer of the necessary Shop Drawings.

1.04 ENGINEER'S REVIEW OF SHOP DRAWINGS AND WORKING DRAWINGS

A. The Engineer'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 Engineer, 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 Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting any exception.

D. When reviewed by the Engineer, 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 Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.

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 Engineer.

G. The Engineer shall review a submittal/resubmittal a maximum of three (3) times after which cost of review shall be borne by the Contractor. The cost of engineering shall be equal to the Engineer's actual payroll cost.

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

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

1.05 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 Engineer 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 Engineer 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 one (1) year.

H. Only the Engineer will utilize the color "red" in marking shop drawing submittals.

1.06 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 Engineer where required by the Contract Documents or requested by the Engineer and shall be submitted at least thirty (30) days (unless otherwise specified by the Engineer) 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 Engineer, 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 Owner and Engineer shall not have responsibility therefore.

1.07 SAMPLES

A. The Contractor shall furnish, for the review of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer 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 Engineer.

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 Engineer. 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 Engineer 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 Engineer a Schedule of Values, using Manatee County Standard Payment forms, allocated to the various portions of the work, within 10 days after date of Notice to Proceed.

B. The schedule of values breakdown shall reflect the unit prices for each bid items bid by the Contractor and accepted by the Owner for performance of the various unit price work items under the project. The contractor shall utilize Manatee County Project Management Forms PDM-1, PDM-2 and PDM-3 in preparing application for payment and schedule of values documentation for the project.

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 Engineer 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 bid sheets included in this Contract Documents as the format for listing component items for unit price bid items.

D. 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 two prints 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 Owner and Engineer 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 x 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 Engineer 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 Engineer on digital video disks (DVD) for the permanent and exclusive use of the Engineer 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 Engineer. In addition, no progress payments shall be made until the preconstruction video recordings are accepted by the Engineer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Owner 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. Owner 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.

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 Engineer 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 Owner 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 Owner 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 Engineer.

H. If the test results indicate the material or equipment complies with the Contract Documents, the Owner 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 01510 TEMPORARY AND PERMANENT UTILITIES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

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

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

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 AND PEDESTRIAN CONTROL

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall be responsible for providing safe and expeditious movement of traffic and pedestrians through construction zones. A construction zone is defined as the immediate areas of actual construction and all adjacent or staging 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 Contractor shall develop and implement a traffic and pedestrian control plan for the specific requirements of this project, The plan shall provide for the continuous safe passage of motor, non-motorized vehicles and pedestrians, access to public and private property, access by emergency vehicles and other traffic and pedestrian movements with the vicinity of the work site.

B. 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 & Traffic Design Standards, Latest Edition.

C. 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 (1) 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.
3. If for any reason a roadway becomes impassable, it shall be the responsibility of the Contractor to immediately notify the police, fire and emergency services departments.

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 Engineer will consult with the Owner 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 Engineer 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 six inches below the adjacent pavement surface.

1.03 PEDESTRIAN CONTROL

A. The Contractor shall develop and implement a pedestrian control plan for the specific requirements of this project. The pedestrian control plan shall provide for the continuous safe passage of pedestrians, access to public and private property, access to sites such as bus stops and school bus site and other pedestrian movements in the vicinity of the work site.

B. Pedestrian 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 maintenance of traffic plan from the FDOT Maintenance of Traffic Standards, Series 600 of the FDOT Roadway and Traffic Design Standards, Latest Edition.

C. The Contractor shall provide at least one (1) day advanced notification to the affected right-of-way department of the necessity to close any portion of a sidewalk or walking area for pedestrians. All pedestrian 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 not in effect, and checked twice a day by the Worksite Traffic Supervisor when they are in effect. The Contractor's attention is directed to the fact that the work is to be conducted in a residential neighborhood and that when required, pedestrian control actions shall be developed to specifically address the needs of local residents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01580 PROJECT IDENTIFICATION AND SIGNS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish, install and maintain County project identification signs.
B. Remove signs on completion of construction.
C. Allow no other signs to be displayed except for traffic control and safety.

1.02 PROJECT IDENTIFICATION SIGN (COUNTY)

A. Two (2) painted sign, of not less than 32 square feet (3 square meters) area, with painted graphic content to include:
   1. Title of Project.
   2. Name of Owner.
   3. Names and titles of authorities as directed by Owner.
   4. Prime Contractor.
B. Graphic design, style of lettering and colors: As approved by the Engineer and subject to approval of the Owner.
C. Erect each sign at a location as defined and approved by the Engineer and the Owner

1.03 INFORMATIONAL SIGNS

A. Painted signs with painted lettering, or standard products.
   1. Size of signs and lettering: as required by regulatory agencies, or as appropriate to usage.
   2. Colors: as required by regulatory agencies, otherwise of uniform colors throughout project.
B. Erect at appropriate locations to provide required information.

1.04 QUALITY ASSURANCE

A. Sign Painter: Professional experience in type of work required.
B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.

1.05 PUBLIC NOTIFICATION

A. Door Hangers: Manatee County Project Management shall generate and the General Contractor shall distribute door hangers to all residents who will be impacted by project construction.
B. Residents impacted include anyone who resides inside, or within 500 feet of project limits of construction.
C. Door Hangers shall be distributed prior to start of construction of the project. Hangers shall be affixed to doors of residents via elastic bands or tape.

1.06 MANATEE COUNTY SCHEDULED WATER OFF/PRE-CAUTIONARY BOIL WATER NOTICE PROCEDURES

A. It is not anticipated that Construction activities will impact the Manatee County Water system however, should the contractors activities interrupt damage or impact Manatee County Water

facilities, the Contractor shall comply with Manatee County standards with regard to scheduled water off, public notification and boil water notices. The Contractor shall comply with the requirements of the Manatee County Florida - Scheduled Water Off/Pre-Cautionary Boil Notice Procedures contained as an attachment at the end of this specification section.

PART 2 PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: May be new or used, wood or metal, in sound condition structurally adequate to work and suitable for specified finish.

B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.

1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.

C. Rough Hardware: Galvanized.

D. Paint: Exterior quality, as specified in the Contract Documents.

PART 3 EXECUTION

3.01 PROJECT IDENTIFICATION SIGN

A. Paint exposed surface or supports, framing and surface material; one coat of primer and one coat of exterior paint.

B. Paint graphics in styles, size and colors selected.

3.02 SIGN MAINTENANCE

The Contractor shall maintain signs and supports in a neat, clean condition; repair damages to structures, framing or sign.

3.03 SIGN REMOVAL

The Contractor shall remove signs, framing, supports and foundations at completion of project.

3.04 DOOR HANGERS

The Contractor shall distribute door hangers three (3) three days prior to commencing work within a street segment within the project area. Upon commencing work on a street segment within the project area, the Contractor shall have additional door hangers available in the field to distribute to local residents or the public should they indicate they were not notified of the project.

END OF SECTION

MANATEE COUNTY
FLORIDA

Scheduled Water Off / Pre-Cautionary Boil Water Notice Procedures

Project Management Inspections will notify Distribution by e-mail that a cut-in or shut off is requested. Information about location, size, and a contact number shall be provided for clarification purposes. Area supervisor will confirm that the area can be isolated and notify Project Management when the shut off or cut-in can be scheduled. (Fax # 708-7548) Project Management will notify the Engineer and resubmit a cut-in or shut off notice. Utility Operations (Distribution) on an average needs at least one week notice (could be longer) for requested water shut off. 792-8811 x 5268

M.C.U.O.D. will advise contractor of how large an area will be affected and if a Pre-Cautionary Boil Water Notice will be issued for the proposed shut down. M.C.U.O.D. Will provide water off / pre-cautionary boil water notice & Rescission information to the local newspapers, radio stations, Water Treatment Lab, Health department and Universal Communication. Notifications of scheduled water shut downs must be made at least 48 hours prior to the scheduled shut down.

Contractor Responsibility:

Contractor is responsible for placing Water off and Pre-Cautionary Boil Water Notice (when needed) signs in areas designated by M.C.U.O.D. Two signs may be needed (Water Off and Precautionary Boil Water) at each road entering the area and should be 4' x 4' in size with 3"min. lettering. Letters must be in contrast to and clearly standout against the back ground (Example; White background Black letters). Signs should read as follows:

1) **Water Off**
M/D/YY of Turnoff:
Duration: TIME OFF & ON
Contractor Name:
Phone Number:
Reason:

2) **Precautionary Boil Water Notice**
When this sign is removed the notice will be rescinded. 792-8811 x 5268

Contractor will also be responsible for notifying door to door with door hangers the same information as the signs reflect.
A ***Written Conformation of Notification*** (Precautionary when issued and Rescission when lifted) is required for all businesses that serve Food.
Signs, Copy of Written Conformation to Coordinator and door hangers must be in place at least 48 hours prior to scheduled water shut off. All of these procedures must be followed before water will be shut off by M.C.U.O.D.

If you have any questions please call 792-8811 x 5268

4526 66th St. W. Bradenton, Fl. 34210 * PHONE: 941-792-8811 (Ext: 5216) * FAX: 941-795-3448
Utilities Department, Distribution * www.mymanatee.org(8-22-08)

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 Engineer.
   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 Engineer. 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 Engineer 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 PRODUCT OPTIONS

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

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.

A. 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 Engineer. 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 Engineer.
   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 Engineer 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 insure 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 insure 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 coverings to protect finished surfaces from damage.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01700 CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

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 Engineer and Owner 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 Engineer determines that the work is not substantially complete:
   1. The Engineer 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 Engineer.
   3. The Engineer shall reinspect the work.

E. When the Engineer finds that the work is substantially complete:
   1. He shall prepare and deliver to the Owner 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 Owner as provided in Conditions of the Contract. When the Engineer considers the work substantially complete, he will execute and deliver to the Owner and the Contractor 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 Owner's representative and are operational.
   5. The work is completed and ready for final inspection.

B. The Engineer shall make an inspection to verify the status of completion after receipt of such certification.

C. If the Engineer determines that the work is incomplete or defective:

1. The Engineer 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 Engineer that the work is complete.
3. The Engineer shall reinspect the work.

D. Upon finding the work to be acceptable under the Contract Documents, the Engineer shall request the Contractor to make closeout submittals.

E. For each additional inspection beyond a total of three (3) inspections for substantial and final completion due to the incompleteness of the work, the Contractor shall reimburse the Owner for the Engineer's fees.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

A. Project Record Documents (prior to substantial completion).

B. Operation and maintenance manuals (prior to substantial completion).

C. Warranties and Bonds.

E. Evidence of Payment and Release of Liens: In accordance with requirements of General and Supplementary Conditions.

F. Certification letter from Florida Department of Transportation and Manatee County Department of Transportation, as applicable.

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 Engineer.

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

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

Execute cleaning during progress of the work and at completion of the work, as required by the General Conditions.

1.02 DISPOSAL REQUIREMENTS

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 Owner 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 Owner one record copy of:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Engineer'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 Engineer.

1.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by the Engineer.

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. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc. Locations of drainage ditches, swales, water lines and force mains shall be shown every 200 feet (measured along the centerline) or alternate lot lines, whichever is closer. Dimensions at these locations shall indicate distance from centerline of right-of-way to the facility.
   2. Field changes of dimension and detail.
   3. Changes made by Field Order or by Change Order.
   4. Details not on original contract drawings.
   5. Equipment and piping relocations.

6. Locations of all valves, fire hydrants, manholes, water and sewer services, water and force main fittings, underdrain cleanouts, catch basins, junction boxes and any other structures located in the right-of-way or easement, shall be located by elevation and by station and offset based on intersection P.I.'s and centerline of right-of-way. For facilities located on private roads, the dimensioning shall be from centerline of paving or another readily visible baseline.
7. Elevations shall be provided for all manhole rim and inverts; junction box rim and inverts; catch basin rim and inverts; and baffle, weir and invert elevations in control structures. Elevations shall also be provided at the PVI's and at every other lot line or 200 feet, whichever is less, of drainage swales and ditches. Bench marks and elevation datum shall be indicated.
8. Slopes for pipes and ditches shall be recalculated, based on actual field measured distances, elevations, pipe sizes, and type shown. Cross section of drainage ditches and swales shall be verified.
9. Centerline of roads shall be tied to right-of-way lines. Elevation of roadway centerline shall be given at PVI's and at all intersections.
10. Record drawings shall show bearings and distances for all right-of-way and easement lines, and property corners.
11. Sidewalks, fences and walls, if installed at the time of initial record drawing submittal, shall be located every 200 feet or alternate lot lines, whichever is closer. Dimensions shall include distance from the right-of-way line and the back of curb and lot line or easement line.
12. Sanitary sewer mainline wyes shall be located from the downstream manhole. These dimensions shall be provided by on-site inspections or televiewing of the sewer following installation.
13. Elevations shall be provided on the top of operating nuts for all water and force main valves.
14. Allowable tolerance shall be ± 6.0 inches for horizontal dimensions. Vertical dimensions such as the difference in elevations between manhole inverts shall have an allowable tolerance of ± 1/8 inch per 50 feet (or part thereof) of horizontal distance up to a maximum tolerance of ± 2 inch.
15. The contractor shall prepare record drawings referencing all new water pipeline construction to the both the ROW line and centerline of paving on each street. For each street segment, a reference line with stationing shall be established down the centerline of each street (pavement). All pipelines, fittings, valves, meter boxes, service connections, air release valves and other water system components shall be horizontally referenced to the centerline of pavement on each street. Piping system elevation information shall be tied to survey benchmarks. All record drawing reference lines, elevation information, record drawing locations and other record drawing information shall be compiled by a Surveyor registered in the State of Florida employed by the contractor.
16. Properly prepared record drawings on mylar, together with two copies, shall be certified by a design professional (Engineer and/or Surveyor registered in the State of Florida), employed by the Contractor, and submitted to the Owner/Engineer.

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):
   1. 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 Engineer. 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 dated mylar drawings together with a recordable compact disk (CD).

C. The CD shall contain media in AutoCad Version 12 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 Engineer.

B. Drawings shall meet the criteria of paragraph 1.04 D above.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01730 OPERATING AND MAINTENANCE DATA

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under Contract.
Prepare operating and maintenance data as specified in this and as referenced in other pertinent sections of Specifications.

B. Instruct Owner's personnel in maintenance of products and equipment and systems.

C. Provide three (3) sets of operating and maintenance manuals for each piece of equipment provided within this Contract.

1.02 FORM OF SUBMITTALS

A. Prepare data in form of an instructional manual for use by Owner's personnel.

B. Format:
1. Size: 8-1/2 inch x 11 inch
2. Paper: 20 pound minimum, white, for typed pages
3. Text: Manufacturer's printed data or neatly typewritten
4. Drawings:
   a. Provide reinforced punched binder tab, bind in with text.
   b. Fold larger drawings to size of text pages.
5. Provide fly-leaf for each separate product or each piece of operating equipment.
   a. Provide typed description of product and major component parts of equipment.
   b. Provide indexed tabs.
6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
   a. Title of Project.
   b. Identity of separate structures as applicable.
   c. Identity of general subject matter covered in the manual.

C. Binders:
1. Commercial quality three-ring binders with durable and cleanable plastic covers.
2. Maximum ring size: 1 inch.
3. When multiple binders are used, correlate the data into related consistent groupings.

1.03 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit three copies of complete manual in final form.

B. Content for each unit of equipment and system, as appropriate:
1. Description of unit and component parts.
   a. Function, normal operating characteristics and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
2. Operating Procedures:
   a. Start-up, break-in, routine and normal operating instructions.
   b. Regulation, control, stopping, shut-down and emergency instructions.

c. Summer and winter operating instructions.
d. Special operating instructions.

3. Maintenance Procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair and reassembly.
   d. Alignment, adjusting and checking.
4. Servicing and lubricating schedule.
   a. List of lubricants required.
5. Manufacturer's printed operating and maintenance instructions.
6. Description of sequence of operation by control manufacturer.
7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
   a. List of predicted parts subject to wear.
   b. Items recommended to be stocked as spare parts.
8. As installed control diagrams by controls manufacturer.
9. Each contractor's coordination drawings.
   a. As installed color coded piping diagrams.
10. Charts of valve tag numbers, with location and function of each valve.
11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
12. Other data as required under pertinent sections of specifications.

C. Content, for each electric and electronic system, as appropriate:
1. Description of system and component parts.
   a. Function, normal operating characteristics and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
2. Circuit directories of panelboards.
   a. Electrical service.
   b. Controls.
   c. Communications.
3. As-installed color coded wiring diagrams.
4. Operating procedures:
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.
5. Maintenance procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair and reassembly.
   d. Adjustment and checking.
6. Manufacturer's printed operating and maintenance instructions.
7. List of original manufacture's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
8. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

D. Prepare and include additional data when the need for such data becomes apparent during instruction on Owner's personnel.

E. Additional requirements for operating and maintenance data: Respective sections of Specifications.

1.04 SUBMITTAL SCHEDULE

A. Submit one copy of completed data in final form fifteen days prior to substantial completion.
   1. Copy will be returned after substantial completion, with comments (if any).

B. Submit two copies of approved data in final form. Final acceptance will not be provided until the completed manual is received and approved.

1.05 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.

B. Operating and maintenance manual shall constitute the basis of instruction.
   1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

PART 2 PRODUCTS (NOT USED)

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 Engineer for review and transmittal to Owner.

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 Owner'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 x 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 ten 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, service and maintenance contracts as specified in respective sections of Specifications.

B. Approval by the Owner 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 02100 SITE PREPARATION

PART 1 GENERAL

SCOPE OF WORK

A. This Section covers clearing, grubbing and stripping of the project site and/or along the pipeline route.

B. The Contractor shall clear and grub all of the area within the limits of construction or as required, which includes, but is not limited to utility easements. The width of the area to be cleared shall be reviewed by the Engineer prior to the beginning of any clearing.

C. The Contractor's attention is directed to any Soil Erosion and Sediment Control Ordinances in force in Manatee County. The Contractor shall comply with all applicable sections of these ordinances.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CLEARING

The surface of the ground, for the area to be cleared and grubbed shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish and all other objectionable obstructions resting on or protruding through the surface of the ground. However, trees shall be preserved as hereinafter specified unless otherwise designated by the Engineer. Clearing operations shall be conducted so as to prevent damage to existing structures and installations and to those under construction, so as to provide for the safety of employees and others. Soil erosion control devices such as hay bales and silt fences shall be installed to satisfy all Federal, State and County requirements.

3.02 GRUBBING

Grubbing shall consist of the complete removal of all stumps, roots larger than 1-1/2 inches in diameter, matted roots, brush, timber, logs and any other organic or metallic debris not suitable for foundation purposes, resting on, under or protruding through the surface of the ground to a depth of 18 inches below the subgrade. All depressions excavated below the original ground surface for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

3.03 STRIPPING

In areas so designated, topsoil shall be stockpiled. Topsoil so stockpiled shall be protected until it is placed as specified. The Owner shall have the option to receive all excess topsoil materials. The Contractor shall pay all equipment and labor cost to deliver excess top soil material to a remote site chosen by the Owner within a five mile radius of the construction site. Should Owner not choose to receive any or all excess topsoil materials, the Contractor shall dispose of said material at no additional cost to Owner.

3.04 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

The Contractor shall dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris off site. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered a subsidiary obligation of the Contractor; the cost of which shall be included in the prices bid for the various classes of work.

3.05 PRESERVATION OF TREES

Those trees which are not designated for removal by the Engineer shall be carefully protected from damage. The Contractor shall erect such barricades, guards and enclosures as may be considered necessary by him for the protection of the trees during all construction operation.

3.06 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

A. The Contractor shall exercise extreme care to avoid unnecessary disturbance of developed private property adjacent to proposed project site. Trees, shrubbery, gardens, lawns and other landscaping, which are not designated by the Engineer to be removed, shall be replaced and replanted to restore the construction easement to the condition existing prior to construction.

B. All soil preservation procedures and replanting operations shall be under the supervision of a nursery representative experienced in such operations.

C. Improvements to the land such as fences, walls, outbuildings and other structures which of necessity must be removed, shall be replaced with equal quality materials and workmanship.

D. The Contractor shall clean up the construction site across developed private property directly after construction is completed upon approval of the Engineer.

3.07 PRESERVATION OF PUBLIC PROPERTY

The appropriate paragraphs of these Specifications shall apply to the preservation and restoration of public lands, parks, rights-of-way, easements and all other damaged areas. This includes, but is not limited to the trimming of trees damaged by contractor's equipment.

END OF SECTION

SECTION 02220 EXCAVATION, BACKFILL, FILL AND GRADING FOR STRUCTURES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Structural excavation shall consist of the removal of material for the construction of foundations for structures and other excavation designated on the drawings or in these specifications.

B. Structural excavation and backfill shall consist of furnishing material, if necessary and placing and compacting backfill material around structures to the lines and grades designated on the drawings, as specified or directed by the Engineer.

C. Structural excavation and backfill shall include the furnishing of all materials, equipment and other facilities which may be necessary to perform the excavations, place and compact the backfill, install sheeting and bracing, and carry out any necessary dewatering. It shall also include the wasting or disposal of surplus excavated material in a manner and in locations approved by the Engineer.

D. 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 plans. 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.

1.02 QUALITY ASSURANCE

A. Testing Agency:
   1. In place soil compaction tests shall be performed by a qualified testing laboratory.
   2. Compaction tests shall be taken every 500 feet, except in the road crossings or road shoulders. Tests are to be taken according to current FDOT Standards.

B. Reference Standards:
   1. American Society for Testing and Materials (ASTM):
      a. ASTM D1557, Moisture-Density Relations of Soils Using 10-lb. (4.5-kg) Rammer and 18-in. (457-mm) Drop.

1.03 JOB CONDITIONS

A. The Contractor shall provide, operate and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavation, bases, pits, etc., free from seepage, standing or running water at all times throughout the period of construction.

B. The Contractor shall assume all responsibility for the security of the excavation required, employing bracing, lining or other accepted means necessary to accomplish same.

C. Excavated areas shall be cleared of all debris, water, slush, muck, clay and soft or loose earth and shall be conditioned to the entire satisfaction of the Engineer.

D. All excavated material unsuitable for use or which will not be used shall be disposed of in a manner consistent with State and County regulation.

E. All unsuitable organic materials, roots, logs, etc., found during excavation shall be removed by the Contractor and the trench shall be refilled with suitable material.

PART 2 PRODUCTS

2.01 MATERIAL FOR CONTROLLED FILL

A. Composition: Only approved material free from organic matter and lumps of clay, shall be used for backfill. Excavated earth free from debris or organic material may be used for backfilling foundations or fill.

B. Crushed stone and shell shall meet or exceed current FDOT Standards.

2.02 UNSUITABLE MATERIAL

Unsuitable material shall be defined as highly organic soil per ASTM D2487 Group PT. This includes, but is not limited to, such items as topsoil, roots, vegetable matter, trash, debris, and clays that cannot be dried sufficiently to obtain specified compaction.

PART 3 EXECUTION

3.01 INSPECTION

A. The Contractor shall verify that work preceding the affected work of this Section has been satisfactorily completed.

B. Conditions adversely affecting the work of this Section shall be corrected to the satisfaction of the Engineer.

3.02 REMOVAL OF UNSUITABLE MATERIALS

A. The Contractor shall remove unsuitable material from within the limits of the Work.

B. Materials meeting requirements for controlled fill shall be stockpiled as necessary and in such a manner satisfactory to the Engineer.

C. All material excavated shall be placed so as to minimize interference with public travel and to permit proper access for inspection of the work.

3.03 EXCAVATION

A. When concrete or shell subbase footing is to rest on an excavated surface, care shall be taken not to disturb the natural soil. Final removal and replacement of the foundation material and subbase compaction to grade shall not be made until just before the concrete or masonry is placed.

B. When any structural excavation is completed, the Contractor shall notify the Engineer who will make an inspection of the excavation. No concrete or masonry shall be placed until the excavation has been approved by the Engineer.

C. The elevations of the footing bottom and the base slab as shown on the Drawings, shall be considered as approximate and the Engineer may order in writing, such changes in dimensions or elevations of the footings and slab base as necessary to secure satisfactory foundations.

D. All excavation shall be made within an area bounded by lines five feet outside and parallel to the exterior walls of the structure to allow for correct forming, shoring and inspection of foundation work. Pouring of concrete against earth side walls shall not be permitted.

E. If the ground is excavated below the grade called for by the Drawings or becomes unstable due to the Contractor's carelessness or operations, the ground shall be excavated to undisturbed native soil before continuing concreting operations.

D. If in the opinion of the Engineer, the material at or below the normal grade of the bottom of the trench is unsuitable for pipe or structure foundation, it shall be removed to the depth directed by the Engineer and if so directed, replaced by crushed stone or washed shell.

3.04 STRUCTURAL BACKFILL

A. Structural backfill shall not be placed until the footings or other portions of the structure or facility have been inspected by the Engineer and approved for backfilling.

B. A minimum of 1-1/2" layer of lean concrete shall be placed as a working mat for the concrete base slabs and footings if required by the engineer.

C. Fill shall be placed in uniform layers not more than 12" thick and compacted to a minimum of 98 percent of the maximum density determined by ASTM D1557, Method A or C, or as directed by the Engineer. The Contractor shall securely tamp the backfill with pneumatic rammer around all wall foundations. The method of compaction shall be satisfactory to the Engineer.

D. Compaction of structural backfill by ponding and jetting may be permitted when, as determined by the Engineer: the backfill material is of such character that it will be self-draining when compacted; foundation materials will not soften or be otherwise damaged by the applied water; no damage from hydrostatic pressure will result to the structure. Ponding and jetting within two feet below finished subgrade shall not be permitted in roadway areas. At the discretion of the Engineer, ponding and jetting may be permitted with compaction layers not to exceed four feet.

E. Surplus material not used on-site shall be removed and disposed of off-site by the Contractor. In no case shall surplus material be deposited on adjacent lands. Fill used for grading shall be placed in layers not to exceed 12 inches in thickness and shall be compacted to a density equal or greater to that of the surrounding natural ground.

3.05 BACKFILLING AROUND STRUCTURES

A. Common fill and structural fill are specified for use as backfill against the exterior walls of the structures. Fill shall be placed in layers having a maximum thickness of eight (8) inches in loose state and shall be compacted sufficiently to prevent settlement. If compaction is by rolling or ramming, material shall be wetted down as required. Where material can be suitably compacted by jetting or puddling, the Contractor may use one of these methods. No boulders shall be allowed to roll down the slopes and hit the walls.

B. Backfilling shall be carried up evenly on all walls of an individual structure simultaneously. A variation of two (2) feet in elevation will be the maximum allowable. No backfill shall be allowed against walls until the walls and their supporting slabs, if applicable, have attained sufficient strength. Backfilling shall be subjected to approval by the Engineer.

C. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the refill up to an elevation of at least one foot above the bottom of the pipes:

1. Place structural fill in such areas for a distance of not less than three feet either side of the center line of the pipe in level layers not exceeding 6-inches in depth.
2. Wet each layer to the extent directed and thoroughly compact each layer with a power tamper to the satisfaction of the Engineer.
3. Structural fill shall be of the quality specified under Part 2 of this Section.

D. The surface of filled areas shall be graded to smooth true lines, strictly conforming to grades indicated on the grading plan. No soft spots or uncompacted areas shall be allowed in the work.

E. Temporary bracing shall be provided as required during construction of all structures to protect partially completed structures against all construction loads, hydraulic pressure and earth pressure. The bracing shall be capable of resisting all loads applied to the walls as a result of backfilling.

3.06 FIELD QUALITY CONTROL

E. The density of soil in place shall be a minimum of 95 percent in accordance with ASTM test 1557-70T, Method A or C.

END OF SECTION

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; 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 plans. 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.

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 one foot above the top of any pipe unless otherwise directed by the Engineer. During the progress of the work, the Engineer 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 Owner/Engineer. 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 Engineer 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" of excavation for this work in-the-dry and not until the water level is a minimum of 6" 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 Engineer prior to their installation.

The observation wells shall be extended to 6 inches above finished grade, capped with screw-on caps protected by 24" x 24" 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 Engineer 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 Engineer.

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 Engineer of the source of the material and shall furnish the Engineer, for approval, a representative sample weighing approximately 50 pounds, at least ten 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 three 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" 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" 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.

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 Engineer, 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" 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" 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 Engineer may direct, sufficiently to prevent subsequent settling.

END OF SECTION

SECTION 02223 EXCAVATION BELOW GRADE AND CRUSHED STONE OR SHELL REFILL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. If in the opinion of the Engineer, the material at or below the normal grade of the bottom of the trench is unsuitable for pipe or structure foundation, it shall be removed to the depth directed by the Engineer and replaced by crushed stone or washed shell.

PART 2 PRODUCTS (NOT USED)

PART 3 MATERIALS

3.01 EXCAVATION AND DRAINAGE

A. Whatever the nature of unstable material encountered or the groundwater conditions, trench stabilization shall be complete and effective.

B. Should the Contractor excavate below the grade shown on the Contract drawings because of negligence or for his own convenience; due to failure in properly dewatering the trench; disturbs the subgrade before dewatering is sufficiently complete; he shall be directed by the Engineer to excavate below grade. The work of excavating below grade and furnishing and placing the approved refill material shall be performed at the Contractor's expense.

3.02 REFILL

A. Should the material at the level of trench bottom consist of fine sand, sand and silt or soft earth, the subgrade material shall be removed as directed by the Engineer and the excavation shall be refilled with crushed stone or washed shell.

END OF SECTION

SECTION 02260 FINISH GRADING

PART 1 GENERAL

1.01 WORK INCLUDED

A. The Contractor shall finish grade sub-soil.
B. The Contractor shall cut out areas to receive stabilizing base course materials for paving and sidewalks.
C. The Contractor shall place, finish grade and compact top soil.

1.02 PROTECTION

The Contractor shall prevent damage to existing fencing, trees, landscaping, natural features, bench marks, pavement and utility lines. Damage shall be corrected at no cost to the Owner.

PART 2 PRODUCTS

A. Topsoil: Shall be friable loam free from subsoil, roots, grass, excessive amount of weeds or other organics, stones, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 4 percent and a maximum of 25 percent organic matter. The Contractor may use topsoil stockpiles on site if they conform to these requirements.

PART 3 EXECUTION

3.01 SUB-SOIL PREPARATION

A. The Contractor shall rough grade sub-soil systematically to allow for a maximum amount of natural settlement and compaction. Uneven areas and low spots shall be eliminated. Debris, roots, branches or other organics, stones, and sub-soil shall be removed by the Contractor and disposed of in a manner consistent with the latest Manatee County Standards as well as any affected regulatory agency. Should contaminated soil be found, the Contractor shall notify the Engineer.
B. The Contractor shall cut out areas to sub-grade elevation to stabilize base material for paving and sidewalks.
C. The Contractor shall bring sub-soil to required profiles and contour graces gradually; and blend slopes into level areas.
D. The Contractor shall slope the structure grade a minimum of two (2) inches in ten (10) feet unless indicated otherwise on the Drawings.
E. The Contractor shall cultivate sub-grade to a depth of 3 inches where the topsoil is to be placed. He shall repeat cultivation in areas where equipment use has compacted sub-soil.
F. The Contractor shall not make grade changes which causes water to flow onto adjacent lands.

3.02 PLACING TOPSOIL

A. The Contractor shall place topsoil in areas where seeding, sodding and planting is to be performed. He shall place from the following minimum depths, up to finished grade elevations:
   1. 6 inches for seeded areas
   2. 4-1/2 inches for sodded areas
   3. 24 inches for shrub beds

4. 18 inches for flower beds

B. The Contractor shall use topsoil in a dry state as determined by the Engineer. He shall place the material during dry weather.

C. The Contractor shall use fine grade topsoil eliminating rough and low areas to ensure positive drainage. He shall maintain levels, profiles and contours of the sub-grades.

D. The Contractor shall remove stone, roots, grass, weeds, debris, and other organics or foreign material while spreading the material.

E. The Contractor shall manually spread topsoil around trees, plants and structures to prevent damage which may be caused by grading equipment.

F. The Contractor shall lightly compact and place the topsoil.

3.03 SURPLUS MATERIAL

A. The Contractor shall remove surplus sub-soil and topsoil from site at his expense.

B. The Contractor shall leave stockpile areas and entire job site clean and raked, ready for landscaping operations.

END OF SECTION

SECTION 02276 TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

A. The work specified in this Section consists of the design, provision, maintenance and removal of temporary erosion and sedimentation controls as necessary.

B. Temporary erosion controls include, but are not limited to: grassing, mulching, netting, watering, and the reseeding of on-site surfaces and spoil and borrow area surfaces, interceptor ditches at ends of berms and other such work at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the Owner/Engineer.

C. Temporary sedimentation controls include, but are not limited to: silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which shall ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the Owner/Engineer.

D. The Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.02 REFERENCE DOCUMENTS

A. Florida Building Code.
B. FDEP/COE Dredge and Fill Regulations and/or Permit as applicable.
C. SWFWMD Permit Regulations and/or Permit as applicable.
D. Florida Stormwater, Erosion and Sedimentation Control Inspector's Manual.

PART 2 PRODUCTS

2.01 EROSION CONTROL

A. Netting - fabricated of material acceptable to the Owner.
B. Seed and sod.

2.02 SEDIMENTATION CONTROL

A. Bales - clean, seed free cereal hay type.
B. Netting - fabricated of material acceptable to the Owner.
C. Filter stone - crushed stone conforming to Florida Dept of Transportation specifications.
D. Concrete block - hollow, non-load-bearing type.
E. Concrete - exterior grade not less than one inch thick.

PART 3 EXECUTION

3.01 EROSION CONTROL

A. Minimum procedures for grassing shall be:
   1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.
   2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.

3. Apply mulch loosely and to a thickness of between 3/4-inch and 1-1/2 inches.
4. Apply netting over mulched areas on sloped surfaces.
5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

3.02 SEDIMENTATION CONTROL

A. The Contractor shall install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved descriptions and working drawings. Deteriorated hay bales and dislodged filter stone shall be replaced by the Contractor at his expense.

3.03 PERFORMANCE

A. The Contractor, at his own expense, shall immediately take whatever steps are necessary to correct any deficiencies of the temporary erosion and sediment control measures employed if they fail to produce results or do not comply with the requirements of the State of Florida or any other federal, governmental or regulatory agency.

END OF SECTION

SECTION 02325 ROAD AND RAILROAD CROSSINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, equipment, materials and incidentals required to install road or railroad crossings as shown on the Drawings and as specified herein.

1.02 OPERATIONS ON MANATEE COUNTY OR STATE OF FLORIDA PROPERTY

A. All work affecting Manatee County, Florida Department of Transportation, any other governmental agency's right-of-way or facilities, or railroad right-of-way shall be carried out to the full satisfaction of the applicable Department's authorized representative. The Contractor shall be responsible to meet any and all requirements of the Department of Transportation, railroad, or other agency pertaining to the specific project and shall conduct all his work accordingly.

B. Prior to the start of the jacking operation, a detailed jacking plan shall be submitted to the Engineer for review and approval. No work shall be permitted until the submittals are accepted. A Bore Path Report shall be submitted within three (3) days of completion of the bore.

C. Prior to construction, a minimum of three working days written notice prior to start of the actual work shall be given to the Engineer and to the Florida Department of Transportation or other applicable agency.

D. The Contractor shall install, maintain and leave in place any sheeting, underpinning, cribbing and other related items (other than that required for the jacking pits) to support any structures or facility on the right-of-way owned by either Manatee County, Florida Dept. of Transportation or other governmental agency or railroad entity. The Contractor, at his expense, may be directed by the Department of Transportation, other applicable agency, or the Owner/Engineer, to leave sheeting in place.

E. The Contractor shall perform all necessary soil test borings to determine actual soil conditions and shall utilize the results of said borings to determine the procedures required for each jack and bore operation, including, but not limited to, the presence of rock and necessary dewatering requirements.

F. No wires, equipment, or other appurtenances shall be permitted to be placed across or pass across State property without the express written permission of the Department of Transportation's authorized representative.

G. All equipment used by the Contractor on State property may be inspected by the State and shall not be used if it is deemed unsatisfactory by an authorized State representative. State highways shall be kept free of obstructions at all times.

H. No blasting shall be permitted under or adjacent to any State highways.

I. The Contractor shall be responsible for all damages arising from his negligence or failure to comply with any State or Manatee County regulations or requirements or deviations from the Contract Documents.

J. All State highway crossings shall be performed and completed in a manner fully satisfactory to the Department of Transportation and Manatee County.

K. Traffic control requirements and procedures are detailed in Section 01570 of this specification.

1.03 SHOP DRAWINGS

The Contractor shall furnish working drawings showing all fabrication and construction details for the jacked crossings.

1.04 SUBMITTALS

A. Contractor shall submit a Jacking Plan that includes the following:
   1. Site layout plan for entry and exit pit locations, drawn to scale, depicting the position of all required equipment, access points, existing facilities to remain in place, existing traffic lanes to be maintained in operation, office trailers and storage sites.
   2. Qualification information on jack/bore contractor.
   3. Manufacturer's information on equipment to be used.
   4. Methods and materials for retaining walls for jacking and receiving pits.

B. Bore Report that details final alignment, dimensions, and record documentation.

PART 2 PRODUCTS

2.01 MATERIALS

Sleeve, carrier pipe, skids, insulation, bulkheads, etc. shall be per contract plans.

PART 3 EXECUTION

3.01 CONTROL OF WATER

A. Conform to Section 02327, Dewatering.

3.02 JACKING SLEEVE

A. The Contractor shall provide all labor, material, equipment and appurtenances required for jacking the sleeves beneath the roadway or railroad tracks. The steel sleeve shall be welded steel pipe and jacked in one continuous operation at the locations shown on the drawings. Once the operation starts, jacking shall not be discontinued. Proper alignment and elevation of the sleeves shall be consistently maintained throughout the jacking operation.

B. The Contractor shall shore the jacking pits with sheeting or such other materials as required. Sheeting shall be driven to a sufficient depth below the invert of the steel sleeve to resist any pressure developed by the soil outside the jacking pit. Sheeting shall terminate not less than 3-feet, 6-inches above existing grade.

C. The sections of steel sleeve shall be field welded in accordance with the applicable portions of AWWA C-206 for field welded water pipe joints. Steel sleeve shall receive one coat of Tnemec 46H-413 Hi-Build Tnemec-tar applied in accordance with manufacturer's recommendation.

D. At the completion of the jacking operations, the Contractor shall be required to leave all sheeting in place. The top of the sheeting shall be cut off 36-inches below finished grade.

E. The Contractor shall be responsible for preventing voids outside the steel sleeves. Should they occur, the Contractor may be directed to fill them with grout in a method approved by the Engineer. The Contractor shall exercise care in the sleeve removal to prevent voids.

F. The Contractor shall be responsible for furnishing, installing and removing the thrust block or restraint which was employed in driving the sleeve forward. No additional payment for the jacking restraint shall be made other than the unit price for this item. The entire jacking

operation shall be discussed and accepted by the Engineer prior to commencing jack and bore operation. After completion, the backup structures shall be removed in part or whole to permit construction of the pipeline in the sleeve.

3.03 INSTALLING PIPE IN SLEEVE

A. The Contractor shall install the pipe in full conformity with the Contract Documents. The pipe shall be installed to the lines and grades required within the sleeve and placed to the approval of the Engineer. The pipe shall be braced to the side and the top of the sleeve to prevent flotation or motion.

B. A bulkhead shall be placed at the ends of the sleeve to keep the surrounding soil and material from migrating into the voids in the sleeve..

3.04 TESTING

The pipe shall be tested as provided in the Contract Document.

END OF SECTION

SECTION 02326 GEOTECHNICAL MONITORING

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, equipment, materials and incidentals required to install and monitor the construction and its potential impact on site geotechnical conditions and existing surface and subsurface infrastructure. The Contractor shall use this monitoring data to establish that construction activities conform to the requirements of these specifications, provide for the protection of adjacent properties and do not impact existing surface and subsurface infrastructure. The monitoring program is not intended to be used to ensure safety of the work.

1.02 WORK INCLUDED

A. The Contactor shall be responsible for monitoring ground conditions as necessary to conform to the requirements of the contract documents. Ground conditions may include monitoring ground surface elevation, ground water level, buried utility location and other factors as required by the drawings and specifications. The geotechnical monitoring program required by this section does not relieve the Contactor of responsibility for providing additional monitoring at other locations in the project, if in the Contactors opinion, such additional monitoring is necessary to accomplish the work.

B. The work specified in this section includes, but is not limited to, requirements for furnishing, installing, maintaining geotechnical monitoring instrumentation and performing survey observations to monitor ground movements and ground water conditions within, around, and above auger bore alignments.

C. At a minimum, the Contractor shall install and monitor the geotechnical instruments and monitoring points shown on the drawings and specified. Additionally, the Contactor shall install instrumentation as necessary to control operations, monitor ground conditions, and ground responses during construction activities to achieve project requirements and to prevent damage to existing structures and facilities.

D. The Contractor shall furnish, install and monitor geotechnical instruments and compile monitoring data in accordance with the Quality Assurance article of this specifications.

E. All geotechnical monitoring points shall be tied horizontally and vertically to the project survey in accordance with the horizontal and vertical datum stipulated for the project.

F. Perform all work in accordance with these project contract documents and FDOT standard specification that apply to roadway and utility construction within FDOT right-of-way.

1.03 SUBMITTALS

A. Contractor shall submit a geotechnical monitoring plan that includes the following:

1. Site layout plan for the project showing the location where geotechnical monitoring will be conducted. The project drawings show the location geotechnical monitoring points for the auger bore crossings on the project. The contractor shall provide a discussion regarding the basis for providing or not providing additional geotechnical monitoring at this or other locations within the project. This discussion should provide a review of the construction techniques planned by the Contractor that may impact the need for or decision not to provide supplemental geotechnical monitoring.

2. Submit a movement, settlement, support system plan for the work of the project. Support system improvements required by the Contractors work plan shall be prepared by a Florida Licensed Professional Engineer. Survey of monitoring points associated with the plan shall be conducted by a Florida Licensed Professional Land Surveyor.
3. A drawing showing the control points and bench marks that will be used for survey ties to each geotechnical monitoring point.
4. Submittal documentation for review and approval for all materials used associated with the geotechnical monitoring program.

B. Geotechnical monitoring, data collection and reports shall be provided as the work proceeds as follows:
1. Submit copies of initial baseline readings for each geotechnical monitoring point on a form which will provided by the Engineer. Baseline monitoring data shall be submitted at least 15 days prior to commencing any construction activities within 50 feet of the auger bore alignments or other locations on the project to be monitored by the Contactor during construction.
2. Provide the results of geotechnical monitoring to the County field representative as the data is collected in the field. Submit geotechnical monitoring data for each monitoring location 24 hours after the observations have been made.
3. For each monitoring location or if more appropriate each construction activity location, the Contractor shall provide a weekly summary of all monitoring data including monitoring elevations, piezometer elevations and all other monitoring data.
4. Inform the COUNTY field representative and the ENGINEER immediately when Action Limits or Displacement Limits are reached for any monitoring point.

1.04 DEFINITIONS

A. Ground Surface Settlement Marker (GM): GMs. Are stakes, rods or nails installed in unpaved or paved areas at predetermined locations to measure vertical (elevation) changes of the ground surface

B. Open Ground: Ground without any above or below grade facilities, paved or unpaved roadways, and utilities located within a 25 foot horizontal radius.C.

C. Instrument: A mechanical or electronic device specifically manufactured to independently monitor and record information regarding ground settlement, the settlement of surface features such as roadways or structures, the settlement of subsurface soils, the settlement of subsurface utilities or other similar information pertaining to changed geotechnical or infrastructure condition over time.

D. Workshaft: Launching or receiving pit.

E. Support System: Any structural or geotechnical improvements which are intended to provide temporary support, shoring, bracing, or stability to existing structures, utilities, roadways, and site geotechnical features during construction of the work and prevent damage and movement to such facilities.

1.05 QUALITY ASSURANCE

A. Personnel Qualifications: Personnel responsible for installing, maintaining, and monitoring shall be experienced with construction survey, layout and monitoring activities. The Contractor shall utilize a Florida Licensed Land Surveyor to establish all monitoring points and supervise the collection of all monitoring data. The surveyor shall certify the accuracy of monitoring results.

B. The Contractor shall retain the services of a Florida Licensed Professional Engineer to prepare any structural support systems that are required by the Contractors work plan to protect existing surface or subsurface infrastructure or geologic features that may impact the movement or settlement of such infrastructure.

C. Monitoring Control: The Contractor shall utilize project control points as required by the project contract documents.

1.06 PROJECT CONDITIONS

A. Obtain necessary permits and regulatory approval for the installation of monitoring systems

B. Provide the Engineer and the County access to all monitoring locations and monitoring data at all times.

C. Protect project monitoring points from damage or vandalism.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Ground Surface Settlement Marker (GM) in unpaved areas shall consist of a 2-inch by 2-inch by 12 inch long hard wood sake or 12 inch long 1-inch by 1-inch diameter (No. 8) reinforcing bar driven approximately 10 inches below grade as shown on the plans. In paved areas, GMs shall be hardened surveyor "PK" nails that are securely fastened by driving or epoxy grouting within a properly size hole, flush with the pavements.B.

B. Geotechnical Instrumentation, when required by the project, shall be of the type and with the accuracy to allow for consistent monitoring of geotechnical, surface feature and subsurface feature status during the project to meet the requirements of the contract documents. 2.02

PART 3 EXECUTION

3.01 GENERAL

A. Instrumentation and Monitoring locations shall be installed at the locations shown on the plans, or within the approved shop drawings and submittals, for the work. The Contractor shall install added instrument and monitoring locations when based upon the Contractors experience and selected work plan, it is deemed appropriate to achieve the intent of the project contract documents.

B. Locate all underground assets that may be impacted by installation of instrument or monitoring systems prior to installation. Repair damage to existing utilities or and other asset result from instrument or monitoring point installations at no additional cost to the County.

C. The Engineer and County shall have access to all instrument and monitoring point locations.

D. Mark and label all instrument and monitoring point locations. Record instrument and monitoring point locations on the record drawings.

E. Initial readings: Following instrument or monitoring point installation, and prior to the commencement of any construction within 50 linear feet of the construction site, the Contractor shall take a minimum of two sets or initial readings to provide a baseline for monitoring construction.

1. Installation of the instrumentation by the Contractor does not preclude the Owner, through an independent contractor, from installing instrumentation in, on, near, or adjacent to the construction work.

2. Elevations shall be recorded to a precision of 0.001 of a foot. Horizontal survey accuracy shall be 0.01 feet or less.
3. The Contractor shall take additional survey(s) as requested by the Engineer if in the opinion of the Engineer the two sets of initial readings do not adequately establish the baseline level. After initial readings are approved by the Engineer, the average of the two sets of initial readings shall be used to establish the baseline level of the instrument, unless otherwise directed by the Engineer.F.

3.02 Ground Surface Settlement Markers

A. GMs shall be installed where shown on the drawings and approved submittals. Markers shall be installed firmly to prevent loosening and in a manner and location that allows survey rods to be consistently placed on the high point of the marker head or point being measured.

3.03 INSTRUMENT PROTECTION, MAINTENANCE AND REPAIR

A. Flag and protect all locations. Exercise care during construction so as to avoid damage to instrumentation. Repair or replace instrumentation that is damaged as a result of the contractor's operation at his expense. The Engineer will determine whether repair or replacement is required. Complete the repair or replacement as soon as practical after notification by the Engineer as to whether a repair or replacement is required.

3.04 PROTECTION OF PROPERTY AND GROUND MOVEMENT LIMITS

A. The Contractor shall use whatever means and methods are necessary to limit ground movements, settlements and damage of utilities, structures and other facilities. These means and methods include, but are not limited to ground support systems, tunneling methods, underpinning of vulnerable facilities, grouting and other forms of ground improvement.

B. The ground movement limits for all instruments are established as follows:

Facility	Action Limit (inch)	Displacement Limit (inch)
Above- and below-grade utilities	0.7	1.0
Street and general roadway pavement	0.7	1.0

C. If settlement of a facility or settlement marker reaches an Action Limit, the likely cause of the settlement shall be reported to the Engineer and actions shall be promptly taken to limit further settlements and to prevent Settlement Limits from being exceeded. Actions to be taken in response to measured settlements shall be reported to the Engineer before being taken, except in emergency situations. The cost of actions required to comply with settlement limits and to repair any damage to adjacent facilities shall be borne by the Contractor with no cost to the Owner.

3.05 MOVEMENT/ SETTLEMENT MONITORING

A. The Contractor shall develop and implement a settlement control plan to protect existing facilities, utilities, structures, roads, streets, and other improvements from damage due to settlement resulting from tunnel construction. The plan shall include the specific methods that will be used to minimize loss of ground, procedures for monitoring for loss of ground as specified herein, and ground improvement plans.

B. If necessary, obtain the permission of Engineer, in advance, to work outside of the work hours established for the project. Monitor roadways and utilities at existing crossings and repair immediately if damaged due to construction activities. The Contractor shall be responsible for making any necessary changes in construction methods to control loss of ground and minimize settlement to prevent damage to adjacent facilities, existing utilities, and adjacent structures.

C. Monitoring of structures and ground movement: Submit a movement/settlement monitoring plan that complies with Article 1.03 of this Specification Section. Plan shall be prepared and sealed by a Civil or Structural Engineer registered with the State of Florida. Monitoring required by this Specification Section is the minimum. If, in the opinion of the Contractor's design support engineer, additional instrumentation is required than that required by the Contract Documents, Contractor shall install the additional instrumentation at no additional cost to the Owner.

D. For workshafts, monitor as follows:
   1. Monitor all instruments within 50 feet of the outer edge of workshaft daily beginning when workshaft construction, ground improvement, excavation or dewatering activity begins, whichever comes first. Continue daily monitoring until backfill and removal of excavation support of the workshaft are complete. Provide a brief description of the construction activity in the submittal of monitoring data.
   2. Monitor at least once every 6 hours during ground support system installation (including contact grouting to fill exterior voids), excavating, and ground improvement within and around workshaft..

E. For auger bore excavation, monitor all instruments located within, around and above the excavation as follows:
   1. Monitor at least once every 2 hours, but not less than 4 per day beginning when auger Bore excavation approaches within 50 feet of the station of the instrument location. Continue monitoring at the same frequency until excavation advances 100 feet beyond the station of the instrument location or the auger bore drive is completed (i.e. casing pipe completely enters the receiving pit).
   2. Upon completion of the auger bore drive, monitor daily until for a minimum period of two weeks or that period defined in the approved geotechnical monitoring submittal.

F. Actions to Mitigate Excess Ground Movements:
   1. If displacement limit of a facility or settlement marker reaches an action limit, the likely cause of the displacement shall be promptly discussed with the Engineer. The Engineer may increase the monitoring frequency for all settlement markers within 100 feet of the location where the displacement action limit was exceeded. Review excavation and ground support operations and make operational changes or implement ground improvement or underpinning measures as appropriate to limit further displacements and to prevent displacement limits from being exceeded. Actions to be taken in response to action limits being exceeded shall be reported to the Engineer before being taken, except in emergency situations.
   2. If displacement of a facility or settlement marker reaches a displacement limit, cease excavation or other construction operations that result in further displacement until additional operational changes are made to reduce ground loss around excavation. The likely cause of the displacement shall be immediately discussed with the Engineer. The Engineer may further increase the monitoring frequency for all settlement markers and inclinometers within 100 feet of the location where the

displacement limit was exceeded and may add additional settlement markers and inclinometers. Review excavation and ground support operations and make operational changes or implement ground improvement or underpinning measures as appropriate to limit further displacements and to prevent displacement limits from being exceeded. Actions to be taken in response to displacement limits being exceeded shall be discussed with and approved by the engineer before being taken, except in emergency situations.

3. The cost of actions required for complying with displacement limits and to repair any damage to adjacent facilities shall be borne by the Contractor with no additional cost to the County.

3.06 DISCLOSURE OF DATA

A. The Contractor shall not disclose any instrumentation data to third parties and shall not publish data without prior approval and written consent of the County.

3.07 ABANDONMENT OF INSTRUMENTS

A. At the completion of the job, abandon or remove instrumentation.

B. Settlement Markers: All GMs shall be removed by the Contractor during the cleanup and restoration work, or sooner as allowed or required by the Engineer. Abandonment shall be documented and records submitted to the Engineer and agencies requiring abandonment records.

END OF SECTION

SECTION 02327 DEWATERING

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section addresses the provisions for controlling, handling, disposing and treating groundwater and surface water including groundwater that may be encountered in pit excavation, open cut, and ancillary excavation as required for performance of the work, and work necessary to repair or replace property damaged due to groundwater disturbance.

B. General dewatering and lowering of the groundwater table for the purpose of construction of the work shall be conducted in a manner that protects existing surface and subsurface features and allows for construction of the work as required by the contact documents.

C. The Contractor is responsible for designing, furnishing, installing and maintaining dewatering system that accomplishes continuous control of water at all times during the course of construction, and shall provide adequate backup systems to accomplish control of water. The method of control, handling, and disposal of groundwater and surface water shall be by whatever means are necessary and in conformance with this Section to obtain satisfactory working conditions and to maintain the progress of the work.

D. All required drainage, pumping, treatment, and disposal shall be done without damage to adjacent property or structures and without interference with the operations of other contractors, or the rights of public and private owners, or pedestrian and vehicular traffic.

E. The Contractor shall modify the water control system at his own expense if, after installation and while in operation, it causes or threatens to cause damage to adjacent property or to existing buildings, structures, or utilities.

1.02 SUBMITTALS

A. Submittals shall be made at least 30 days prior to start of excavation, unless otherwise noted.

B. Informational Submittals:

1. Water control plan.
2. Well permits.
3. Discharge permits.
4. Quality control.

1.03 DISCHARGE PERMITS

A. Submit discharge and well permit applications to Florida Department of Environmental Protection (FDEP) if dewatering wells are to be used.

1.04 WATER CONTROL PLAN

A. Water control plan shall be coordinated with requirements of:
   1. Section 02220, Excavation, Backfill, Fill and Grading for Structures.
   2. Section 02221, Trench Bedding and Backfill for Pipe
   3. Section 02325, Road and Railroad Crossings.
   4. Section 02326, Geotechnical Monitoring.
   5. Section 02602, Trenching and Excavation.

B. As a minimum, include:

   1. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment; methods; installation; standby equipment and power supply, pollution control facilities including silt removal facilities, discharge locations to be utilized; removal of water control systems; provisions for immediate temporary water supply as required by this section.
   2. The Contractor shall submit shop drawings showing locations, dimensions, and relationships of elements of each water control system. The submittal shall include design calculations demonstrating adequacy of proposed water control or isolation systems and their components. The Contractor shall provide manufacturer's literature describing installation, operation, and maintenance procedures for all components of the water control system.
   3. Design calculations demonstrating adequacy of proposed water control systems and components. The Contractor may be required to demonstrate the systems proposed in the water control plan and to verify that adequate equipment, personnel, and materials are provided to dewater the excavations at all locations and times required.

C. If system is modified during installation or operation revise or amend and resubmit Water Control Plan.

1.05 QUALITY CONTROL SUBMITTALS

A. During construction, submit pumping rate measurements, water level readings taken at design and construction phase piezometers and groundwater quality data. Contractor readings shall be performed in addition to any readings taken by the Engineer. Submit the data within 24 hours of readings.

1.06 REGULATORY REQUIREMENTS

A. Storm water discharge to storm sewers, watercourses, lakes, and wetlands shall conform to the requirements of local, state, and Federal regulations.

B. Water from excavations shall be kept separate from storm water discharge associated with surface construction. Water from excavations shall be discharged into the nearest sanitary sewer, in compliance with all applicable codes and regulations. Discharge into storm sewers, open waterways, or on open ground is prohibited.

C. In the event that contaminated waters are encountered, the Contractor is required to notify the Owner prior to discharging contaminated water into the sanitary sewer system. The Contractor may be required to provide laboratory test results documenting contaminant concentrations.

PART 2 PRODUCTS

2.01 MATERIALS

A. The Contractor is responsible to determine materials required to meet these Specifications.

2.02 GEOTECHNICAL MONITORING

A. Conform to the requirements of Section 02326, GEOTECHNICAL MONITORING.

PART 3 EXECUTION

3.01 GENERAL

A. If required by the approved water control plan, geotechnical settlement control instrumentation shall be installed and baseline surveyed at least two weeks prior to starting any dewatering activities.

B. Remove and control water during periods when necessary to properly accomplish Work. Provide adequate backup systems to accomplish control of water in conformance with this Section to obtain satisfactory working conditions and to maintain the progress of the work. Water to be controlled includes groundwater, contaminated groundwater; surface water (precipitation and run-off); and wastewater from combined or separated sewers or related facilities.

C. Obtain all permits required from Florida Department of Environmental Protection (FDEP) and any other agencies for installation and operation of water control systems and discharging of collected water into water courses, water bodies, sewers or the ground.

D. Perform the work without damage to adjacent property or structures and without interference with the operations of other contractors, or the rights of public and private owners, or pedestrian and vehicular traffic. Modify the water control system at your the Contractor own expense if, after installation and while in operation, it causes or threatens to cause damage to adjacent property or to existing buildings, structures, or utilities

3.02 WATER CONTROL PLAN

A. Submit the required documents as listed in Article 1.02, Submittals. The Engineer will review the submittal. If the submittal is not accepted, the Engineer will offer comments for the Contractor's consideration.

B. Resubmit as appropriate if the system or any part thereof is modified during installation or operation. Should requirements of any permit be different than requirements herein, the more stringent requirements shall control.

C. Provide the submittal at least 30 days prior to installation of water control systems. Resubmit as appropriate if the system is modified during installation or operation.

3.03 SURFACE WATER CONTROL

A. Provide temporary surface water control features during construction of the work in accordance with the contact documents.

B. Intercept and divert surface drainage away from the work site by the use of dikes, curb walls, ditches, sumps, or other means.

C. Design surface drainage systems so that they do not cause erosion on or off the site.

D. Surface runoff shall be controlled to prevent entry of water into excavations.

E. Remove surface runoff controls when no longer needed.

3.04 DEWATERING SYSTEMS

A. Provide, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry and to lower and maintain groundwater level a minimum of 2 feet below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.

B. For Trenching dewatering systems shall include wells or well points, and other equipment and appurtenances installed outside limits of excavations and sufficiently below lowest point of excavation, or to maintain specified groundwater elevation.

C. Design and Operate Dewatering Systems:
   1. To prevent loss of ground as water is removed.
   2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.
   3. To relieve artesian pressures and resultant uplift of excavation bottom.

D. Provide sufficient redundancy in each system to keep excavation free of water in event of component failure.

E. Provide 100 percent emergency power backup with automatic startup and switchover in event of electrical power failure.

F. Provide supplemental ditches and sumps only as necessary to collect water from local seeps. Do not use ditches and sumps as primary means of dewatering.

3.05 SETTLEMENT

A. Monitoring Dewatering-Induced Settlement: Establish monuments for monitoring settlement at locations shown in the approved water control plan. Monitor vertical movement of each settlement monument, relative to remote benchmark selected by Engineer, at frequency stated in Contractor's Dewatering Plan.

3.06 MONITORING FLOWS

A. Monitor volume of water pumped per calendar day from excavations, as Work progresses. Also monitor volume of water introduced each day into excavations for performance of Work. Monitor flows using measuring devices acceptable to Engineer.

3.07 GROUND LOSS FROM REMOVAL OR DISTURBANCE OF GROUNDWATER

A. Immediately support any structure including, but not limited to, railroad tracks, streets, and utilities that become unstable or vulnerable to settlement due to removal or disturbance of groundwater. Cease excavation and other construction operations that result or have the potential to result in further settlement until corrective measures are implemented. Support shall include but not be limited to shoring; sheeting; bracing; underpinning; compaction grouting; driving piles; excavating, backfilling, and placing new structural concrete beneath or adjacent to the unstable structure; or other means necessary to rectify the particular problem involved.

B. The Contractor shall bear the costs of all loss or damage arising from removal or disturbance of groundwater including, but not limited to claims for subsidence and loss of structure support that may occur in the prosecution of the work. If the Contractor fails to correct the damage resulting from his operations, the Engineer may deem the work to be unacceptable work.

3.08 TREATMENT AND DISPOSAL OF WATER

A. Obtain discharge permit for water disposal from authorities having jurisdiction. Open field discharge for percolation without contact with existing open water drainage systems is permissible.

B. Treat all water to remove suspended solids, oils, cement, bentonite, and other contaminants by use of settling basins, on-site treatment plant, or other means selected by the Contractor. Select treatment systems that can accommodate expansion if greater capacity becomes necessary during the course of the work. Provide to the Engineer copies of all records required by the FDEP.

C. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.

D. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

END OF SECTION

SECTION 02355 LUMBER LEFT IN PLACE

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish and install shoring and sheeting as necessary to provide adequate safety.

PART 2 PRODUCTS

2.01 MATERIALS

Wood for shoring and sheeting shall be green, rough cut hardwood planking.

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractor shall furnish, install and maintain sheeting and bracing required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below which is necessary for proper construction and to protect adjacent structures from undermining or other damage. If the Engineer determines that insufficient or improper supports have been provided, he may order additional supports to be installed at the expense of the Contractor. Compliance with such orders shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting. Should voids form, they shall be immediately filled and rammed.

B. The Contractor shall embed and leave in place all sheeting, bracing and other related items as shown on the Contract Drawings. The Owner/Engineer may direct that sheeting and bracing timber be cut off at a specified elevation. No additional payment or compensation shall be made for this work.

C. Sheeting and bracing not left in place shall be removed carefully in such manner as not to endanger other structures, utilities, property, or proposed construction.

D. The Owner/Engineer may order sheeting and bracing to be left in place; however, this shall not relieve the Contractor from liability for damages to persons or property due to negligence or the failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

E. The Contractor shall receive no payment other than that included in the pipe bid item price for any timber used for sheeting bracing, or other related items.

END OF SECTION

SECTION 02485 SEEDING AND SODDING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials and equipment necessary to satisfactorily return all construction areas to their original conditions or better.

B. Work shall include furnishing and placing seed or sod, fertilizing, planting, watering and maintenance until acceptance by Engineer/Owner.

1.02 RELATED WORK NOT INCLUDED

Excavation, filling and grading required to establish elevation shown on the Drawings are included under other sections of these Specifications.

1.03 QUALITY ASSURANCE

A. It is the intent of this Specification that the Contractor is obliged to deliver a satisfactory stand of grass as specified. If necessary, the Contractor shall repeat any or all of the work, including grading, fertilizing, watering and seeding or sodding at no additional cost to the Owner until a satisfactory stand is obtained. For purposes of grassing, a satisfactory stand of grass is herein defined as a full lawn cover over areas to be sodded or seeded, with grass free of weeds, alive and growing, leaving no bare spots larger than 3/4 square yard within a radius of 8 feet.

B. All previously grassed areas where pipelines are laid shall be sodded. All sodding and grassing shall be installed in accordance with these Specifications or as directed by the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fertilizer: The fertilizer shall be of the slow-release type meeting the following minimum requirements: 12 percent nitrogen, 8 percent phosphorus, 8 percent potassium; 40 percent other available materials derived from organic sources. At least 50 percent of the phosphoric acid shall be from normal super phosphate or an equivalent source which will provide a minimum of two units of sulfur. The amount of sulfur shall be indicated on the quantitive analysis card attached to each bag or other container. Fertilizer shall be uniform in composition, dry and free flowing delivered to sites in original unopened containers bearing manufacturer's statement or guarantee.

B. Seeding/Grassing: The Contractor shall grass all unpaved areas disturbed during construction which do not require sod. All grassing shall be completed in conformance with FDOT Specifications, Sections 570 and 981. The grassed areas shall be mulched and fertilized in accordance with FDOT Specifications, except that no additional payment will be made for mulching, fertilizing and/or watering.

C. Sodding: Sod shall be provided as required on the construction drawings or at locations as directed by the Engineer in accordance with Florida Department of Transportation, Specifications Section 575 and 981. The Contractor shall furnish bahia grass sod or match existing sod. Placement and watering requirements shall be in accordance with FDOT

Specifications Section 575, except that no additional payment will be made for placement and/or watering. This cost shall be included in the Contract price bid.

D. Topsoil: Topsoil stockpiled during excavation may be used as necessary. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the Owner. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants and grassing specified herein.

E. Water: It is the Contractor's responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements that may be necessary to ensure an adequate supply of water to meet the needs for his work. He shall also furnish all necessary hose, equipment, attachments and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

PART 3 EXECUTION

3.01 INSTALLATION

A. When the trench backfill has stabilized sufficiently, the Contractor shall commence work on lawns and grassed areas, including fine grading as necessary and as directed by the Engineer.

B. Finish Grading: Areas to be seeded or sodded shall be finish graded, raked, and debris removed. Soft spots and uneven grades shall be eliminated. The Engineer shall approve the finish grade of all areas to be seeded or sodded prior to seed or sod application.

C. Protection: Seeded and sodded areas shall be protected against traffic or other use by placing warning signs or erecting barricades as necessary. Any areas damaged prior to acceptance by the Owner shall be repaired by the Contractor as directed by the Engineer.

3.02 CLEANUP

Soil or similar materials spilled onto paved areas shall be removed promptly, keeping those areas as clean as possible at all times. Upon completion of seeding and sodding operations, all excess soil, stones and debris remaining shall be removed from the construction areas.

3.03 LANDSCAPE MAINTENANCE

A. Any existing landscape items damaged or altered during construction by the Contractor shall be restored or replaced as directed by the Engineer.

B. Maintain landscape work for a period of 90 days immediately following complete installation of work or until Owner accepts project. Watering, weeding, cultivating, restoration of grade, mowing and trimming, protection from insects and diseases, fertilizing and similar operations as needed to ensure normal growth and good health for live plant material shall be included at no additional cost to the Owner.

3.04 REPAIRS TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATORS

A. Lawn areas planted under this Contract and all lawn areas damaged by the Contractor's operation shall be repaired at once by proper soil preparation, fertilizing and sodding, in accordance with these Specifications.

END OF SECTION

SECTION 02575 PAVEMENT REPAIR AND RESTORATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment, obtain County or State right-of-way permits and incidentals required and remove and replace pavements over trenches excavated for installation of water or sewer lines and appurtenances as shown on the Contract Drawings.

1.02 GENERAL

A. The Contractor shall take before and after photographs.

B. The Contractor shall repair in a manner satisfactory to the County or State, all damage done to existing structures, pavement, driveways, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, utility poles, utility pipe lines, conduits, drains, catch basin, flagstones, or stabilized areas or driveways and including all obstructions not specifically named herein, which results from this Project.

C. The Contractor shall keep the surface of the backfilled area of excavation in a safe traffic bearing condition and firm and level with the remaining pavement until the pavement is restored in the manner specified herein. All surface irregularities that are dangerous or obstructive to traffic are to be removed. The repair shall conform to applicable requirements of Manatee County Transportation Department requirements for pavement repair and as described herein, including all base, subbase and asphalt replacement.

D. All materials and workmanship shall meet or exceed the County requirements and as called for in the Contract Documents and nothing herein shall be construed as to relieve the Contractor from this responsibility.

E. All street, road and highway repair shall be made in accordance with the FDOT and County details indicated on the Drawings and in accordance with the applicable requirements and approval of affected County and State agencies.

PART 2 PRODUCTS

2.01 PAVEMENT SECTION

A. Asphaltic concrete shall consist of asphalt cement, coarse aggregate, fine aggregate and mineral filler conforming to FDOT Type S-III Asphalt. Pavement replacement thickness shall match that removed but in no case shall be less than 1-1/2" compacted thickness. All asphalt concrete pavement shall be furnished, installed and tested in accordance with FDOT Specifications for Road and Bridge Construction.

B. Asphalt or crushed concrete or approved equal base material shall be furnished and installed under all pavement sections restored under this Contract. Asphalt base shall have a minimum 6" compacted thickness, meet requirements for FDOT ABC III (Minimum Marshall Stability of 1000) and be furnished, installed and tested in accordance with the requirements of the FDOT Standards. Crushed concrete base shall be 10" minimum compacted thickness. Crushed concrete aggregate material shall have a minimum LBR of 140 compacted to 99% T-180 AASHTO density. Asphalt base and crushed concrete base are acceptable. Other bases shall be submitted for approval.

C. Prime and tack will be required and applied in accordance with Section 300 - FDOT Specifications: Prime and Tack Coat for Base Courses.

PART 3 EXECUTION

3.01 CUTTING PAVEMENT

A. The Contractor shall saw cut in straight lines and remove pavement as necessary to install the new pipelines and appurtenances and for making connections to existing pipelines.

B. Prior to pavement removal, the Contractor shall mark the pavement for cuts nearly paralleling pipe lines and existing street lines. Asphalt pavement shall be cut along the markings with a rotary saw or other suitable tool. Concrete pavement shall be scored to a depth of approximately two (2) inches below the surface of the concrete along the marked cuts. Scoring shall be done by use of a rotary saw, after which the pavement may be broken below the scoring with a jackhammer or other suitable equipment.

C. The Contractor shall not machine pull the pavement until it is completely broken and separated along the marked cuts.

D. The pavement adjacent to pipe line trenches shall neither be disturbed or damaged. If the adjacent pavement is disturbed or damaged, irrespective of cause, the Contractor shall remove and replace the pavement. In addition, the base and sub-base shall be restored in accordance with these Specifications, Florida Dept. of Transportation Standard Specifications and as directed by the Engineer.

3.02 PAVEMENT REPAIR AND REPLACEMENT

A. The Contractor shall repair, to meet or exceed original surface material, all existing concrete or asphaltic pavement, driveways, or sidewalks cut or damaged by construction under this Contract. He shall match the original grade unless otherwise specified or shown on the Drawings. Materials and construction procedures for base course and pavement repair shall conform to those of the Florida Dept. of Transportation.

B. The Contractor's repair shall include the preparation of the subbase and base, place and maintain the roadway surface, any special requirements whether specifically called for or implied and all work necessary for a satisfactory completion of this work. Stabilized roads and drives shall be finished to match the existing grade. Dirt roads and drives shall have the required depth of backfill material as shown on the Contract Drawings.

C. The width of all asphaltic concrete repairs shall extend the full width and length of the excavation or to the limits of any damaged section. The edge of the pavement to be left in place shall be cut to a true edge with a saw or other approved method so as to provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities.

3.03 MISCELLANEOUS RESTORATION

A. Sidewalks or driveways cut or damaged by construction shall be restored in full sections or blocks to a minimum thickness of four inches. Concrete curb or curb and gutter shall be restored to the existing height and cross section in full sections or lengths between joints. RCP pipe shall be repaired or installed in accordance with manufacturer's specifications. Grassed yards, shoulders and parkways shall be restored to match the existing sections with grass sod of a type matching the existing grass.

3.04 SPECIAL REQUIREMENTS

A. The restoration of all surfaces, as described herein, disturbed by the installation of pipelines shall be completed as soon as is reasonable and practical. The complete and final restoration of both paved and shell stabilized roads within a reasonable time frame is of paramount importance. To this end, the Contractor shall, as part of his work schedule, complete the restoration of any area of road within five weeks after removing the original surface. Successful leak testing shall be performed prior to restoring any area of road. All restoration and replacement or repairs are the responsibility of the Contractor.

3.05 CLEANUP

A. After all repair and restoration or paving has been completed, all excess asphalt, dirt and other debris shall be removed from the roadways. All existing storm sewers and inlets shall be checked and cleaned of any construction debris.

3.06 MAINTENANCE OR REPAIR

A. All wearing surfaces shall be maintained by the Contractor in good order suitable for traffic prior to completion and acceptance of the work.

END OF SECTION

SECTION 02601 MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Modification or conversion of existing structures as required by the construction drawings. Existing piping and equipment removal, dismantling and disposal, as required.

PART 2 PRODUCTS

2.01 PRODUCTS

A. Epoxy mortar shall be fiberglass fiber mixed with an epoxy filler.

B. Nonshrink grout shall be a sand-cement, non-metallic formulation, having a 28-day strength of 4,000 psi and 0.0 percent shrinkage per ASTM C-1090.

C. Manhole liners to be installed in existing manholes and wet wells shall be spray-applied, monolithic, reinforced urethane resin. Urethane resin-based manhole liner material shall be resistant to hydrogen sulfide gas, and other common contents found in a sanitary sewer environment.

D. Approved manhole liner products are SprayWall, Raven 405, Green Monster, and Sauereisen.

PART 3 EXECUTION

3.01 GENERAL MODIFICATION WORK

A. Cut, repair, reuse, excavate, demolish, or otherwise remove parts of the existing structures or appurtenances, as indicated on the construction drawings, or as necessary to complete the work as required. Dispose of surplus materials resulting from the above work in an approved manner. The work shall include all necessary cutting and bending of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.

B. Dismantle and remove all existing equipment, piping, and other appurtenances required for the completion of the work. Where called for or required, cut existing pipelines for the purpose of making connections thereto.

C. Anchor bolts for equipment and structural steel to be removed shall be cut off one inch below the concrete surface. Surfaces shall then be refinished using non-shrink grout or epoxy mortar or as indicated on the construction drawings. Repairs to the interior surfaces of existing concrete structures in sanitary sewers shall be made with epoxy mortar. Repairs to be made on other existing concrete surfaces using non-shrink grout shall be made using a bonding agent such as Acrylbond by Concrete Producers Solutions or an equal approved by the County. Remove all dirt, curing compounds, sealers, paint, rust, or other foreign material, and etch with muriatic acid solution. Flush with clean water and while still damp, apply a coating of the bonding agent. Place the new grout patch onto the treated area immediately.

D. At the time that a new connection is made to an existing pipeline, additional new piping, extending to and including a new valve, shall be installed. Pipe restraint devices, if required, shall also be installed as required. At the time when a new potable or reclaimed water service is installed, a pipe locator tracer wire shall be installed and connected to the tracer wire at the main.

E. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or otherwise altered except with the express approval of and only to the extent approved by the County. All existing valve boxes, fire hydrants, air release valve cabinets, and manholes shall be relocated to meet the new finished grade elevations after construction.

F. When removing materials or portions of existing utility pipelines or structures or when making openings in walls and partitions, take all precautions and use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work, and not to damage the structures or contents by falling or flying debris. Unless otherwise approved by the County, saw-cutting, rotary core-boring, or line drilling will be required in removing material from existing concrete structures or pipes.

G. Materials and equipment removed in the course of making alterations and additions shall remain the property of the County, except that items not salvageable, as determined by the County, shall be disposed of off the work site.

H. All alterations to existing utility pipes and structures shall be done at such time and in such a manner as to comply with the approved time schedule. Before any part of the work is started, all tools, equipment, and materials shall be assembled and made ready so that the work can be completed without delays.

I. All cutting of existing concrete or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective section of these Standards covering the new work. When not covered, the work shall be carried on in the manner and to the extent directed by the County or per the construction drawings.

J. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.

K. Non-shrink cementitious grout shall be used for setting wall castings, sleeves, leveling pump bases, and doweling anchors into existing concrete and elsewhere as shown on the construction drawings. The surface to which grout is to be applied shall be wetted to facilitate good bonding.

L. Where necessary or required for the purpose of making connections; cut existing pipelines in a manner to provide an approved joint. Where required, use flanges, couplings, or adapters, all as required.

M. Provide flumes, hoses, piping, pumps and well points, and other related items to divert or provide suitable plugs, bulkheads, or other means to hold back the flow of water or other liquids, all as required in the performance of the work.

N. Care shall be taken not to damage any part of existing buildings or foundations or outside structures.

O. Prior to entering confined spaces in sanitary sewer structures, conduct an evaluation of the atmosphere within, in accordance with local, state, and federal regulations. Provide ventilation equipment and other equipment as required to assure safe working conditions.

3.02 CONNECTING TO EXISTING PIPING AND EQUIPMENT

A. Verify exact location, material, alignment, joint, etc. of existing piping and equipment prior to making the connections called out in the construction drawings. The verifications shall be performed with adequate time to correct any potential alignment or other problems prior to the actual time of connection. The County Inspector must be present for all tie-ins for a visual inspection.

3.03 REMOVAL AND ABANDONMENT OF ASBESTOS CEMENT PIPE AND APPURTENANCES

A. All work associated with the removal or abandonment of existing asbestos cement pipe and appurtenances shall be performed by a licensed asbestos removal Contractor registered in the State of Florida.

B. The asbestos Contractor shall contact the appropriate regulatory agencies prior to removal or abandonment of any asbestos material and shall obtain all required permits and licenses and issue all required notices. The cost for all fees associated with permits, licenses and notices to the governing regulatory agencies, shall be borne by the asbestos Contractor.

C. All work associated with removal or abandonment of asbestos cement pipe and appurtenances shall be performed in accordance with the standards listed below and all other applicable local, State, or Federal standards.

1. Florida Administrative Code, Chapter 62-257, ASBESTOS PROGRAM.
2. Title 40 CFR, Part 61, Subpart M, NATIONAL EMISSION STANDARD FOR ASBESTOS.
3. Occupational Safety and Health Act, Title 29 CFR.
4. Title 40 CFR, Part 763, ASBESTOS.
5. Florida Statute Title XXXII, Chapter 469, ASBESTOS ABATEMENT.

D. All asbestos cement pipe sections indicated on the construction drawings to be removed, and all related valves, fittings and appurtenances shall be removed in their entirety and disposed of by the asbestos Contractor in accordance with this Section. After removal of the pipelines, all excavations shall be backfilled in accordance with the applicable provisions of the Trenching and Excavation Section of these Standards. The cost of disposing of the removed materials shall be borne by the asbestos Contractor.

E. The cutting of existing asbestos-cement (A/C, a.k.a. "Transite") pipe shall be by hand tools only. No powered machine cutting is allowed. Removal of all fragments of pipe shall be double bagged prior to shipment. Longer sections of pipe removed may be shipped without double bagging. An asbestos manifest form must accompany each shipment of such pipe or pipe material waste to the Manatee County Lena Road Landfill. Prior to each shipment, a minimum of 24 hours notice to the Landfill field office (telephone 941 748 5543) is required.

3.04 IN-PLACE GROUTING OF EXISTING PIPE

A. Where water and wastewater utility pipes are to be abandoned in place, they shall be filled with a non-shrinking sand-cement grout. When such pipes are made of asbestos-cement materials, the abandonment activities shall be performed by a licensed asbestos Contractor. It is completely the Contractor's responsibility to obtain all regulatory clearances and provide documentation in cases where they have determined that an asbestos-cement pipe abandonment activity by in-place grouting does not require a licensed asbestos Contractor.

B. The ends of the pipe sections to be grout-filled shall be capped or plugged with suitable pipe fittings. The grout material shall be of suitable properties and the pumping pressure shall be such that the pipe sections are filled completely with grout.

C. The County shall be given timely notice so that the County's representative may be present to monitor all pipe grouting operations. Provide standpipes and/or additional means of visual inspection as required to determine if adequate grout material has filled the entire pipe sections.

3.05 SPRAY-APPLIED MANHOLE LINERS

A. Use a high-pressure water spray to remove all foreign material from the walls and bench of the manhole. Loose or protruding masonry materials shall be removed using a hammer and chisel. Fill any voids, holes or cracks with epoxy mortar to form a uniform surface. Place covers over all pipe openings to prevent extraneous material from entering the pipes. Block or divert sewer flow from entering the manhole. Any infiltration leaks shall be stopped by using such methods as approved by the County.

B. The liner material shall be sprayed onto the invert, bench and wall areas. The sprayed-on material shall be applied such that the entire manhole is lined with a structurally enhanced monolithic liner. The thickness of the wall liner material shall be such that it will withstand the hydraulic load generated by the surrounding groundwater table, using a factor of safety of two, and using the assumption that the groundwater table is at the level of the top of the structure. The invert and bench liner material shall be the same thickness as that required for the base of the wall.

C. Special care shall be used to provide a smooth transition between the intersecting pipelines and the manhole inverts such that flow is not impaired. Remove concrete material from the existing manhole base channel in depth to the required thickness of the new liner material.

D. No active sewer flow shall be allowed in the newly lined manhole, nor shall any vacuum tests be performed, until the liner material has had adequate time to cure, as recommended by the liner material manufacturer.

3.06 CONNECTION TO EXISTING MANHOLES

A. Where required or as indicated on the construction drawings, make connection of new pipelines to existing manhole structures. If pipe stub-outs of the correct size and position are not available, make connections by removing a portion of the manhole wall by mechanical rotary core boring. The connection between pipe and concrete manhole shall be complete with resilient seals meeting the requirements of ASTM C 923.

B. A new channel shall be formed in the manhole base by removing and reforming or by providing new concrete to convey the new flow into the existing channel in accordance with the standard requirements for new sewer manhole structures. Flow direction shall not change by more than 90 degrees within the manhole base.

C. Repair internal coating of existing manholes cored during tie-in of new sewers by applying approved coating material as listed above in accordance with the manufacturer's recommendations. If existing manhole has an internal coating other than that listed above (e.g. epoxy coating), sandblast the interior of the existing manhole and apply an approved coating in accordance with the manufacturer's recommendations.

3.07 WARRANTY FOR MANHOLE AND WETWELL LINERS

A. Install the coating systems per manufacturer's recommendation and completely protect the structure from corrosion. The liner or coating systems must extend and seal onto manhole ring, seal onto and around pipe openings, and any other protrusions, completely cover the bench and flow invert. Provide a 5-year unlimited warranty on all workmanship and products. The work includes the surface preparation and application of the coating or liner system, and shall protect the structure for at least 5 years from all leaks and from failure due to corrosion from exposure to corrosive gases such as hydrogen sulfide.

END OF SECTION

SECTION 02602 TRENCHING AND EXCAVATION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Excavate for utility pipelines, valves and fittings, manholes, utility vaults and pump stations. Dewater underground soils to elevations as required to allow the installation of pipe lines, beddings, foundations and structures. Store excavated soil materials that are suitable for use as backfill. Dispose of excavated soil materials that are either unsuitable for use as backfill or will not be required for fill on the project site. Import suitable soil materials or granular rock materials as required to provide suitable backfill, bedding or foundation materials. Place and compact bedding and foundation materials and install utility structures. Place and compact backfill materials to finished grades. Provide other materials and labor as required to complete the utility work as indicated on the construction drawings.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

A. Clear and grub the areas within rights-of-way and utility easements where utility structures will be installed. Completely remove and dispose of all buildings, foundations, materials, rubbish, debris, trees, brush, stumps, roots, or any other obstructions on or buried near the surface of the ground. Remove roots and other obstructions to a depth of at least 12 inches below the surface.

3.02 DEWATERING

A. The construction of pipelines, structures, foundations, beddings, and the placement of backfill materials shall be in dry or dewatered subsurface soil conditions. Where the existing groundwater piezometric elevation is higher than 18 inches below the bottom of the proposed excavation, use well points, wells, pumps and other approved methods to lower the groundwater level to 18 inches below the elevation of the proposed excavation bottom. Excavation for pipelines and structures shall not proceed unless or until the existing groundwater levels have been lowered to at least 18 inches below the intended lowest elevation of the digging operation.

B. Dewatering operations shall continue while the pit is open and while structure placement and construction is taking place and while backfilling and compaction is accomplished. At all times during the construction operations, the groundwater levels shall be maintained at an elevation 18 inches below the lowest level where structures are being installed.

C. Divert surface water flows as necessary to prevent surface water from entering the open excavations.

D. Discharged flows from dewatering operations shall be disposed of in a manner consistent with US EPA, FDEP, and SWFWMD regulations.

3.03 PROTECTION OF EXISTING STRUCTURES

A. Where excavations are made and underground utility structures are constructed in close proximity to existing structures, take all reasonable precautions and measures to prevent damage to such structures. Existing building foundations and existing utility structures shall be monitored during the construction operations and any movement of these structures shall be reported to the County's authorized representative. When any movement of existing structures has been detected, immediately take any and all remedial measures required to effect the protection and prevent damage to the structures.

B. Existing structure protection measures shall include, but shall not be limited to the installation of sheet piling, or other shoring methods or materials as needed, maintenance of the groundwater piezometric elevation, and control of the vibrations from construction operations. Where existing utility pipelines or structures are situated vertically above a line from the base of the excavation pit or trench along an angle of repose of the soil, or where an existing utility crosses a trench transversely, take reasonable measures to protect and support these structures during the construction operations.

3.04 EXCAVATION

A. Excavate trenches and pits for structures to the elevations indicated on the construction drawings. Take special care to avoid over-excavating or disturbing the bottom of the trench or pit, so that the soil at the bottom of the hole remains in a naturally compacted condition. Excavate to widths sufficient to provide adequate working room to install the required structures. Do not excavate the final layer of soil to the designed grade until just before placing the bedding, foundation, pipe, structure, or masonry work required. Remove boulders, rocks, logs or any unforeseen obstacles encountered.

B. In case the foundation soil found at the bottom of the trench or pit is soft, plastic or mucky, or does not conform to the soils classification specified as suitable foundation material, over-excavation to a greater depth will be required. Soils not meeting the classification required for foundation material shall be removed to a depth at least four inches below the bottom of the pipe, bedding or structure bottom elevation. Rock, boulders or other hard or lumpy material shall be removed to a depth 12 inches below the bottom of the pipe, bedding or structure bottom elevation. Remove muck, clay or other soft material to a depth as needed to establish a firm foundation.

C. Where possible, the sides of trenches should be vertical up to at least the spring line of the installed pipe.

D. Trench excavation shall be performed in accordance with Florida Statute Title XXXIII, Chapter 553, Part III, Trench Safety Act.

3.05 BACKFILL MATERIALS

A. Bedding: Shall conform to FDOT Standard Specifications for Road and Bridge Construction, Section 901 Coarse Aggregate, and shall be either coarse aggregate of Size No. 57 or coarse sand of Size No. 9. Washed shell may be used as alternate bedding material if it meets Size No. 57 specifications.

B. Structural Fill: Shall be either soil classification A-1, A-2 or A-3, per AASHTO M-145, and shall be free of organic matter, lumps of clay or marl, muck, compressible materials, and rock exceeding 2.5 inches in diameter. Broken concrete, masonry, rubble or other similar materials shall not be used as backfill.

C. Selected Common Fill: Shall have the same material classification and requirements as Structural Fill, as per Paragraph 2.06B above.

D. Common Fill: Shall be either soil classification A-1, A-2, A-3, A-4, A-5 or A-6, per AASHTO M-145, and shall be free of organic matter, lumps of clay or marl, muck, compressible materials and rock exceeding 2.5 inches in diameter. Broken concrete, masonry, rubble or other similar materials shall not be used as backfill.

E. Unsuitable Material: Soil classification A-7 and A-8, per AASHTO M-145, shall not be used as backfill material.

3.06 BACKFILL

A. Backfill materials shall be placed on solid, firm, naturally compacted or compacted, dry or dewatered in-place soil foundations.

B. Where over-excavation is required due to nonconforming soil classification or rocky, unstable, or otherwise undesirable soil conditions, place Structural Fill or Selected Common Fill in the over-excavated zone up to the base of the bedding material layer. Compact the over-excavated zone to a density approximately the same as the natural material into which the trench or pit was cut.

C. When backfilling in an over-excavated zone where moist or watery conditions exist, backfill shall be coarse No. 9 sand or a mixture of No. 57 coarse aggregate with either No. 9 coarse sand, A-1, or A-3 material.

D. After compaction, backfill material in the over-excavation zone shall form a solid and firm foundation on which to build up successive layers of backfill and structures.

E. Bedding materials shall be placed on solid, firm soil foundations and shall be compacted to a density approximately the same as the natural material into which the trench or pit was cut.

F. Concrete and masonry structures shall be backfilled using Structural Fill. Backfilling and compaction shall be carried up evenly on all walls of an individual structure simultaneously. The maximum allowable difference in backfill elevations shall be two feet. No backfilling shall be allowed against concrete or masonry walls until the walls and their supporting slabs have been in place at least seven days or until the specified 28-day strength has been attained. Compaction of Structural Fill shall be 98 percent of the maximum dry density of the material as determined by AASHTO T-180. The Structural Fill shall be either dried or shall have water added so that the moisture content of the material is within a range that will allow the required density to be achieved.

G. Trenching backfill for pipe installation shall be Selected Common Fill for the pipe bedding zone. The pipe bedding envelope shall begin at the level four inches, six inches, or nine inches, depending on pipe diameter, below the bottom of the pipe, and shall extend vertically up to a level 12 inches above the top of the pipe. Where the in-place soil material within the four inch, six inch, or nine inch pipe bedding zone beneath the bottom of the pipe meets the soil classification for Selected Common Fill, undercutting of the trench below the bottom of the pipe will not be required. In this case, loosen the soil in the bottom of the trench immediately below the middle third of the pipe diameter, and place the pipe upon it. Where the in-place soil material within the pipe bedding zone does not meet the soil classification for Selected Common Fill, undercutting shall be required, and the bedding zone shall be backfilled with Selected Common Fill. In this case, place the pipe bedding material and leave it in a moderately firm uncompacted condition under the middle third of the pipe diameter, and compact

the outer portions of the trench bottom to 98 percent of the maximum dry density. Soils that were over-excavated due to rocky, soft or otherwise unsuitable soil foundation conditions shall also be replaced with Selected Common Fill. Compaction of Selected Common Fill shall be 98 percent of the maximum dry density as determined by AASHTO T-180. Such backfill material shall have an optimized moisture content that will allow the required density to be achieved.

H. Pipe sections for gravity flow systems shall be laid with spigots downstream and bells upstream. Excavate for pipe bells before laying pipe. Lay pipe true to the lines and grades indicated on the construction plans. Place backfill material on both sides of the pipe and compact. Take special care to effect the filling and compaction of material in the haunch areas under the sides of the pipe.

I. For pipes that are not installed under roadways or driveways, trenching backfill for pipe installation shall be Common Fill above the pipe envelope zone, and shall be compacted to 98 percent of the maximum dry density of the material as determined by AASHTO T-180, and shall have moisture content optimized to allow the required density. For pipes that are installed under roadways or driveways, trenching backfill for pipe installation shall be Selected Common Fill above the pipe envelope zone, and shall be compacted to 98 percent of the maximum dry density of the material as determined by AASHTO T-180, and shall have moisture content optimized to allow the required density. Selected Common Backfill shall be placed in layers not to exceed 6 inches. Common Backfill shall be placed in layers not to exceed 12 inches.

J. Backfill compaction tests shall be performed every 500 feet in pipe line trenches and for every fifth structure for utility structures. Test reports shall be presented to the County Inspector.

3.07 GRADING AND CLEANING UP

A. Surplus and unsuitable soil materials not used on-site shall be removed and disposed of off-site in a manner that is consistent with state and local regulations. In no case shall surplus or unsuitable material be deposited on-site or on adjacent lands.

B. The surface of backfilled areas shall be graded smooth and true to the lines and grades indicated on the construction plans. No soft spots or uncompacted areas shall be allowed in the work.

C. Upon completion of the work, leave the work areas and all adjacent areas in a neat and presentable condition, clear of all temporary structures, rubbish and surplus materials. Pile any salvageable materials that have been removed in neat piles for pickup by County crews, unless otherwise directed.

END OF SECTION

SECTION 02603 DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install ductile iron pipe, restrained joint ductile iron pipe and cast iron or ductile iron fittings, complete, as indicated on the construction drawings.

B. Provide and install complete, all fittings and appurtenances not noted specifically on the construction Drawings as required to complete the utility system in accordance with these Standards.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ductile iron pipe shall conform to AWWA C150 and AWWA C151. Pipe shall be Pressure Class 350. All ductile iron pipe used in above ground applications shall be Special Thickness Class 53. The pipe exterior coating shall be a standard 1 mil asphaltic coating per AWWA C151. All ductile iron pipe shall be clearly marked on the outside pipe barrel to readily identify it. All pipe materials used in potable water systems shall comply with NSF Standard 61.

B. Unrestrained joint pipe shall be supplied in lengths not to exceed 21 feet and shall be either the rubber-ring compression-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 an approved equal.

C. All fittings shall be pressure rated for 350 psi for sizes 4 to 24 inches and 250 psi for sizes 30 inches and larger and shall meet the requirements of AWWA C110 or AWWA C153.

D. Rubber gaskets shall conform to AWWA C111 for mechanical and push-on type joints and shall be Ethylene Propylene Diene Monomer (EPDM) 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 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.

E. Water Mains and Reclaimed Water Mains: All ductile iron pipe used in water and reclaimed water systems shall have a standard thickness cement lining on the inside in accordance with AWWA C104. All ductile iron or gray iron fittings used in water and reclaimed water systems shall have standard thickness cement linings on the inside per AWWA C104 and an asphaltic exterior coating or they shall have factory-applied fusion bonded epoxy coatings both inside and outside in accordance with AWWA C550.

F. Sewer Mains: All ductile iron pipe and all ductile iron and cast iron fittings used in wastewater sewer systems shall have a factory applied fusion bonded minimum dry film thickness 40-mil Protecto 401 or 40-mil SP2000W Amine Cured Novalac ceramic epoxy lining on the inside in accordance with the manufacturer's specifications. The interior lining application is to be based on the manufacturer's recommendation for long-term exposure to raw sewage. To ensure a holiday-free lining,

documentation must be provided, prior to shipment, showing each section of lined pipe has passed holiday testing at production per ASTM G62 with a minimum 10,000 volt charge. The lining shall have a minimum ten year warranty covering failure of the lining and bond failure between liner and pipe.

G. Ductile iron or cast iron pipe and fittings used in sewer systems shall have either an asphaltic coating per AWWA C151 or a factory-applied fusion-bonded epoxy exterior coating.

H. Thrust restraint devices shall be provided at all horizontal and vertical bends and fittings, in casings under roads and railroads and at other locations as indicated on the construction drawings. Thrust 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 by these Standards. Restrained joint pipe fittings shall be designed and rated for the following pressures:
   1. 350 psi for pipe sizes up to and including 24-inch diameter.
   2. 250 psi for pipe sizes 30-inch diameter and above.

PART 3 EXECUTION

3.01 DETECTION

A. Pipe shall have a 3-inch wide warning tape of the proper color placed directly above the pipe 12 inches below finished grade or a 6-inch warning tape between 12 inches and 24 inches below finished grade.

B. Pipe shall have a No. 10 gauge solid, insulated wire of proper color installed along the pipe alignment as detailed in these standards.

3.02 IDENTIFICATION

A. Each length of pipe and each fitting shall be marked with the name of the manufacturer, size and class, lining type, 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. Pipe may not be entirely polyethylene wrapped if soil testing, which is performed by the Engineer of Record or the Contractor in accordance with AWWA C105, indicates that the soil at the site is not corrosive. If soil testing indicates that the soil at the site is not corrosive, polyethylene may be spiral wrapped with a six-inch minimum spacing or the ductile iron pipe (DIP) may be painted with a minimum 1-inch wide color coded stripe on the top and both sides of the DIP.

END OF SECTION

SECTION 02604 POLYETHYLENE (HDPE) PIPE AND FITTINGS 4-INCH DIAMETER AND LARGER

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install high density polyethylene (HDPE) pressure pipe, fittings and appurtenances as indicated on the construction drawings.

B. Provide and install complete all fittings and appurtenances not noted specifically on the construction plans as required, to complete the utility system in accordance with these Standards.

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyethylene pipe, 4-inch diameter and larger, shall be high-density PE 3408 polyethylene resin per ASTM D3350, Cell Classification 345464C, Class 160, DR 11, CPChem DriscoPlex 4000, 4300 or 4500 or an approved equal, meeting the requirements of AWWA C906. All pipe materials used in potable water systems shall comply with NSF Standard 61.

B. Outside diameters of water, reclaimed water and pressure sewer HDPE pipes shall be ductile iron size (DIPS).

C. 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.

D. Flanged joints, mechanical joints and molded fittings shall be in accordance with AWWA C906.

PART 3 EXECUTION

3.01 DETECTION

A. Direct buried HDPE pipe shall have 3-inch warning tape of the proper color placed directly above the pipe and 12 inches below finished grade or 6-inch warning tape between 12 inches and 24 inches below finished grade.

B Direct buried or horizontal directional drilled HDPE pipe shall also have a No. 10 gauge solid, insulated wire of proper color installed along the pipe alignment as detailed in these Standards.

3.02 IDENTIFICATION

A. Pipe shall bear identification markings in accordance with AWWA C906.

B. Pipe shall be color coded blue for water, purple (Pantone purple 522 C) for reclaimed water or green for pressure sewer using a solid pipe color or embedded colored stripes. Where stripes are used, there shall be a minimum of three stripes equally spaced.

END OF SECTION

SECTION 02606 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install the PVC piping, iron fittings and other appurtenances complete and ready for use as indicated on the construction drawings.

B. Provide and install complete all fittings and appurtenances not noted specifically on the construction plans as required, to complete the utility system in accordance with these Standards.

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyvinyl chloride (PVC) pressure pipe, 4 to 12 inches in diameter, shall be Class 235, DR 18, meeting the requirements of AWWA C900 and shall have cast-iron pipe-equivalent (CI) outside diameters (also known as ductile iron pipe size (DIPS) outside diameter). Each length of pipe shall be hydrostatically tested to four times its pressure class of the pipe by the manufacturer in accordance with AWWA C900.

B. Polyvinyl chloride (PVC) pressure pipe, 14 to 48 inches in diameter, shall be cast-iron-pipe-equivalent (CI) outside diameter and shall meet the requirements of AWWA C905. Pipe used in water and reclaimed water service shall be DR 18 and Pressure Rated 235. Pipe used in sewer force mains shall be DR 21 and Pressure Rated 200. Each length of pipe shall be hydrostatically tested at twice its Pressure Rating in accordance with AWWA C905. Pipe shall be furnished in standard lengths of approximately 20 feet.

C. Polyvinyl chloride (PVC) pressure pipe, 2 to 3 inches in diameter, shall be Pressure Rated 200, SDR 21, conforming to ASTM D 2241, and shall have Iron Pipe Size (IPS) outside diameters. SDR 21 PVC pipe 2 to 3 inches in diameter shall not be used for working pressures greater than 125 psi. PVC pipe shall not be used in applications which require pipes that are less than 2 inches in diameter for wastewater force mains. PVC pipe shall not be used in applications which require pipes that are less than 3 inches in diameter for potable water piping and reclaimed water piping.

D. Standard PVC pressure pipe joints shall be bell and spigot push-on type with elastomeric ring seals. Ring seal gaskets used at push-on joints shall conform to ASTM F477 and shall be EPDM rubber for potable and reclaimed water pipes.

E. Lubricant furnished for lubricating the push-on joints in potable water pipes shall be nontoxic, water soluble, shall not support the growth of bacteria, shall have no deteriorating effects on the gasket or pipe material, and shall not impart color, taste, or odor to the water, and shall be an approved substance per NSF 61.

F. Thrust restraint devices shall be provided at all horizontal and vertical bends and fittings, in casings under roads and railroads and at other locations as indicated on the construction drawings. Thrust restraint devices for PVC pipe and fittings 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, 2000PV, 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 bends or fittings at distances as required by these Standards.

G. All fittings for PVC pipe shall be ductile iron or gray iron with mechanical joints and shall conform to AWWA C110 or AWWA C153 and to the applicable sections of these Standards for ductile iron and gray iron fittings.

H. All pipe materials used in potable water systems shall comply with NSF Standard 61.

I. With the exception of air vent piping for force main above ground air release valves, no plastic piping shall be threaded into metal valves, fittings, or couplings.

PART 3 EXECUTION

3.01 DETECTION

A. Direct buried pipe shall have 3-inch warning tape of the proper color placed directly above the pipe 12 inches below finished grade or 6-inch warning tape between 12 inches and 24 inches below grade.

B. PVC pipe shall have a No. 10 gauge solid, insulated wire of proper color installed along the pipe alignment as detailed as detailed in these Standards.

3.02 IDENTIFICATION

A. PVC pipe shall bear identification markings in accordance with AWWA C900, AWWA C905 or ASTM D2241.

B. PVC pipe shall be color coded blue for water, purple (Pantone purple 522C) for reclaimed water or green for pressure sewer using a solid pipe color pigment.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Timely notice shall be given to the County Inspector of approvals or observations which may be required, and a time and date for a field visit shall be scheduled. Provide all materials, equipment, supplies and labor as required to complete the testing or inspection operations. Should any test fail, the causes of failure shall be corrected, and the work shall be retested until all test requirements have been successfully met.

B. Field tests or observations which require the presence of a County Inspector shall be scheduled on week days during normal working hours. A minimum of two full days' notice, not counting weekends, shall be provided to the inspector in advance of when the test is to be conducted. Any requests for emergency test scheduling must be made in writing, stating why the test should be scheduled ahead of tests for other jobs.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PIPELINE INSPECTIONS

A. During the County Inspector's routine inspections of construction, the County Inspector shall observe that the pipe interior, fittings, valves and other appurtenances are thoroughly cleaned of all dirt, debris and obstructions before being lowered into the trenches; and that the interior of all pipelines are kept clean during and after installation; and that all open pipe ends are securely plugged or capped water-tight when construction stops during the day, or during lunch, or overnight or during long periods of inactivity.

B. Pipelines bedded and laid in the trenches shall be observed by the County Inspector prior to beginning backfill and compaction operations. All thrust restraint devices on pressure pipelines shall be checked and approved by the County Inspector before backfilling.

3.02 COMPACTION TESTING

A. Granular earth backfill materials shall be tested for percentage of compaction every 500 feet in pipeline trenches and for every fifth excavation for structures.

B. Backfill compaction testing shall be done in accordance with either AASHTO T-180, the Modified Proctor Method, unless otherwise approved by the County.

3.03 MATERIALS CLASSIFICATION

A. Soils and soil-aggregate mixtures used as backfill materials shall be identified according to the AASHTO system, designation M-145.

3.04 FLOW TESTS

A. Measurements of static, pitot, and residual pressures and available fire flow, for use in the design of water distribution systems, shall be made using the two-hydrant method (or additional hydrants as required) as described in AWWA Publication M17, "Installation, Field Testing, and Maintenance of Fire Hydrants".

3.05 HYDROSTATIC TESTING OF PRESSURE PIPELINES

A. After the water mains, reclaimed water mains or sewer force mains are installed complete, and the fire hydrants, valves, fittings, blow-offs and restraining devices are permanently installed, and the trenches are backfilled, the new pipelines shall be tested hydrostatically for leakage.

B. The County Inspector shall have been notified and shall be present during hydrostatic testing procedures. The Contractor and an Engineer of Record representative shall also be present during the tests.

C. All excavations for any utility pipes or cables within the rights-of-way or easements must be complete before a hydrostatic test is performed. Any subsequent digging or boring across the water, sewer or reclaimed pipelines after they have been tested shall result in a requirement for the pipelines to be retested.

D. All mains to be tested shall be cleaned as specified in these Standards to remove all dirt, stones, pieces of wood or any other material which may have entered the lines during construction. Refer to Section 02609.03 of these Standards. For reclaimed water mains and potable water mains also refer to Section 02609.04O of these Standards. Any obstructions remaining shall be removed.

E. Pipelines to be tested shall have been allowed to remain in place undisturbed for at least 24 hours to allow time for all joints to develop a complete seal. All potable water services and reclaimed water services are to be connected to the curb stop and meter resetter, with meter box set at grade, as shown in standard details UW-19, and UW-18, during the test. The service lines should be the correct length so that they will be one foot inside the right-of-way line when they are installed. Gate valves on fire hydrant laterals shall be opened so that the test pressure bears against the closed hydrant valve.

F. Discharged flows from cleaning or flushing operations shall be disposed of in a manner consistent with US EPA, FDEP, and SWFWMD regulations.

G. Only one connection to the existing water supply system shall be allowed prior to acceptance of the main. Connection shall be made through an approved backflow prevention device. Air shall be expelled completely from the section of pipeline to be tested. If permanent air venting valves are not installed at high points along the line, corporation cocks shall be installed at these points to expel the air completely as the line is filled with water. After the hydrostatic test has been successfully completed, the corporation stops, located at the temporary jumper connection, are to be closed and plugged with brass or PVC stops.

H. The hydrostatic test duration shall be at least two hours. The test pressure at the beginning of the test shall be 180 psi for water mains and reclaimed water mains, and shall be 150 psi for sewer force mains. The water supply, and the water supply pump, shall be disconnected during the test. The test pressure shall not vary by more than plus or minus 5 psi during the test. If the pressure drops 5 psi, makeup water shall be pumped into the test pipeline section during the test duration to maintain the pressure to within 5 psi of the test pressure and the amount of leakage measured. At the end of the test, the line shall be repumped again back to 180 psi for water mains and reclaimed water mains, and shall be 150 psi for sewer force mains and the amount of leakage measured and added to any previous leakage determined during an earlier portion of the test. The total amount of makeup water added shall be measured and shall be compared to the allowable leakage.

I. The allowable leakage measured during the test duration for DI and PVC pipe shall be as determined by the following formula:

$L = SD\sqrt{P}/133{,}200$ where,

L = testing allowance (makeup water), gallons per hour
S = length of pipe tested, feet
D = nominal pipe diameter, inches
P = test pressure, psi (gage)
or, as determined by Table 6A of the Hydrostatic Testing section of AWWA C600.

J. The maximum length of pipe to be hydrostatically tested shall be 2,600 feet. If an exception to this rule is granted by the County's authorized Public Works Department representative, and a length of pipeline greater than 2,600 feet is tested, the allowable leakage will still be figured for a 2,600 foot length of pipe line.

K. Forcemains shall be pressurized for testing between the valve vault valves at the pumping station and the valve at the termination to the existing forcemain system or at the termination to the gravity system manhole.

L. Any exposed pipe sections, valves, fittings, hydrants, services and pipe joints shall be carefully observed during the test duration. All visible leaks shall be repaired, regardless of the amount of leakage.

M. Any damaged or defective pipeline components that are discovered after the hydrostatic testing shall be repaired or replaced with standard materials, and the test shall be repeated until a satisfactory test result is achieved. Any modifications to the new pipeline made after a successful hydrostatic test has been performed shall be cause for a new hydrostatic test of the same pipeline to be performed again.

N. No pipeline installation shall be accepted if the amount of make up water is greater than the allowable leakage. In the event of a failed test result, locate all leaks and make repairs or replacements as required, and retest the pipeline until the leakage is within the allowable limit.

O. When the test has been completed successfully, blow off the pressure from the opposite end of the line from the water supply connection, to demonstrate the limits of the length of pipeline subjected to testing. Also flush water from all hydrants, services and blow-offs, to demonstrate that they were on-line during the test.

P. The section of pipeline being tested shall be identified on the charge sheet. The Station numbers from the construction survey shall be used to describe the extent of the tested pipelines, if available. The exact lengths and sizes, and the precise extents of the tested pipelines, and the particular valves being tested against, must all be identified clearly on the charge sheet. A copy of the charge sheet shall be provided to the Engineer of Record's and the Contractor's representative.

Q. A punch list shall be made at the end of all tests.

R. Hydrostatic Testing for HDPE Pipelines:

1. For pressure pipelines laid wholly or partly using HDPE pipe, a modified hydrostatic test is required. In the modified test, the pipeline shall be cleaned, flushed, filled and vented, and otherwise prepared for testing similar to other types of pipeline materials; but, prior to the test, an initial expansion period at test pressure shall be allowed, during which the HDPE pipe shall be allowed to stretch and assume an equilibrium volume against the applied pressure. During the expansion period, make-up water shall be added to the pipeline to maintain the test pressure.
2. After the initial expansion period, the test shall commence, and shall proceed in accordance with the methods presented in Chapter 2, "Inspections, Tests and Safety Considerations" of the Handbook of Polyethylene Pipe, Plastics Pipe Institute, or with the pipe manufacturer's written directions for the size and class of pipe installed, unless otherwise approved by the County. The allowable volume of make-up water shall be as prescribed in Table 3, "Test Phase Make-up Amount" of Chapter 2. If the amount of make-up water exceeds the amounts listed in the Table, the pipeline shall not be accepted. Locate and repair the cause of the excessive leakage and retest the pipeline. Repair all visible leaks regardless of the amount of leakage.

3.06 BACTERIOLOGICAL TESTING

A. After the new potable water pipelines have been hydrostatically tested, or after existing potable water pipelines have been modified or repaired, they shall be cleaned, disinfected and sampled and tested for the presence of coliform organisms in accordance with AWWA C651.

B. The County Inspector shall have been notified and shall be present at the time of the introduction of the chlorine disinfectant and water from the supply system into the main, refer to Standard Details UW-21 and UW-22.

C. At the end of the chlorine contact period, the chlorine residual shall be determined by sampling and testing, and the results shall be reported to the regulatory agencies with the County and State. The pipelines shall then be flushed thoroughly with clean potable water until chlorine measurements show that the concentration is no higher than the chlorine concentration that is acceptable for domestic use, refer to Standard Details UW-21 and UW-22.

D. Discharge flows from cleaning or flushing operations, and heavily chlorinated water from disinfecting operations, shall be disposed of in a manner consistent with US EPA, FDEP and SWFWMD regulations.

E. After final flushing and before the new main is connected to the distribution system, sampling and analysis of the replacement water shall be performed by an approved laboratory or by the Department of Health. Sampling locations shall be as required by AWWA C651 or as determined by the Health Department representative. Pipelines that are tested and return an unsatisfactory test result shall be reflushed and resampled, or re-disinfected, or otherwise reconditioned, until a satisfactory result is attained, refer to Standard Details UW-21 and UW-22.

F. No potable water main shall be placed into service until the results of the bacteriological tests are satisfactory and the Department of Health has provided the County with a written letter of acceptance. Potable water services and fire hydrant leads that are exempt from a permit from the Florida Department of Health but still require bacteriological sampling, in accordance with Chapter 62-555, Florida Administrative Code, shall not be placed into service until the results of the bacteriological tests are satisfactory and the Manatee County Public Works Department Engineering Division has provided written acceptance.

3.07 INSPECTION OF PRECAST CONCRETE STRUCTURES

A. Precast concrete manhole bases, sections and tops, utility vaults, and wet wells shall be subject to inspection and approval by the County.

B. The County Inspector will carefully examine the structures for compliance with ASTM C 478, these Standard, and the manufacturer's Shop Drawings. All structures will be inspected for dimensions, cracks, voids, blisters, roughness, soundness, scratch strength, and general appearance. There shall be no visible leaks within the manholes, utility vaults and wet wells.

C. Structures with minor imperfections may be repaired, subject to the approval of the County's Representative, after demonstration by the manufacturer that such repairs will result in strong and permanent restorations. All visible leaks in the manhole structures shall be repaired. Repair leaks by injecting grout using Avanti Multi-Grout AV-202, AV-118, or equal approved by Manatee County. The County Inspector shall have been notified and shall be present during the repair and retesting. Repairs shall be carefully examined by the County Inspector before final approval by the County.

3.08 AIR TESTING OF GRAVITY SEWER MAINS

A. Gravity sewer pipes shall be tested for leakage by performing the low-pressure air test. The County Inspector shall have been notified and shall be present during the pressure test.

B. All excavations for any utilities or cables within the rights-of-way or easements must be complete before a low-pressure air test is performed. Any subsequent digging or boring across the gravity sewer pipes after they have been tested shall result in a requirement for the sewer system to be retested.

C. The sewer pipes to be tested shall be flushed and cleaned prior to the test to remove dirt, debris or obstructions.

D. Each pipe section tested shall be the length of pipe between two manholes. The ends of all branches, laterals, tees, wyes and stub-outs included in a test section, as well as the ends of the pipe section to be tested, shall be plugged to prevent any air leakage, and all plugs shall be secured in place to prevent blowouts due to the internal test pressure.

E. The test pressure shall be no less than 3.5 psi and no more than 9 psi. The specific test pressure shall be determined by the average height of the natural ground water table above the pipe springline. The elevation of the ground water table shall be measured by using a test well, or by digging a test pit, or by other approved methods, or the County Inspector may accept an assumption of the surface of the ground or pavement for the ground water table elevation. The height of the ground water table above the test pipe section shall be the average of the height above the inlet of the pipe and the height above the outlet of the pipe.

F. The test pressure shall be calculated individually for each test section of pipe and shall be as determined by the following formula:

$$P = 3.5 + 0.43\,H \quad P \leq 9$$

where,

P = test pressure, psi (gage)
H= average height of ground water table above pipe springline, feet

G. Air shall be pumped into the test section of pipe until the pressure inside reaches the test pressure. After the pressure has been stabilized at the test pressure, remove the connection from the pressurized air source and begin the test duration. The test duration shall be as indicated in the following table:

LOW PRESSURE AIR TEST
SPECIFICATION TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

L = length of test section, feet.

Source: Uni-Bell Handbook of PVC Pipe.

H. No more air shall be added to the test section during the test duration. The allowable drop in pressure during the test duration shall be 1 psi or less. No gravity sewer main installation shall be accepted if the pressure drop during the test duration is greater than 1 psi.

I. In the event of a failed test result, locate all leaks and make repairs or replacements as required, and retest the sewer main until the leakage is within the allowable limit. All visible leaks in sewer pipes or at connections to manholes shall be repaired regardless of the results of the low-pressure air tests.

J. Any damaged or defective sewer main or service lateral components that are discovered after the low-pressure air testing shall be repaired or replaced with standard materials, and the test shall be repeated until a satisfactory test result is achieved. Any modifications to the new sewer collection system made after a successful test has been performed shall be cause for a new low-pressure air test of the same sewer main to be performed again.

Pipe Diameter (in.)	Minimum Time (min: sec)	Length for Minimum Time (ft.)	Time for Longer Length (sec)	Specification Time for Length (L) Shown (min: sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26.10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106.50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129.16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128.12	153.50	179:29	205:07	230:46

3.09 PIPE RING DEFLECTION TESTING OF GRAVITY SEWERS

A. The Contractor shall perform a pipe ring deflection test on all new gravity sanitary sewer mains. The rigid ball or mandrel used for the ring deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside diameter of the pipe depending on which is specified in the ASTM C 3034, to which the pipe is manufactured. The test shall be performed without mechanical pulling devices.

B. The allowable ring deflection is 5 percent of the inside pipe diameter. Pipes that have a ring deflection that exceeds this amount shall not be accepted.

3.10 TELEVISION INSPECTION OF GRAVITY SEWERS

A. TV inspection of the entire length of the inside of new gravity sewer mains shall be conducted by the Contractor. The County Inspector shall have been notified and shall be present during the TV inspection.

B. The sewer pipelines shall be thoroughly cleaned of all dirt, debris or obstructions before the TV inspection. Water shall be added to the upstream manhole until it is seen flowing from the most downstream point of the system to be inspected.

C. The TV camera shall be a self-propelled, 360-degree pan-head, color type and shall have dual tape recording capability. The camera shall be equipped with a depth gauge calibrated to 1/4-inch increments to accurately record the depth of the water in the pipeline. A calibration report shall be submitted with each digital video disk (DVD), which shall include a drawing of the depth gauge, indicating the marks on the gauge, and what depth each mark represents.

D. The County Inspector shall be present and will observe the TV monitor along with the camera operator as the camera progresses through the pipe. All pipelines will be inspected with the camera progressing in an upstream direction when possible. The camera operator shall record the manhole numbers and the distance the camera has progressed from the downstream manhole as the inspection proceeds. The operator shall stop the progress of the camera and record the distance at all locations along the pipeline where unusual or defective features are encountered. The operator shall record the distance and depth of the water in the pipe at all locations where the depth is greater than or equal to 3/4 inch. The Contractor shall make records where cracked, dented or deformed pipe is found, or at joints that are not properly installed, or where infiltration is observed, or at any other abnormality or where any other defective feature is encountered.

E. At the end of the inspections, or at the end of the day, one original digital video disk (DVD) of the TV record shall be submitted to the County Inspector along with the written inspection report and depth gauge calibration for evaluation. The County's representative shall be the sole judge of whether any information imparted by the TV test DVD will cause the County to accept or reject the pipe test section.

F. Joint deflection and longitudinal pipe deflection between manholes shall not deviate by more than 1 inch, from the design line, as measured with the television (TV) camera's depth gauge during the TV inspection, provided that such variance does not result in a level or a reverse slope. Joint deflection and longitudinal pipe deflection between manholes that exceeds 1 inch, as measured with the television camera's depth gauge during the TV inspection, shall not be accepted.

3.11 LIFT STATION INSPECTIONS

A. Prior to placing a sanitary sewer pumping station into service, the new facility will be inspected for general compliance with the County's standards and for conformance to the pump performance required by the construction Drawings.

B. The County Inspector shall have been notified and shall be present during the pump startup tests. When calling for inspection, the pumping station Contractor shall have ready the approved Shop Drawings, pump sheet, manufacturer's information and maintenance manuals for the facility and he shall present them to the County at the time of the inspection. The manufacturer's information shall include the model number, serial number, impeller diameter, motor horsepower, voltage, speed and certified performance curve for each pump installed. Provide County's Lift Station Maintenance Section with one copy of the lift station information described above at startup.

C. The total dynamic head for each pump shall be found by direct measurement. The performance of each pump shall be in substantial conformance with the design performance requirement as indicated on the construction Drawings. The Contractor shall perform a "draw down" test and a "dead head" test for each pump.

D. Any materials or installation found not in compliance with the County standards shall be reinstalled or removed and replaced with standard materials. Any pumps found to be not conforming to the performance required by the construction drawings shall be removed and replaced with conforming pumps. Replacement pumps shall be retested until a satisfactory result is achieved. Manatee County Public Works Department and Utility Department representatives shall be the judges of the suitability and acceptability of the pumps.

E. Generator Set Testing:

1. All test instruments used to perform the testing are to have been calibrated within the past 12 months. The calibration shall be performed in accordance with the standards of the National Institute for Standards and Technology.
2. Perform all necessary tests recommended by the manufacturer and all NFPA 110 tests that are in addition to the following:
    a. System Integrity Test: Verify proper installation, connection, and integrity of each of the components of the diesel generator system before and during operation.
    b. Exhaust Emissions Test: After installation at the project site, perform the standard emission test and verify that the diesel engine complies with all applicable local, state and federal requirements for emissions.
    c. Noise Level Test: Measure and calculate the A-weighted (DbA) levels emanating from the product assembly at three meters for at least six equally spaced points around the enclosure while the machine is under load. Include such points as the exhaust discharge, and cooling air intake and discharge. Refer to the test method as defined by ISO 3744.
    d. Load Bank Test: Run a two hour minimum test with all applicable field load. The automatic transfer switch is to be engaged and fully tested for all phases of operation during this test. The load bank may be either resistive or inductive. For purposes of the load test, the NEMA LRKVA/HP Code of the pump motors is H.
    e. Determine the rise by resistance of the generator while under full load. It may be performed in conjunction with the load test. This test is sometimes called a "Heat Run" or "Hot Shutdown Test" (refer to IEEE – 112) and is performed by measuring the ambient temperature and the resistance across any two phases (plus or minus 1 percent accuracy) of the generator immediately prior to starting the machine for the load test and at the conclusion of the load test and temperature stabilization. The test is performed for a minimum of two hours and at least until the measured temperature stabilizes in the machine while under full load. After the termination of the load test and the temperature stabilization, allow the machine to coast to a stop, quickly remove any residual charge on the windings and immediately measure the resistance again (+/- 1% accuracy) across the exact same leads as when measuring the ambient temperature at the beginning of the test. The rise by resistance is calculated by a formula which correlates a change in electrical resistance to a change in temperature.
3. Compare all measured quantities with required values of testing. Correct all deficiencies identified by tests and repeat test and correction procedure until specified test requirements are met. All problems and shortcomings in the product provided, which are discovered during the testing process, shall be remedied and corrected at the expense of the supplier with no cost to the County.
4. The County shall have the option of whether or not to witness all testing that is performed. Report all test results in writing to the County prior to acceptance of the generator by the County.

F. Fiberglass Wet Wells and Valve Vaults:

1. Wet wells and valve vaults for grinder lift stations that are privately owned and maintained, may be fiberglass. The manufacture, dimensions, material and construction methods shall

be available for inspection and approved by the Engineer of Record in advance of construction. As a basis of acceptance, the manufacturer shall provide an independent certification consisting of a copy of the manufacturer's test reports along with a copy of the test results certifying that representative wet well and valve vault samples have been tested, and inspected in accordance with the provisions of this Specification and meet all requirements of same. The Contractor shall provide the County Inspector a copy of the aforementioned independent certification consisting of a copy of the manufacturer's test reports along with a copy of the test results certifying that representative wet well and valve vault samples have been tested, and inspected in accordance with the provisions of this Specification prior to installation of the wet well and valve vault.

2. The quality of all materials, the process of manufacture and the finished wet wells and valve vaults shall be subject to inspection and approval by the Engineer of Record and the County Inspector. Such inspection may be made at the place of manufacture, on site, or both locations. The fiberglass wet wells and valve vaults may be inspected prior to unloading from the delivery truck and marked by the inspector showing acceptance or rejection. Discovery of failure at any time to meet the requirements of these Specifications is cause for rejection.
3. Wet wells and valve vaults rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. All wet wells and valve vaults which are damaged after delivery as determined by the Engineer of Record or County Inspector, shall be rejected. Wet wells and valve vaults already installed, shall be removed and replaced entirely at the Contractor's expense.
4. At the time of inspection, the wet well and valve vault shall be examined for compliance with ASTM D-3753, latest revision; these Specifications; and with the approved manufacturer's drawings. All wet wells and valve vaults shall be inspected for general appearance, dimension, blisters, cracks, roughness, soundness, etc. The surface shall be free of defect.
5. Imperfections may be repaired subject to the approval of the Engineer of Record and County Inspector and after demonstration by the manufacturer that strong and permanent repairs result.
6. There shall be no leaks in the fiberglass wet well and valve vault.

G. Lift stations will not be accepted for County ownership and maintenance until all punch list items are resolved. This includes security fence and driveways, landscaping when required, irrigation, water meter, and a FDEP acceptance letter.

3.12 IN-PLACE GROUTING OF ABANDONED PIPE

A. The County Inspector shall have been notified and shall be present at the time when the grout is pumped into the abandoned pipe. Provide stand pipes or other visual means of inspection as required by the County Inspector to determine if adequate grout material has filled the entire interior volume of the pipe.

3.13 TRACER WIRE

A. Prior to acceptance of pressure pipe by the County, the Contractor shall demonstrate that the locator tracer wire functions properly and is connected to all service meter boxes and fire hydrants. During the tracer wire testing, the Contractor shall also demonstrate that the wire is connected to all services at meter boxes, hydrants, backflow preventers, butterfly valves, wastewater plug valves, tapping valves, air release valves, and blow-off valves. The Contractor shall use one of several commercially available utility locating instruments to energize and trace the locator wire for

continuity. Direct signal locate method shall directly apply the current from the transmitter to the tracer wire and the signal shall be detected and followed with a receiver. Submit to the County Inspector for approval of locating instruments and method. Testing of the locator wire shall be done prior to scheduling a final inspection of the pipeline system. The Contractor shall prepare a report indicating continuity. The report shall list each location that the current was applied to the tracer wire and each location that the signal was detected. The Engineer of Record shall review the report and shall submit the report to the County as part of the as-built construction records.

3.14 THE MAXIMUM LENGTH OF PIPE TO BE HYDROSTATICALLY TESTED

A. Granular earth backfill materials shall be tested for percentage of compaction every 500 feet in pipeline trenches and for every fifth excavation for structures.

B. Backfill compaction testing shall be done in accordance with either AASHTO T-180, the Modified Proctor Method, unless otherwise approved by the County.

END OF SECTION

SECTION 02609 INSTALLATION OF PIPELINES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish and install pipe, fittings, valves, fire hydrants, services, and all other appurtenances and incidentals complete and in-place as required by the construction Drawings.

B. Trees shall not be planted or located within 10 feet of any potable water main, reclaimed water main, sanitary force main or gravity sanitary sewer main that is owned and maintained by Manatee County.

PART 2 PRODUCTS

2.01 MATERIALS

A. Where potable or reclaimed water mains are proposed to be installed under new pavement or new concrete roads, or new parking lots, etc., the main shall be ductile iron with Type "K" copper or Type 316 stainless steel Schedule 40 services. Where water mains are to be installed under existing pavement or existing concrete roads, or existing parking lots, etc., the potable or reclaimed water main shall be installed in a steel casing pipe (for installation using the bore and jack method), or the potable or reclaimed water main shall be high density polyethylene (for installation using the horizontal directional drilling method), or the potable or reclaimed water main shall be ductile iron (for installation using the open trench method). High density polyethylene potable or reclaimed water mains may be used for crossing under existing pavement or existing concrete roads. However, high density polyethylene potable or reclaimed water mains shall not be used for piping that is both running under and along existing pavement or existing concrete roads. All potable or reclaimed services installed under existing pavement or existing concrete roads, or existing parking lots shall be Type "K" copper or Type 316 stainless steel Schedule 40 services.

B. Transmission water mains 16 inches and larger shall be ductile iron or high density polyethylene.

C. Plastic potable water mains shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Ductile iron water mains, with gaskets referenced in these Standards, shall be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents.

PART 3 EXECUTION

3.01 HANDLING AND STORAGE

A. Prior to installation, all pipe and fittings shall be inspected. Cracked, broken or otherwise defective materials not in conformance with these standards shall not be used and shall be removed from the project site.

B. The pipeline installer shall take care in the handling, storage and installation of the pipe and fittings to prevent injury to the materials or coatings. Use proper implements, tools and facilities for the safe and proper protection of the work. Lower the pipe in a manner to avoid any physical damages. Under no circumstances shall the pipe or fittings be dropped onto the ground or into the trenches.

C. The pipeline installer shall not distribute material on the job site faster that it can be used to good advantage. Unless otherwise approved by the County, he shall not distribute more than one week's supply of material in advance or laying. Any materials not to be installed within two weeks of delivery shall be protected from the sunlight, atmosphere and weather by suitable enclosures or protective wrapping until ready for installation. Stored PVC pipe shall be placed on suitable racks with bottom tiers raised above the ground to avoid damage. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's written instructions.

3.02 CLEANING

A. The interior of pipe, fittings, valves and other appurtenances shall be thoroughly cleaned of all dirt, debris and obstructions before being lowered into the trenches. All pipelines shall be kept clean during and after installation and shall be protected from dirt or foreign matter entering the pipe at all times. All open pipe ends shall be securely plugged or capped water-tight when construction stops during the day, or during lunch, or overnight or during longer periods of inactivity.

3.03 INSTALLATION

A. Pipe, fittings, valves, and other appurtenances shall be installed in accordance with the manufacturer's written installation instructions. Water mains, valves, and hydrants shall be installed according to the provisions of "Recommended Standards for Water Works - A Report of the Committee of the Great Lakes - Upper Mississippi River Board of State Public Health and Environmental Managers," Health Education Services, as incorporated by reference by Chapter 62-555, F.A.C. Sewer mains shall be installed according to the provisions of "Recommended Standards for Wastewater Facilities - A Report of the Wastewater Committee of the Great Lakes - Upper Mississippi River Board of State Public Health and Environmental Managers," Health Education Services, as incorporated by reference by Chapter 62-604, F.A.C.

B. Lay all pipe true to the lines and grades indicated on the construction Drawings. Gravity sewer pipe shall be laid on grade with bell upgrade and spigot downgrade. Pressure pipe, including water, reclaimed water and force main sewer, shall be laid with no less than three feet of cover, but not more than six feet of cover, unless otherwise approved by the County. The trenches and bedding for the pipe installations shall be prepared according to Section 2, Trenching and Excavation, of these standards. Pipe sections shall be laid in full contact with the prepared pipe bedding, with bell holes dug out, to provide a continuous and uniform bearing and support for the pipe barrel between joints. Blocking under the pipe shall not be permitted (except through casing sleeves).

C. In gravity sewer installations, the pipe alignment shall not deviate by more than 1/2 inch for line and 1/4 inch for grade, as measured at the pipe inverts at the manhole, from the design line and grade established on the construction drawings, provided that such variance does not result in a level or a reverse sloping pipe invert. Line and grade of gravity sewer pipelines shall be measured at the pipe invert and shall be controlled during installation by laser beam method. Other methods of controlling line and grade may be approved by the County if the laser beam method is shown to be unworkable. A "Caution - Laser Light" placard shall be displayed in a conspicuous place while laser beam pipe laying equipment is in use. Joint deflection and longitudinal pipe deflection between manholes shall not deviate by more than 1 inch from the design line, as measured with the television (TV) camera's depth gauge during the TV inspection, provided that such variance does not result in a level or a reverse sloping pipe invert.

D. Joining of pipe sections shall be done in strict accordance with the pipe manufacturer's written instructions. The joining surfaces of the bell and spigot and the rubber seal ring shall be thoroughly cleaned and lubricated immediately prior to joining the pipe per the written instructions. After the joint has been made, the pipe alignment shall be checked. Place sufficient backfill material around and over the pipe to secure the pipe from movement before installing the next joint to assure proper pipe alignment and joint makeup.

E. When cutting or machining pipe in the field is necessary, the pipe installer shall use only the tools and methods recommended by the manufacturer in the written instructions. Care shall be taken to not damage the pipe coating or linings. Damage to linings shall be cause for rejections of the complete section of pipe, or for the rejection of a fitting or valve. Damage to exterior coatings shall be corrected to the original standard material specification.

F. At connections to manholes or other concrete structures, the pipe joint shall be located a minimum of 18 inches outside of the edge of the structure.

G. At stub-outs from new structures to future pipelines, the pipe stub-out length shall be the same as the standard pipe length being laid. Stub-out pipes shall be closed off with standard plug or cap fittings.

H. Thrust restraint devices shall be either cast-in-place concrete thrust blocks or other approved restrained joint devices. Cast-in-place concrete for thrust blocks shall have a 28-day strength of 3,000 psi. Precast thrust blocks shall not be accepted. At all fire hydrant laterals, the lateral pipe from tee to fire hydrant shoe shall have all joints restrained. The lateral shall also be restrained from side movement by concrete thrust blocks placed at the fire hydrant shoe and at the lateral tee.

I. Place and secure a bag over all fire hydrants not yet placed into service to designate them as such and to serve as a warning that the water is not safe to drink. Bags shall be colored orange and shall have the words "NOT IN SERVICE" printed on them, and shall be N.I.S. bags as manufactured by Assured Flow Sales, or an approved equal.

J. All pressure water, reclaimed water and force main sewer pipelines laid in trenches shall have a continuous, No. 10 gauge solid copper wire attached to the pipe with minimum 30-mils polyethylene insulation rated UF or USE by Underwriter's Laboratories. Insulation shall be of proper color. The plastic wire insulation shall be color coded blue (water), Pantone purple 522 C (reclaimed water) or green (sanitary sewer). The wire shall be laid on top of the pipe and secured in place at every joint and at 5-foot intervals.

K. All pressure mains which are installed by the open-trench method, regardless of piping material, shall also include the installation of a warning tape buried directly over the pipe continuously. Pipe shall have a 3-inch wide warning tape of the proper color placed directly above the pipe 12 inches below finished grade or a 6-inch wide warning tape between 12 inches and 24 inches below finished grade. The tape shall be colored green (sewer), blue (water), or Pantone purple 522C (reclaimed

water) on top, and be boldly labeled every eighteen to thirty-two (18-32) inches as follows "CAUTION POTABLE WATER LINE BURIED BELOW", "CAUTION WASTEWATER LINE BURIED BELOW", OR "CAUTION RECLAIMED WATER LINE BURIED BELOW". The tape shall have a tensile strength of no less than 4,000 psi, a dart impact strength of no less than 120 grams per 1.5 mils, be no less than 0.0055-inch thick. The tape shall be designed to last as long as the pipe it is installed over, even in adverse soils.

L. Trenching, backfilling and compaction for the newly laid pipelines shall be accomplished in accordance with Section 2, Trenching and Excavation.

M. In directional bore applications, one No. 10-gauge extra high strength copper clad steel wire shall be pulled and secured to the top of the pipe with duct tape or 10-mil thickness polyethylene pressure sensitive tape at every joint and at 24-inch intervals. The tracer wire shall have minimum 30-mil polyethylene insulation rated UF or USE by Underwriter's Laboratories. The plastic wire insulation shall be color coded blue (water), Pantone purple 522 C (reclaimed water) or green (sanitary sewer).

N. Underground splice connections shall be minimized and shall be rated for direct burial service. Spliced tracer wire connections shall be split bolt connectors or solder as approved by manufacturer. A waterproof or corrosion-proof connector for direct bury applications shall be used. The wire shall terminate at fire hydrants, backflow preventers, and at each meter box. The wire shall also terminate at valve boxes for butterfly valves, wastewater plug valves, tapping valves, air release valves and blow-off valves. The tracer wire shall also terminate at gate valve boxes that are not located within 200 feet of a fire hydrant, backflow preventer, meter box, butterfly valve, air release valve or blow-off valve. Meter boxes shall have 12 inches of wire looped into the boxes. The looped termination shall allow for the connection of an electronic locator transmitter.

O. With the County Inspector present, new reclaimed water mains with diameters greater than or equal to 6 inches shall be pigged and new reclaimed water mains with diameters smaller than 6 inches shall be flushed or pigged to clean all parts of the system and to remove any accumulation of construction debris, rocks, sand, gravel, silt and other foreign material. With County Inspector present, new potable water mains with diameters greater than or equal to 6 inches shall be pigged and new potable water mains with diameters smaller than 6 inches shall be flushed or pigged to preliminarily clean all parts of the system and to remove any accumulation of construction debris, rocks, sand, gravel, silt and other foreign material. If necessary, also make use of mechanical rodding or bucketing equipment. Prior to construction of potable water mains and reclaimed water mains, the Contractor shall submit a flushing/pigging plan to the County Inspector for approval. The flushing/pigging plan shall identify on the drawings each location where each pig will be placed in the pipe and each location that the pig will be retrieved. The flushing/pigging plan shall describe at minimum the procedures and installations for flushing, any field turbidity measurement equipment provided, pumps used, source and volume of water to be used, flow velocity pumped, effluent screen collector, disposal methods of debris and effluent, and calculations for the length of pipe flushed. A pig recommended by the pipe manufacturer for the type of pipe installed, shall run through pressure potable and reclaimed water main pipes greater than or equal to 6 inches. Pipes smaller than 6 inches shall be flushed. Inspectors must be notified 48 hours in advance of any pigging and flushing operations. Short pipe lengths (i.e. stubs) may be flushed without pigs with prior approval from County. If flushing of pipes smaller than 6 inches fails, or if the potable water main or reclaimed water main has a pipe diameter greater than or equal to 6 inches, or if the water supply is not sufficient to supply the quantity of water required for flushing a new main smaller than 6-inches, the pipe shall be cleaned with pigs recommended by the pipe manufacturer. For flushing, a minimum velocity of at least 3.0 ft/sec, preferably 3.5 ft/sec, shall be obtained in the pipe. This velocity shall be maintained long enough to allow three complete pipe volume changes of water for proper flushing

action. Successful flushing shall be determined visually by the County Inspector and may be deemed acceptable when the water is debris free. Refer to the procedures in Sections 02609.06 and 10 of these Standards.

P. Boring logs shall be kept with all horizontal and vertical locations, at intervals not to exceed 25 linear feet, by the horizontal directional drill (HDD) Contractor.

Q. The pulling force and downhole mud pressure shall be monitored with DCI's TensiTrak System, or an approved equal, during the installation of pipelines using the horizontal directional drilling (HDD) method.

R. 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 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 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. 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.

3.04 PRESSURE TAPS

A. Pressure taps for connection of new water, reclaimed water or sewer systems to existing County pressure mains shall be made by a County crew for tap sizes up to and including 12 inches diameter. For each pressure tap performed by the County, the pipeline installer shall provide excavation to unearth the existing pipe and provide a dry, safe tapping pit, and shall provide and install the tapping sleeve and tapping valve. Prior to the tapping of the pipe, the pipeline installer shall pressure test the sleeve and the valve to the satisfaction of the County Tapping Crew or the County Inspector. After the tap has been made, the pipeline installer shall backfill and compact the excavation, and provide all other materials and labor required to complete the work.

B. Pressure taps shall not be used to make pipeline connections in new work except to make a connection to an existing County main, and then only if it is deemed to be inconvenient or unworkable to make the connection by another method using standard fittings. Where a new phase of the system will be connected to a future phase or future subdivision, standard fittings will be assembled which shall include a line valve and stub-out and cap where the future system will be connected without need for making another pressure tap. All pressure tap installations shall be subject to approval by the County.

C. All pressure taps for tap sizes larger than 12 inches in diameter, and for all tap sizes on concrete mains, shall be made by a Manatee County approved tapping company.

D. When installations are made under pressure, the flow of water through the existing main shall be maintained at all times. The diameter of the tap shall be at least 2 inches smaller than the inside diameter of the through main.

E. The Contractor shall determine the locations of the existing main to be tapped to confirm the fact that the proposed position for the tapping sleeve will be satisfactory and no interference will be

encountered such as the occurrence of existing utilities or of a joint or fitting at the location proposed for the connection. No tap will be made closer than 30 inches from a pipe joint or a fitting.

F. Adequate support shall be provided under the sleeve and valve during the tapping operation. Thrust blocks shall be provided behind all tapping sleeves. Proper tamping of supporting earth around and under the valve and sleeves is mandatory. After completing the tap, the valve shall be flushed to ensure that the valve seat is clean.

3.05 FINAL CLEANING

A. All new reclaimed water mains shall be cleaned, in accordance with Section 02609.04.O of these Standards, to clean all parts of the system and to remove any accumulation of construction debris, rocks, sand, gravel, silt and other foreign material.

B. After preliminary cleaning as specified Section 9.04.O of these Standards, and after disinfection, and prior to final acceptance, all new potable water mains shall receive a final flush to clean all parts of the system and to remove all remaining debris/foreign material. For flushing, a minimum velocity of at least 3.0 ft/sec, preferably 3.5 ft/sec, shall be obtained in the pipe. This velocity shall be maintained long enough to allow three complete pipe volume changes of water for proper flushing action. Successful flushing shall be determined visually by the County Inspector and may be deemed acceptable when the water is debris free. The Contractor shall submit a flushing plan for County Inspector's approval where the plan will describe at minimum the procedures and installations for flushing, any field turbidity measurement equipment provided, pumps used, source and volume of water to be used, flow velocity pumped, flushing effluent screen collector, disposal methods of debris and flush effluent, and calculations for the length of pipe flushed. Refer to Section 02610, Cleaning and Disinfecting Potable Water Pipelines, of these Standards.

3.06 PIPELINE ALIGNMENTS

A. Water, sewer, and reclaimed water pipelines to be installed within new roadway rights-of-way shall be situated along typical uniform alignments that minimize the number of interferences or obstructions between the different utilities.

B. Potable water pipelines shall typically be located along the southerly and easterly sides of the roadways midway between the right-of-way and the back-of-curb line. Fire hydrants shall be installed on the same side of the roadways as the potable water mains. Potable water mains shall be on the opposite side of the street from the sidewalks. Sanitary force mains and reclaimed water mains shall be on the opposite side of the street from the potable water mains. Where it is shown that it is not technically feasible or economically sensible for the sanitary force mains or the reclaimed water mains to be on the opposite side of the street from the potable water mains; a minimum horizontal separation of potable water mains to force mains and reclaimed water mains shall be 10 feet and 5 feet, respectively.

C. Force main sewer pipelines shall typically be located along the northerly and westerly sides of the roadways midway between the right-of-way line and the back-of-curb line when no reclaimed water pipeline is present, or no closer than 3 feet to the right-of-way line when this side of the road is shared with a reclaimed water main.

D. Reclaimed water pipelines shall be typically located on the same side of the roads as the force mains, along the centerline side and 5 feet away from the force mains, when force mains are present, so that the reclaimed water main and force main are centered between the back-of-curb line and the right-of-way line, or, when no force main is present, located midway between the back-of-curb and the right-of-way lines, on the northerly and westerly sides of the roadways.

E. Gravity-flow sanitary sewer pipelines shall typically be located under the roadway pavement along the centerline of the right-of-way, and may vary from side to side under curved roadways, but shall be no closer to the potable water main than 10 feet and no closer to the reclaimed water or force mains than 5 feet.

F. Depth of bury for potable water mains, reclaimed water mains and force mains shall typically be no less than 3 feet and no more than 6 feet of cover at final grade. Potable water mains, when crossing other sewer or reclaimed water mains, shall cross over the top of the other mains with a minimum of 18 inches of vertical clearance of the sewer or reclaimed water main. Where approved by the County, potable water, reclaimed water or force mains may be buried less than 3 feet deep to avoid an obstruction or another pipeline, provided the potable water mains or reclaimed water mains are constructed of ductile iron pipe or the potable water mains or reclaimed water mains or force mains are enclosed in ductile iron or steel encasement pipes. Increased thrust restraint shall be provided for decreasing the pipes depth of cover. Written approval from the County is required prior to construction for depth of bury for potable water mains, reclaimed water mains and force mains less than 3 feet or more than 6 feet of cover.

G. A minimum horizontal separation of reclaimed water or force mains to storm sewers is 5 feet. A minimum horizontal separation of potable water mains or gravity sanitary sewer mains to storm sewers is 10 feet.

H. A minimum of 18 inches of vertical clearance shall be provided for potable water mains, reclaimed water mains, gravity sanitary sewer mains, and force mains that cross any potable water, reclaimed water, gravity sanitary sewer mains, force mains, and storm sewers. This vertical clearance may be reduced as follows

1. The vertical clearance may be reduced to 6 inches if the potable water main or the reclaimed water main is ductile iron; or
2. The vertical clearance may be reduced if one of the mains is encased in a watertight casing pipe as follows:
    a. For reclaimed water mains or sanitary force mains that are within a watertight casing pipe, the top of the casing pipe shall be at least 3 inches below the bottom of the potable water main, or
    b. For sanitary force mains that are within a watertight casing pipe, the top of the casing pipe shall be at least 3 inches below the bottom of the reclaimed water main.

I. Maximum obtainable horizontal separation shall be practiced. Setbacks between piping in this section are from outside of pipe to outside of pipe. Where it is shown that it is not technically feasible or economically sensible to comply with the requirements in Sections 9.07 D, E, F & G, acceptable exceptions are as follows:

1. The minimum horizontal setback between potable water mains to both gravity sanitary sewer mains and force mains may be reduced to 5 feet if:
    a. The potable water main is ductile iron, or jointless/fused high density polyethylene, or in a watertight casing pipe; or
    b. The force main is jointless/fused high density polyethylene, or the gravity sanitary sewer main or force main is in a watertight casing pipe.
2. The minimum horizontal setback between potable water mains to stormwater sewer mains may be reduced to 5 feet if:
    a. The potable water main is ductile iron, or jointless/fused high density polyethylene, or in a watertight casing pipe.
3. The minimum horizontal setback between potable water mains to reclaimed water mains may be reduced to 3 feet if:

a. The potable water main is ductile iron, or jointless/fused high density polyethylene, or in a watertight casing pipe; or
b. The reclaimed water main is ductile iron, or jointless/fused high density polyethylene, or in a watertight casing pipe.

4. The minimum horizontal setback between reclaimed water mains to both gravity sanitary sewer mains and force mains may be reduced to 3 feet if:
   a. The reclaimed water main is ductile iron, or jointless/fused high density polyethylene, or in a watertight casing pipe; or
   b. The force main is jointless/fused high density polyethylene, or the gravity sanitary sewer main or force main is in a watertight casing pipe.
5. The minimum horizontal setback between both reclaimed water mains and sanitary force mains to stormwater mains may be reduced to 3 feet if:
   a. The reclaimed water main is ductile iron, or jointless/ fused high density polyethylene, or in a watertight casing pipe; or
   b. The force main is jointless/fused high density polyethylene, or in a watertight casing pipe.

J. Force mains 4 inches and larger in diameter shall be designed to minimize the adverse effects of air pocket entrapment by either the use of air release valves (ARV's) or by the selection of pumps such that air-scouring fluid velocity is achieved within the pipeline. Where ARV's are used, long upward or downward sloping runs of pipeline should be used – rather than laying-to-cover of 3 feet minimum bury, or rather than dipping up and down under other utility structures – and the vertical alignment should be designed such that the number of ARV's required is limited to the minimum. ARV's shall be placed at high points along the pipeline and where air would otherwise become entrapped. For vertical alignments requiring ARV's, such alignments shall be fully defined and depicted on the construction plans with use of elevation notations at each station or with use of elevations given for all vertical points of intersection and slopes given on the pipeline in between all vertical points of intersection from the lift station valve vault to the termination of the force main. Any proposed significant deviation from the vertical alignment of the approved construction plans must be resubmitted for checking and re-approval by the Manatee County Infrastructure Engineering Division representative before such revised vertical alignments may be constructed. Where an air-scouring design is proposed, and air is to be transported downstream along the pipeline by the sufficiently rapid movement of the fluid, no ARV's are required and no strict definition of the alignment by means of elevation and slope notations are required on the plans. Air-scouring velocity to move air pockets downstream at various downward slopes shall be as determined by Wheeler in Table B-9 of Pumping Station Design, by Robert L. Sanks, 1998, or as determined by an equally credible source or calculation.

3.07 VALVE SPACING

A. In-line potable or reclaimed water valves shall generally be installed at intervals no greater than 1,600 LF on transmission mains where systems serve widely scattered customers and where future development is not expected; and at intervals of no greater than 800 LF on main distribution loops and feeders, and on all primary branches connected to these lines.

B. In residential, commercial and industrial subdivisions, water valves shall be installed, at all sides of tees and crosses, as necessary to minimize the number of persons affected by a break. Valves must be provided at tee connections. One in-line valve should be located, in the run of the tee, at fire hydrant connections. In all instances, effectiveness of placement shall be primary criteria in determining water valve location. Valves placed in curbs will not be accepted. Valves must be

provided within the boundary of the public utility easement when serving privately owned and maintained utilities. All valves require lids and must be marked "water" or "reclaimed water". All potable or reclaimed water valves shall be identified on construction drawings. Clearance of 18 inches or one pipe diameter, whichever is greater, shall be maintained between all fittings (bells, valves, saddles, flanges, etc.).

C. In-line sewer valves shall be installed at intervals of no greater than 1,200 LF on sewer transmission mains. In-line sewer valves shall be installed near each side of a canal crossing and/or major road crossing. Valves must be provided at tee and wye connections. In high-density areas, sewer valves shall be installed as necessary to minimize the number of persons affected by a break and to minimize amount for disposal by pumper trucks. In all instances, effectiveness of placement shall be the primary criteria in determining valve location. Valves must be provided within the boundary of the public utility easement when serving privately owned and maintained utilities. Valves placed in curbs will not be accepted. All valves require lids and must be marked "sewer". All valves shall be identified on construction drawings. Clearance of 18 inches or one pipe diameter, whichever is greater, shall be maintained between all fittings (bells, valves, flanges, etc.).

3.08 MINIMUM PIPE FLOW DESIGN CRITERIA

A. Gravity Sewer Design:

A minimum design velocity of 2.0 feet per second and a maximum design velocity of 10.0 feet per second shall be used for the design of gravity-flow pipelines. Maximum design flow depths for peak design flow rates shall not exceed 80 percent of the pipe inside diameter. Minimum slopes required to achieve a velocity of at least 2.0 feet per second are provided below:

Sewer Pipe Diameter in Inches, I.D.	Minimum Slope in Feet per 100 Feet, Manning's n = 0.013
8	0.40
10	0.28
12	0.22
14	0.17
15	0.15
16	0.14
18	0.12
21	0.10
24	0.08
27	0.067
30	0.058
36	0.046

B. Sewer Force main Design: Sewer force main velocities shall not be less than 2 feet per second, with one/smallest pump running, at minimum flow and not exceed 6 feet per second at peak-hour flow conditions. Hazen-William's roughness coefficient of a maximum of 120 will be used in the calculations.

C. Gravity Sewer, Sewer Force Main, and Lift Station Design: Construction drawings that are submitted to Manatee County for approval shall include engineering calculations, which may include electronic hydraulic modeling. Gravity sewer, sewer force main, and lift station design shall be based on peak-hour flow rate. Unless the Engineer of Record provides credible documentation and/or data to support peaking factors used in his or her calculations, peaking factors for peak hour flow rate shall be based on the following equation:

Peak-Hour Flow/Average Daily Flow = $(18 + \sqrt{P})/(4 + \sqrt{P})$
(where $\sqrt{P}$ = square root of the population in thousands)

D. Water Distribution Main Design:

1. Water mains shall be designed with velocities no greater than 5 feet per second at peak-hour flow conditions and no greater than 10 feet per second at maximum-day plus needed fire flow conditions. Hazen-William's roughness coefficient of a maximum of 130 shall be used in the calculations for plastic pipe and lined ductile iron pipe. Delivered flows for pressure water mains shall meet the needed fire flow rate plus a background water demand equivalent to the maximum-day demand with a residual gauge pressure not less than 20 pounds per square inch (psi). A residual gauge pressure not less than 20 psi shall be maintained at the peak-hour water demand. Construction drawings that are submitted to Manatee County for approval shall include engineering calculations, which may include electronic hydraulic modeling. Unless the Engineer of Record provides credible documentation and/or data to support peaking factors used in his or her calculations, peaking factors for peak hour flow rate in potable water main design shall based on the following equation:
   Peak-Hour Flow/Average Daily Flow = $(18 + \sqrt{P})/(4 + \sqrt{P})$
   (where $\sqrt{P}$ = square root of the population in thousands)
2. Also, unless the Engineer of Record provides credible documentation and/or data, Peak-Hour Flow shall be as indicated in the aforementioned calculation or 2.0 x Average Daily Flow, whichever is greater.
3. Unless the Engineer of Record provides credible documentation and/or data, Maximum-Day demand shall be at least 60 percent of the peak hour flow rate or 1.5 x Average Daily Flow, whichever is greater.

END OF SECTION

SECTION 02610 CLEANING AND DISINFECTING POTABLE WATER PIPELINES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish all labor, materials, equipment and incidentals required to clean and disinfect portable water pipe lines. This work is required to place all types of pipe into service as potable water lines.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CLEANING WATER MAINS

A. With the County Inspector present, all new potable water mains shall be preliminarily cleaned, in accordance with Section 02609.04.O of these Standards, to clean all parts of the system and to remove any accumulation of construction debris, rocks, sand, gravel, silt and other foreign material.

B. Fire hydrants may be used to perform the flushing. A blowoff connection, if one has been installed, may also be used if diameter is determined to be large enough to flush debris. A velocity of at least 3.0 ft/sec, preferably 3.5 ft/sec, should be obtained in the pipe without causing the County's main pressure to fall below 35 psi. This velocity should be maintained long enough to allow three complete changes of water for proper flushing action and follow the requirements in Sections 02609.04.O and 02609.06. The pipeline installer shall take care in the handling, storage and installation of the pipe and fittings to prevent injury to the materials or coatings. Use proper implements, tools and facilities for the safe and proper protection of the work. Lower the pipe in a manner to avoid any physical damages. Under no circumstances shall the pipe or fittings be dropped onto the ground or into the trenches.

3.02 DISINFECTING POTABLE WATER PIPE LINES

A. Prior to being placed in service, all potable water pipe lines shall be chlorinated in accordance with AWWA C651, refer to Standard Detail UW-22. The location of the chlorination and sampling points shall be determined by the Engineer of Record, Health Department, and Manatee County Representatives. Taps for sampling shall be uncovered and backfilled by the pipeline installer as required.

B. The general procedure for chlorination shall be to flush or pig all dirty or discolored water from the lines, then introduce chlorine in approved dosages through a tap at one end while water is being withdrawn at the other end of the line. The chlorine solution shall remain in the pipeline for 24 hours; refer to Standard Detail UW-22.

C. Water for flushing, pigging, filling and disinfecting the new lines must be obtained without contaminating existing pipe lines. Water obtained from existing pipe lines for this purpose shall pass through an approved backflow prevention device, refer to Standard Detail UW-21.

D. After preliminary cleaning as specified Section 9.04.O of these Standards, and subsequently following the chlorination period, all treated water shall be flushed (final flush) from the lines at their extremities and replaced with water from the distribution system, refer Section 9.06.B and to Standard Detail UW-22. Bacteriological sampling and analysis of the replacement water shall then be made by an approved laboratory or the Health Department in full accordance with the AWWA Manual C651. The line shall not be placed in service until the requirements of the State and County Public Health Department are met. Results of the bacteriological tests together with certified record drawings must be submitted to the Health Department (DOH/FDEP) within 60 days of the tests.

E. Water discharged by cleaning, disinfection and flushing operations shall be disposed of in accordance with US EPA, FDEP and SWFWMD regulations.

F. Special disinfection procedures when approved by the County may be used where the method outline above is not practical.

END OF SECTION

SECTION 02611 VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install complete and ready for operation all valves and appurtenances as indicated on the construction Drawings and specified herein.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

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 standards as applicable. Valves used in waterworks applications shall comply with Section 8 of NSF Standard 61 for mechanical devices.

B. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of potable water, reclaimed water, wastewater, etc., depending on the applications.

C. 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 a single manufacturer. The year of the valve shall be cast in the body of the valve.

D. 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 visible part of the body.

E. Special tools, if required for the normal operation or maintenance, shall be supplied with the equipment.

F. All hand actuated buried valves shall have three-piece adjustable valve boxes and 2-inch square AWWA operating nuts. Provide extension stems and alignment rings where needed to bring the operating nut to within 4 feet below the box lid.

G. Water and reclaimed water system isolation valves shall be gate valves for sizes 2-inch through 12-inch and shall be butterfly valves for sizes 16-inch and larger.

H. With the exception of force main tapping valves, isolation valves for sewer force main pipelines shall be plug valves and shall be spaced not more than 1,200 linear feet apart. Gate valves shall be used for tapping force mains.

I. Isolation valves for potable water and reclaimed water shall be in accordance with the Ten State Standards. Valves shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves should be located at not more than 500 feet intervals in commercial districts and at not more than one block or 800 feet intervals in other districts. Where systems serve widely scattered customers and where future development is not expected, the valve spacing should not to exceed 1,600 linear feet.

J. Valves shall open when turning the operating nut or wheel counterclockwise and shall close when turning clockwise.

K. All bonnet bolts, gland bolts, nuts, and other trim hardware exposed to the outside environment shall be stainless steel. Thrust collar tie-rod bolts shall be stainless steel.

L. Fire hydrant spacing shall be in accordance with the Recommended Standards for Water Facilities (Ten State Standards), Latest Edition, the Manatee County Land Development Code, and State of Florida Fire Prevention Code. Generally, hydrant spacing may range from 350 to 600 feet, depending on the area being served. Hydrants should be provided at each street intersection and at intermediate points between intersections as recommended by the State Fire Marshal or designated local Fire District.

M. All valves shall have:
   1. A standard screw type valve box (buried valves).
   2. Operator nuts centered in the valve box including a centering device AFC part no. B 59434 or equal (buried valves).
   3. Mechanical joint or flanged ends.

N. Valve operator nuts located 4 feet or more below final grade shall be equipped with an approved mechanically connected valve extension. All fittings, bends, crosses, etc., shall have mechanical joint or flanged ends unless previously approved flexible joint restraint system is used.

2.02 DIRECTORY

A. The following valves and appurtenances are specified herein:

Equipment	Paragraph
GATE VALVES	2.03
COMBINATION PRESSURE REDUCING AND PRESSURE SUSTAINING WITH CHECK VALVE OPTION	2.04
BALL VALVES	2.05
BUTTERFLY VALVES	2.06
PLUG VALVES	2.07
VALVE ACTUATORS	2.08
AIR RELEASE VALVES	2.09
VALVE BOXES	2.10
CORPORATION STOPS AND SADDLES	2.11
FLANGE ADAPTERS AND PLAIN END COUPLINGS	2.12
HOSE BIBS	2.13
SWING CHECK VALVES	2.14
HYDRANTS	2.15
RESTRAINED JOINTS	2.16
TAPPING SLEVES AND VALVES	2.17

2.03 GATE VALVES

A. 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.

B. Gate valves installed underground shall be provided with a box cast in a concrete pad and a box cover. Valve wrenches and extension stems shall be provided by the manufacturer to actuate the valves.

C. Gate valves 2 inches to 14 inches in diameter shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 and AWWA C515 and shall be UL listed and FM approved where applicable. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.

D. The valves shall have a nonrising 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.

E. 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.

F. The valve body, bonnet, and bonnet cover shall meet or exceed all the requirements of AWWA C509 or AWWA C515. All ferrous surfaces inside and outside shall have a fusion-bonded epoxy coating per AWWA C550.

G. 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.

H. The valves are to have 2-inch cast or ductile iron or operating nuts and shall open left or counter-clockwise.

I. 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.

J. 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.

2.04 COMBINATION PRESSURE REDUCING AND PRESSURE SUSTAINING VALVE WITH CHECK VALVE

A. Pressure sustaining and check valve shall be pilot operated diaphragm actuated valve with cast iron body, bronze trim, and 125-pound flanged ends. The valve shall be hydraulically operated, diaphragm type globe valve. The main valve shall have a single removable seat and a resilient disc, of rectangular cross section, surrounded on three and a half sides. No external packing glands are permitted and there shall be no pistons operating the main valve or any controls. The valve shall be

equipped with isolation valves to service the pilot system while permitting flow if necessary. Main valve and all pilot controls shall be manufactured in the United States of America. Valve shall be single chamber type, with stainless steel stem.

B. Valve shall automatically reduce pressure for the downstream distribution network and sustain a minimum pressure in the high pressure main regardless of distribution demand, and as an option, shall also close when a pressure reversal occurs for check valve operations. The pilot system shall consist of two direct acting, adjustable, spring loaded diaphragm valves.

C. Valve shall be cast iron or ductile iron with main valve trim of brass and bronze. The pilot control valves shall be cast brass with 303 stainless steel trim. Valve shall be similar in all respects to Cla-Val Company, Model 92-01 or a similar control valve such as Bermad Model 723, GA Industries Model 4700 or an approved equal.

2.05 BALL VALVES

A. Ball valves for water and reclaimed water, in sizes 3/4 inch through 2 inches, 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 inches through 3 inches, 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 WOG, Pike PSB2 or approved equal, with threaded or flanged ends as required.

CURB STOPS (POTABLE & RECLAIMED WATER)

PIPE MATERIAL	TYPE OF CONNECTION	MODEL
HDPE	Compression x FIP	B-25170
HDPE	Pack Joint x FIP	P-25170
Copper	Compression x FIP	B-25170
Copper	Flare x FIP	B-25166
Stainless Steel	FIP x FIP Thread	B-20200

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.

C. Potable plastic service pipe material and compression and pack joint connectors shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.

2.06 BUTTERFLY VALVES

A. Butterfly valves shall conform to AWWA C504, Class 250 B, Mueller Lineseal XP, DeZurik AWWA, Pratt Triton HP-250, or an approved equal. All ferrous surfaces inside and outside shall have a fusion-bonded epoxy coating per AWWA C550.

B. 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. Valves 20 inches and smaller shall have bonded or mechanically restrained seats as outlined in AWWA C504.

C. All valves shall be subject to hydrostatic and leakage tests at the point of manufacture. The hydrostatic test for Class 250 valves shall be performed with an internal hydrostatic pressure equal to 500 psi applied to the inside of the valve body of each valve. During the hydrostatic test, there shall be no leakage through the metal, the end joints or the valve shaft seal. The leakage test for the Class 250 valves shall be performed at a differential pressure of 250 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. All valves shall be leak-tight in both directions.

D. Butterfly valve actuators shall conform to C504. Gearing for the actuators shall be totally enclosed in a gear case. Actuators shall be capable of seating and unseating the disc against the full design pressure and shall transmit a minimum torque to the valve. Actuators shall be rigidly attached to the valve body.

2.07 PLUG VALVES

A. Plug valves shall be eccentric, non-lubricating type with integral plug and shafts and shall be furnished with end connections and with actuating mechanisms as called for on the construction plans or as otherwise required. Valves shall seal bubble-tight or water drop-tight in both directions when tested according to the Leakage Test method of AWWA C504 with an air pressure or hydrostatic pressure of 150 psi.

B. Plug valves shall also be subjected to the internal, full body Hydrostatic Test of AWWA C504 at a pressure two times the rated pressure or a minimum pressure of 300 psi, whichever is greater. During the test, there shall be no leakage through the metal, or through the end joints or shaft seal, nor shall any part of the valve be deformed.

C. Flanged valve ends shall be faced and drilled according to ANSI B 16.1, Class 125. Mechanical joint valve ends shall conform to AWWA C111. Threaded ends shall conform to the NPT requirements of ANSI B1.20.1.

D. The plug valve body, bonnet and gland shall be cast iron per ASTM A 126, Class B. The integral plug and shafts shall be cast iron ASTM A 126, Class B, or Type 316 stainless steel. The entire plug, except for the shafts, shall be covered with nitrile (Buna N) rubber. The rubber compound shall have been vulcanized to the metal plug and shall have a peel strength of not less than 75 pounds per inch when tested according to ASTM D 429, method B. The valve seat shall be at least 90 percent pure nickel, welded-in overlay into the cast iron body. The top and bottom bearings shall be Type 316 stainless steel.

E. Plug valves shall have a minimum port area of 80 percent of the nominal pipe size area.

F. Valves shall have worm gear type actuators with 2-inch square operating nuts.

G. Plug valves shall be installed side-ways with plug shaft horizontal so that the plug rotates upward when it opens.

H. Plug valves shall be coated inside with Protecto 401 or Amine Cured Novolac ceramic epoxy.

2.08 VALVE ACTUATORS

A. Butterfly valve and plug valve actuators shall conform to the requirements for actuators presented in AWWA C 504 and shall be either manual or motor operated. 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.

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 or of the worm gear type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Valves located above grade shall have handwheel and position indicator, and valves located below grade shall be equipped with a 2-inch square AWWA operating nut located at ground level and cast iron extension type valve box.

C. Motor Actuators (Modulating):

1. The motor actuated valve controller shall include the motor, actuator unit gearing, limit switch gearing, limit switches, position transmitter which shall transmit a 4 to 20 mA DC signal, control power transformer, electronic controller which will position the valve based on a remote 4 to 20 milliamp signal, torque switches, bored and key-wayed drive sleeve for non-rising stem valves, declutch lever and auxiliary handwheel as a self-contained unit.
2. The motor shall be specifically designed for valve actuator service using 480-volt, 60-Hertz, 3-phase power as shown, on the electrical Drawings. The motor shall be sized to provide an output torque and shall be the totally enclosed, non-ventilated type. The power gearing shall consist of helical gears fabricated from heat treated alloy steel forming the first stage of reduction. The second reduction stage shall be a single stage worm gear. The worm shall be of alloy steel with carburized threads hardened and ground for high efficiency. The worm gear shall be of high tensile strength bronze with hobbed teeth. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout. Preference will be given to units having a minimum number of gears and moving parts. Spur gear reduction shall be provided as required.
3. Limit switches and gearing shall be an integral part of the valve control. The limit switch gearing shall be made of bronze and shall be grease lubricated, intermittent type and totally enclosed to prevent dirt and foreign matter from entering the gear train. Limit switches shall be of the adjustable type capable of being adjusted to trip at any point between fully opened valve and fully closed valve.
4. The speed of the actuator shall be the responsibility of the system supplier with regard to hydraulic requirements and response compatibility with other components within the control loop. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing. The rotor type gear limit switch shall have two normally open and two normally closed contacts per rotor. Gear limit switches must be geared to the driving mechanism and in step at all times whether in motor or manual operation. Provision shall be made for two additional rotors as described above, each to have two normally open and two normally closed contacts. Each valve controller shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve, should excessive load be met by obstructions in either direction of travel. The torque switch shall be provided with double-pole contacts.
5. A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operations, but must be responsive to manual operation at all times except when being electrically operated. The motor shall not rotate during hand operation nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve operator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. This movement from motor operation to handwheel

operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running. The gear limit switches and torque switches shall be housed in a single easily accessible compartment integral with the power compartment of the valve control. All wiring shall be accessible through this compartment. Stepping motor drives will not be acceptable.

6. The motor with its control module must be capable of continuously modulating over its entire range without interruption by heat protection devices. The system, including the operator and control module must be able to function, without override protection of any kind, down to zero dead zone.
7. All units shall have strip heaters in both the motor and limit switch compartments.
8. The actuator shall be equipped with open-stop-close push buttons, an auto-manual selector switch, and indicating lights, all mounted on the actuator or on a separate locally mounted power control station.
9. The electronics for the electric operator shall be protected against temporary submergence.
10. Actuators shall be Limitorque L120 with Modutronic Control System containing a position transmitter with a 4 to 20 mA output signal or equal.

D. Motor Actuators (Open-Close):

1. The electronic motor-driven valve actuator shall include the motor, actuator gearing, limit switch gearing, limit switches, torque switches, fully machined drive sleeve, declutch lever, and auxiliary handwheel as a self-contained unit.
2. The motor shall be specifically designed for valve actuator service and shall be of high torque totally enclosed, nonventilated construction, with motor leads brought into the limit switch compartment without having external piping or conduit box.
    a. The motor shall be of sufficient size to open or close the valve against maximum differential pressure when voltage to motor terminals is 10 percent above or below nominal voltage.
    b. The motor shall be prelubricated and all bearings shall be of the anti-friction type.
3. The power gearing shall consist of helical gears fabricated from heat treated steel and worm gearing. The worm shall be carburized and hardened alloy steel with the threads ground after heat treating. The worm gear shall be of alloy bronze accurately cut with a hobbing machine. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout.
4. Limit switches and gearing shall be an integral part of the valve actuator. The switches shall be of the adjustable rotor type capable of being adjusted to trip at any point between fully opened valve and fully closed valve. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing (influent valves require additional contacts to allow stopping at an intermediate position). The rotor type gear limit switch shall have two normally open and two normally closed contacts per rotor. Additional switches shall be provided if shown on the control and/or instrumentation diagrams. Limit switches shall be geared to the driving mechanism and in step at all times whether in motor or manual operation. Each valve actuator shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve should excessive load be met by obstructions in either direction of travel. Travel and thrusts shall be independent of wear in valve disc or seat rings.

5. A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operation except when being electrically operated. The motor shall not rotate during hand operation, nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve actuator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. Movement from motor operation to handwheel operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running.
6. Valve actuators shall be equipped with an integral reversing controller and three phase overload relays, Open-Stop-Close push buttons, local-remote-manual selector switch, control circuit transformer, three-phase thermal overload relays and two pilot lights in a NEMA 4X enclosure. In addition to the above, a close coupled air circuit breaker or disconnect switch shall be mounted and wired to the valve input power terminals for the purpose of disconnecting all underground phase conductors.
7. The valve actuator shall be capable of being controlled locally or remotely via a selector switch integral with the actuator. In addition, an auxiliary dry contact shall be provided for remote position feedback.
8. Valve A.C. motors shall be designed for operation on a 480-volt, 3-phase service. Valve control circuit shall operate from a fuse protected 120-volt power supply.
9. Motor operators shall be as manufactured by Limitorque Corporation, Type L120 or approved equal.

2.09 AIR RELEASE VALVES

A. Air release valves shall be automatic float operated, GA Industries 929, or an approved equal, with inlet size and working pressure ratings as required and NPT connections.

B. Valve bodies shall be cast iron per ASTM A126, Class B. The orifice, float and linkage shall be Type 304 stainless steel. The seat shall be (Buna N) nitrile elastomer.

2.10 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.

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, such as Russco 461-S through 668-S. 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. 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.

E. Reclaimed Valve Boxes shall be square 9-inch by 9-inch load bearing marked "Reclaimed Water" and painted purple.

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).

2.11 CORPORATION STOPS AND SADDLES

A. Corporation stops for connections to ductile iron and PVC water and reclaimed water mains shall be all red brass, alloy 85-5-5-5, per ASTM B 62, and shall conform to AWWA C800. 1-inch through 2-inch corporation stops shall be ball type, 300 psi working pressure rated, with AWWA MIP threaded inlets and compression, pack joint, flare, or FIP threaded joint outlets, Mueller as shown in the table below, or an approved equal. All joints made to CTS size HDPE tubing shall use stainless steel insert stiffeners.

Corporation Stops

Pipe Material	Type of Connection	Model
HDPE	Compression X AWWA MIP Thread	B-25028 (Saddle)
HDPE	Compression CTS X AWWA MIP Taper Thread	B-25008 (Direct Tap)
HDPE	Pack Joint CTS X AWWA MIP Thread	P-25028 (Saddle)
HDPE	Pack Joint CTS X AWWA MIP Taper Thread	P-25008 (Direct Tap)
Copper	Compression X AWWA MIP Thread	B-25028 (Saddle)
Copper	Pack Joint CTS X AWWA MIP Taper Thread	B-25008 (Direct Tap)
Copper	Pack Joint CTS X AWWA MIP Thread	P-25028 (Saddle)
Copper	Pack Joint CTS X AWWA MIP Taper Thread	P-25008 (Direct Tap)
Copper	Flare X AWWA MIP Thread	B-25025 (Saddle)
Copper	Flare X AWWA MIP Taper Thread	B-25000 (Direct Tap)
Stainless Steel	FIP Thread X AWWA MIP Thread	B-20046 (Saddle)
Stainless Steel	FIP Thread X AWWA MIP Taper Thread	B-20045 (Direct Tap)

B. Potable plastic service pipe material and compression and pack joint connectors shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.

C. Service connections to water and reclaimed water mains shall be made using red brass saddles, alloy 85-5-5-5 per ASTM B 62. Straps, washers and nuts shall be brass or stainless steel. No ductile iron, cast iron or steel saddles will be allowed. Saddles shall be Smith Blair 325 Bronze saddles with Stainless Steel or brass extra wide strap or equivalent.

D. Connections to sanitary force mains that are less than or equal to 2 inches, shall be made using Romac Style 306 double bolt stainless steel service saddles or equivalent.

E. Connections to HDPE mains shall be as specified in Sections 11.12 C & D or shall be Central Electrofusion Corp Saddles, or equivalent, per AWWA C906 and ASTM F-1055, with stainless steel compression ring and a brass adapter insert (for potable and reclaimed connections) providing direct

connection to the brass corporation stop. A stainless steel insert shall be provided for any direct connection to wastewater force mains with stainless steel ball valves associated with air release valves. All saddles shall be properly sized for and compatible with the HDPE pipe. Saddles shall be electrofusion installed per the saddle and electrofusion installation equipment manufacturer's recommendations. All other materials, specifications, and provisions shall remain unchanged.

2.12 FLANGED ADAPTERS AND PLAIN END 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 nonchlorinated 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 of a two-bolt design where each end gasket is compressed and sealed by tightening a single bolt, equal to Dresser Style 262 Hymax, or another approved equal. Flanged adapters shall have a plain end single-bolt compression seal same as the Hymax, with an ANSI 125 Class flange on the opposite end, and shall be Dresser Style 272 or an approved equal. Type 316 stainless steel backup rings shall be used for force mains that are located in corrosive environments including wet wells and valve vaults.

2.13 HOSE BIBS

A. Hose bibs shall be 3/4-inch or 1-inch brass, polished chromium plated brass, with vacuum breaker as noted on the Drawings.

2.14 SWING CHECK VALVES

A. Check valves shall be swing type, weighted lever, conforming to AWWA C508. Valves shall be iron-body, bronze-mounted, single disk, 175 psi working pressure for 2 inches through 12 inches, 150 psi for 14 inches through 30 inches, with ANSI B16.1 Class 125 flanged ends, as manufactured by Mueller, No. A-2600-6-01 (sewer), Mueller, No. A-2602-6-01 (water), or AVK series 41, or an approved equal.

B. When there is no flow through the line, the disc shall hang lightly against its seat in practically a vertical position. When open, the disc shall swing clear of the waterway.

C. Check valves shall have bronze seat and body rings, extended bronze or stainless steel hinge pins and stainless steel nuts and bolts on bolted covers.

D. Valves shall be so constructed that disc and body seat may easily be removed and replaced without removing the valve from the line. Valves shall be fitted with an extended hinge arm with outside lever and weight.

2.15 HYDRANTS

A. Hydrants shall be dry barrel, nostalgic style, and shall be AVK Model 2780, or approved equal, and shall conform to AWWA C502 and be UL/FM certified, and shall in addition meet the specific requirements and exceptions which follow:

1. Hydrants shall be according to manufacturer's standard pattern or nostalgic style and of standard size, and shall have one 5-inch Storz connection or equivalent with two 2-1/2-inch hose nozzles.
2. Hydrant inlet connections shall have mechanical joints for 6-inch pipe.
3. Hydrant valve opening shall have an area at least equal to that area of a 5-1/4-inch minimum diameter circle and be obstructed only by the valve rod. Each hydrant shall be able to deliver 1,000 gpm minimum through its 5-inch Storz nozzle with a loss of not more than 2.5 psi in the hydrant.
4. The upper and lower stem rod shall be stainless steel and shall have stainless steel break coupling, pins and clips; or cast or ductile iron breakaway coupling with fusion bonded epoxy coated at the factory with stainless steel pins and clips.
5. Hydrants shall be hydrostatically tested as specified in AWWA C502 and shall be rated at 250 psi minimum.
6. The operating nut shall be 1-1/2-inch pentagon shaped with a protective weather cover, and open counter clockwise.
7. All nozzle threads shall be American National Standard.
8. Each nozzle cap shall be provided with a Buna N rubber washer.
9. All hydrants shall be traffic break away type and allow for 360-degree rotation to position the Storz connection/nozzle in the desired direction after installation.
10. Hydrants must be capable of being extended without removing any operating parts.
11. Weepholes shall be excluded from fire hydrants.
12. Hydrant main valve closure shall be of the compression type opening against the pressure and closing with the pressure. The main valve shall be faced or covered with EPDM elastomer, which shall seat on a bronze ring.
13. Hydrant bonnets, weather cover, nozzle section, caps and shoe shall be cast iron or ductile iron, and shall be fusion-bonded epoxy coated at the factory, per AWWA C550, inside and outside. Hydrant extensions shall have stainless steel stems with stainless steel breakaway couplings and pins; or fusion bonded epoxy coated cast or ductile iron breakaway coupling with stainless steel pins, and stainless steel nut and bolt sets. Aboveground parts shall also have a top coat of UV resistant polyester or exterior enamel paint; color Safety Yellow for fire hydrants that are connected to the potable water system. Aboveground parts shall also have a top coat of UV resistant polyester or exterior enamel paint; color Pantone Purple 522C for fire hydrants that are connected to the reclaimed water system.
14. Exterior nuts, bolts and washers shall be stainless steel. Bronze nuts may be used below grade.
15. All internal operating parts shall be removable without requiring excavation.
16. Hydrants shall be located on same side of roads as water main unless approved by Manatee County.
17. All hydrant sections shall have a yellow electrostatic applied, fusion bonded epoxy coating internally and externally, or approved equal by Manatee County. The coating shall meet or exceed the requirements of AWWA C-550. Coating will be applied only at the original manufacturing facility. The standpipe shall be Bitumen coated internally and externally or fusion-bonded epoxy internally and externally with a bury line present below the break flange to indicate proper installation depth. Bury line will be clearly stenciled on the standpipe section. All hydrants shall be delivered painted externally with Sherman-Williams Acrolon™ 218 HS, an Aliphatic Acrylic Polyurethane, or a manufacturer's equivalent. The color shall be Safety Yellow (Color #330) for fire hydrants that are connected to the potable water system.

The color shall be Pantone Purple 522C for fire hydrants that are connected to the reclaimed water system. All hydrants 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.

2.16 RESTRAINED JOINTS

A. Pipe joints shall be restrained by poured-in-place concrete thrust blocks, thrust collars 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 aboveground.

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.

D. Valves may be restrained by a restrained vault or thrust collars when restrained joints are not feasible.

2.17 TAPPING SLEVES 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 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 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 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 protected from corrosion by being fusion applied epoxy coated, or be made of 18-8 Type 304 stainless steel. Saddle straps shall be 18-8 Type 304 stainless steel.

2.18 TRACER WIRE BOXES

A. Tracer wire test station boxes shall be provided at plug valves, butterfly valves, blowoff valves, gate valves, fire hydrants and backflow preventers as shown in these standards. Tracer wire test station boxes shall be 2-1/2-inch diameter, 15-inch length, ABS plastic with a cast iron lid, part no. P200NFG2T as manufactured by Bingham/Taylor, or equal approved by Manatee County.

PART 3 EXECUTION

3.01 INSTALLATION

A. All valves, hydrants, and other appurtenances shall be installed at the location indicated on the construction Drawings, in accordance with the Ten State Standards, Latest Edition, true to the required alignment on firm foundations, rigidly affixed and firmly supported, as required, and at right angles to the horizontal. In the event of any damages occurring to the installed materials, they shall be either repaired to the complete satisfaction of the County or they shall be removed from the project site and replaced with new standard equipment.

END OF SECTION

SECTION 02614 RECORD DRAWINGS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. When construction is complete, Record Drawings, indicating the locations and elevations of the improvements that have been built, shall be provided to Manatee County Public Works Department. The Record Drawings shall be a special revision of the Construction Drawings, and shall depict design information crossed out (or screen shaded) and replaced by accurate record information.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 RECORD INFORMATION

A. Water distribution utility systems, reclaimed water (or irrigation) utility systems, and sanitary sewer collection utility systems shall be located and the locations shall be depicted and noted on the Record Drawings by station and offset from an established baseline, and by elevation relative to established benchmarks.

1. Elements of the utility systems that shall be located and noted by station and offset:
   a. Valves (center of cover).
   b. All fittings (other than sanitary sewer service wyes and water or reclaimed water saddles).
   c. Water services (center of meter or meter box).
   d. Reclaimed water (or irrigation) services (center of meter or meter box).
   e. Other miscellaneous utility structures with features at or above the surface of the ground.
2. Elements of the utility systems that shall be located and noted by station, offset and elevation:
   a. Center of sanitary sewer manhole covers (top of rim for elevations).
   b. Center of lift stations (top of slab for elevations).
   c. Center of valve vaults (top of slab for elevation).
   d. Top of pipe on 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.
   e. Center of sanitary sewer service clean-out cover (invert of 45° wye that is located directly below the clean-out cover for elevation).
   f. Center of fire hydrants, (center of 5-inch Storz connection nozzle for elevation).
3. At locations where a top-of-pipe elevation is required for pipeline, a top-of-ground or top-of-pavement elevation shall also be measured and noted on the Drawings.
4. Elements of the utility systems that shall be located and noted by elevation only - sanitary sewer manhole inverts of individual sewer pipes where they enter and exit the manhole.

B. On Record Drawings, at locations where the horizontal positions of constructed pipelines or other utility structures deviate by more than 5 feet (as scaled on the Drawing) from the horizontal positions that were shown on the Construction Drawings, the actual positions of the pipelines or structures shall be measured and they shall be depicted in their actual positions on the Record Drawings and their original design positions shall be crossed-hatched out or screen shaded.

C. Record information shall include a thorough description of the pipes that have been installed, including type of pipe material, size, class, diameter ratio, and other basic information. The recalculated slopes of gravity sewer mains, based on the record survey of manhole inverts and lengths of pipes, shall be indicated on the Record Drawings.

D. For new valves, the manufacture type (as in gate, plug or butterfly), size (pipe nominal diameter) and make (manufacturer) of each valve shall be noted on the Record Drawings.

E. Lift station control and equipment elevations that were shown on the original construction drawing lift station detail sheet shall be measured and the record survey elevations shall be shown on the record drawing revision of the detail sheet. Record pump information, including pump make, model, year of manufacture, serial number, impeller diameter, voltage, horse power and speed, shall be shown on the record drawing revision of the lift station detail sheet.

F. Horizontal Directional Drilling (HDD) locations and elevations shall be shown on the Record Drawing. The Surveyor shall locate the beginning, ending and the surface location of the log readings, and shall be so noted on the Record Drawings. 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. The information provided by the HDD Contractor shall be depicted on the Record Drawing and identified as having been provided by the HDD Contractor.

3.02 REQUIREMENTS AS TO FORM

A. Every set of Record Drawings shall have a cover sheet with a vicinity map, which shows where the project is located, and a key map, which shows where each sheet in the record drawing set is located inside the project boundaries.

B. Each sheet of the Record Drawings shall have the title "RECORD DRAWING" printed on it in large, bold lettering, near the title block. Each sheet shall also have the words "COUNTY MAINTAINED – WATER," "- SEWER" or "-WATER AND SEWER," or "PRIVATELY MAINTAINED – WATER," "- SEWER," or "- WATER AND SEWER" in large, bold lettering, near the title block, depending on which entity will be responsible for maintaining the utilities. If the project includes a new reclaimed water system, each sheet shall also have the words "COUNTY MAINTAINED - RECLAIMED WATER," or "PRIVATELY MAINTAINED - RECLAIMED WATER," in large, bold lettering, near the title block, depending on which entity will be responsible for maintaining the utilities.

C. Record drawing information submitted in tabular form shall not be accepted. Record information notes shall be positioned individually on the Drawings near the depictions of structures to which each note corresponds.

D. Record information notes shall be bold, italics, boxed or clouded to identify them as record information.

E. Record Drawings shall have a revision note such as "Record Drawing" in the revision block and a date corresponding to the date the Record Drawing was issued.

F. Record information shall be presented in a clear and comprehensible form.

G. The drawing scales used in the Record Drawings shall be the same as were used in the Construction Drawings, and the sheet number of each Record Drawing sheet shall be the same as the sheet numbers that were used on the Construction Drawings from which the Record Drawings originate.

H. All sheets that were used to depict locations and elevations of utility structures in the Construction Drawings shall be included in the record drawing set.

I. Record Drawings shall accurately depict all existing improvements lying within the immediate vicinity of the constructed utilities. Existing improvements shall include, but not be limited to: sidewalks, walls, fences, road surfaces, buildings, and other utilities. Immediate vicinity includes areas within utility easements, includes areas within rights of way, and also includes areas within 15 feet of potable water mains, reclaimed water mains, sanitary force mains, and gravity sewer mains. Immediate vicinity also includes areas within 10 feet of potable water meters, reclaimed water meters, backflow preventers, and fire hydrants. Private irrigation mains that are not located within the rights of way shall also be located on the Record Drawings. Rights of way, easements, and property corners shall be shown and shall be of sufficient detail as to determine if the constructed utilities are within the easements or rights of way. A reference to the recording document (O.R. Book or Plat Book and Page) shall be included with any depiction of a right-of-way or easement. O.R. Book or Plat Book and Page are not required to be shown on the Record drawings of a project for proposed rights of way, or proposed easements that will identified on the proposed final plat for the said project.

J. Each roadway depicted on the Drawings shall have the correct roadway name noted on it. Provisional roadway names, such as “Street A”, shall not be allowed on the Record Drawings. Each new lot of a new subdivision shall have its street address number noted on the Record Drawings.

K. Horizontal locations required for valves, fittings, services, and other utility structures shall be to the center of each installation. Top of ground or pavement elevations required along pipelines shall be reported to the nearest 0.1 feet. Top of pipe elevations shall be to the nearest 0.1 feet. Elevations of manhole rims and manhole pipe inverts shall be reported to the nearest 0.01 feet. Horizontal locations of all features shall be reported to the nearest 0.1 feet.

L. Computer drawing files submitted shall be AutoCAD® 2004 or later release date versions. All reference files required to recreate the signed and sealed Record Drawings shall be included in the submitted digital files. Computer drawing files format shall be DWG only and shall be Windows NT or Windows 2000 or Windows XP compatible.

3.03 MONUMENTATION

A. Record information shall be referenced by station and offset to a monumented baseline. The monumentation for the baseline shall be shown or described on the record drawing (i.e. iron rod & cap, nail & disk or other durable and identifiable monument). For each baseline, there shall be at least two monuments described and referenced. State Plane Coordinates for the monuments shall be shown in NAD 83 (99 adjustment) in feet. Developments not within existing or proposed subdivisions and not within 1.5 miles from existing Manatee County Primary Control Points or platted State Plane Coordinates may be exempted from the requirement for monuments to be based on State Plane Coordinates.

B. The alignment of the baseline shall be along the centerline or edge of one of the following: an existing paved road, recorded right-of-way, recorded easement, face of an existing building, existing sidewalk or other existing, identifiable reference line. Offsets from the baseline shall not exceed 150 feet. All elevations shown on Record Drawings shall be referenced to a minimum of two described bench marks. A minimum of two on-site bench marks shall be described including datum. All bench marks shall be based upon NGVD29 and NAVD88. However, all Record Drawings shall be in NGVD29.

C. All locations and elevations shall be field located by or under the direct supervision of a Florida Licensed Surveyor and Mapper.

3.04 CERTIFICATIONS

A. Record Drawings shall be certified by a Florida Licensed Surveyor and Mapper. The certification shall state that the Record Locations and Elevations depicted on the Record Drawing are true and correct and were collected in the field by the Surveyor and Mapper or by a representative under the direct supervision of the Surveyor and Mapper.

B. Record Drawings shall be certified by the Engineer-of-Record. The certification must state that the improvements have been constructed in substantial conformance with the approved plans.

C. All visible record features, including sewer inverts, must be measured and located by the Surveyor or by personnel under his or her direct supervision. The certifying Surveyor shall be fully responsible for the accuracy of the record locations and elevations shown on the Record Drawings. However, the Surveyor may include statements on the Record Drawings indicating the following:

1. With the exception of the beginning, ending and the surface locations of the Horizontal Directional Drilling (HDD) log readings, the Horizontal Directional Drilling (HDD) locations and elevations provided by the HDD Contractor have not been field verified.
2. Station and offset of pipe fittings are based on PVC pipe markers or 2-inch by 4-inch markers inserted by the Contractor on the top of pipe fittings.
3. Station, offset, and elevation of potable water mains, reclaimed water mains, and sanitary force mains are based on PVC pipe markers or 2-inch by 4-inch markers inserted by the Contractor on the top of pipe. (See Sections 02614.02F and 02609.04R of these Standards.)

3.05 SUBMITTALS

A. Record Drawing submittal materials shall be attached to a transmittal letter, which shall list the following information:

1. Submittal date.
2. Project Title.
3. Planning Department Final Site Plan number (if applicable).
4. Title and sheet number of each Record Drawing sheet submitted.

B. The following materials shall be submitted for review and approval:

1. Transmittal letter.
2. Two signed, dated, and sealed sets of the Record Drawings.
3. Final plats and/or easements when applicable.
4. Final breakdown of construction quantities and final costs when applicable.
5. Performance bond, defect security bond, warranties and associated cost estimates when applicable.
6. A copy of the bacteriological test results.
7. A copy of all of the infrastructure inspection reports, and
8. Up to four copies each of the water and wastewater Completion of Construction forms, fully signed, sealed and dated by the Owner and Engineer, of which one of each will be retained for the County's records.

C. Once the Record Drawings has been reviewed and all corrections have been made, notification will be given to the Engineer to make the final submittal, which shall consist of the following materials:

1. Transmittal letter.
2. One set original Mylar Record Drawings.
3. Three copies of the Record Drawings plan set, each signed, dated, and sealed by the Engineer of Record.
4. One 3-1/2-inch floppy or CD ROM copy of the Record Drawings plan set.

END OF SECTION

SECTION 02619 HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment and incidentals required to install all pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents by Horizontal Directional Drilling (HDD).

1.02 GENERAL

A. All existing structures, water and sewer lines, storm drains, utilities, driveways, sidewalks, signs, mail boxes, fences, trees, landscaping, and any other improvement or facility in the construction area that the Contractor disturbs for his own construction purposes shall be replaced to original condition at no additional cost to the County.

B. For "Navigable Waters of the U.S." reference 33 of the Code of Federal Regulations, Part 329.

C. For "Waters of the U.S." reference 33 of the Code of Federal Regulations, Part 323.

D. For "Waters of the State" reference Section 62-301 of the Florida Administrative Code.

1.03 TESTING

A. In place soil compaction tests shall be performed by a qualified testing laboratory.

B. Compaction tests shall be taken at every excavation, except in the road crossings or road shoulders; tests are to be taken according to current FDOT Standards.

C. All pipe shall be tested in accordance with the appropriate material specifications.

D. Reference Standards: American Society for Testing and Materials (ASTM), D1557, Moisture-Density Relations of Soils Using 10-lb. Rammer and 18-in. Drop.

E. The density of soil in place shall be a minimum of 95 percent in accordance with ASTM test 1557-70T, Method A or C.

1.04 QUALIFICATIONS

A. Pipe Manufacture: All pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

B. Drilling Supervisor: The Contractor shall provide a competent boring specialist who shall remain on the project site during the entirety of the directional boring operation. This includes, but is not limited to, drilling fluid preparation, seaming, boring and pulling. The boring specialist shall have a minimum of five years experience in supervising directional bores of similar nature, diameter, materials and lengths.

C. Pipe Fusion: All boring and fusing equipment shall be certified for operation. The Contractor responsible for thermal butt fusing pipe and fittings shall have manufacturer certification for performing such work or a minimum of five years experience performing this type of work. If no certification is available, written documentation of the required work experience shall be submitted for approval.

D. Drilling Fluid Specialist: The personnel responsible for supervising the supply, mixing, monitoring fluid quality, pumping and re-circulation system proposed for the drilling

fluid shall have a written certification issued by the Drilling Fluid manufacturer for performing such work or a minimum of five years experience performing this type of work. If no certification is available, written documentation of the required work experience for the proposed personnel shall be submitted for review and approval.

1.05 SUBMITTALS

A. Detailed description including specifications and catalog cuts for:
   1. Shop drawings and catalog data for all HDD equipment.
   2. The pipe manufacturer's maximum degree of radial bending allowed for the pipe when full and when empty and pullback force recommended setting.
   3. Steering and tracking devices including specific tracer wire.
   4. Drilling fluids; the drilling fluid submittal shall include the ratio of mixture to water, including any additives, based on the Contractor's field observations prior to construction, knowledge and experience with drilling in similar conditions, and any soil data provided in the Contract Documents, which shall be verified by the fluid specialist.
   5. Shop drawings for the breakaway swivel, including the method of setting the swivels' break point and set point to be used.
   6. Pipe assembly procedure, details of support devices, and staging area layout including methods to avoid interference with local streets, driveways, and sidewalks.
   7. Details of pipe fusion procedures and copies of the fusion technician qualification certification or documentation.
   8. Drilling fluid technician qualification certification or documentation

B. If the Contractor proposes any changes to the pull-back distance or profile shown on the drawings, he may be required to submit a complete design for the proposed pipe including an analysis for pull-back forces, external loads including full hydrostatic pressure if empty, external forces due to borehole collapse, ovalization during pull-back, thermal stress while exposed to Sun-light, shortening after release of pull-back force, and tensile stress during pull-back.

C. Bore Plan: For all contiguous piping installations over 300 feet in length or any installations for piping larger than 4" in diameter, the Contractor shall submit a Bore Plan that includes the following:
   1. Contact information and experience for the drilling fluid specialist.
   2. The number of passes the bore will include to get the product pipe installed.
   3. The pilot bore and all reaming bore sizes including the final pullback with the product pipe.
   4. Drilling rod length in feet.
   5. The pilot bore, pre-ream bores (if any) and pullback production rate in minutes per (drilling) rod to maintain adequate mud flow.
   6. Details of the entry and exit pit locations along with entry and exit angles for the bore, drawn to scale, depicting the position of all required equipment, access points, existing facilities to remain in place, existing traffic lanes to be maintained in operation, office trailers and storage sites.
   7. The method of fusing or joining pipe of adjacent bores to ensure that the joint is on grade with the installed pipe.

D. Furnish a Bore Path Report to the Engineer within seven days of the completion of each bore path. Data collected by the County Representative does not relieve the Contractor from the responsibility of recording his own data. Include the following in the report:

1. Location of project, project name and number
2. Name of person collecting data, including title, position and company name
3. Investigation site location (Contract plans station number or reference to a permanent structure within the project right-of-way)
4. Driller's Log & identification of the detection method used
5. Elevations and offset dimensions of installed pipe as referenced to the drawings
6. Data log of pullback force during product pipe installation
7. All failed bores. Include length of pipe left in place and explanation of failed installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Incidental materials that may or may not be used to install the product depending on field requirements are not paid for separately and will be included in the cost of the installed product.

B. Drilling Fluids shall use a mixture of bentonite clay or other approved stabilizing agent mixed with potable water with a pH of 8.5 to 10.0 to create the drilling fluid for lubrication and soil stabilization. Vary the fluid viscosity to best fit the soil conditions encountered. Contractor shall have appropriate additives for drilling fluid available for different soil conditions that may be encountered. Do not use any other chemicals or polymer surfactants in the drilling fluid without written consent from the Engineer. Certify to the Engineer in writing that any chemicals to be added are environmentally safe and not harmful or corrosive to the product pipe.

C. For drilling operations that will be below waters of the State of Florida, only bentonite free drilling fluids shall be used. Acceptable products are BioMax, manufactured by M-I Swaco, Inc., P.O. Box 2216, Laurel, Mississippi 39440, Phone: (800) 731-7331 or Bio-Bore, manufactured by Baroid Drilling Fluids, Inc., P.O. Box 1675, Houston, Texas 77251, Phone: (731) 987-5900 or approved equal.

D. Identify the source of water for mixing the drilling fluid. Approvals and permits are required for obtaining water from such sources as streams, rivers, ponds or fire hydrants. Any water source used other than potable water may require a pH test.

E. The tracer wire to be used for all directional drills 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.

F. Breakaway connectors shall be supplied by DCD Design & Manufacturing, Condux International, Inc. or approved equal.

PART 3 EXECUTION

3.01 SITE CONDITIONS

A. Carry out excavation for entry, exit, recovery pits, slurry sump pits, or any other excavation as specified in the Contract documents. Sump pits are required to contain drilling fluids if vacuum devices are not operated throughout the drilling operation, unless approved by the Engineer.

B. Within 48 hours of completing installation of the boring product, clean the work site of all excess slurry or spoils. Take responsibility for the removal and final disposition of excess slurry or spoils. Ensure that the work site is restored to pre-construction conditions or as identified on the plans.

C. Exposure of product pipe to sunlight shall be limited to 14 consecutive days unless approved by the Engineer.

D. The pipe shall be supported at intervals along its length with rollers or Teflon pads to minimize frictional forces when being pulled, and to hold the pipe above the ground. Surface cuts or scratches greater than or equal to the maximum defect depth in 3.08 E are not acceptable.

3.02 DAMAGE RESTORATION & REMEDIATION

A. The Contractor shall take responsibility for restoration for any damage caused by heaving, settlement, separation of pavement, escaping drilling fluid (frac-out), or the directional drilling operation, at no cost to the County.

B. When required by the Engineer, provide detailed plans which show how damage to any roadway facility will be remedied. These details will become part of the Record Drawings Package. Remediation Plans must follow the same guidelines for development and presentation of the Record Drawings. When remediation plans are required, they must be approved by the Engineer before any work proceeds.

C. For HDD operations that will be below waters of the State of Florida, the contractor shall be responsible for any damage caused by the drilling operation, including, but not limited to, fracturing of the channel bottom. Any State or Federal required environmental cleanup due to the release of drilling fluids into State waters shall be at the Contractor's expense. The Contractor may at his own expense increase the depth of his drilling operations upon the approval from the Engineer.

3.03 QUALIFICATIONS FOR REJECTION OF DIRECTIONAL BORE

A. The Engineer may reject any portion of the work that is deemed to be non-responsive to the Contract requirements or not in conformance with approved plans and submittals, and for other factors including the following:

1. Failed Bore: When there is any indication that the installed product has sustained damage, stop all work, notify the County and investigate damage. The County may require a pressure and / or mandrel test at no additional cost to the County and shall have a County representative present during the test. Perform all testing within 24 hours unless otherwise approved by the Engineer. Furnish a copy of the test results and all bore logs to the Engineer for review and approval. The Engineer is allowed up to 5 working days to

approve or determine if the product installation is not in compliance with the specifications.

2. Obstructions: If an obstruction is encountered during boring which prevents completion of the installation in accordance with the design location and specification, the pipe may be taken out of service and left in place at the discretion of the Engineer.
3. Pull-back Failure: If the installed breakaway device should fail during pull back.
4. Loss of Drilling Fluids: If the drilling fluid is "lost" during the pull back of the product and cannot be regained within the required timeframe of the manufacturer or if more than a reasonable amount of fluid is used to fill an unknown void and flow cannot be regained. No pipe shall be pulled without visible flow of drilling fluid.
5. Test Failure: If the pipe shall fail a hydraulic pressure test as specified by the County.
6. Damaged Pipe: If at any time when the product is pulled back and any exposed areas have a greater than allowable "gouging" or visible marring of the pipe per the table in 3.08 E.
7. Alignment Tolerance Exceeded: If the vertical and horizontal limits are not within tolerances.
8. Defective Material: Any other defect in material or workmanship which would affect the quality, performance, or installation life of the installed pipeline.

B. Remediation: All rejected bores shall be at the Contractors expense to correct and provide a satisfactory installed product. The Contractor shall submit to the Engineer a revised installation plan and procedure for approval before resuming work. The Engineer may require non-compliant installations to be filled with excavatable flowable fill or to be completely removed at no additional cost to the County.

3.04 PRODUCT LOCATING AND TRACKING

A. The County recognizes walkover, wire line, and wire line with surface grid verification, or any other system as approved by the Engineer, as the accepted methods of tracking directional bores. Use a locating and tracking system capable of ensuring that the proposed installation is installed as intended. The locating and tracking system must provide information on:

1. Clock and pitch information
2. Depth
3. Transmitter temperature
4. Battery status
5. Position (x,y)
6. Azimuth, where direct overhead readings (walkover) are not possible (i.e. sub aqueous)

B. Ensure proper calibration of all equipment before commencing directional drilling operation.

C. Prepare the Driller's Log. Take and record alignment readings or plot points such that elevations on top of and offset dimensions from the center of the product to a permanent fixed feature are provided. Such permanent fixed feature must have prior

approval of the Engineer. Provide elevations and dimensions at all bore alignment corrections (vertical and horizontal) with a minimum distance between points of 10 feet. Provide a sufficient number of elevations and offset distances to accurately plot the vertical and horizontal alignment of the installed product.

D. Installation Location Tolerances: The location of the initial bored hole shall be deemed acceptable by the Engineer if the deviations of the bore from the design alignment or approved adjustments do not exceed the following tolerances:

1. Profile:
   a. 2.0 feet within a length of 100 feet
   b. No reverse curvature within 200 feet
   c. Total deviation not to exceed 5 feet
2. Alignment:
   a. 3.0 feet within a length of 200 feet
   b. No reverse curvature
   c. Total deviation not to exceed 7.0 feet

3.05 PRODUCT BORE HOLE DIAMETER

Minimize potential damage from soil displacement/settlement by limiting the ratio of the bore hole to the product size. The size of the back reamer bit or pilot bit, if no back reaming is required, will be limited relative to the product diameter to be installed as follows:

Maximum Pilot or Back-Reamer Bit Diameter When Rotated 360 Degrees	
Nominal Inside Pipe Diameter Inches	**Bit Diameter Inches**
2	4
3	6
4	8
6	10
8	12
10	16
12 and greater	Maximum Product OD plus 6

3.06 EQUIPMENT REQUIREMENTS

A. The HDD equipment selected by the Contractor shall be capable of drilling, steering, tracking, reaming and installing the pipeline through all the subsurface conditions that may be present at the site.

B. Match equipment to the size of pipe being installed. Obtain the Engineer's approval for installations differing from the above chart. Ensure that the drill rod can meet the bend radius required for the proposed installation.

C. All HDD equipment shall have a data logger to record pull back force during all pipe installations.

D. All HDD equipment that has the capability to exceed the maximum recommended pulling force shall have a breakaway swivel properly attached to the product pipe that will release if the pullback force exceeds the pipe manufacturers recommended pulling force.

3.07 THRUST / PULLBACK REQUIREMENTS

The Contractor shall provide as part of the required working drawings submittal complete data regarding the operational and maximum thrust or pulling forces to be used for the initial drill head and back-reamer installations, and the final pull-back of the pipe. Gages or other measurement tools shall be used to monitor the forces being used.

3.08 INSTALLATION PROCESS

A. Ensure adequate removal of soil cuttings and stability of the bore hole by monitoring the drilling fluids such as the pumping rate, pressures, viscosity and density during the pilot bore, back reaming and pipe installation. Relief holes can be used as necessary to relieve excess pressure down hole. Obtain the Engineer's approval of the location and all conditions necessary to construct relief holes to ensure the proper disposition of drilling fluids is maintained and unnecessary inconvenience is minimized to other facility users.

B. The Contractor shall determine the pull-back rate in order to allow the removal of soil cuttings without building excess down-hole pressure and to avoid local heaving, or spills. Contain excess drilling fluids at entry and exit points until they are recycled and separated from excavated materials, or removed from the site or vacuumed during drilling operations. Ensure that entry and exit pits and storage tanks are of sufficient size to contain the expected return of drilling fluids and soil cuttings. The bored hole shall always be maintained full of drilling fluids for support of surfaces, and the fluid re-circulation equipment shall operate continuously until the pipe installation is completed and accepted by the Engineer.

C. Ensure that all drilling fluids are disposed of or recycled in a manner acceptable to the appropriate local, state, or federal regulatory agencies. When drilling in suspected contaminated ground, test the drilling fluid for contamination and appropriately dispose of it. Remove any excess material upon completion of the bore. If in the drilling process it becomes evident that the soil is contaminated, contact the Engineer immediately. Do not continue drilling without the Engineer's approval.

D. The timing of all boring processes is critical. Install a product into a bore hole within the same day that the pre-bore is completed to ensure necessary support exists. Once pullback operations have commenced, the operation shall continue without interruption until the pipe is completely pulled into the borehole.

E. All prepared pipe that is being used for installation shall be adequately supported off the ground along the entire length to avoid damaging of the material during pullback due to ground surface conditions. Surface cuts or scratches greater than or equal to the maximum defect depth are not acceptable.

Maximum Defect – HDPE Pipe	
Pipe Size In.	**Max. Defect Depth In.**
4	1/16
6	1/16
8	5/32
10	3/16

Maximum Defect – HDPE Pipe	
Pipe Size In.	**Max. Defect Depth In.**
12	1/4
> 12	Per Pipe Manufacturer's Recommendations

F. The drilling fluid specialist shall remain on the project site during the entirety of the directional boring operation to ensure proper mixture and production of drilling fluids needed for the bore.

G. Upon successful completion of the pilot hole, the borehole shall be reamed to a minimum of 25 percent greater than the outside diameter of the pipe being installed.

H. For bores with more than two radii of curvature (entrance and exit), the borehole should be reamed up to 50 percent larger than the outside diameter of the carrier pipe. Prereaming may be necessary dependent on size of material to be pulled.

I. Additional passes for prereaming may be required for larger pipe. Incremental increases shall be used as needed until appropriate bore hole size has been achieved.

J. Prereaming must be accomplished with no product attached to the reamer head on all bore pipe 6" and larger. The bore product maybe pulled back on final pass of prereaming upon prior approval from the Engineer.

K. After reaming the borehole to the required diameter, the pipe shall be pulled through the hole. In front of the pipe shall be a breakaway swivel and barrel reamer to compact the borehole walls.

L. The Contractor shall not attempt to ream at a rate greater than the drilling equipment and drilling fluid system are designed to safely handle.

M. Install all piping such that their location can be readily determined by electronic designation after installation. For non-conductive installations, externally attach two (2) tracer wires; see Section 2.01 – Materials, Part I. above, to the product pipe. Connect any break in the conductor line before construction with an electrical clamp, or solder, and coat the connection with a rubber or plastic insulator to maintain the integrity of the connection from corrosion. Clamp connections must be made of brass or copper and of the butt end type with wires secured by compression. Soldered connections must be made by tight spiral winding of each wire around the other with a finished length minimum of 3 inches overlap. Tracking conductors must extend 2 feet beyond bore termini. Test conductors for continuity. Each conductor that passes must be identified as such by removing the last 6 inches of the sheath. No deductions are allowed for failed tracking conductors. Upon completion of the directional bore, the Contractor shall demonstrate to the County that the wire is continuous and unbroken through the entire run of the pipe by providing full signal conductivity (including splices) when energizing for the entire run in the presence of the County Representative. If the wire is broken, the Contractor shall repair or replace it at no additional cost to the County.

END OF SECTION

SECTION 02720 SANITARY SEWER BYPASS PUMPING

PART 1 GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment and incidentals required to maintain existing and anticipated flows within the affected portion of the collection system throughout the construction period.

1.02 PUBLIC IMPACTS

The contractor shall not create a public nuisance due to excessive noise or dust, nor impact the public with flooding of adjacent lands, discharge of raw sewage, or release of other potential hazards, nor shall he encroach on or limit access to adjacent lands. No extra charge may be made for increased costs to the contractor due to any of the above.

1.03 SUBMITTALS

A. The Contractor shall, within 30 days of the date of the Notice to Proceed, submit to the Project Manager a detailed Pumping Plan for each site by-pass pumping will be needed. The Pumping Plan shall address all measures and systems to prevent a sanitary sewer overflow (SSO) as defined by the EPA. The Plan shall include as a minimum:

1. Working drawings and sketches showing work location, pump location, piping layout & routing. Show all proposed encroachment and access impacts on adjacent properties or facilities.
2. Pump, control, alarm and pipe specifications or catalog cuts. Detailed sketch of controls and alarm system.
3. Power requirements and details on methods to provide by-pass power or fueling.
4. Calculation and determination of response times to prevent an SSO after a high water alarm. If anticipated peak flows are 750 G.P.M. or greater, an operator is required on site at all times pump is in service. If the anticipated peak flows are less than 750 G.P.M. an operator may not be required to be on site at all times; show operator on-site schedule.
5. Procedures to be taken in case of power, pump, or piping failures; including contact names and numbers for emergency notifications.
6. Frequency and specific responsibility for monitoring pump operation, fuel levels, pump maintenance and entire length of piping.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Pumps:

1. By-pass pumping system shall consist of at least a primary pump and a backup pump. Each pump shall have a minimum pumping capacity of 150% of the anticipated peak flows. If a lift station by-pass, 150% of the lift station capacity (G.P.M. & T.D.H) for the lift station being by-passed.
2. Pumps shall be low noise or sound attenuated. The noise level at any operating condition, in any direction, shall not exceed 70dBA at a distance of twenty three (23) feet (7 meters) from the pump and/or power source.

B. Controls:
The by-pass pump system shall be equipped with automatic controls and an alarm system. The automatic controls will automatically start the backup pump in the event of a high water condition or failure of the primary pump. The alarm system will immediately notify the Contractor of a pump failure or high water condition.

C. Pipe:
Pipe shall be of adequate size and capacity to match the pumps. Pipe type and materials will depend on the particulars of the site conditions, and shall be detailed in the Pumping Plan. Contractor will provide all connections.

PART 3 EXECUTION

3.01 SITE CONDITIONS

Site conditions will vary by site. Contractor is responsible to determine and address requirements such as traffic control, excavation, connections & fittings, impacts on access to adjacent properties, routing and support of by-pass piping, etc., in the Pumping Plan.

3.02 ON-SITE MONITORING

A. All by-pass operations where the anticipated flow rates are 750 G.P.M or greater shall require an employee on-site at all times (full-time on-site monitoring attended by personnel experienced with the pumps and controls, with demonstrated ability to monitor, turn on & off, and switch between pumps while the by-pass pump system is in service.

B. By-pass operations where the anticipated flow rates are less than 750 G.P.M may not require an employee on-site at all times while the by-pass pump system is in operation. The Contractor shall have personnel experienced with the pumps and controls on site within the calculated response time to prevent an SSO after a high water alarm.

C. During by-pass operations, the Contractor shall have posted on site with the permit, a copy of the approved Plan and the name and 24 hour contact number of the primary response person, the job site superintendent, and the construction company owner.

3.03 OPERATIONS

A. The Contractor is responsible for securing and providing power, fuel, site security, traffic control and all other supplies, materials and permits required for the by-pass pumping.

B. Contractor shall demonstrate automatic pump switching and alarm system to the satisfaction of: the County inspector, Project Manager, or Lift Stations Superintendent

prior to beginning by-pass pumping. Satisfactory demonstration shall be documented by the inspector's, PM's or Lift Station Superintendent's dated signature on the posted copy of the approved Pumping Plan.

3.04 DAMAGE RESTORATION & REMEDIATION

A. The Contractor shall be responsible for any pre-pump notifications, all restoration of pre-pump conditions and any damage caused by by-pass operations.

B. Should there be an SSO caused by or as a direct result of the by-pass pumping, the contractor is responsible for all immediate & long term response, notifications, clean up, mitigation, etc. Copies of all written response plans, notifications, documentation, mitigation plans, etc., shall be submitted to the County Project Manager.

END OF SECTION

SECTION 02999 MISCELLANEOUS WORK AND CLEANUP

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section includes items and operations which are not specified in detail as separate items, but may be sufficiently described as to the kind and extent of work involved. The Contractor shall furnish all labor, materials, equipment and incidentals necessary to complete all work under this Section.

B. The work of this Section may include, but is not limited to the following:

1. Restoration of roads, sidewalks, driveways, curbing and gutters, fences, guardrails, lawns, shrubbery and any other existing items damaged or destroyed.
2. Crossing utilities.
3. Relocation of existing water, reclaim water, or sewer lines less than four inches diameter, water and sanitary sewer services, low pressure gas lines, telephone lines, electric lines, cable TV lines as shown on the Contract Drawings.
4. Restoring easements (servitudes) and rights-of-way.
5. Clean up.
6. Incidental work (project photographs, testing, shop drawings, traffic control, record drawings, etc.).
7. Excavation and Embankment - As defined in the Florida Department of Transportation Standard Specifications for Road and Bridge Construction (1991 Edition or latest revision).
8. Stormwater and erosion control devices.

1.02 SUBMITTAL OF LUMP SUM BREAKDOWN

Contractor shall submit to the Owner/Engineer, a breakdown of the lump sum bid for Miscellaneous Work and Cleanup Item in the Proposal within 10 days after date of Notice to Proceed.

1.03 WORK SPECIFIED UNDER OTHER SECTIONS

All work shall be completed in a workmanlike manner by competent workmen in full compliance with all applicable sections of the Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS

Materials required for this Section shall equal or exceed materials that are to be restored. The Contractor may remove and replace or reuse existing materials with the exception of paving.

PART 3 EXECUTION

3.01 RESTORING OF SIDEWALKS, ROADS, CURBING, FENCES AND GUARDRAILS

A. The Contractor shall protect existing sidewalks & curbing. If necessary, sidewalks & curbing shall be removed from joint to joint and replaced after backfilling. Curbing damaged during construction because of the Contractor's negligence or convenience, shall be replaced with sidewalks & curbing of equal quality and dimension at no cost to the Owner.

B. At the locations necessary for the Contractor to remove, store and replace existing fences and guardrails during construction, the sections removed shall be only at the direction of the Engineer. If any section of fence is damaged due to the Contractor's negligence, it shall be replaced at no cost to the Owner with fencing equal to or better than that damaged and the work shall be satisfactory to the Engineer.

C. Guardrails in the vicinity of the work shall be protected from damage by the Contractor. Damaged guardrails shall be replaced in a condition equal to those existing.

D. Road crossings shall be restored in accordance with the Contract Documents and current FDOT Standards. Compensation for road restoration shall be included under the Road Restoration Bid Item if specified or under Miscellaneous Cleanup if it is not specified.

3.02 CROSSING UTILITIES

This item shall include any extra work required in crossing culverts, water courses, drains, water mains and other utilities, including all sheeting and bracing, extra excavation and backfill, or any other work required or implied for the proposed crossing, whether or not shown on the Drawings.

3.03 RELOCATIONS OF EXISTING GAS LINES, TELEPHONE LINES, ELECTRIC LINES AND CABLE TV LINES

The Contractor shall notify the proper utility involved when relocation of these utility lines is required. The Contractor shall coordinate all relocation work by the utility so that construction shall not be hindered.

3.04 RESTORING THE EASEMENTS AND RIGHTS-OF-WAY

The Contractor shall be responsible for all damage to private property due to his operations. He shall protect from injury all walls, fences, cultivated shrubbery, pavement, underground facilities, including water, sewer and reclaimed water lines and services, or other utilities which may be encountered along the easement. If removal and replacement is required, it shall be done in a workmanlike manner, at his expense, so that the replacement are equivalent to that which existed prior to construction.

3.05 STORMWATER AND EROSION CONTROL DEVICES

The Contractor shall be responsible for, provide, and install all stormwater and erosion control devices necessary to insure satisfactory compliance with the Florida

Department of Environmental Protection Stormwater, Erosion, and Sedimentation Control Inspector's Manual.

END OF SECTION

DIVISION 3 CONCRETE

SECTION 03200 CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 WORK INCLUDED

A. Reinforcing steel bars and welded steel wire fabric for cast-in-place concrete, complete with tie wire.

B. Support chairs, bolsters, bar supports and spacers, for reinforcing.

1.02 QUALITY ASSURANCE

Perform concrete reinforcing work in accordance with ACI 318 unless specified otherwise in this Section.

1.03 REFERENCES

A. ACI 318 - Building Code Requirements for Reinforced Concrete.

B. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

C. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

D. CRSI 63 - Recommended practice for placing reinforcing bars.

E. CRSI 65 - Recommended practice for placing bar supports, specifications and nomenclature.

F. ACI 315 - American Concrete Institute - Manual of Standard Practice.

1.04 SHOP DRAWINGS

A. Submit shop drawings in accordance with Contract Documents.

B. Indicate bar sizes, spacings, locations and quantities of reinforcing steel and wire fabric, bending and cutting schedules and supporting and spacing devices.

C. Manufacturer's Literature: Manufacturer's specifications and installation instructions for splice devices.

PART 2 PRODUCTS

2.01 REINFORCING

A. Reinforcing steel: Grade 60, Minimum Yield Strength 60,000 psi, deformed billet steel bars, ASTM A615; plain finish.

B. Welded steel wire fabric: Deformed wire, ASTM A497; smooth wire ASTM A185 in flat sheets; plain finish.

2.02 ACCESSORY MATERIALS

A. Tie wire: Minimum 16 gauge annealed type, or patented system accepted by Engineer.

B. Chairs, bolsters, bar supports, spacers: Sized and shaped for strength and support of reinforcing during construction conditions.

C. Special chairs, bolsters, bar supports, spacers (where adjacent to architectural concrete surfaces): Stainless steel type sized and shaped as required.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with ACI 315.
B. Locate reinforcing splices, not indicated on Drawings, at points of minimum stress. Location of splices shall be reviewed by Engineer.
C. Where indicated, weld reinforcing bars in accordance with AWS D12.1.

PART 3 EXECUTION

3.01 PLACEMENT

A. Reinforcing shall be supported and secured against displacement. Do not deviate from true alignment.
B. Before placing concrete, ensure reinforcing is clean, free of loose scale, dirt, or other foreign coatings which would reduce bond to concrete.

3.02 QUALITY ASSURANCE

A. Acceptable Manufacturers: Regularly engaged in manufacture of steel bar and welded wire fabric reinforcing.
B. Installer Qualifications: Three years experience in installation of steel bar and welded wire fabric reinforcing.
C. Allowable Tolerances:
   1. Fabrication:
      a. Sheared length: +l in.
      b. Depth of truss bars: +0, -1/2 in.
      c. Stirrups, ties and spirals: $\pm$1/4 in.
      d. All other bends: $\pm$1 in.
   2. Placement:
      a. Concrete cover to form surfaces: $\pm$1/4 in.
      b. Minimum spacing between bars: 1 in.
      c. Top bars in slabs and beams:
         (1) Members 8 in. deep or less: $\pm$1/4 in.
         (2) Members more than 8 in.: $\pm$1/2 in.
      d. Crosswise of members: Spaced evenly within 2 in. of stated separation.
      e. Lengthwise of members: Plus or minus 2 in.
   3. Maximum bar movement to avoid interference with other reinforcing steel, conduits, or embedded items: 1 bar diameter.

3.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size and length.

B. Handle and store materials to prevent contamination.

3.05 INSTALLATION

A. Placement:
   1. Bar Supports: CRSI 65.
   2. Reinforcing Bars: CRSI 63.

B. Steel Adjustment:
   1. Move within allowable tolerances to avoid interference with other reinforcing steel, conduits, or embedded items.
   2. Do not move bars beyond allowable tolerances without concurrence of Engineer.
   3. Do not heat, bend, or cut bars without concurrence of Engineer.

C. Splices:
   1. Lap splices: Tie securely with wire to prevent displacement of splices during placement of concrete.
   2. Splice devices: Install in accordance with manufacturer's written instructions.
   3. Do not splice bars without concurrency of Engineer, except at locations shown on Drawings.

D. Wire Fabric:
   1. Install in longest practicable length.
   2. Lap adjoining pieces one full mesh minimum, and lay splices with 16 gauge wire.
   3. Do not make end laps midway between supporting beams, or directly over beams of continuous structures.
   4. Offset end laps in adjacent widths to prevent continuous laps.

E. Cleaning: Remove dirt, grease, oil, loose mill scale, excessive rust, and foreign matter that will reduce bond with concrete.

F. Protection During Concreting: Keep reinforcing steel in proper position during concrete placement.

END OF SECTION

SECTION 03300 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED

Poured-in-place concrete slabs, thrust blocks, pile caps and pipe support cradles.

1.02 QUALITY ASSURANCE

Perform cast-in-place concrete work in accordance with ACI 318, unless specified otherwise in this Section.

1.03 TESTING LABORATORY SERVICES

A. Inspection and testing will be performed by the testing laboratory currently under contract to Manatee County in accordance with the Contract Documents.
B. Provide free access to work and cooperate with appointed firm.
C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of work.
D. Tests of cement and aggregates may be performed to ensure conformance with requirements stated herein.
E. Three concrete test cylinders will be taken for every 100 cu. yds. or part thereof of each class of concrete placed each day. Smaller pours shall have cylinders taken as directed by the Engineer.
F. One slump test will be taken for each set of test cylinders taken.

1.04 REFERENCES

A. ASTM C33 - Concrete Aggregates
B. ASTM C150 - Portland Cement
C. ACI 318 - Building Code Requirements for Reinforced Concrete
D. ASTM C260 - Air Entraining Admixtures for Concrete
E. ASTM C94 - Ready-Mixed Concrete
F. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete
G. ACI 305 - Recommended Practice for Hot Weather Concreting

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: Moderate-Type II, High early strength-Type III, Portland type, ASTM C150.
B. Fine and Coarse Aggregates: ASTM C33.
C. Water: Clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious material.

2.02 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical: ASTM C494 Type A - water reducing admixture.

2.03 ACCEPTABLE MANUFACTURERS

Acceptable Products:
1. Pozzolith
2. WRDA

2.04 ACCESSORIES

Non-shrink grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2400 psi in 2 days and 7000 psi in 28 days.

2.05 CONCRETE MIXES

A. Mix concrete in accordance with ASTM C94.
B. Provide concrete of following strength:
   1. Required concrete strengths as determined by 28 day cylinders shall be as shown on the Drawings, but shall not be less than 3000 psi.
   2. Select proportions for normal weight concrete in accordance with ACI 301 3.8 Method 1, Method 2, or Method 3. Add air entraining agent to concrete to entrain air as indicated in ACI 301 Table 3.4.1.
   3. All mixes shall be in accordance with FDOT Specifications.
C. Use set-retarding admixtures during hot weather only when accepted by Engineer.
D. Add air entraining agent to concrete mix for concrete work exposed to exterior.

2.06 FORMS

A. Forms shall be used for all concrete masonry, including footings. Form shall be so constructed and placed that the resulting concrete will be of the shape, lines, dimensions, appearance and to the elevations indicated on the Drawings.
B. Forms shall be made of wood, metal, or other approved material. Wood forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots; where used for expose surfaces, boards shall be dressed and matched. Plywood shall be sanded smooth and fitted with tight joints between panels. Metal forms shall be of an approved type for the class of work involved and of the thickness and design required for rigid construction.
C. Edges of all form panels in contact with concrete shall be flush within 1/32-inch and forms for plane surfaces shall be such that the concrete will be plane within 1/16-inch in four feet. Forms shall be tight to prevent the passage of mortar and water and grout.
D. Forms for walls shall have removable panels at the bottom for cleaning, inspection and scrubbing-in of bonding paste. Forms for walls of considerable height shall be arranged with tremies and hoppers for placing concrete in a manner that will prevent segregation and accumulation of hardened concrete on the forms or reinforcement above the fresh concrete.
E. Molding or bevels shall be placed to produce a 3/4-inch chamfer on all exposed projecting corners, unless otherwise shown on the Drawings. Similar chamfer strips

shall be provided at horizontal and vertical extremities of all wall placements to produce "clean" separation between successive placements as called for on the Plans.

F. Forms shall be sufficiently rigid to withstand vibration, to prevent displacement or sagging between supports and constructed so the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy.

G. Forms, including new pre-oiled forms, shall be oiled before reinforcement is placed, with an approved nonstaining oil or liquid form coating having a non-paraffin base.

H. Before form material is re-used, all surfaces in contact with concrete shall be thoroughly cleaned, all damaged places repaired, all projecting nails withdrawn, all protrusions smoothed and in the case of wood forms pre-oiled.

I. Form ties encased in concrete shall be designed so that after removal of the projecting part, no metal shall be within 1-inch of the face of the concrete. That part of the tie to be removed shall be at least 1/2-inch diameter or be provided with a wood or metal cone at least 1/2-inch in diameter and 1-inch long. Form ties in concrete exposed to view shall be the cone-washer type equal to the Richmond "Tyscru". Throughbolts or common wire shall not be used for form ties.

PART 3 EXECUTION

3.01 PLACING CONCRETE

A. Place concrete in accordance with ACI 304.

B. Notify Engineer minimum 24 hours prior to commencement of concreting operations.

C. Verify anchors, seats, plates and other items to be cast into concrete are placed, held securely and will not cause hardship in placing concrete. Rectify same and proceed with work.

D. Maintain records of poured concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

E. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

F. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's recommendations.

G. Pour concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur.

H. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solidly with non-shrink grout.

I. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

J. Conform to ACI 305 when concreting during hot weather.

3.02 SCREEDING

Screed surfaces level, maintaining flatness within a maximum deviation of 1/8" in 10 feet.

3.03 PATCHING

Allow Engineer to inspect concrete surfaces immediately upon removal of forms. Patch imperfections as directed. All patching procedures shall be submitted to and approved by the Engineer prior to use.

3.04 DEFECTIVE CONCRETE

A. Modify or replace concrete not conforming to required lines, details and elevations.

B. Repair or replace concrete not properly placed resulting in excessive honeycomb and other defects. Do not patch, fill, touch-up, repair, or replace exposed architectural concrete except upon express direction of Engineer for each individual area.

3.05 CONCRETE FINISHING

Provide concrete surfaces to be left exposed, columns, beams and joists with smooth rubbed finish.

3.06 CURING AND PROTECTION

Beginning immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury. Maintain concrete with minimal moisture loss at relatively constant temperature for a period of 7 days or until concrete strengths reaches 75% of the 28 day design strength.
Protection against moisture loss may be obtained with spray on curing compounds or plastic sheets. Protection against heat or cold may be obtained with insulated curing blankets or forms.

3.07 CONCRETE DRIVEWAY RESTORATION

Concrete driveways shall be restored with 6 inches of 3,000 psi concrete with W2.5 X W2.5, 6X6 wire mesh. Place ½ inch expansion joint between back of curb and new concrete. Area beneath restoration shall be mechanically tamped prior to placing concrete.

3.08 CONCRETE SIDEWALK RESTORATION

Concrete sidewalks across driveways shall be restored with 6 inches of 3,000 psi concrete with W2.5 X W2.5, 6X6 wire mesh. Place ½ inch expansion joint between back of curb and new concrete. Area beneath restoration shall be mechanically tamped prior to placing concrete.

Concrete sidewalks outside of driveways shall be restored with 4 inches of 3,000 psi concrete per FDOT Design Standards, Sections 522 & 310

END OF SECTION

SECTION 03350 CONCRETE FINISHES

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to finish cast-in-place concrete surfaces as specified herein.

1.02 SUBMITTALS

Submit to the Engineer as provided in the Contract Documents, the proposed chemical hardener manufacturer's surface preparation and application procedures.

1.03 SCHEDULE OF FINISHES

A. Concrete for the Project shall be finished in the various specified manners either to remain as natural concrete or to receive an additional applied finish or material under another Section.

B. The base concrete for the following conditions shall be finished as noted and as further specified herein:

1. Exterior, exposed concrete slabs and stairs - broomed finish.
2. Interior, exposed concrete slabs - steel trowel finish.
3. Concrete on which process liquids flow or in contact with sludge - steel trowel finish.
4. Concrete where not exposed in the finished work and not scheduled to receive an additional applied finish or material - off-form finish.
5. Provide concrete surfaces to be left exposed such as walls, columns, beams and joists with smooth rubbed finish.

1.04 RESPONSIBILITY FOR CHANGING FINISHES

A. The surface finishes specified for concrete to receive additional applied finishes or materials are the finishes required for the proper application of the actual products specified under other Sections. Where different products are approved for use, it shall be the Contractor's responsibility to determine if changes in finishes are required and to provide the proper finishes to receive these products.

B. Changes in finishes made to accommodate product different from those specified shall be performed at no additional cost to the Owner. Submit the proposed new finishes and their construction methods to the Engineer for approval.

PART 2 PRODUCTS

2.01 MATERIALS

A. Portland cement and component materials required for finishing the concrete surfaces shall be as specified in the Contract Documents.

B. Hardener shall be Lapidolith as manufactured by Sonneborn Building Products or approved equal. Hardener shall be used on all floors, stair treads and platforms.

PART 3 EXECUTION

3.01 FORMED SURFACES

A. Forms shall not be stripped before the concrete has attained a strength of at least 50 percent of the ultimate design strength. This is equivalent to approximately five "100 day-degrees" of moist curing.

B. Care shall be exercised to prevent damaging edges or obliterating the lines of chamfers, rustications, or corners when removing the forms or doing any work adjacent thereto.

C. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to the satisfaction of the Engineer.

D. Off-form finish. Fins and other projections shall be removed as approved. Tie cone holes and other minor defects shall be filled with non-shrink grout specified under the Contract Documents.

3.02 FLOORS AND SLABS

A. Floors and slabs shall be screeded to the established grades and shall be level with a tolerance of 1/8-inch when checked with a 10 foot straight edge, except where drains occur, in which case floors shall be pitched to drains as indicated. Failure to meet either of above shall be cause for removal, grinding, or other correction as approved by the Engineer.

B. Following screeding as specified above, power steel trowel as follows:

1. Immediately after final screeding, a dry cement/sand shake in the proportion of 2-sacks of portland cement to 350-pounds of coarse natural concrete sand shall be sprinkled evenly over the surface at the rate of approximately 500 pounds per 1,000 square feet of floor. Neat, dry cement shall not be sprinkled on the surface. This shake shall be thoroughly floated into the surface with an approved disc type power compacting machine weighing at least 200 pounds if a 20-inch disc is used or 300 pounds if a 24-inch disc is used (such as a "Kelly Float" as manufactured by the Weisner-Rapp Corporation of Buffalo, New York). A mechanical blade-type float or trowel is not acceptable for this work.

   NOTE: This operation (application of the cement/sand shake) may be eliminated at the discretion of the Engineer if the base slab concrete exhibits adequate fattiness and homogeneity.

2. In lieu of power steel troweling, small areas as defined by the Engineer shall be compacted by hand steel troweling with the dry cement/sand shake as ordered.

3. The floor or slab shall be compacted to a smooth surface and the floating operation continued until sufficient mortar is brought to the surface to fill all voids. The surfaces shall be tested with a straight edge to detect high and low spots which shall be eliminated.

4. Compaction shall be continued only until thorough densification is achieved and a small amount of mortar is brought to the surface. Excessive floating shall be avoided.

C. After Paragraph 3.02 A and B procedures are accomplished, floors and slabs for particular conditions shall be completed as scheduled in one of the following finishes:
   1. Wood float finish. Hand wood float, maintaining the surface tolerance to provide a grained, nonslip finish as approved.
   2. Broomed finish. Hand wood float maintaining the surface tolerance and then broom with a stiff bristle broom in the direction of drainage to provide a nonslip finish as approved.
   3. Steel trowel finish. Hand steel trowel to a perfectly smooth, hard even finish free from high or low spots or other defects as approved.

D. Floors, stair treads and platforms shall be given a floor hardener. Application shall be according to manufacturer's instructions.

3.03 APPROVAL OF FINISHES

A. All concrete surfaces will be inspected during the finishing process by the Engineer.

B. Surfaces which, in the opinion of the Engineer, are unsatisfactory shall be refinished or reworked until approved by the Engineer.

END OF SECTION

SECTION 03410 PRECAST CONCRETE STRUCTURES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all materials, labor and equipment and construct valve vaults, meter vaults, concrete pipe and accessory items, consisting of precast sections as shown on the Drawings and as specified herein.

B. The forms, dimensions, concrete and construction methods shall be approved by the Engineer in advance of construction.

C. These Specifications are intended to give a general description of what is required, but do not purport to cover all of the structural design details which will vary in accordance with the requirements of the plans. It is, however, intended to cover the furnishing, shop testing, delivery and complete installation of all precast structures whether specifically mentioned in these Specifications or not.

D. The supplier of the precast items shall coordinate his work with that of the Contractor to insure that the units will be delivered and installed in the excavation provided by the Contractor, in accordance with the Contractor's construction schedule.

E. The Contractor will ensure coordination of the precast structures fabrication with the supplier to achieve the proper structural top slab openings, spacings and related dimensions for the selected equipment frames and covers. The top slabs, frames, covers, and subsurface structures outside of roadways shall be capable of live load of 300 pounds per square foot unless noted otherwise.

F. All interior surfaces of valve vaults and meter vaults shall be painted with two coats of coal tar epoxy paint dry film thickness of 8 mils each coat, as approved by the Engineer.

1.02 SUBMITTALS

A. Submit to the Engineer in accordance with the Contract Documents, shop drawings showing details of construction, reinforcing, and joints.

B. Shop Drawings
   1. Content
      a. Dimensions and finishes.
      b. Estimated camber.
      c. Reinforcing and connection details.
      d. Lifting and erection inserts.
      e. Other items cast into members.
   2. Show location of unit by same identification mark placed on member.
   3. Include design calculations.

C. Manufacturer's Literature: Manufacturer's recommended installation instructions.

D. Manufacturer's certificates of material conformance with Specifications.

E. Test Reports: Reports of tests on concrete. A minimum of three compression test cylinders will be required for each pour.

1.03 INSPECTION

A. The quality of all materials, the process of manufacture and the finished sections shall be subject to inspection and approval by the Engineer, or other representatives of the Owner. Such inspection may be made at the place of manufacture, or at the site after delivery, or at both places and the sections shall be subject to rejection at any time due to failure to meet any of the Specification requirements; even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the project site shall be marked for identification and shall be removed from the project site at once. All sections which have been damaged after delivery will be rejected and if already installed, shall be acceptably repaired, if permitted, or removed and replaced entirely at the Contractor's expense.

B. At the time of inspection, the sections will be carefully examined for compliance with the applicable ASTM designation and these Specifications and with the approved manufacturer's drawings.

1. All sections shall be inspected for general appearance, dimension, "scratch-strength", blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured.
2. All sections shall meet the manufacturing tolerance requirements of ASTM C-478 or the following casting tolerances, whichever are more severe:

   Wall Thickness ± 3/8"
   Inside Diameter ± 3/8"
   Outside Diameter ± 1/2"
   Height or Length ± 3/8"

C. Imperfections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at the end of 7 days and 5,000 psi at the end of 28 days, when tested in 3-inch by 6-inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.

PART 2 PRODUCTS

2.01 PRECAST CONCRETE SECTIONS

A. Joints between precast concrete sections shall be set by plastic shims and filled with non-metallic non-shrink grout as specified in the Contract Documents and shown on the Drawings.

B. The top slab sections shall be fitted with water tight hatches as specified in the Construction Drawings. The frames and covers will be sized for the openings shown on the Contract Drawings.

C. The various precast sections shall have the inside dimensions and minimum thickness of concrete as indicated on the Drawings. All precast and cast-in-place concrete members shall conform to the Building Code Requirements for Reinforced Concrete ACI 318 and applicable ASTM Standards.

D. Fillets shall be provided and installed in the wet wells as shown on the Drawings. They shall be constructed using concrete fill and shall conform to the Contract Documents.

E. Precast structures shall be constructed to the dimensions as shown on the Drawings and as specified in these Specifications. Flow channels, inverts, and benches in manholes shall be precast, not constructed after installation. Provide a true curve of the largest radius possible for changes in direction of sewer and entering branch or branches.

F. Type II cement shall be used, typically at a compressive strength of 4,000 psi, except as otherwise approved.

G. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.

H. Sections shall be cured by an approved method and shall not be shipped until at least seven (7) days after having been fabricated.

I. Each precast section manufactured in accordance with the Drawings shall be clearly marked to indicate the intended installation location. The Contractor shall be responsible for the installation of the correct precast sections in their designated locations.

J. Wet wells, and manholes receiving flow from lift stations shall be precast with a cast in place PVC protective liner.

1. The prefabricated wetwell or manhole liner shall be a non-load bearing component installed and adequately anchored inside a new precast concrete wetwell or manhole riser during the concrete casting process at the concrete precaster's manufacturing facility. The liner must be fully supported during the casting process.
2. The liners shall be resistant to the chemical environment normally found in the gravity wastewater transmission systems to which they will be exposed.
3. The liner shall have a warranty against defect in material and workmanship for a period of three years.
4. After assembly and installation, in the field, all internal seams are to be sealed by bonding or welding per the manufacturer's standard method and details.
5. Any repairs or other modifications to the liner, such as patching or sealing PVC sleeves used for pipe penetrations of the structure, shall sealed by bonding or welding per the PVC liner manufacturer's standard methods and details.

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractor shall be responsible for handling ground water to provide firm, dry subgrade for the structure, shall prevent water rising on new poured-in-place concrete or grouted joint sections within 24 hours after placing and shall guard against flotation or other damage resulting from ground water or flooding.

B. A minimum of an 8-inch shell base compacted layer of washed shell or crushed stone shall be placed as a foundation for the wet well base slabs and valve and/or meter vault pits.

C. Backfill materials around the wet well and above the pipe bedding shall be select material as specified in the Contract Documents.

D. Precast bases, conforming to all requirements of ASTM C478 and above listed requirements for precast sections, may be used.

E. The structure shall not be set into the excavation until the installation procedure and excavation have been approved by the Engineer.

F. The base may be cast-in-place concrete placed on a thoroughly compacted crushed rock subbase. The tops of the cast-in-place bases shall be shaped to mate with the precast barrel section and shall be adjusted in grade so that the top slab section is at the approximately correct elevation.

G. Precast concrete structure sections shall be set so as to be vertical and with sections in true alignment with a 1/4-inch maximum tolerance to be allowed. The outside and inside joint shall be filled with a non-shrink grout and finished flush with the adjoining surfaces. Allow joints to set for 24 hours before backfilling. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides. The Contractor shall install the precast sections in a manner that will result in a watertight joint. Leaking joints are not acceptable.

H. Holes in the concrete sections required for handling or other purposes shall be plugged with a non-shrink grout or by grout in combination with concrete plugs.

I. Where holes must be cut in the precast sections to accommodate pipes, cutting shall be done prior to setting them in place to prevent any subsequent jarring which may loosen the mortar joints.

J. Frames and hatches specified and furnished shall be cast in the cover slab prior to setting. Normal installation shall include 6" to 12" of concrete grade rings between the top of the cone section and the cover plate ring slab.

K. ASTM A48-74, or most recent revision, Specification for Gray Iron Castings, Class 30 or Grade 60-45-10 Ductile Iron meeting the requirements of ASTM A536-72, or most recent revision, Specification for Ductile Iron Castings. Cast in a true symmetrical pattern of tough, dense and even grained iron, free from warping, scales, lumps, blisters, sandholes, or any defects of any kind. Provide indented pattern lids with lettering as shown on the Drawings. Machine or grind frames and lids at touching surfaces to provide firm seats and prevent rocking. Remove and replace any set not matching perfectly. All frames and covers shall be designed to withstand an HS20-44 wheel loading as defined by AASHTO specifications.

L. Manhole inserts: Watertight manhole inserts shall be required for all sanitary sewer manholes installed. Inserts shall be as manufactured by FRW Industries, Conroe, Texas, or approved equal. Inserts shall be complete with a self-cleaning relief valve. Relief valves shall operate on a pressure differential of 1/2 psi. Neoprene gaskets shall be installed under the insert lip to insure a leakproof seal.

M. Penetrations and connections into precast or existing structures shall be accomplished by rotary core boring.

N. Cast in place liners shall be repaired, fitted around penetrations, sealed at joints, etc. in accordance with the manufacturer's recommendations for that liner. As a general rule, repairs, sleeves and patches shall be welded in place, glues and sealants shall not be used unless approved by the manufacturer.

3.04 TESTING

A. After constructed to its finished height and before being backfilled, each manhole shall be tested for water tightness.

1. Plug pipe lines and perform vacuum test. Observing all recommended safety measures induce a backpressure of 5.0 p.s.i. equivalent to 10" Hg (mercury). The manhole assembly is considered satisfactory if the vacuum loss is less than 1" Hg for the length of time listed in the following table:

Time of Test in Seconds			
Depth Feet	**Manhole Diameter in Feet**		
	4	**5**	**6**
4	10	13	16
8	20	26	32
12	30	39	48
16	40	52	64
20	50	65	80
24	60	78	96
T	**5**	**6.5**	**8**

Note: Add "T" seconds for each additional 2'- of depth.

B. Failure to pass this test requires the Contractor to correct the problems and retest. The Contractor will replace leaking gaskets and/or concrete sections and retest the completed manhole. No manhole will be accepted without successfully passing this test.

END OF SECTION

DIVISION 5 METALS

SECTION 05500 MISCELLANEOUS METAL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, equipment and incidentals required and install covers, grates, frames and other miscellaneous metals as shown on the Drawings and specified herein. The miscellaneous metal items include but are not limited to the following:

1. All metal frames, ladders, stairs, stair rails, floor opening frames including gratings and supports.
2. Prefabricated access hatches and frames.
3. Anchors and anchor bolts except those specified to be furnished with all equipment.
4. Railings, posts and supports both interior and exterior.
5. Cast iron frames, covers, grates, drain leaders and drains.
6. Bridge crane track supports.
7. Stair nosings, steel plates, overhead steel door frames, angle frames, plates and channels.
8. Exterior H.V.A.C. hoods.
9. Pump guide rail system.

1.02 COORDINATION

A. The work in this Section shall be completely coordinated with the work of other Sections. Verify at the site both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.

B. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.

1.03 SHOP DRAWINGS AND SAMPLES

A. Detail drawings, as provided for in the Contract Documents, showing sizes of members, method of assembly, anchorage, and connection to other members shall be submitted to the Engineer for approval before fabrication.

B. Samples shall be submitted at the request of the Engineer for concurrent review with Shop Drawings.

1.04 FIELD MEASUREMENTS

A. Field measurements shall be taken at the site to verify or supplement indicated dimensions and to insure proper fitting of all items.

1.05 REFERENCED SPECIFICATIONS

A. Unless otherwise specified, materials shall conform to the following:

Structural Steel ASTM A36

Welded & Seamless Steel Pipe	ASTM A53
Gray Iron Castings	ASTM A48, Class 30
Galvanizing, general	ASTM A123
Galvanizing, hardware	ASTM A153
Galvanizing, assemblies	ASTM A386
Aluminum (Extruded Shapes)	6061-T6 (Alum. alloy)
Aluminum (Extruded Pipe)	6061-T6 (Alum. alloy)
Aluminum Bar Structural	6061-T6 (Alum. alloy)
Bolts and Nuts	ASTM, A307
Stainless Steel Bolts, Fasteners	AISI, Type 316
Stainless Steel Plate and Sheet, Wire	AISI, Type 316
Welding Rods for Steel	AWS Spec. for Arc Welding

PART 2 PRODUCTS

2.01 ANCHORS, BOLTS AND FASTENING DEVICES

A. Anchors, bolts, etc., shall be furnished as necessary for installation of the work of this Section.

B. Compound masonry anchors shall be of the type shown or required and shall be equal to Star Slug in compounded masonry anchors manufactured by Star Expansion Industries, equal by Phillips Drill Co., Rawlplug, or equal. Anchors shall be minimum "two unit" type.

C. The bolts used to attach the various members to the anchors shall be the sizes shown or required. Stainless steel shall be attached to concrete or masonry by means of stainless steel machine bolts and iron or steel shall be attached with steel machine bolts unless otherwise specifically noted.

D. For structural purposes, unless otherwise noted, expansion bolts shall be Wej-it "Ankr-Tite", Phillips Drill Co. "Wedge Anchors", or Hilti "Kwik-Bolt". When length of bolt is not called for on the Drawings, the length of bolt provided shall be sufficient to place the wedge portion of the bolt a minimum of 1-inch behind the reinforcing steel within the concrete. Material shall be as noted on the Drawings. If not listed, all materials shall be stainless steel.

2.02 ALUMINUM ITEMS

A. Aluminum gratings shall be of serrated I-Bar Aluminum Alloy 6061-T6, fabricated to the depths and thicknesses shown on the Drawings and shall be Reliance Steel Products Company, I-Lok Type 7/8 R4 Aluminum Grating; IKG Industries, "Galok" Aluminum I-Bar Grating Type S194-I, or equal. All openings 2 inches and greater in diameter shall be banded with a bar of the same depth and thickness as the main bearing bars of the grating, or furnished with continuous cross bridges. Each cut bar shall be welded to the band if banding is utilized. The ends of all grating sections shall be likewise banded. Clamps and bolts used for attaching grating to supporting members shall be stainless steel. All grating shall be clamped unless noted otherwise. Clamps shall be as recommended by the manufacturer.

B. Stair treads shall be as specified above for grating and shall have abrasive nonslip nosing.

C. Aluminum nosing at concrete stairs shall be an extrusion of 4-inch minimum width with abrasive filled and shall be Wooster Products, Inc., Alumogrit Treads, Type 116; equal by Barry Pattern and Foundry Co.; Andco; or equal. Embedded anchors shall be furnished with a minimum of three anchors per tread.

D. Aluminum ladders shall be fabricated to the dimensions and details and installed as shown on the Drawings. Treads to be of cast aluminum by Dixie Metals, Inc. of Fort Lauderdale, Florida or equal.

E. Aluminum Handrails, Mechanically Fastened Type:

1. All aluminum mechanically fastened type pipe handrails and guardrails shall be clear anodized aluminum finish and installed as specified herein and indicated on the Drawings. Handrails shall be made of nominal 1-1/2 inches inside diameter pipe (Schedule 40) fabricated or seamless 6063-T6 alloy. The supplier of the handrail system shall supply all necessary fittings, rackets, transition, corner and connector pieces, toeboards, protective gaskets, etc., for a complete job at the locations, indicated on the Drawings. All mounting hardware including bolts, studs, nuts, etc., shall be stainless steel Type 316. Bends shall be smooth and accurate to the details shown. Railings shall be the "Rigid Rail System" as manufactured by Reynolds Aluminum of Reynolds Metal Company as Reynolds II pipe railing system or the "Connectorail System" as manufactured by Julius Blum & Co., Inc., Carlstadt, New Jersey. The handrail systems shall comply with all OSHA and D Section 1208.2 of the Standard Building Code.

2. Spacing of posts where posts are required shall be as noted on shop drawings, but in all cases, shall be uniform and shall not exceed the requirements of OSHA and Section 1208.2 of the Standard Building Code. Shorter spacing may be used where required to maintain the maximum spacing. The fabricator of the aluminum handrail and guardrail system shall be responsible for the design and preparation of shop drawings and design calculations (signed and sealed by Florida Registered Engineer) to meet OSHA requirements and Section 1208.2 of Standard Building Code.

3. All railings shall be erected in line and plumb. Field splicing and expansion compensation shall be accomplished using internal splice sleeves. Make provisions for removable railing sections as detailed and where shown on the Drawings.

4. Where handrail or guardrail posts are set in concrete as per the manufacturer's requirements the posts shall be set into aluminum sheeves cast in the concrete and firmly cemented with 1651 epoxy resin by E-Bond Epoxies, Oakland Park, Florida, Moulded Reinforced Plastics, Inc., Fort Lauderdale, Florida or equal. Collars shall be placed on the posts and fastened in place, as shown and as detailed on approved shop drawings.

5. Where handrail is supported from structural members, it shall be done by the use of approved sockets, flanges, brackets, or other approved means which will provide neat and substantial support for the pipe railing.

6. All railing shall be properly protected by paper, or by an approved coating or by both against scratching, splashes or mortar, paint, or other defacements during transportation and erection and until adjacent work by other trades has been completed.

F. Toeboards: Contractor shall furnish and install aluminum toeboards conforming to latest OSHA requirements on all railings and other locations where indicated on the Drawings.

1. Toeboards shall consist of an extruded 6063-T6 aluminum shape bolted by means of a pipe clamp to the railing posts without requiring any drilling or welding of the toeboard to the railing posts as manufactured by Reynolds Aluminum, Julies Blum & Company, Thompson Fabricating Company or equal. Toeboards shall have pitched top and tear drop bottom to prevent accumulation of dirt, or other material.

2. All fastening hardware shall be Type 316 stainless steel.

G. Kickplates, if required, shall be fabricated and installed as shown on the Drawings.

H. Aluminum safety gate shall be fabricated of extruded aluminum.

I. Prefabricated checkerplate aluminum floor hatches shall be Type "JD", or "KD" as manufactured by Bilco Co., Babcock-Davis Associates, Inc.; Type "AM" Inland-Ryerson Construction Products Co., Milcor Division; or equal, sized as shown. Hatches with either dimension over 3 feet-6 inches shall be double leaf type. Hatches shall be designed for a live load of 300 pounds per square foot. Hatches shall be watertight.

J. Ship ladders shall be of all aluminum construction as detailed. Treads shall have abrasive nosing as manufactured by Reliance Steel Products Co., IKG Industries, or equal.

K. Checkplate aluminum cover plates shall be fabricated to the details shown and installed at the locations shown.

L. Structural aluminum angle and channel door frames shall be provided as shown on the Drawings and shall be anodized. Frames shall be fabricated with not less than three anchors on each jamb.

M. Miscellaneous aluminum shapes and plates shall be fabricated as shown. Angle frames for hatches, beams, grates, etc., shall be furnished complete with welded strap anchors attached. Furnish all miscellaneous aluminum shown, but not otherwise detailed. Structural shapes and extruded items shall conform to the detail dimensions on the Plans within the tolerances published by the American Aluminum Association.

2.03 STEEL ITEMS

A. Sleeves shall be steel or cast iron pipe in walls and floors with end joints as shown on the Drawings. All pipe sleeves shall have center anchor around circumference as shown.

B. Miscellaneous steel pipe for sleeves and lifting attachments and other uses as required shall be Schedule 40 pipe fabricated according to the details as shown on the Drawings.

C. Miscellaneous steel shall be fabricated and installed in accordance with the Drawings and shall include: beams, angles, support brackets, closure angles in roof at edge of

T-beams; base plates to support ends of T-beams; door frames; splice plates, anchor bolts; lintels and any other miscellaneous steel called for on the Drawings and not otherwise specified.

2.04 CAST IRON ITEMS

A. Outside pipe clean-out frames and covers shall be heavy duty, R-6013-R-6099 series as manufactured by Neenah Foundry Co., or equal. All outside pipe clean-outs shall be 6-inch diameter.

B. Frames and covers for valve vaults and manholes shall be of a good quality, strong, tough even grained cast iron except as otherwise specified below. Castings shall be as manufactured by the U. S. Foundry, Neenah Foundry, Mechanics Iron Foundry, or equal. Covers to have letters "WATER", "SEWER" or "DRAIN", as applicable, embossed on top.

PART 3 EXECUTION

3.01 FABRICATION

A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability.

B. Connections and accessories shall be of sufficient strength to safely withstand stresses and strains to which they will be subjected. Steel accessories and connection to steel or cast iron shall be steel, unless otherwise specified. Threaded connections shall be made so that the threads are concealed by fitting.

C. Welded joints shall be rigid and continuously welded or spot welded as specified or shown. The face of welds shall be dressed flush and smooth. Exposed joints shall be close fitting and jointed where least conspicuous.

D. Welding of parts shall be in accordance with the Standard Code of Arc and Gas Welding in Building Construction of the AWS and shall only be done where shown, specified, or permitted by the Engineer. All welding shall be done only by welders certified as to their ability to perform welding in accordance with the requirements of the AWS Code. Component parts of built-up members to be welded shall be adequately supported and clamped or held by other adequate means to hold the parts in proper relation for welding.

E. Welding of aluminum work shall be on the unexposed side as much as possible in order to prevent pitting or discoloration.

F. All aluminum finish exposed surfaces, except as specified below, shall have manufacturer's standard mill finish. Aluminum handrails shall be given an anodic oxide treatment in accordance with the Aluminum Association Specification AA-C22-A41. A coating of methacrylate lacquer shall be applied to all aluminum shipment from the factory.

G. Castings shall be of good quality, strong, tough, even-grained, smooth, free from scale, lumps, blisters, sand holes, and defects of any kind which render them unfit for the service for which they are intended. Castings shall be thoroughly cleaned and will be subjected to a hammer inspection in the field by the Engineer. All finished surfaces shown on the Drawings and/or specified shall be machined to a true plane surface and

shall be true and seat at all points without rocking. Allowances shall be made in the patterns so that the thickness specified or shown shall not be reduced in obtaining finished surfaces. Castings will not be acceptable if the actual weight is less than 95 percent of the theoretical weight computed from the dimensions shown. The Contractor shall provide facilities for weighing castings in the presence of the Engineer showing true weights, certified by the supplier.

H. All steel finish work shall be thoroughly cleaned, in accordance with the Contract Documents, of all loose mill scale, rust, and foreign matter before shipment and shall be given one shop coat of primer compatible with finish coats specified in Painting Section after fabrication but before shipping. Paint shall be applied to dry surfaces and shall be thoroughly and evenly spread and well worked into joints and other open spaces. Abrasions in the field shall be touched up with primer immediately after erection. Final painting is specified in the Contract Documents.

I. Galvanizing, where required, shall be the hot-dip zinc process after fabrication. Following all manufacturing operations, all items to be galvanized shall be thoroughly cleaned, pickled, fluxed, and completely immersed in a bath of molten zinc. The resulting coating shall be adherent and shall be the normal coating to be obtained by immersing the items in a bath of molten zinc and allowing them to remain in the bath until their temperature becomes the same as the bath. Coating shall be not less than 2 oz. per sq. ft. of surface.

3.01 INSTALLATION

A. Install all furnished items imbedded in concrete or other masonry. Items to be attached to concrete or masonry after such work is completed shall be installed in accordance with the details shown. Fastening to wood plugs in masonry will not be permitted. All dimensions shall be verified at the site before fabrication is started.

B. All steel surfaces to come in contact with exposed concrete or masonry shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions prior to installation.

C. Where aluminum is embedded in concrete, apply a heavy coat of approved bitumastic troweling mastic in accordance with the manufacturer's instructions prior to installation.

D. Where aluminum contacts masonry or concrete, provide a 1/32-inch neophrene gasket between the aluminum and the concrete or masonry.

E. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer and provide a 1/32-inch neoprene gasket between the aluminum and the dissimilar metal.

F. Where aluminum contacts wood, apply two coats of aluminum metal and masonry paint to the wood.

END OF SECTION

SECTION 05550 AIR RELEASE ENCLOSURE

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to install the above ground air release enclosure as listed in the specifications and as shown on the Drawings.

1.02 RELATED WORK

The contractor shall be responsible for any related work necessary for the proper installation of enclosure. This shall include, but is not limited to, any required bypass pumping, any required earthwork and any required concrete work.

1.03 SUBMITTALS

A. Submit to the Engineer shop drawings and schedules of all enclosure systems and appurtenances required. Submit design data and specification data sheets listing all parameters used in the enclosure system design.

B. Submit to the Engineer the name of the enclosure supplier and a list of materials to be furnished.

1.04 REFERENCE STANDARDS

A. American Water Works Association (AWWA).

B. American Society for Testing and Materials (ASTM).

C. Where reference is made to the above standard, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

The enclosure manufacturer shall be a company specializing in the manufacture of such enclosures with at least five(5) years of successful field experience and being lab certified as meeting A.S.S.E 1060 requirements.

1.06 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in shipping, handling and placing to avoid damaging. Any material damaged in shipment shall be replaced as directed by the Engineer.

B. Any material showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

PART 2 PRODUCTS

2.01 GENERAL

All enclosures shall comply with the standard detail for shape and size and shall include a 24"W x 24"H access door with a hasp for a padlock. The enclosure shall

be securely attached to a concrete base with anchor brackets installed on the interior of the enclosure, through the flange base of the enclosure itself or through a stainless steel anchor hinge.

2.02 ALUMINUM ENCLOSURE

A. The roof, walls and access panels shall be constructed of mill finish aluminum, ASTM B209, solid sheet construction, with a wall thickness of one eighth inch.

B. All structural members shall be aluminum. No wood or "particle board" shall be allowed in assembly.

C. Multi-sectional enclosures shall fit together with overlapping "tongue and groove" joints and be secured internally with mechanical fasteners.

D. All assembly fasteners shall be stainless steel or aluminum.

2.03 STAINLESS STEEL ENCLOSURE

A. The roof, walls and access panels shall be constructed stainless steel, type 316, solid sheet construction, with a wall thickness of one eighth inch.

B. All structural members shall be stainless steel. No wood or "particle board" shall be allowed in assembly.

C. Multi-sectional enclosures shall fit together with overlapping "tongue and groove" joints and be secured internally with mechanical fasteners.

D. All assembly fasteners shall be stainless steel.

FIBERGLASS ENCLOSURE

A. Enclosure shall be a 1 piece molded fiberglass enclosure with a base flange for mounting to the concrete slab and a full recessed door opening with a lip. Enclosure shall be by Allied Molded Products, or approved equal. Color shall be as directed by the Engineer.

B. Full length piano style hinge, door latch, padlock hasp and all bolts and other hardware shall be of stainless steel.

PART 3 EXECUTION

3.01 INSTALLATION

A. Enclosure shall be assembled and mounted on the concrete pad according to the manufacturer's instructions and the contract drawings.

B. Enclosure shall be installed plumb, level and square.

END OF SECTION