SECTION 01010

PROJECT REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

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

B. Work Included:

1. The Contractor shall furnish all labor, superintendence, materials, plant power, light, heat, fuel, water, tools, appliances, equipment, supplies, and means of construction necessary for proper performance and completion of the Work. The Contractor shall obtain and pay for all necessary local building permits. The Contractor 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.

2. The cost of incidental work described in these Project 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.

3. 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:

1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, 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, sewerage, drainage, water, or other public or private property which may be affected by the Work shall be deemed included hereunder.

2. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to make his own investigations to inform himself fully of the character, condition, and extent of all such installations and structures as may be encountered and as may affect the construction operations.

3. 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 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 shall be repaired by the Contractor, at his expense. No separate payment shall be made for such protection or repairs to public utility installations or structures.

4. Public utility installations or structures owned or controlled by the Owner or other governmental body which are shown on the Drawings to be removed, relocated, replaced, or rebuilt by the Contractor 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 therefor.

5. Where public utility installations of 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 Drawings 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 paid for as extra work as provided in the Agreement.

6. The Contractor shall, at all times in performance of the Work, employ acceptable methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage, or destruction of public utility installations and structures; and shall, at all times in the performance of the

Work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.

7. 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 48-hours in advance of breaking ground in any area or on any unit of the Work.

8. 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 owners of such utilities.

1.02 DRAWINGS AND PROJECT MANUAL

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

B. Supplementary Drawings:

1. 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 the Contractor will be furnished one (1) complete set of reproducible plans and one (1) reproducible copy of the specifications.

2. The Supplementary Drawings shall be binding upon the Contractor with the same force as the Contract Drawings. Where such Supplementary Drawings require either less or more than the estimated quantities of Work, credit to the Owner or compensation therefor to the Contractor shall be subject to the terms of the Agreement.

C. Contractor to Check Drawings and Data:

1. The Contractor shall verify all dimensions, quantities, and details shown on the Drawings, 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 therefrom, nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the Engineer, should such errors or omissions be discovered.

2. 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 or the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

D. Specifications: The Technical Specifications consist of three (3) parts: General, Products, and Execution. The General part of a Specification contains General Requirements which govern the Work. The Products and Execution parts modify and supplement the General Requirements by detailed requirements for the Work and shall always govern whenever there appears to be a conflict.

E. Intent:

1. All Work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the Work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

2. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, the interpretation of these Specifications shall be made upon that basis.

1.03 MATERIALS AND EQUIPMENT

A. Manufacturer:

1. All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request and at the Engineer's option, 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.

2. Any two (2) or more pieces of material or equipment of the same kind, type, or classification, and being used for identical types of service, shall be made by the same manufacturer.

B. Delivery:

1. The Contractor shall deliver materials in ample quantities to ensure the most speedy and uninterrupted progress of the Work so as to complete the Work within the allotted time.

2. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.

C. Tools and Accessories:

1. The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind, or size of equipment, one (1) complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

2. Spare parts shall be furnished as specified herein and as recommended by the manufacturer necessary for the operation of the equipment, not including materials required for routine maintenance.

3. Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight, and principal rate data.

D. Service of Manufacturer’s Engineer:

1. The Contract Prices for equipment shall include the cost of furnishing 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.

2. 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:

1. 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. Five (5) 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.

2. 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 Documents, 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.

3. Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with the recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.

4. The Contractor shall be fully responsible for the proper operation of equipment during testing 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:

1. All inspection and testing of materials furnished under this Contract will be provided by the Contractor, unless otherwise expressly specified.

2. The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor, and such costs shall be deemed to be included in the Contract Price.

3. Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the Owner for compliance. The Contractor shall reimburse the Owner for the expenditures incurred in making such tests of materials and equipment which are rejected for non-compliance.

C. Certificate of Manufacture:

1. Contractor shall furnish to Engineer authoritative evidence in the form of a certificate of manufacture that the materials to be used in the Work have been manufactured and tested in conformity with the Contract Documents.

2. 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.

D. Shop Tests:

1. Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function, or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents.

2. Five (5) 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 and/or independent laboratory, shall be submitted to the Engineer for approval.

3. The cost of shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

E. Start-up Tests:

1. As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make start-up tests of equipment.

2. If the start-up tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to demonstration tests, make all changes, adjustments, and replacements required. The furnishing Contractor shall assist in the start-up tests as applicable.

F. Demonstration Tests:

1. Prior to Contractor's request for a Substantial Completion inspection, all equipment and piping installed under this Contract shall be subjected to demonstration tests as specified or required to prove compliance with the Contract Documents.

2. The Contractor shall furnish labor, fuel, energy, water, and all other materials, equipment, and instruments necessary for all demonstration tests, at no additional cost to the Owner. Contractor shall assist in the demonstration tests as applicable.

1.05 LINES AND GRADES

A. Grade:

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

2. The Engineer will establish bench marks and baseline controlling points. Reference marks for lines and grades as the Work progresses will be located by the Contractor to cause as little inconvenience to the prosecution of the Work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. He shall remove any obstructions place by him contrary to this provision.

B. Surveys:

1. The Contractor shall furnish and maintain, at his own expense, stakes and other such materials.

2. The Contractor shall check such reference marks by such means as he may deem necessary and, before using them, shall call the Engineer's attention to any inaccuracies.

3. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the reference marks set by the Engineer, and shall be solely responsible for the accuracy thereof. He shall, however, be subject to the check and review by the Engineer.

C. Safeguarding Marks:

1. The Contractor shall safeguard all points, stakes, grade marks, monuments, and bench marks made or established on the Work, bear the cost of re-establishing 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.

2. The Contractor shall safeguard all existing and known property corners, monuments, and marks adjacent to but not related to the Work and shall bear the cost of re-establishing them if disturbed or destroyed.

1.06 REFERENCES AND ABBREVIATIONS

A. Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for bids, even though reference has been made to an earlier standard. The following list of specifications is hereby made a part of the Contract the same as if herein repeated in full. In the event of any conflict between any of these specifications, standards, codes or tentative specifications, and the Specifications, the latter shall govern. In the event

that one of the following conflict with another, the decision as to which shall govern will be decided by the Engineer, whose judgment will be final.

B. Reference to a technical society, organization, or body may be made in the Specifications by abbreviations, in accordance with the following list:

AAN	-	American Association of Nurserymen, Inc.
AASHTO	-	The American Association of State Highway and Transportation Officials
ACI	-	American Concrete Institute
AGA	-	American Gas Association
AGC	-	The Associated General Contractors of America, Inc.
AGMA	-	American Gear Manufacturers Association
AIA	-	American Institute of Architects
AISC	-	American Institute of Steel Construction
AISI	-	American Iron and Steel Institute
ANSI	-	American National Standards Institute
AREA	-	American Railway Engineering Association
API	-	American Petroleum Institute
ASCE	-	American Society of Civil Engineers
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society of Testing Materials
AWG	-	American Wire Gauge
AWPA	-	American Wood Preservers Association
AWS	-	American Welding Society
AWWA	-	American Water Works Association
CIPRA	-	Cast Iron Pipe Research Association
CRSI	-	Concrete Reinforcing Steel Institute
DIPRA	-	Ductile Iron Pipe Research Association
EASA	-	Electrical Apparatus Service Association
EPA	-	Environmental Protection Agency of the United States Government
FDOT, DOT	-	Florida Department of Transportation
FED. SPEC.	-	Federal Specifications
FHWA	-	Federal Highway Administration
FSS	-	Federal Specifications and Standards
HI	-	Standards of Hydraulic Institute
IEEE	-	Institute of Electrical and Electronic Engineers
IES	-	Illuminating Engineering Society
IPCEA	-	Insulated Power Cable Engineers Association
ISO	-	International Organization for Standards
MUTCD	-	Manual on Uniform Traffic Control Devices
NCPI	-	National Clay Pipe Institute
NEC	-	National Electric Code
NEMA	-	National Electrical Manufacturers Association

NEWWA	-	New England Water Works Association
NFPA	-	National Fire Protection Association
NIST	-	National Institute for Standards and Technology
NLMA	-	National Lumber Manufacturers Association
NOAA	-	National Oceanic and Atmospheric Administration
OSHA	-	Occupation Health and Safety Act
PCA	-	Portland Cement Association
SAE	-	Society of Automotive Engineers Standards
SBCC	-	Standard Building Code Congress International, Inc.
SHBI	-	Steel Housing Boiler Institute
SI	-	International System of Units
SPEC.	-	Navy Department Specification
SSPC	-	Steel Structures Painting Council
TCA	-	Tile Council of America, Inc.
U.L., Inc.	-	Underwriter's Laboratories, Inc.

C. When no reference is made to a code, standard, or specification, the standard specification of the FDOT, ASTM, the ANSI, the ASME, the IEEE, or the NEMA shall govern.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01026

APPLICATIONS FOR PAYMENT
CONTRACTOR'S PREREQUEST

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

Submit Applications for Payment to the Engineer in accord with the schedule established by Conditions of the Contract and Agreement between Owner and Contractor.

1.2 RELATED REQUIREMENTS

A. Agreement between Owner and Contractor.

B. Conditions of the Contract: Progress Payments, Retainage, and Final Payment.

C. Section 01030: Measurement and Payment.

D. Section 01700: Contract Close-out.

E. Section 01720: Project Record Documents.

1.3 FORMAT AND DATA REQUIRED

A. Submit three applications to the Engineer typed on forms provided by the Engineer, Application for Payment, with itemized data typed on 8-1/2 inch x 11 inch or 8-1/2 inch x 14 inch white paper continuation sheets.

B. Fill in required information, including that for Change Orders executed prior to date of submittal of application.

C. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.

D. Execute certification with signature of a responsible officer of Contract firm.

1.4 PREREQUISITES FOR PAYMENTS

The Contractor shall provide the following as a prerequisite for payment.

A. Exhibit the updated record drawings as required by Section 01720, Project Record Documents, for review by the Engineer.

B. Submit required certificates and evidence of passing test for items for which payment is requested in accordance with the testing requirements in Section 01410, Testing Services.

C. Submit payroll records indicating compliance with Federal Wage Requirements on Form WH347.

D. Submit revised construction schedules in accordance with Section 01310, Construction Schedules.

1.5 SUBMITTAL AND PAYMENT PROCEDURE

A. Contractor's Responsibility

1. In order for progress payments be made to the Contractor, the Owner must request and receive the funds for each progress payment from the Department of Community Affairs (DCA). The process of requesting and receiving funds from DCA requires approximately 45 days. In order to expedite payment to the Contractor, it is recommended that the Contractor notify the Engineer by phone 30 days prior of his intention to submit an Application for Payment and indicate the estimated funds to be requested. This will allow the Engineer to instruct the Owner to proceed with the request for funds from DCA. This will help insure the immediate availability of funds upon the final approval of the actual Application for Payment.

2. Contractor shall satisfy all prerequisites prior to submittal of Application for Payment.

3. Contractor shall submit completed and signed Application for Payment to Engineer. Contractor may submit Application for Payment at any time, however, not more frequently than one per month.

B. Engineer's Responsibility

1. Inform Owner/Grant Administrator of Contractor's advance notice of intention to submit Application for Payment.

2. Review and make recommendation concerning Application for Payment to Owner.

C. Owner's Responsibility

1. Approve Application for Payment when submitted correctly.

2. Make a progress payment to the Contractor not later than thirty (30) days on the basis of a duly certified and approved Application for Payment for the work performed during the preceding interim, but to ensure the proper performance of this Contract, the Owner shall retain ten percent (10%) of the amount of each estimate until final completion and acceptance of all work covered by this Contract. The County may reduce the retainage to 5% at any time at the County's option.

END OF SECTION

SECTION 01046

SPECIAL PROVISIONS

PART 1 – GENERAL

1.1 CONSTRUCTION AREAS

The CONTRACTOR shall:

A. Limit use of the construction areas for Work and for storage to allow for:

1. Work by other contractors.

2. Utilities use.

3. OWNER use.

4. Public use.

B. Coordinate use of Work site under direction of the PROJECT REPRESENTATIVE.

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

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

E. Obtain and pay for the use of additional lay down areas needed for operations.

1.2 SPECIFICATIONS

All Work called for in the Specifications applicable to this Contract, but not shown on the plans in its 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 the Specifications, but involved in carrying out 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 on that basis. The inclusion of the General 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.

1.3 WORK PROGRESS

A. The CONTRACTOR shall construct the Work as shown on the Drawings and provide equipment which will be efficient, appropriate, and large enough to secure a satisfactory quality of Work and a rate of progress which will ensure the completion of the Work within the Contract Time.

B. If at any time, Project execution appears to be inefficient, inappropriate, or insufficient for securing the quality of Work required or for producing the necessary rate of progress, the PROJECT REPRESENTATIVE may request the CONTRACTOR to increase the efficiency, change the character or increase the project equipment and the CONTRACTOR shall conform to such request. Failure of the PROJECT REPRESENTATIVE to give such request shall in no way relieve the CONTRACTOR of his/her obligations to secure the quality of the Work and rate of progress required.

1.4 PRIVATE LAND

The CONTRACTOR shall not enter or occupy Government or private land outside of the construction site or easements, except by written permission of the land owner.

1.5 WORK LOCATIONS

Structures, pipelines, and equipment shall be substantially located as indicated on the Drawings, but the ENGINEER through the PROJECT REPRESENTATIVE reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons.

1.6 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by the CONTRACTOR by providing temporary barricades, caution signs, lights, and other appropriate means to prevent accidents to persons and damage to property. The CONTRACTOR shall, at his/her own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions. The PROJECT REPRESENTATIVE may require special construction procedures such as limiting the length of the open trench, prohibiting

stacking excavated material in the street or 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 properly signed, appropriately barricaded, and well lighted at all times.

C. The CONTRACTOR shall adhere to the requirements of Chapter 553 Part II of the Florida Statutes entitled Trench Safety Act, and O.S.H.A. Excavation Safety Standards 29 CFRs 1926.650 Subpart P.

1.7 TEST PITS

A. Test pits for the purpose of locating all known and unknown underground pipelines, utilities, or structures in advance of the construction shall be excavated and backfilled by the CONTRACTOR at the direction of the PROJECT REPRESENTATIVE.

B. Test pits shall be immediately backfilled after its purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the PROJECT REPRESENTATIVE.

C. No separate payment will be made for such test pit obligations.

1.8 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/her expense, to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the OWNER and PROJECT REPRESENTATIVE.

B. All sidewalks, mailboxes, and driveways which are disturbed by the CONTRACTOR's operations shall be restored to its original construction or better and in accordance with best practice and the requirements of the Contract Documents.

C. All fences, walks, bushes, trees, shrubbery, and other physical features along the location of this Work shall be protected and restored in a thoroughly workmanlike manner. Fences and other features removed by the CONTRACTOR shall be

replaced in the location and by the date indicated by the PROJECT REPRESENTATIVE.

All grass areas beyond the limits of construction which have been damaged by the CONTRACTOR shall be re-graded, sodded, and re-established as before damage. All sod shall match the same type of grass in front of each private "yard" within the right of way.

D. Trees close to the Work shall be boxed or otherwise protected against injury. The CONTRACTOR shall trim all branches that are liable to be damaged because of construction operations, but in no case shall any tree be cut or removed without prior notification or written approval of the PROJECT REPRESENTATIVE. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to appropriate methods, using only appropriate tools and materials. All landscaping to be removed shall be documented and replaced with like kind or better and re-established as before removal. All palm trees shown on plans shall be spaded out, protected, temporarily stored, and replaced to its same location(s).

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 lump sum prices.

1.9 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 buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, storm drains, as well as electric and telephone cables, 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, or any of its subcontractors, operations shall be repaired at his/her expense.

B. The CONTRACTOR shall bear full responsibility for obtaining all locations of 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 shall be a part of the Work under the Contract and all costs in connection therewith shall be included in the lump sum price.

D. The CONTRACTOR shall be responsible to maintain water, telephone, power, cable TV, sewer, gas, and other related utilities throughout construction at no additional cost to the OWNER.

E. The CONTRACTOR shall fully cooperate with all private and public utilities during the installation of new facilities, or relocation of existing facilities. The CONTRACTOR shall accordingly coordinate his/her work and shall have no claim except for time extension for delays associated with the proposed utility improvements.

1.10 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

A. During the course of the Work, the CONTRACTOR shall keep the construction site in a reasonably clean and neat condition. The CONTRACTOR shall dispose of all residues resulting from the construction work and, at the conclusion of the work, shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operations as well as leave the entire site of the Work in a neat, orderly, and restored condition.

B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the CONTRACTOR and his/her subcontractors shall comply with all applicable federal, state and local laws and regulations concerning waste material disposal, as well as any other specific requirements stated elsewhere in the Specifications or the Contract Documents.

1.11 MAINTENANCE OF ACCESS

Portions of the Work are located in developed areas requiring access for fire, police, emergency, and other city, county, state, or federal agencies to be provided and at least one free lane must be available at all times for all traffic. The CONTRACTOR shall arrange operations in these areas to meet these requirements and secure approval or operating procedures from the Gulf Coast Electric Cooperative, Tyndall Air Force Base, Bay County, or Florida Department of Transportation (FDOT) as the case may be.

1.12 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, the CONTRACTOR shall, at his/her own expense, maintain normal traffic flow during extended construction stoppage.

B. All excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If construction operations cause traffic hazards, the CONTRACTOR shall repair the road surface, provide temporary roadways, erect wheel guards or fences, or take other satisfactory measures for safety, subject to approval by the PROJECT REPRESENTATIVE.

C. Detours around construction areas will be subject to the approval of the PROJECT REPRESENTATIVE. Where detours are permitted, the CONTRACTOR shall provide all necessary barricades and signs as required by the PROJECT REPRESENTATIVE to divert the flow of traffic.

While traffic is detoured, the CONTRACTOR shall expedite construction operations and the PROJECT REPRESENTATIVE will strictly control periods when traffic is being detoured.

1.13 CONNECTION TO WORK BY OTHERS

If construction by others occurs at the same time and in the same areas as Work being done under this Contract, the CONTRACTOR shall conduct operations as follows:

Force Mains and Water Mains:

A. If shown on the Drawings, pipelines constructed under this Contract may be connected to pipelines to be built by others.

B. Pipelines built under this Contract will be connected to pipelines constructed by others by removing the plugs at both ends of the pipeline segment and making the connection.

C. If the pipelines have not been constructed by others, the pipeline under this Contract shall be laid to the required line and grade, terminated with a plugged connection, precisely at the location of the connection indicated on the Drawings, and then backfilled and marked with a stake and the connection made later as specified in (B) above.

1.14 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed work shall be carefully protected from any injury or damage. The CONTRACTOR shall not allow any wheeling or walking or placing of heavy loads on any newly constructed Work and all portions injured or damaged shall be reconstructed by the CONTRACTOR at his/her own expense.

B. All structures shall be protected in a manner approved by the PROJECT REPRESENTATIVE. 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 by the OWNER 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 guarantee period described in the Contract.

C. 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.

D. The CONTRACTOR shall maintain the Work during construction and until the Project is accepted. Such maintenance shall constitute continuous and effective Work prosecuted on a daily basis, with adequate equipment and forces in order that the roads or structures are kept in satisfactory condition at all times. In the case of a contract for the placing of a previously constructed course or subgrade, the CONTRACTOR shall maintain the previous course or subgrade during all construction operations.

All cost of maintenance work during construction and before the Project is accepted shall be included in the Contract Price and the CONTRACTOR will not be paid an additional amount for such Work.

1.15 WORKING HOURS

A. Regular working hours are defined as up to 10 hours per day, Monday through Friday, beginning no earlier than 7:00 a.m. and ending no later than 5:00 p.m. The CONTRACTOR shall not work on federal holidays. The Contract Time shall not be extended due to holidays falling within the Contract Time. All Work performed by the CONTRACTOR is subject to observation at all times by the OWNER and its agents, including the PROJECT REPRESENTATIVE. Requests to work outside of the defined regular working hours must be submitted in writing to the PROJECT REPRESENTATIVE, at least 48 hours prior to any proposed weekend work or scheduled extended workweeks. Periodic unscheduled overtime on weekdays will be permitted if 2 hours notice is provided to the PROJECT REPRESENTATIVE. Maintenance of the CONTRACTOR's equipment and cleanup may be performed during hours other than regular working hours.

B. The CONTRACTOR shall reimburse the OWNER for additional engineering and/or inspection costs incurred as a result of overtime work in excess of the regular working hours. At the OWNER'S option, overtime costs may either be

deducted from the CONTRACTOR's monthly payment request or deducted from the CONTRACTOR's retention prior to release of final payment.

Engineering/Inspection costs shall be calculated at the following rates:

Professional Engineer (P.E.)	$135.00
Project Engineer	$115.00
Senior Field Representative	$ 95.00
Field Representative	$ 55.00

1.16 MEETINGS

A. Immediately after awarding the Contract but before construction work begins, the CONTRACTOR shall attend a preconstruction conference as scheduled by the PROJECT REPRESENTATIVE to review construction aspects of the project and to provide required preconstruction submittals and other documentation.

B. In addition, the CONTRACTOR shall attend monthly meetings as requested by the PROJECT REPRESENTATIVE to discuss Contract progress, near-term scheduled activities, including utility relocations, problems and proposed solutions. The CONTRACTOR shall submit a monthly planning schedule at each meeting, showing the Work planned for the next month in bar chart format, identifying current and planned activities and related contract schedule work activities, including subcontractor work. The planning schedule shall designate all activities that are controlling work items as determined by the currently accepted Contract schedule.

C. The CONTRACTOR shall also attend other meetings as may be required by OWNER or PROJECT REPRESENTATIVE from time to time to discuss, coordinate and resolve specific issues, problems, change orders, or disputes.

1.17 APPENDICES

The CONTRACTOR shall follow all permit conditions in the Appendices which are part of the Contract Documents.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION

SECTION 01050

FIELD ENGINEERING

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Provide and pay for field engineering services for work.

1. Survey work required in execution of work.

2. Civil, structural, or other professional engineering services specified, or required to execute Contractor's construction methods.

3. The method of field staking for the construction of the work shall be at the option of the Contractor. The Owner shall provide the engineering surveys to establish reference points which in his judgment are necessary to enable the Contractor to proceed with his work.

4. The accuracy of any method of staking shall be the responsibility of the Contractor. All engineering for vertical and horizontal control shall be the responsibility of the Contractor.

B. The Contractor shall retain the services of a registered land surveyor licensed in the State of Florida to identify existing control points and maintain a survey during construction. Verify all existing structure locations and all proposed building corner locations, tank locations, equipment locations, and roadway locations.

1.2 QUALIFICATIONS OF SURVEYOR OR ENGINEER

A. Qualified engineer or registered land surveyor, acceptable to the Owner and the Engineer.

B. Registered professional engineer of the discipline required for the specific service on the Project, currently licensed in the State of Florida.

1.3 SURVEY REFERENCE POINTS

A. Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.

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

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

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

no additional cost to the Owner.

4. Establish replacements based on original survey control.

1.4 PROJECT SURVEY REQUIREMENTS

A. Establish a permanent bench mark onsite, referenced to data established by survey control points.

1. Record location, with horizontal and vertical data, on Record Documents.

B. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means:

1. Site improvements.

a. Stakes for grading, fill and topsoil replacement.

b. Utility slopes and invert elevations.

2. Batter boards for structure.

3. Building foundation, column locations and floor levels.

4. Controlling lines and levels required for mechanical and electrical trades.

C. From time to time, verify layouts by same methods.

D. Establish all lines and grades prior to construction of line work for all force mains, water mains and transmission mains at 100 to 200 feet increments.

1.5 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses.

B. At Contract closeout submit a certified site survey at 1"=50' scale on a reproducible tracing sheet 24" x 36", indicating the building corners and location of all structures.

C. At Contract closeout submit a certified survey at the same scale as the Engineer's line drawings indicating elevations and stationing at 100 feet increments and at all valve and fitting locations.

1.6 SUBMITTALS

A. Submit name and address of surveyor and professional engineer to the Engineer.

B. On request of the Engineer, submit documentation to verify accuracy of field engineering work.

C. Submit certificate signed by registered engineer or surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.

D. Submit drawings showing locations of all structures constructed. This drawing shall be included with the Record Documents.

END OF SECTION

SECTION 01065
PERMITS AND FEES

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

The CONTRACTOR shall:

A. Obtain and pay for any and all permits and licenses as specified in the General Requirements, except as otherwise provided herein, and in effect at the time of bidding.

B. Schedule all inspections and obtain all written approvals of the agencies required by the permits and licenses.

C. Comply with all construction related conditions specified in each permit and license.

A copy of the permits obtained by the OWNER will be furnished to the CONTRACTOR.

1.2 PERMITS BY OWNER

The OWNER will acquire the following permits:

A. Florida Department of Environmental Protection (FDEP) Permit to Construct/ Operate Water Distribution System.

B. Florida Department of Environmental Protection (FDEP) Permit to Construct/ Operate a Domestic Wastewater Collection/Transmission System.

C. Florida Department of Transportation (FDOT) Utility Work Within Right-of-Way

1.3 CONSTRUCTION PERMIT

A. The CONTRACTOR shall be responsible for acquiring all construction permits including local building permits and any permits necessary to comply with the Northwest Florida Water Management District (NWFWMD) dewatering plan and the National Pollutant Discharge Elimination System (NPDES) stormwater discharge from construction site.

B. The dewatering plan shall include sequence of excavation, discharge locations,

sediment sump, turbidity control, erosion control, and turbidity monitoring points.

1.4 NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION SITE

A. The CONTRACTOR shall comply with stormwater discharge regulations and Amendments to the Clean Water Act (33 U.S.C. 1251 et seq.). On September 17, 1992, the State of Florida certified the general permit for stormwater discharges from construction sites for use in Florida. This project is governed by regulations under this general permit and the CONTRACTOR shall comply with all such regulations.

B. Under these regulations, construction projects that disturb more than 5 acres must have and comply with a stormwater pollution prevention plan (SWPPP). The CONTRACTOR shall complete and sign a SWPPP prior to initiation of any construction activities on the site.

C. The CONTRACTOR shall ensure that all employees and subcontractors implement the specified erosion control practices to properly manage stormwater.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION

SECTION 01100

SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.1 HURRICANE PREPAREDNESS PLAN

A. Within 20 days of the date of Notice to Proceed, the CONTRACTOR shall submit to the PROJECT REPRESENTATIVE a Hurricane Preparedness Plan. The plan shall outline the necessary measures which the CONTRACTOR proposes to perform at no additional cost to the OWNER in case of a hurricane warning. Such measures shall be in accordance with local and state requirements.

B. In the event of inclement weather, the CONTRACTOR will, and will cause Subcontractors to, protect carefully the Work and materials against damage or injury from the weather. If, in the opinion of PROJECT REPRESENTATIVE, any portion of Work or materials are damaged or injured by reason of failure on the part of the CONTRACTOR or Subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of CONTRACTOR.

1.2 CONSTRUCTION CONDITIONS AND SUBSURFACE INVESTIGATION

A. The CONTRACTOR shall strictly adhere to the specific requirements of the government unit(s) 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.

B. The CONTRACTOR shall be responsible for having determined, prior to bid submission, the nature and location of the Work, the conformation of the ground, the character and quality of the substrata, the types and quantity of materials to be encountered, the nature of the groundwater conditions, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions and all other matters which can in any way affect the Work under this Contract. The prices established for the Work to be done will reflect all costs pertaining to the Work. Any claims for extras based on substrata, groundwater table, and other such conditions will not be allowed.

1.3 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 odor.

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

1.4 PUBLIC RIGHT-OF-WAY

A. This project requires work in Jackson County right-of-way and/or easements.

B. In the event of a natural disaster or declared emergency, the CONTRACTOR shall remove all equipment and materials that may impede evacuation effort, as directed by the OWNER. The CONTRACTOR shall cooperate with local officials and all emergency operations personnel during the extent of the natural disaster or declared emergency.

1.5 RELOCATIONS

The CONTRACTOR shall be responsible for the relocation of structures, including, but not limited to, light poles, signs, sign poles, fences, piping, conduits and drains that interfere with the positioning of the work as set out on the Drawings. The cost of all such relocations shall be included in the Contract Price.

1.6 PUMPING

A. The CONTRACTOR shall accomplish all pumping necessary to prevent flotation of any part of any structures, or pipe/conduit during construction operations.

B. The CONTRACTOR shall, for the duration of the contract pump out water and wastewater which may seep or leak into the excavations or structures. Galleries and other operating areas shall be kept dry at all times. Discharges shall be in conformance with applicable regulations and permits.

1.6 WORK ON PRIVATE PROPERTY

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1.7 DAILY REPORTS

A. The CONTRACTOR shall submit daily reports of construction activities, including any activities that may occur on non-work days. The report shall include:

1. Weather conditions;

2. Manpower, number of men by craft;

3. Equipment on the project;

4. Major deliveries;

5. Activities work with reference to the CPM schedule activity numbers;

6. New problems; and

7. Other pertinent information

B. A similar report shall be submitted for/by each Subcontractor.

C. The reports shall be submitted to the PROJECT REPRESENTATIVE within two days of the respective report date. Each report shall be signed by the CONTRACTOR'S Superintendent or Project Manager.

D. Information provided on the daily report shall not constitute notice of delay or any other notice required by the CONTRACT DOCUMENTS. Notice shall be as required therein.

1.8 EMERGENCIES

A. The CONTRACTOR shall at all times after regular working hours, including weekend and holidays, maintain a telephone where the CONTRACTOR's representative can be reached on an emergency basis. The CONTRACTOR or CONTRACTOR's representative shall be prepared to act to correct conditions on the Site deemed to constitute an emergency by either the OWNER, the PROJECT REPRESENTATIVE, or local authorities and is obligated to act to prevent threatened damage, injury or loss without special instructions from the OWNER, PROJECT REPRESENTATIVE, or ENGINEER. The CONTRACTOR shall give the PROJECT REPRESENTATIVE prompt written notice of all significant changes in the Work or deviations from the Contract Documents caused thereby. If a condition on the Site requires attention after working hours, either the OWNER, PROJECT REPRESENTATIVE, or local authority shall call the CONTRACTOR or representative at the emergency telephone number, identify themselves and describe the emergency condition. The CONTRACTOR is expected to dispatch personnel and equipment to adequately institute corrective measures within two (2) hours. If for some reason the CONTRACTOR or representative cannot be reached at the emergency number within two hours, the OWNER shall have the right to immediately initiate corrective measures, and the cost shall be borne by the CONTRACTOR.

B. In the event that the CONTRACTOR fails to maintain safe job conditions and traffic conditions, including, but not limited to, trench settlement and hazardous

storage of backfill or construction materials, the OWNER, after failure of the CONTRACTOR to commence substantial steps at the job site to rectify the situation within two (2) hours of the time the CONTRACTOR has been notified of the unsafe condition, may hire guards, take such precautions, make such repairs and take any other steps which the OWNER or the PROJECT REPRESENTATIVE, in their sole discretion, consider necessary to protect the property, persons, or the OWNER. The cost of any of these precautions, guards, or steps shall be deducted from the payments due the CONTRACTOR, and the costs for such services, work and material shall be calculated at prevailing market rates.

1.9 PROPERTY DAMAGES

A. In the event of any indirect or direct damage to Government, public or private property caused in whole or in part by an act, omission or negligence on the part of the CONTRACTOR, any of its Subcontractors, any of its Sub-subcontractors or anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable, the CONTRACTOR shall at no additional cost to OWNER promptly remedy and restore such property to a condition equal to or better than that existing before such damage was done. The CONTRACTOR shall perform such restoration by "underpinning", repairing, rebuilding, replanting, or otherwise restoring as may be required by the PROJECT REPRESENTATIVE, or shall correct such damage in a satisfactory and acceptable manner to the OWNER or the PROJECT EPRESENTATIVE. In case of failure on the part of the CONTRACTOR to promptly restore such property or correct such damage, the OWNER may, upon five (5) calendar days written notice, proceed to repair, rebuild or otherwise restore such property as may be necessary and the cost thereof, or a sum sufficient in the judgment of the OWNER to reimburse the owners of the property so damaged, will be deducted from any monies due or to become due the CONTRACTOR under the Contract.

1.01 PUBLIC NUISANCE

A. Several existing utilities are in close proximity to the work to be performed in this project. It is the contractor's responsibility to verify the locations of all existing utilities. In cases where existing utilities are within three horizontal feet of new construction, trenches must be dug by hand. Any damage to existing utilities shall be the responsibility of the contractor.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall cooperate and coordinate with the Engineer to schedule and administer the pre-construction meeting, periodic progress meetings, and specifically called meetings throughout the progress of the Work. The Contractor shall:

   a. Prepare agenda for meetings.
   b. Make physical arrangements for meetings.
   c. Preside at meetings.
   d. Take and distribute meetings minutes.

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

3. The Owner shall attend meetings to ascertain that the Work is expedited consistent with Contract Documents and construction schedules.

4. The Contractor shall record the pre-construction meeting and each progress meeting in its entirety, and shall provide the Engineer with a regular cassette copy of such recording, having good quality and clarity, and a typed transcript of the minutes of each meeting. A copy of the minutes of each progress meeting shall be available five business days after the meeting.

B. Related Requirements Described Elsewhere:

1. Shop Drawings, Working Drawings, and Samples: Section 01340.

1.02 PRE-CONSTRUCTION MEETING

A. Engineer will schedule a pre-construction meeting no later than five (5) days after date of Notice to Proceed. The meeting shall be scheduled at the convenience of all parties.

B. Location: A local site, convenient for all parties, designated by the Engineer.

C. Attendance:

1. Owner's representative.
2. Engineer and his professional consultants.
3. Resident project representative.
4. Contractor and his superintendent.
5. Major subcontractors.
6. Representatives of major suppliers and manufacturers as appropriate.
7. Governmental representatives as appropriate.
8. Others as requested by the Contractor, Owner, and Engineer.

D. The Engineer shall preside at the pre-construction meeting. The Contractor shall provide for keeping minutes and distribution of minutes to the Owner, Engineer and others. The purpose of the pre-construction meeting is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established.

E. The suggested agenda for the pre-construction meeting would include the following:

1. Distribution and discussion of:

   a. List of major subcontractors and suppliers.
   b. Projected schedules.
   c. Schedule of Values.

2. Critical work sequencing: Relationships and coordination with other contracts and/or work.

3. Major equipment deliveries and priorities.

4. Project coordination; Designation and responsible personnel.

5. Procedures and processing of:

   a. Field decisions.
   b. Proposal requests.
   c. Request for Information.
   d. Submittals.
   e. Change Orders.
   f. Applications for Payment.

6. Submittal of Shop Drawings, project data and samples.

7. Adequacy of distribution of Contract Documents.

8. Procedures for maintaining Record Documents

9. Use of premises:

    a. Office, work, and storage areas.
    b. Owner's requirements.
    c. Access and traffic control.

10. Construction facilities, controls, and construction aids.

11. Temporary utilities.

12. Safety and first aid procedures.

13. Check of required Bond and Insurance certifications.

14. Completion time for contract and liquidated damages.

15. Request for extension of Contract Time.

16. Procedures for periodic monthly (or whatever interval is deemed appropriate or necessary, however, a minimum of monthly meetings will be required) progress meetings, for all involved.

17. Security procedures.

18. Procedures for making partial payment.

19. Guarantees on completed work.

20. Equipment to be used.

21. Project layout and staking of work.

22. Project inspection.

23. Labor requirements.

24. Laboratory testing of material requirements.

25. Provisions for material stored on-site and monthly inventory of materials stored.

26. Requirements of other organizations such as utilities, railroads, highway departments, building departments.

27. Rights-of-way and easements.

28. Housekeeping procedures.

29. Liquidated damages.

30. Posting of signs and instillation of Project Sign.

31. Pay request submittal dates.

32. Equal opportunity requirements.

1.03 PROGRESS MEETINGS

A. The Engineer shall schedule regular periodic meetings. The progress meetings will be held a minimum of once every thirty (30) days and at other times as required by the progress of the Work. The first meeting shall be held within thirty (30) days after the pre-construction meeting or thirty (30) days or less after the date of Notice to Proceed.

B. Hold called meetings as required by progress of the Work.

C. Location of the meetings: JACKSON COUNTY BOARD ROOM

D. Attendance:

1. Engineer and his professional Subconsultants as needed.
2. Resident Project Representative.
3. Contractor and his Superintendent.
4. Owner's representatives.
5. Subcontractors (active on the site, as appropriate to the agenda).
6. Others as appropriate to the agenda (suppliers, manufacturers, other subcontractors, etc).

E. The Contractor shall preside at the meetings and provide for keeping minutes and distribution of the minutes to the Owner, Engineer, and others. The purpose of the meetings will be to review the progress of the Work.

F. The suggested agenda for the progress meetings will include but no be limited to the following:

1. Review approval of minutes of previous meeting.

2. Review of Work progress since previous meeting and Work scheduled (3-week look ahead schedule).

3. Field observations, problems, conflicts.

4. Problem which impede construction schedule.

5. Review of off-site fabrication, delivery schedules.

6. Corrective measures and procedures to regain projected schedule.

7. Status of approved Construction Schedule and revisions to the Construction Schedule as appropriate.

8. Progress schedule during succeeding work period.

9. Coordination of schedules.

10. Review status of submittals and submittal schedule, expedite as required.

11. Pending changes and substitutions.

12. Review proposed changes for:

    a. Effect on Construction Schedule and on completion date.
    b. Effect on other contracts of the Project.

13. Critical/long lead items.

14. Other business.

G. The Contractor is to attend progress meetings and is to study previous meeting minutes and current agenda items, and be prepared to discuss pertinent topics and provide specific information including but not limited to:

1. Status of all submittals and what specifically is being done to expedite them.

2. Status of all activities behind schedule and what specifically will be done to regain the schedule.

3. Status of all material deliveries, latest contact with equipment manufacturer, and specific actions taken to expedite materials.

4. Status of open deficiencies and what is being done to correct the same.

H. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section 01340: Shop Drawings, Working Drawings, and Samples.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01300
SUBMITTALS

1.1 REQUIREMENTS INCLUDED

A. The CONTRACTOR shall submit to the ENGINEER for review such working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this Section called "Data"), and material samples (hereinafter in this Section called "Samples") as are required for the proper control of work, including but not limited to those working drawings, shop drawings, Data and Samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.

B. The CONTRACTOR shall note that there are specific submittal requirements in other sections of these Specifications.

C. The CONTRACTOR is to maintain an accurate updated submittal log and shall bring this log to each scheduled progress meeting with the PROJECT REPRESENTATIVE and the ENGINEER. This log shall be organized using the 10 character numbering system in Subparagraph 1.6 F. This log should include the following items:

1. Submittal-Description and File Number assigned.

2. Date to ENGINEER.

3. Date returned to CONTRACTOR (from ENGINEER).

4. Status of Submittal

    a. Approved

    b. Approved As Noted

    c. Approved As Noted/Confirm

    d. Not Approved/Resubmit

    e. Not Approved

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. Status of O&M submittal.

1.2 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, erection and setting drawings and schedule drawings, manufacturer's scale drawings, bills of material, wiring and control diagrams, and inspection and test reports including performance curves and certifications as applicable to the Work.

B. All details on shop drawings submitted for approval shall show clearly the elevations of the various parts to the main members and lines of the structure and/or equipment, and where correct fabrication of the Work depends upon field measurements, such measurements shall be made and noted on the shop drawings before being submitted for approval.

C. See Shop Drawing Schedule requirements in Subparagraph 1.7 CONTRACTOR'S RESPONSIBILITY.

1.3 PRODUCT DATA

Product data as specified in individual sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, MANUFACTURER'S printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing storage instructions, and printed product warranties, as applicable to the Work.

1.4 WORKING DRAWINGS

A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the CONTRACTOR's plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and false work; for underpinning; and for such other work as may be required for construction but does not become an integral part of the Project.

B. Working drawings shall be signed and sealed by a registered Professional

Engineer, currently licensed to practice in the State and shall convey, or be accompanied by, calculations or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use.

C. Prior to commencing such Work, working drawings must have been reviewed without specific exceptions by the ENGINEER. Such 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 have no responsibility therefore.

1.5 SAMPLES

A. The CONTRACTOR shall furnish, for the approval of the ENGINEER, samples required by the Contract Documents or requested by the ENGINEER. Samples shall be delivered to the ENGINEER as specified or requested and in quantities and sizes as specified. A minimum of two samples of each item shall be submitted unless otherwise specified. The CONTRACTOR shall pre-pay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in the Work until approved by the ENGINEER.

B. Samples specified in individual sections, include, but are not necessarily limited to, physical examples of the Work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols, and units of Work to be used by the ENGINEER or PROJECT REPRESENTATIVE for independent inspection and testing, as applicable to the Work.

C. The CONTRACTOR shall prepare a transmittal letter in triplicate for each shipment of samples to the ENGINEER. The CONTRACTOR shall enclose a copy of this letter with the shipment and send a copy of this letter to the PROJECT REPRESENTATIVE. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.

D. Approved samples not destroyed in testing shall be sent to the ENGINEER or stored at the site of the Work. Materials and equipment incorporated in the Work shall match the approved samples. Samples which fail testing or are not approved will be returned to the CONTRACTOR at their expense, if so requested at time of submission.

1.6 SUBMITTAL REQUIREMENTS

A. The CONTRACTOR shall review, approve, and submit, with reasonable promptness and in such sequence as shown on the Shop Drawing Submittal Schedule so as to cause no delay in the Contract Work or in the Work of the OWNER or any separate contractor, all shop drawings, product data, working drawings and samples required by the Contract Documents.

B. The CONTRACTOR shall submit 10 copies of all shop drawings for the ENGINEER to review, of which the ENGINEER will retain eight sets.

C. All submittals shall be directly transmitted to the ENGINEER's office. Submittals to the PROJECT REPRESENTATIVE will not be accepted.

D. Shop drawings, product data, working drawings and Samples shall be furnished with the following information:

1. Number and title of the drawing.

2. Date of drawing or revision.

3. Name of project building or facility.

4. Name of contractor, subcontractor, and manufacturer submitting drawing.

5. Clear identification of contents, location of the work, and the sheet numbers where the product is found in the contract drawings.

6. CONTRACTOR Certification Statement.

7. Submittal Identification Number.

8. Contract Drawing Number Reference.

9. A certification by the CONTRACTOR that states the following: I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is in compliance with the Contract Drawings and Specifications, can be installed in the allocated space, will be stored in accordance with the manufacturers recommendations and the Specifications, and is submitted for approval.

E. In accordance with Subparagraph 1.7 A, each shop drawing, working drawing, Sample, and catalog data submitted by the CONTRACTOR shall have affixed to it the following Certification Statement, signed by the CONTRACTOR: "Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data and I have checked and coordinated each item with other applicable approved shop drawings and

all contractor requirements."

F. The CONTRACTOR shall utilize a 10-character submittal identification numbering system in the following manner:

1. The first character shall be a D, S, P, M, or R, which represents Shop/Working Drawing and other Product Data (D), Sample (S), Preliminary Submittal (P), Operating/Maintenance Manual (M), or Request for Information (R).

2. The next five digits shall be the applicable Specification Section Number.

3. The next three digits shall be the numbers 001-999 to sequentially number each item or drawing submitted under each specific Section number.

4. The last character shall be a number 1-10, indicating the submission, or resubmission of the same Drawing, i.e., 1=1st submission, 2=2nd submission, 3=3rd submission, etc. A typical submittal number would be as follows:

D-03300-008.2

D	=	Shop Drawing
03300	=	Specification Section for Concrete
008	=	The eighth submittal under this specification section
2	=	The second submission (first resubmission) of that particular shop drawing.

G. The CONTRACTOR shall submit a copy of each submittal transmittal sheet (for shop drawings, product data, working drawings and Samples) to the PROJECT REPRESENTATIVE simultaneously with the CONTRACTOR's submission of said drawings, Data, Samples or manual packages to the ENGINEER.

H. All items specified are not necessarily intended to be a manufacturer's standard product. Variations from specified items will be considered on an "or equal" basis. If submittals show variations from Contract requirements because of standard shop practice or for other reasons, the CONTRACTOR shall describe such variations in the letter of transmittal and on the shop drawings along with notification of intent to seek contract adjustment. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the CONTRACTOR fails to describe such variations, responsibility will not be waived for executing the Work in accordance with the Contract, even though such drawings have been reviewed. Variations submitted but not described may be cause for rejection. Any variations initiated by the CONTRACTOR will not be considered as an addition to the scope of work unless specifically

noted and then approved as such in writing by the ENGINEER.

I. Data on materials and equipment shall include materials and equipment lists giving, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, material, size, finish, and all other pertinent data.

J. 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. In addition, a maintenance and lubrication schedule for each piece of equipment shall be submitted.

K. The CONTRACTOR shall use the color "green" to make his remarks on the Submittals. Only the ENGINEER will utilize the color "red" in marking submittals.

L. Facsimiles or copies of facsimiles will not be accepted for review.

1.7 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the CONTRACTOR to check, and coordinate with the work of all trades, all drawings, Data, schedules and Samples before submitting them to the ENGINEER for review. Each and every copy of any drawing or data sheet larger than 11"x17" shall bear CONTRACTOR's stamp showing that they have been so checked and approved. Drawings or data sheets 11"x17" and smaller shall be bound together in an orderly fashion and bear the CONTRACTOR's stamp on the cover sheet. The cover sheet shall fully describe the packaged data and include a list of all sheet numbers within the package. Shop drawings submitted to the ENGINEER without the CONTRACTOR's stamp will be returned to the CONTRACTOR, without review at the ENGINEER's option, for conformance with this requirement.

B. The CONTRACTOR shall review shop drawings, product data, and Samples prior to submission to determine and verify the following:

1. Field measurements.

2. Field construction criteria.

3. Manufacturer's catalog numbers and similar data.

4. Conformance with Specifications.

C. Shop drawings shall indicate any deviations in the submittal from the requirements of the Contract Documents.

D. At a time decided upon at the preconstruction meeting the CONTRACTOR shall furnish the PROJECT REPRESENTATIVE and ENGINEER a Shop Drawing schedule fixing the respective dates for the initial submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall be provided as a separate entity and indicate those submittals that are critical to the progress schedule. The CONTRACTOR shall prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the CONTRACTOR's failure to transmit complete and acceptable submittals sufficiently in advance of the Work.

E. The CONTRACTOR shall not begin any Work affected by a submittal returned not approved. Before starting this Work, all revisions must be corrected by the CONTRACTOR. After resubmittal they will be reviewed and returned by the ENGINEER. If approved or approved as noted, then the CONTRACTOR may begin this Work. Any corrections made to the shop drawings are to be followed without exception.

F. The CONTRACTOR shall submit to the ENGINEER all shop drawings and data sufficiently in advance of construction requirements to provide no less than **21** calendar days for review from the time the ENGINEER receives them. No less than **30** calendar days will be required for major equipment that requires review by more than one engineering discipline.

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 review and approval by ENGINEER of the necessary shop drawings.

H. All shop drawings, product data, working drawings and Samples submitted by subcontractors for approval shall be sent directly to the CONTRACTOR for checking. The CONTRACTOR shall be responsible for their submission according to the approved shop drawing schedule so as to prevent delays in delivery of materials and project completion.

I. The CONTRACTOR shall check all subcontractor's shop drawings, product data, working drawings and Samples regarding measurements, size of members, materials, and details to satisfy himself that they are in conformance to the Contract Documents. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission to the ENGINEER.

J. Requests for Information (RFI) shall be submitted on a standard form through the PROJECT REPRESENTATIVE. RFIs shall indicate their importance to the timely completion of the project. RFIs will be processed as a shop drawing unless there is an urgent need for immediate response.

1.8 ENGINEER'S REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

A. The ENGINEER's review is for general conformance with the design concept and contract drawings. Markings or comments shall not be construed as relieving the CONTRACTOR from compliance with the contract plans and specifications or from departures therefrom. The CONTRACTOR remains responsible for details and accuracy, for coordinating the Work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

B. The review of shop drawings, Data, and Samples will be general. They 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 shop drawings, Data or Samples as submitted describe variations per Subparagraph (1.6H), and show a departure from the Contract requirements which 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 Contract Time for performance, the ENGINEER may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the CONTRACTOR under one of the following codes:

Code 1 - "**APPROVED**" is assigned when there are no notations or comments on the submittal. When returned under this code the CONTRACTOR may release the equipment and/or material for manufacture.

Code 2 - "**APPROVED AS NOTED**" is assigned when notations or comments have been made on the submittal pointing out minor discrepancies as compared with the Contract Documents. Resubmittal or

confirmation is not necessary prior to release for manufacturing.

Code 3 - "**APPROVED AS NOTED/CONFIRM**" This combination of codes is assigned when a confirmation of the notations and comments is required by the CONTRACTOR. The CONTRACTOR may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation is to address the omissions and/or nonconforming items that were noted. Only the items to be "confirmed" need to be resubmitted.

Code 4 - "**NOT APPROVED/RESUBMIT**" This combination of codes is assigned when the submittal is in noncompliance with the Contract Documents and must be corrected and the entire package resubmitted. This code generally means that the equipment or material cannot be released for manufacture unless the CONTRACTOR takes full responsibility for providing the submitted items in accordance with Contract Documents.

Code 5 - "**NOT APPROVED**" is assigned when the submittal does not meet the intent of the Contract Documents. The CONTRACTOR must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

Code 6 - "**COMMENTS ATTACHED**" is assigned where there are comments attached to the returned submittal which provide additional data to aid the CONTRACTOR.

Code 7 - "**FOR YOUR INFORMATION**" is assigned when the package provides information of a general nature that may or may not require a response.

Codes 1 through 5 designate the status of the reviewed submittal with Code 6 showing there has been an attachment of additional data.

Code 7 is used as may be necessary.

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the CONTRACTOR shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the ENGINEER on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the CONTRACTOR. The CONTRACTOR shall make corrections to any Work

done because of this type revision that is not in accordance to the Contract Documents as may be required by the ENGINEER.

F. If the CONTRACTOR considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the CONTRACTOR shall give written notice thereof to the PROJECT REPRESENTATIVE at least seven (7) working days prior to release for manufacture.

G. The ENGINEER will review a submittal a maximum of two (2) times, after which cost of review will be borne by the CONTRACTOR. The cost of engineering shall be equal to the ENGINEER's charges to the OWNER under the terms of the ENGINEER's agreement with the OWNER.

H. When the shop 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. Partial submittals may not be reviewed. The ENGINEER will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the CONTRACTOR, and will be considered "Not Approved" until resubmitted. The ENGINEER may, but is not required to, provide a list or mark the submittal directing the CONTRACTOR to the areas that are incomplete

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Promptly after award of the Contract and within ten days after the effective date of the Agreement, prepare and submit to the Engineer estimated construction progress schedules for the work, with subschedules of related activities which are essential to its progress.

B. Submit revised progress schedules on a monthly basis.

C. No partial payments shall be approved by the Engineer until there is an approved construction progress schedule on hand.

D. 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.

1.2 RELATED REQUIREMENTS

A. Conditions of the Contract.

B. Section 01010: Summary of Work.

1.3 FORM OF SCHEDULES

A. Prepare schedules in the form of a horizontal bar chart.

1. Provide separate horizontal bar for each trade or operation within each structure or item.

2. Horizontal time scale: In weeks from start of construction and identify the first work day of each month.

3. Scale and spacing: To allow space for notations and future revisions.

4. Minimum sheet size: 8-1/2 inches x 14 inches.

B. Format of listings: The chronological order of the start of each item of work for each structure.

C. Identification of listings: By major specification section numbers as applicable and structure.

1.4 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity.

2. Show the dates for the beginning of, and completion of, each major element of construction in no more than a two-week increment scale. Specifically list, but not limit to:

    a. Site clearing.
    b. Site utilities.
    c. Foundation work.
    d. Structural framing.
    e. Subcontractor work.
    f. Equipment installations.
    g. Finishings.
    h. Instrumentation.
    i. Painting.
    j. Schooling.
    k. Testing.
    l. Start-up.
    m. Receipt of spare parts.
    n. Pipe installation.
    o. Boring and jacking.
    p. Restoration.

3. Show projected percentage of completion for each item, as of the first day of each month.

4. Show projected dollar cash flow requirements for each month of construction.

B. Submittals Schedule for Shop Drawings, and Samples in accordance with Section 01340. Show:

1. The dates for Contractor's submittals.

2. The dates submittals will be required for owner-furnished products, if applicable.

3. The dates approved submittals will be required from the Engineer.

C. A typewritten list of all long-lead items (equipment, materials, etc.).

1.5 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

B. Show changes occurring since previous submission of schedule:

1. Major changes in scope.
2. Activities modified since previous submission.
3. Revised projections of progress and completion.
4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.
2. Corrective action recommended, and its effect.
3. The effect of changes on schedules of other prime Contractors.

1.6 SUBMISSIONS

A. Submit initial schedules to the Engineer within 10 days after the effective date of the Agreement.

1. The Engineer will review schedules and return review copy within 21 days after receipt.
2. If required, resubmit within 7 days after return of review copy.

B. Submit revised monthly progress schedules with that month's application for payment.

C. Submit one copy.

1.7 DISTRIBUTION

A. Distribute copies of the revised schedules to:

1. Engineer.
2. Job site file.
3. Subcontractors.
4. Other concerned parties.
5. Owner (two copies).

B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01340

SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall submit to the Engineer for review and approval, such Shop Drawings, Test Reports, and Product 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 Shop Drawings, Data, and Samples for materials and equipment specified elsewhere in the Specifications and in the Drawings.

2. Within fourteen (14) calendar days after the Notice to Proceed, 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. Review of this list by the Engineer shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Contract Documents. This procedure is required in order to expedite final review of Shop Drawings.

3. 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:

   a. Submittal description and number assigned.

   b. Date to Engineer.

   c. Date returned to Contractor (from Engineer).

   d. Status of submittal (Approved, Approved as Noted, Amend and Resubmit, and Rejected).

   e. Date of resubmittal and return (as applicable).

   f. Date material release (for fabrication).

   g. Projected date of fabrication.

h. Projected date of delivery to site.

i. Status of O&M manuals submittal.

j. Specification Section.

k. Drawings sheet number.

1.02 CONTRACTOR'S RESPONSIBILITY

A. It is the responsibility of the Contractor to check all drawings, data and samples prepared before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear the 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. If the Contractor takes exception to the specifications, the Contractor shall note the exception in the letter of transmittal to the Engineer.

B. Determine and verify:

1. Field measurements.

2. Field construction criteria

3. Catalog numbers and similar data.

4. Conformance with 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 and ending 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 Shop 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 approval.

E. The Contractor shall submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than thirty (30) calendar days for checking and appropriate action from the time the Engineer receives them.

F. All submittals shall be accompanied with a transmittal letter prepared in duplicate containing the following information:

1. Date.

2. Project Title and Number.

3. Contractor's name and address.

4. The number of each Shop Drawings, Project Data, and Sample submitted.

5. Notification of Deviations from Contract Documents.

   a. The Contractor shall indicate in **bold type** at the top of the cover sheet of submittal of shop drawing if there is a deviation from the Drawings, Specifications, or referenced specifications or codes.

   b. The Contractor shall also list any deviations from the Drawings, Specifications, or referenced specifications or codes and identify in green ink prominently on the applicable Shop Drawings.

6. Submittal Log Number conforming to Specification Section Number.

G. The Contractor shall submit four (4) copies of descriptive or product data information and Shop Drawings to the Engineer **plus** the number of copies which the Contractor requires returned. The Engineer will review the submitted date and return to the Contractor the set of marked-up submittals with appropriate review comments.

H. The Contractor shall be responsible for and bear all costs 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 the Engineer of the necessary Shop Drawings.

I. The Contractor shall be fully responsible for observing the need for and making any changes in the arrangement of piping, connections, wiring, manner of installation, etc., which may be required by the materials/equipment he proposes to supply both as pertains to his own work and any work affected under other parts, headings, or divisions of the Drawings and Specifications.

J. The Contractor shall not use Shop Drawings as a means of proposing alternate items to demonstrate compliance with the Drawings and Specifications.

K. Each submittal will bear a stamp indicating that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal as illustrated below.

(OWNER'S NAME)
(PROJECT NAME)
(PROJECT NUMBER)
SHOP DRAWING NO.:_____

SPECIFICATION SECTION:_____ DRAWING NO._____

WITH RESPECT TO THIS SHOP DRAWING OR SAMPLE, I HAVE DETERMINED AND VERIFIED ALL QUANTITIES, DIMENSIONS, SPECIFIED PERFORMANCE CRITERIA, INSTALLATION REQUIREMENTS, MATERIALS, CATALOG NUMBERS, AND SIMILAR DATA WITH RESPECT THERETO AND REVIEWED OR COORDINATED THIS SHOP DRAWING OR SAMPLE WITH OTHER SHOP DRAWINGS AND SAMPLES AND WITH THE REQUIREMENTS OF THE WORK AND THE CONTRACT DOCUMENTS.

_____ NO VARIATION FROM CONTRACT DOCUMENTS

_____ VARIATION FROM CONTRACT DOCUMENTS AS SHOWN

(CONTRACTOR'S NAME)
(CONTRACTOR'S ADDRESS)

BY: _____DATE:_____
AUTHORIZED SIGNATURE

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

1.03 ENGINEER'S REVIEW OF SHOP DRAWINGS

A. The Engineer's review of Shop Drawings, Data, and Samples as submitted by the Contractor will be to determine if the items(s) generally conforms to the information in the Contract Documents and is compatible with the design concept. The Engineer's review and exceptions, if any, will not constitute an approval of dimensions, connections, quantities, and details of the material, equipment, device, or item shown.

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

1. As permitting any departure from the Contract Documents.

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 Documents 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 contract time, the Engineer may return the reviewed drawings without noting an exception.

D. "Approved As Noted" - Contractor shall incorporate Engineer's comments into the submittal before release to manufacturer. The Contractor shall send a letter to the Engineer acknowledging the comments and their incorporation into the Shop Drawing.

E. "Revise And Resubmit" - Contractor shall resubmit the Shop Drawing to the Engineer. The resubmittal shall incorporate the Engineer's comments highlighted on the Shop Drawing.

F. "Rejected" - Contractor shall correct, revise and resubmit Shop Drawing for review by Engineer.

G. 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.

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

I. When the Shop 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.

J. No partial submittals will be reviewed. Submittals not deemed complete will be stamped "Rejected" and returned to the Contractor for resubmittal. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items for:

1. Systems.

2. Processes.

3. As indicated in specific Specifications Sections.

All drawings, schematics, manufacturer's product Data, certifications, and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interface review.

K. Only the Engineer shall utilize the color "red" in marking Shop Drawing submittals.

L. Shop drawing and submittal data shall be reviewed by the Engineer for each original submittal and first resubmittal; thereafter review time for subsequent resubmittals shall be charged to the Contractor and the Contractor shall reimburse the Owner for services rendered by the Engineer as specified in the Supplementary Conditions.

1.04 SHOP DRAWINGS

A. When used in the Contract Documents, the term "Shop Drawing" shall be considered to mean Contractor's plans for materials and equipment which become an integral part of the Project. Shop Drawings shall be complete and detailed and shall consist of fabrication, erection, setting and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Catalogs cuts, catalogs, pamphlets, descriptive literature, and performance and test data shall be considered only as supportive information to required Shop Drawings as defined above. As used herein, the term "manufactured" applies to standard units usually mass-produced; and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements.

B. Manufacturer's catalog sheets, brochures, diagrams, illustrations, and other standard descriptive data shall be clearly marked to identify pertinent materials, products, or models. Delete information which is not applicable to the Work by striking or cross-hatching.

C. Each Shop Drawing shall be submitted with an 8-1/2" by 11" cover sheet which shall include a title block for the submittal. Each Shop Drawing cover sheet shall have a blank area 3-1/2 inches high by 4-1/2 inches wide, located adjacent to the title block. The title block/cover sheet shall display the following:

1. Project Title and Number.

2. Name of project building or structure.

3. Number and title of the Shop Drawing.

4. Date of Shop Drawing or revision.

5. Name of Contractor and subcontractor submitting drawing.

6. Supplier/manufacturer.

7. Separate detailer when pertinent.

8. Specification title and Section number.

9. Applicable Drawing number.

D. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog data sheets, catalog cuts, performance curves, diagrams, verification of conformance with applicable standards or codes, 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.

E. 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.

F. 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 for executing the Work in accordance with the Contract, even though such drawings have been reviewed.

G. All manufacturers or equipment suppliers who propose 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 (5) installations where identical equipment has been installed and has been in operation for a period of at least two (2) years.

1.05 WORKING DRAWINGS

A. When used in the Contract Documents, the term "Working Drawings" shall be considered to mean the Contractor's plan for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and false work for underpinning, and for such other work as may be required for construction but does not become an integral part of the Project.

B. Copies of working drawings as noted in paragraph 1.05 A. 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) calendar days (unless otherwise specified by the Engineer) in advance of their being required for the 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 to new or existing work are assumed by the Contractor; the Owner and Engineer shall have no responsibility therefore.

1.06 SAMPLES

A. The Contractor shall furnish, for the approval 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 the Work until approved 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 three (3) samples of each item shall be submitted.

C. Each sample shall have a label indicating:

1. Name of Project.

2. Name of Contractor and subcontractor.

3. Material or equipment represented.

4. Place of origin.

5. Name of producer/supplier and brand (if any).

6. Location in Project.

7. Submittal and specification numbers.
(Samples of finished materials shall have additional marking that will identify them under the finished schedules.)

D. The Contractor shall prepare a transmittal letter and a description sheet for each shipment of samples. The description sheet shall contain the information required in Paragraphs

1.06B and C above. He shall enclose a copy of the letter and description sheet with the shipment and send a copy of the letter and description sheet to the Engineer. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.

E. Approved samples not destroyed in testing shall be sent to the Engineer or stored at the site of the Work. Approved Samples of the hardware in good condition will be marked for identification and may be used in the Work. Materials and equipment incorporated in the Work shall match the approved Samples. Samples which failed testing or were not approved will be returned to the Contractor at his expense, if so requested at time of submission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01410

TESTING AND TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

A. The Contractor shall arrange for, schedule, provide and pay for the test called for in the specifications.

B. The test shall be performed by an independent certified testing laboratory approved by the Engineer.

C. The Contractor shall submit the name and evidence of certification of the testing laboratory prior to start of construction.

D. The type, number and frequency of tests set forth in the appropriate Sections herein represent the minimum number of passing tests. Tests which indicate non-compliance (i.e., failing test) do not count towards the minimum number required. The Contractor may test the work in excess of the minimums and as necessary to assure himself the work complies with the specifications. The minimum type, number and frequency of tests shall be conducted.

E. When test results indicate non-compliance with the specifications, the Contractor shall take additional tests to determine if deficiencies have been corrected. The type, number and scheduling of tests so ordered shall be determined by the Engineer. The Contractor shall provide and pay for these additional tests.

F. The Engineer shall be furnished results of all tests conducted. Test results shall be mailed directly from the testing laboratory to the Engineer. The test shall be signed and sealed by a Registered Professional Engineer registered in the State of Florida. Such tests results shall be submitted to the Engineer prior to the Engineer's approval of Contractor's pay request that request payment for such items that require testing.

G. Prior to final completion, the Contractor shall submit to the Engineer a statement

indicating that all work performed as a part of this Contract is in accordance with the plans and specifications or noting any deviation thereof.

1.2 RELATED REQUIREMENTS

A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.

B. Respective sections of specifications: Certification of products.

C. Each specification section listed: Laboratory tests required, and standards for testing.

D. Testing Laboratory inspection, sampling and testing is required for but not limited to the following:

1. Site Preparation
2. Earthwork
3. Asphaltic Concrete Paving
4. Concrete Reinforcement
5. Concrete
6. Masonry

1.3 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.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with Laboratory personnel, provide access to Work, 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.

E. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, with the cost having been included in the item for which the testing is associated, and no extra charge to the Owner shall be allowed on account of such testing and certification.

F. 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.

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

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01700

CONTRACT CLOSE-OUT

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

1.2 RELATED REQUIREMENTS

A. Conditions of the Contract. Fiscal provisions, legal submittals and additional administrative requirements.

B. Section 01720: Project Record Documents.

C. Section 01740 and/or Section 01742: Warranties and Bonds.

D. The respective sections of Specification: Close-out Submittals Required of Trades.

1.3 SUBSTANTIAL COMPLETION

A. When Contractor considers the Work is substantially complete, he shall submit to the Engineer:

1. A written notice that the Work, or designated portion thereof, is ready for a substantial completion inspection.

2. A list of items to be completed or corrected.

B. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to determine the status of completion.

C. Should the Engineer determine that the Work is not substantially complete:

1. The Engineer will promptly notify the Contractor, in writing, giving the reasons therefor.

2. Contractor shall remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Engineer.

3. The Engineer will reinspect the Work.

D. When the Engineer finds that the Work is substantially complete, he will:

1. Prepare and deliver to Owner a tentative

Certificate of Substantial Completion found in Section 00640, with a tentative list "punch list" of items to be completed or corrected before final payment.

2. After consideration of any objections made by the Owner as provided in Conditions of the Contract, and 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 with a revised punch list of items to be completed or corrected.

1.4 FINAL INSPECTION

A. When Contractor considers the Work is complete, he shall submit written certification that:

1. Contract Documents have been reviewed.

2. Work has been inspected for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents.

4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.

5. Work is completed and ready for final inspection.

B. The Engineer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.

C. Should the Engineer consider that the Work is incomplete or defective:

1. The Engineer will promptly notify the Contractor, in writing, listing the incomplete or defective Work.

2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Engineer that the Work is complete.

3. The Engineer will reinspect the Work.

D. When the Engineer finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make close-out submittals.

1.5 REINSPECTION FEES

A. Should the Engineer perform reinspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:

1. Owner will compensate the Engineer for such additional services.

2. Owner will deduct the amount of such compensation from the final payment to the Contractor.

1.6 CONTRACTOR'S CLOSE-OUT SUBMITTALS TO ENGINEER

A. Evidence of compliance with requirements of governing authorities.

B. Project Record Documents: To requirements of Section 01720.

C. Operating and Maintenance Data, Instructions to Owner's Personnel: To requirements of Section 01730.

D. Warranties and Bonds: To requirements of Section 01740 and Section 01742.

E. Keys and Keying Schedule.

F. Spare Parts and Maintenance Materials: To requirements of Section 01730.

G. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.

H. Certificate of Insurance for Products and Completed Operations.

1.7 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. Allowances.
c. Unit Prices.

d. Deductions for uncorrected Work.
e. Penalties and Bonuses.
f. Deductions for liquidated damages.
g. Deductions for reinspection payments.
h. Other adjustments.

3. Total Contract Sum, as adjusted.

4. Previous payments.

5. Sum remaining due.

C. Engineer will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.8 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 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

A. 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.

1.2 RELATED REQUIREMENTS

A. Section 01340: Shop Drawings, Working Drawings and Samples.

1.3 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/CSC 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.

E. As a prerequisite for monthly progress payments, the Contractor is to exhibit the currently updated "record documents" for review by the Engineer and the Owner.

1.4 MARKING DEVICES

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

1.5 RECORDING

A. Label each document "PROJECT RECORD" in neat large printed letters.

B. Record information concurrently with construction progress.

1. Do not conceal any work until required information is recorded.

C. Record Drawings ("As-Builts"):

1. Depths of various elements of foundation in relation to finish first floor datum.

2. All underground piping with elevations and dimensions. Changes in piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.

3. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

4. Field changes of dimension and detail.

5. Changes made by Field Order or by Change Order.

6. Details not on original Contract drawings.

7. Equipment and piping relocations.

8. Major architectural and structural changes including relocation of doors, windows, etc.

A complete set of record drawings must be of professional quality, legibly marked in red ink to record the actual construction configuration, with coversheet labeled "CERTIFIED AS-BUILT", signed and dated by the Contractor, submitted to the Engineer in "Hard Copy", and if so specified in the Bid Proposal "As-Built Drawings" line item, shall also be submitted to the Engineer in AutoCAD format on compact disc. Final payment will be withheld until receipt of record documents.

D. 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.

E. Shop Drawings (after final review and approval):

1. One set of record shop drawings for each process equipment, piping, (including casings) electrical system and instrumentation system.

1.6 SUBMITTAL

A At Contract close-out, deliver Record Documents to the Engineer for the Owner.

B. 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.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01742

WARRANTIES AND BONDS FOR ROADWAY PROJECTS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Compile specified warranties and bonds, as in the General Conditions.

B. Submit to the Engineer for review and transmittal to Owner.

C. The contractor shall provide a one (1) year warranty covering workmanship and materials for the following roadway features: expansion joints, pavement, roadway features, grassing items, signal systems, lighting, signage, pavement markings, retaining walls, structure drainage systems, roadway drainage systems, concrete defects, structural steel defects and foundation elements. The contractor shall provide a Maintenance Bond covering the warranty period for all roadway facilities. The contractor assumes sole responsibility for the performance and all associated warranty work for the proposed warranty period.

1.2 RELATED REQUIREMENTS

A. Instructions to Bidders: Bid or Proposal Bonds.

B. Conditions of the Contract: Performance Bond and Payment Bond.

C. Section C-700: General Conditions.

D. Section 01700: Contract Close-out.

E. Section C-641: Certifications of Final Completion

1.3 SUBMITTAL REQUIREMENTS

A. Assemble warranties and maintenance bond, for roadway features.

B. Number of original signed copies required: Three 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.
7. Contractor, name of responsible principal, address and telephone number.

1.4 FORM OF SUBMITTALS

A. Prepare in triplicate packets.

B. Format:

1. Size 8-1/2 inches x 11 inches.

a. Fold larger sheets to fit into binders.

1.5 WARRANTY SUBMITTAL REQUIREMENTS

A. Upon final acceptance of the project, the contractor shall provide a Maintenance Bond for the warranted features to be in effect for the warranty period. The contractor shall provide proof of the Maintenance Bond commitment before execution of the Contract and use a bonding company which, in addition to satisfying the provisions of Section 287.0935, Florida Statutes, has an A.M. Best Rating of "A" or better. If the bonding company drops below the "A" rating during the Maintenance Bond period, the contractor shall provide a new Maintenance Bond for the balance of the warranty period from a bonding company with an "A" rating or better, at no cost to the owner.

B. At the end of the Warranty Period, the owner will release the contractor from further warranty work and responsibility, provided all previous warranty work and remedial work, if any, has been completed.

C. The start date for all warranties shall be the date of final acceptance of the project as detailed in Sections 01700 and C-641 of these specifications.

D. All warranties to be furnished shall exclude matters resulting from vandalism, traffic accidents, misuse, failure to follow manufacturer's recommendations or acts of God (tornadoes, hurricanes, earthquakes, sink holes, meteorite impacts, etc.). Abnormally high ground water will not be considered an act of God.

The Contractor shall warranty all work as described herein Section 1.1.C and in Table 1.6-1 for one year regardless of the contributing factors involved except as provided in Section 1.5.D above.

1.6 THRESHOLD VALUES AND REMEDIAL ACTIONS

The threshold values and remedial actions for the warranted items for the roadway project are specified in but not limited to Table 1.6-1.

TABLE 1.6-1

TYPE OF DISTRESS	WARRANTY ITEM (Y/N)	TYPE OF SURVEY	THRESHOLD LEVEL (FOR ASPHALT EACH LOT (0.1 MILE) PER LANE)	REMEDIAL ACTION
Asphalt				
Rutting	Y	Any Survey	Depth > 0.30"	Remove and replace the distressed LOT(s) to the full distressed depth and full lane width.
			Depth ≤ 0.30"	None Required
Ride-ability	Y	Any Survey	RN < 3.69	Remove and replace the distressed LOT(s) to the full distressed area(s) and full lane width.
Cracking	Y	Any Survey	Cracking > 1/8" (Class 1B), accumulative cracking length >50'	Remove and replace the distressed LOT(s) to the full distressed depth and full lane width.
Raveling, delamination and other disintegrated areas affecting the friction course	Y	Intermediate Survey	Underlying Layer exposed, individual length ≥ 10'	Remove and replace the distressed area(s) to the full distressed depth and full lane width and extend 50' at both ends or temporarily patch the distressed area.
			Underlying Layer exposed, individual length < 10'	Patch the distressed area(s) and remove and replace the distressed area(s) to the full distressed depth and full lane width prior to the final survey.
		Final Survey	Observation by Engineer	Replace the distressed area(s) or the patched area(s) and extend 50' at both ends at full lane width.
Pot Holes, slippage area(s), segregated area(s) and other disintegrated areas including separation of roadway widening from original roadway.	Y	Any Survey	Observation by Engineer	Remove and replace the distressed area(s) to the full distressed depth and full lane width and extend 50' at both ends or temporarily patch the distressed area(s) and remove and replace the patched area(s) to the full distressed depth and full lane width and extend 50' at both ends prior to the final survey.

TABLE 1.6-1 CONTINUED				
Grassing				
All grassing operations	Y	Any Survey	Observation by Engineer	A healthy stand of grass on all areas of the project will be maintained for the warranty period. Mowing, litter pickup and regular maintenance shall be the responsibility of the Owner. Areas subjected to erosion due to the lack of adequate grass and/or lack of soil compaction on slopes shall require an immediate remedy. Contractor shall install topsoil, regrade and regrass at no cost to the owner. The contractor may elect to regrass in these areas by sodding at no additional cost to the owner. The contractor may be required to water and/or fertilize the grassed areas during the warranty period in order to maintain a healthy stand of grass at no additional cost to the owner. Droughts are NOT an acceptable excuse. Loss of grassing during the warranty period due to erosion around drainage structures and culvert end treatments shall be
Signs				
All signs	Y	Any Survey	Observation by Engineer	All signs shall maintain their originally designed intent for the warranty period except as provided
Concrete				
Mitered Ends	Y	Any Survey	Any cracking or breaking during construction and the warranty period.	Contractor shall warranty by removing and replacing any broken concrete mitered ends that were constructed on the project for the warranty period except as provided in section 1.5 D. Breakages due to Normal mowing operations is NOT included in the
Headwalls, Drainage Pipe, Drainage structures, concrete turnouts and Other Misc. Concrete Structures	Y	Any Survey	Any cracking, spalding or breaking during construction and the warranty period which reduces its originally designed function.	Contractor shall warranty cracked or broken structures by removing and replacing the structure if deemed non- repairable by the engineer. Contractor shall repair or replace as required any structure that fails due to improper installation (i.e. Drainage pipe that separates and causes undermining of an adjacent drainage structure or

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 02000
SIMPLEX SANITARY SEWER GRINDER PACKAGE

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Simplex Sanitary Sewer Grinder Package

1. Sanitary Sewer Grinder Pump
2. Sanitary Sewer Wet Well
3. Valve and Valve Box
4. Simplex Control Panel with "Push-to-Run" botton and Generator Receptacle

1.2 DESCRIPTION OF WORK

A. The Contractor shall furnish and install all simplex sanitary sewer grinder packages as shown on the drawings and as specified herein.

1.3 SUBMITTALS

1. Documentation

a. Five (5) sets of submittal data must be supplied for review and approval.

b. Submittal data to consist of:

a. Pump catalog data

b. Pump performance curve

c. Break Away Fitting (BAF) data

d. Cover data

e. Typical installation drawing

f. Control panel data

g. Panel wiring schematic

h. Accessory data

i. Installation & Operation Manuals with Parts List

j. Copy of the five (5) year, 100% parts/shop labor warranty.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Follow the manufacturer's recommendations.

1.5 MEASUREMENT AND PAYMENT

A. Measurement: Each simplex sanitary sewer grinder package installed at a residence will be measured as an assembly.

B. Payment: Payment will be made at the unit price per assembly for each simplex sanitary sewer grinder pump package.

C. Includes: Unit price includes, but is not limited to, furnishing and installing sanitary sewer grinder pump, sanitary sewer wet well, valve and valve box, simplex control panel with generator receptacle, electrical power supply service, bedding material, placing bedding and backfill material, fittings, pipe joints, pipe connections; dewatering, testing, and inspection. Additional specific items that are to be included:

1. The pump manufacturer shall provide a five (5) year parts and labor warranty for the materials and equipment provided by the manufacturer, including but not limited to the pump, control panel and valves. In the event a pump, control panel or valve is replaced under warranty, the replacement pump shall have the same manufacturer's warranty for five (5) years from the new install date.

2. In addition to pump manufacturer's warranty, the entire fiberglass package including pipe, valves, fittings, hatch cover and fiberglass basin shall be warranted for five (5) years.

PART 2 – PRODUCTS

2.1 Simplex Sanitary Sewer Grinder Package

A. Sanitary Sewer Grinder Pump

1. DESIGN

a. A centrifugal submersible grinder pump designed to reduce all material found in normal domestic sewage, including plastics, rubber, sanitary napkins, and disposable diapers into a finely ground slurry. The resultant slurry is then pumped through small diameter piping, gravity interceptor or treatment facility. The temperature limitation of the liquid being pumped is 104°F (40°C)

continuous and shall be capable of running dry for extended periods.

b. Pumps must have serial numbers that are trackable by manufacturer and stamped onto Pump name plates.

2. PERFORMANCE

a. In order to insure proper operation in all conditions, pump(s) must provide, without overheating in continuous operation, maximum head condition required by the system. Pump(s) must also be capable of operating at zero or negative heads without damage to the pump(s).

b. The pump(s) must be a 2 HP and operate at 3450 RPM's and maximum 16.5 amps. The Pump "shut off head" shall be 200 ft (87 psi). The pump shall be capable of producing a 28 gpm flow of water at 125 ft of head.

3. GRINDER

a. The grinder pump shall be a Barnes OGP Razor.

b. The pumps shall be equipped with 316 SST float bracket assembly per detail in Contract Drawings.

4. TESTING

a. Each grinder pump shall be submerged, operated and tested for performance compliance to its respective curve. Testing process and periodic inspection of testing process shall be conducted and approved by U.L.

5. START-UP

a. The pump (s) shall be tested at start-up by a qualified representative of the manufacturer. A start-up report as provided by the manufacturer shall be completed before final acceptance of the pump (s).

B. Wet Well

1. DESIGN

a. The fiberglass wet well shall be the 36"x48" fiberglass "funky tank" with a 24"x12" riser with integrated "hang and bang" quick removal systems with SST components and backing plate bent to

the 24” radius (see detail drawing). Note: The radius bent back plate shall be ¼” thick, 10 inch x 10 inch 316 SST.

b. The pumps will be suspended 3” above basin floor via “Hang and Bang” quick removal systems. Piping will be 1-1/4" diameter Sch.40 304 SST. All piping and quick removal Hang and Bang apparatus inside the wet well shall be SST.

c. Wet well covers shall be ¼ inch thick diamond plate aluminum with SST slam locks with PVC plate between cover and lock to prevent galvanic corrosion. Diamond plate hatch shall be gasketed and must be powder coated forest green. Cover will be rated 300 PSF loading.

d. Hatches must have 3/16th inch SST "stop" chains. One end attached to basin wall via aluminum bracket, other end attached to aluminum bracket welded to hatch.

e. Each basin must include a 2" adapt-a-flex and 4" adapt-a-flex. 2" is for electrical conduit and the 4" is for inlet pipe.

f. All hardware and brackets used must be SST or aluminum. All Piping must be SST. Pitless Adapter must be SST. All to match as indicated in detail on plans.

C. Valve and Valve Box

1. DESIGN

a. Valve Assembly and 12” valve box as indicated on plans. SST Check/Cleanout/Curb Stop /SST Flex assembly will be as supplied by pump manufacturer to assure single source responsibility and culpability and must be all 300 series SST construction.

b. Valve box top must be green and have the word "Sewer" etched or cast.

D. Simplex Control Panel

1. DESIGN

a. Panel must be provided by pump manufacturer to assure single source responsibility and culpability and shall have 25 amp breaker for pump and 10 amp breaker for alarm light/horn.

b. Enclosure shall be fiberglass/PVC and must have external horn silence button.

c. Electrical Power Service Supply to panel must be 35 amps with an electrical disconnect as needed per code.

d. Panel must provide a “Push-to-Run” button and generator receptacle.

END OF SECTION

SECTION 02100

SANITARY SEWER SYSTEM

1.1 SCOPE:

The work to be done under this Section of the specifications consists of furnishing all materials and equipment and performing all labor necessary for the complete construction of the sanitary sewer system including all sewer pipe, manholes, fittings, and other appurtenances as indicated on the drawings and/or specified.

1.2 GENERAL:

1. All materials used in the construction shall be new and unused when delivered to the site and shall be subject to inspection by the Engineer before installation.

2. Sewers shall be constructed of polyvinyl chloride (PVC) pipe except where the plans require other types of pipe.

1.3 APPROVAL OF MATERIAL AND EQUIPMENT :

1. Within 30 days after notice to proceed is issued, the Contractor shall submit, for the approval of the Engineer, shop drawings and/or manufacturer's description sheets for the following materials and/or equipment:

    a. Piping and Fittings

    b. Precast Manholes

    c. Casting and Steps

    d. Sewage Combination Air Valve

    e. Force Main Valves and Fittings

2. Submittals shall include digital copies for each item. Drawings and manufacturer's descriptive materials shall include sufficient detail to clearly establish that the item submitted meets the specifications.

3. Items installed without approval of the Engineer shall be subject to

removal and replacement at no additional cost to the Owner.

D. SEWER PIPE:

1. Polyvinyl Chloride (PVC) pipe for gravity sewers shall meet extra-strength minimum of SDR-35 of the requirements of the latest revisions of ASTM D-3034. At each joint, provisions must be made for contraction and expansion by insertion of a rubber ring. The bell shall consist of an integral wall section with a solid cross-section rubber ring, factory-assembled, securely locked in place to prevent displacement. The pipe shall be joined with an integral bell, bell-and-spigot type rubber gasketed joint, each integral bell joint shall consist of a formed bell with a single rubber gasket. Gaskets shall conform to ASTM F-477.

2. Ductile Iron Pipe supplied shall be push-on, mechanical or flanged joint, as indicated on the drawings and shall:

    1. Conform to AWWA C106 or C108;

    2. Be thickness Class 50, AWWA C150;

    3. Be cement-lined in accordance with AWWA C104;

    4. Be rated working pressure 150 psi, AWWA C151;

    5. Have rubber-gasket joints conforming to AWWA C111.

    The weight, casting period, and class or nominal thickness shall be shown on each pipe. The manufacturer's mark, the year in which the pipe was produced, and the letters "DI" or "DUCTILE" shall be clear and legible and all cast marks shall be on or near the bell.

3. Polyvinyl Chloride (PVC) pipe for the sewage force main shall meet the requirements of Section 2A-14.D.1. with dimension ratio DR-25, for both barrel and bell, and be pressure rated at 165 psi. It shall be of the bell-and-ring type integral bell or gasketed coupling conforming to the requirements of AWWA C-900, commercial standard CS-256 and ASTM D1784. Rubber rings shall conform to ASTM F477. Pressure testing of force main shall be in accordance with Section 2A-14.S.

4. Fittings for the sewage force main shall be mechanical joint gray iron or ductile iron conforming to AWWA C110 and shall be cement lined. The cost for ductile iron fittings shall be included in the unit price bid for the sewer force main.

5. Service line connections shall be made of the same material as the major sewer line to which they are connected. All service line shall be 4" in diameter unless noted otherwise on the plans. Polyvinyl chloride (PVC) service pipe shall be as specified for PVC pipe in Paragraph 1. above.

E. MANHOLES, WET WELLS AND CASTINGS - GENERAL:

1. Manholes and wet wells shall be precast concrete manholes or wet wells and shall be located as shown on the drawings. All manholes and wet wells shall be 48" inside diameter unless noted otherwise, and shall be installed level, true and plumbed.

2. Where the difference in the invert elevation of two or more sewers intersecting in one manhole is more than 2'-0", a drop manhole shall be constructed. Drop manholes shall be similar in construction to the standard manhole except that a drop connection of pipe and fittings of the proper size and material shall be constructed outside the manhole as detailed on the drawings. Where a sanitary sewer force main connects to an existing or proposed manhole, an exterior drop connection shall be constructed as detailed in the plans. Inside all wet wells and the manhole receiving the force main discharge, all exposed surfaces (including bottom of top slab) shall be lined with a protective coating manufactured by Spectrashield. These linings shall be applied in strict accordance with the manufacturer's recommendations by a certified installer. All concrete shall be sufficiently cured to prevent gaseous formation behind the liner per the liner manufacturer’s specifications. All wet well and manhole receiving force main discharge surfaces shall be thoroughly prepared, cleaned, dry and free from all mill-scale, rust, grease, dirt and other foreign matter to assure proper adhesion/installation of the liner. Liners shall be shown, labeled, and dimensioned on the shop drawings submitted for approval to the Engineer.

3. Where the difference in invert elevation of two or more sewers intersecting in one manhole is less than 2', the invert shall be filleted to prevent deposition of solids.

4. Payment for wet wells and manholes will include excavation, tops, covers, floor, barrel, steps, false sloped floor, invert channels, weirs, orifices, linings and other accessories such as supports to connecting pipes, future connections and their channels, flexible joint-pipe to manhole. Payment shall be made at the unit price bid per each as stated in the Bid Schedule.

5. Pipe to manhole connection shall be made with a mechanically

compressed flexible joint system. The joint system shall consist of an internal expanding band which clamps and seals a neoprene boot to opening in wall of manhole and an external band which contracts around the boot to clamp and seal to the pipe. Flexible Joint Connection shall be "Kor-n-seal" as manufactured by National Pollution Control System, Inc., Nashua, New Hampshire, or approved equal.

6. Payment for drop connections shall include the pipe and fittings and concrete or brick encasement required for the drop connection. Payment shall be made at the unit price per each as stated in the Bid Schedule.

F. PRECAST MANHOLES:

1. Prefabricated concrete manholes shall be constructed as shown on the contract drawings. The concrete shall have a minimum of 28-day compressive strength of 4000 psi with 2" x 8" - 6/8 welded wire mesh. The wall thickness shall be a minimum of 5" and the inside diameter of the manhole shall be 4'. Manholes shall conform to the requirements of ASTM C-478, latest revision.

2. Manhole steps shall be factory-cast into walls of manholes with 12" vertical spacing between steps.

3. The necks of precast manholes may be built up with brickwork a maximum of 8" in order to set the manhole frame and cover at the required elevation. Where manholes are located within or adjacent to existing paved roads, the top surface of the frame and cover shall be set flush with the existing roadway surface. Where manholes are located within or adjacent to existing dirt or gravel based roads, the top surface of the frame and cover shall be set 1-1/2" above the existing surface. The area around the frames, except in paved areas, shall be mounded with earth to prevent any obstruction to vehicular traffic. Where manholes are located outside of roadway right-of-way, the top surface of the frame and cover shall be set at the existing grade unless otherwise indicated on the drawings. The top surface of all frames and covers within roadway areas shall be tilted to conform to the slope, crown and grade of the existing surface adjacent thereto.

G. MANHOLE CASTINGS:

1. All castings shall be made accurately to the required dimensions and shall be sound, smooth, clean and free of blisters and other defects. Defective castings which have been plugged or otherwise treated shall be rejected. The contact surfaces between the cover and its corresponding supporting ring in the frame shall be machined so that the cover will rest on the ring

for the full perimeter of the contact surfaces. Castings shall be thoroughly cleaned and, before rusting begins, shall be painted with a bituminous coating so as to present a smooth finish, tough and tenacious when cold, but not tacky nor with any tendency to scale. There shall be no holes or perforations in the covers.

2. Manhole castings shall consist of cast iron frames and 23-7/8" diameter covers. Castings shall be Class II, weighing at least 350 and 460 pounds as detailed on the drawings. Manhole covers must be set neatly in the frames with contact edges machined for even bearing and tops flush with the tops of the frames. They shall have sufficient corrugations to prevent slipperiness and be marked in large letters "SANITARY SEWER". Covers shall have 2 pick holes about 1-1/2" wide and 1 " deep with 5/8" undercut all around. Payment for manhole casting shall be included in the unit price bid for manhole.

3. Manhole steps shall be cast iron, 10" x 10" minimum size, having corrugated treads, or approved equal. Payment for manhole steps shall be included in the unit price bid for manhole.

H. INVERTS:

Manhole inverts shall be constructed of cement mortar and shall have the same cross section as the invert of the sewers which they connect. The manhole invert shall be carefully formed to the required size and grade with gradual and uniform changes in sections and shall be made to a true curve with as large a radius as the size of the manhole will permit.

I. STAKING AND GRADING:

1. The Engineer shall be responsible for locating bench marks from which the Contractor shall work.

2. The Contractor shall be responsible for construction staking and for providing laser beam equipment and using this equipment to grade and align all sewer lines between manholes.

J. INSPECTION OF PIPE AND JOINTS:

1. All pipe shall be subject to inspection by the Engineer for uniform diameter, straightness, and defects before being lowered into trench. Rejected pipe shall be marked in such a way as will not impair its value and separated from accepted pipe and removed from the project.

2. No backfilling (except for securing pipe in place) over pipe will be

allowed until the Engineer has had an opportunity to make an inspection of the joints, alignment and grade in the section laid.

3. Inspection of piping and joints shall not relieve the Contractor of further liability in case of defective piping and/or joints which prove defective.

K. PIPE BEDDING:

1. Bedding of Polyvinyl Chloride and Ductile Iron Pipe shall be as specified under this Paragraph.

2. All pipe shall be laid with bottom of the pipe barrel on original earth or on crushed stone in case of solid rock subgrade, with cuts in trench subgrade made for bells of pipe. Subgrade shall be accurately shaped so as to give uniform bearing for the bottom of pipe. At no additional cost to the Owner, irregularities in subgrade shall be corrected by the use of pea gravel (No. 4 to 1/2"), a supply of which shall be available at trench side whenever pipe is being laid.

3. Pea gravel for shaping cradle bedding of pipe shall be No. 4 to 1/2" size. No extra payment will be made for such gravel; its cost shall be included in the unit price for laying pipe.

4. Crushed stone for bedding sewer pipe on solid rock shall be No. 8 to 3/4" size. No extra payment will be made for such crushed rock bedding; its cost shall be included in the unit price for laying pipe.

L. TRENCH WIDTHS:

1. Maximum permissible trench widths from bottom of trench to a point 12" above top of pipe shall be equal to the outside diameter of pipe barrel plus 16", except as noted otherwise.

2. Maximum permissible trench widths from finished grade down to a point 12" above top of pipe shall be as follows:

Pipe Size	Maximum Trench Width
6" and smaller	2' - 4"
8"	2' - 4"

3. If the excavated trench width up to a point 12" above the top of sewer pipe is greater than the maximum permissible trench width as set forth in paragraph 2 above, then the Contractor shall, at no additional cost to the

Owner, lay and backfill the line as herein specified for wider trenches.

M. JOINT CONSTRUCTION:

1. Each joint shall be laid so that it will form a close concentric joint with adjoining pipe and so as to avoid sudden offsets or inequalities in the flow line. The inside of all bells and the outside of all spigots shall be wiped to remove all dirt, water, or other foreign matter so that their surfaces are clean and dry when the pipes are joined.

2. Rubber ring gasket joints for PVC pipe shall be installed according to the pipe manufacturer's specifications and recommendations. Extreme care shall be used in joining large diameter pipe to avoid damaging the rubber ring or displacing it from the proper operating position.

3. After the joints have been completed, they shall be inspected by the Engineer before they are covered up. Any leaks or defects discovered at any time after completion of the work shall be repaired immediately. All pipe in place shall be carefully protected from damage until the backfilling operations have been completed. Any pipe which has been disturbed shall be taken up, the joint cleaned and remade and the pipe relaid at no additional cost to the Owner.

4. Water shall not be allowed to run or stand in the trench while pipe laying is in progress or before the joints are completed or before the trench has been backfilled. The Contractor shall not open up at any time more trench than his available pumping facilities are able to dewater.

N. PIPE LAYING - GENERAL:

1. Before sewer pipe is placed in position in the trench, the bottom and sides of trench shall be carefully prepared, bedding shall be placed and compacted, and necessary bracing and sheeting shall be installed.

2. Each piece of pipe and special fitting shall be carefully inspected before it is placed and no defective pipe shall be laid in the trench. Pipe laying shall proceed upgrade starting at the lower end of the grade and with the bells upgrade.

3. All sewer lines shall be laid to constant grades between invert elevations shown on the plans. Grades shown on the drawings are invert of pipe and not trench subgrade. The pipe lengths shall be fitted together and matched so that when they are laid in the trench they will form a sewer with a smooth and uniform invert visible as a full circle from manhole to

manhole.

4. No filling of trench with earth to bring pipe to grade will be permitted. If trenches are dug too deep, they must be brought to grade and supported by crushed stone for pipe bedding (No. 4 to 1/2") as specified in -.K of this section of these specifications, at no additional cost to Owner. No pipe shall be laid in the trench until subgrade is tested and found correct.

5. Pipe shall not be laid on solid rock. A pad of crushed stone for pipe bedding as hereinbefore specified at least 6" deep shall provide support for at least the bottom quadrant of the pipe.

6. No walking upon the completed pipelines will be permitted until trench has been backfilled to a depth of at least 6" over the top of pipe. Exception may be made at the discretion of the Engineer where it is necessary in order to tamp the backfill around the pipe.

7. The interior of the pipe shall, as the work progresses, be cleaned of all dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted into the pipe bell so as to exclude earth and other material, precautions being taken to prevent floatation of pipe by runoff into trench.

8. Laying of pipe may be delayed by the Engineer until trenching has progressed far enough ahead to remove the possibility of having to change grade or alignment on account of other structures, pipelines or conduits.

9. Unless permitted or directed for the following reasons, not less than 100' of pipe shall be laid at one operation:

   a. Street crossings;

   b. Wet caving trenches;

   c. Business houses or institution which would be damaged by prolonged disconnection from street.

10. In wet, yielding, and mucky locations where pipe is in danger of sinking below grade or floating out of grade or line, or where backfill materials are of such a fluid nature that such movements of pipe might take place during the placing of the backfill, the pipe must be weighted or secured permanently in place by such means as will prove effective.

11. When ordered by the Engineer, mucky and quicksand trench

subgrades shall be removed below ordinary trench depth. Pay for such excavation shall be included in the unit prices bid for pipe.

12. Pipes shall be laid free from all structures other than manholes. Any pipes entering structures underground unsupported by original earth shall be supported by Class "C" concrete or brick and mortar masonry.

13. Pipe stubbed out of manholes for future connection shall be plugged and tightly sealed with a plug jointed in the bell with joint compound approved by the Engineer. Plugs shall be made of the same material as the pipe used for the stubs.

14. Sewer pipe laid shall be paid for by linear foot measured from center to center of manholes, transition in type of pipe, or junction fittings to ends of pipe, including all fittings and channels. In case of transition of type of pipe at manhole, transition in pay will be at center of manhole. In case of laterals consisting of fittings only and in case of connections to existing sewers with not more than 6' of pipe, no sewer pipe payment will be included. All channels, pipe stubs, and plugs in manholes, regardless of whether shown on the plans, shall be considered a part of such structures and included in payment for same and not included in pipe laid.

15. No joints that show leakage will be accepted. If, after backfilling and inspection, any joints are found that are allowing groundwater to enter the sewer, such joints must be dug up and corrected at no additional cost to the Owner.

16. Payment for pipe shall be per linear foot of pipe installed. Cut classification for gravity sewer shall be determined from the construction drawings unless the Contractor notifies the Engineer prior to installation of the pipe that the actual topographic conditions are different from what is shown on the drawings so as to cause a change in cut classification. Upon such notification, the Engineer will make the necessary measurements to confirm or refute a discrepancy. However, no claim for additional payment will be allowed when a change in alignment or grade has been made without approval of the Engineer; and, in this case, or when no change in cut classification is confirmed, the Contractor shall pay to the Owner all additional cost incurred in making such a determination.

O. SERVICE CONNECTIONS:

1. Branch service pipes shall be laid to serve the abutting property at points to be designated by the Engineer. Such pipes shall be connected to the sewer through wyes with the same run size as the main sewer and 4" side branch and 4" 45˚ bends. Side branches shall be supported from bottom of

trench with crushed stone (No. 8 to 3/4") where cover is less than 6'.

2. Four inch service pipe shall be laid from the main sewer to the property line of the abutting property. The end openings shall be plugged and sealed with a PVC plug jointed in the bell of the pipe with a jointing compound approved by the Engineer. Where practical, due to the slope of the existing ground, the service lines shall end at the property line with a wye which shall provide service connections to two adjacent properties. An E.M.S. marker shall be placed at end of service line. These locations shall be determined by the Engineer. Payment for service connections shall be made at the unit prices stated in the Bid Schedule.

3. Under normal conditions, where elevations are not critical, branch service sewers to customers shall be laid on not less than 3 inch per foot of length grade. Where elevations are critical, minimum grade shall be 1/8 inch per foot laid with batter boards and grade line string.

4. In the case of deep sewers, as directed by the Engineer, branch pipes may be brought up to a depth of approximately 6' below ground level with suitable bends and service pipe. These pipes shall be laid on a slant outside sewer trench so they will be supported on original earth and not dragged down and cracked by backfill settlement. Where depth of cover over wye branches is greater than 6', these wyes or tees shall be encased in concrete. Cost of such concrete shall be included in the price bid for service connections.

5. In the case of branches to deep sewers in rock or narrow places, the service pipe shall be brought up to a depth of approximately 6' below ground level with suitable bends and riser pipe and encased in Class "C" concrete or block and mortar masonry to subgrade of branch trench. The cost of such concrete and forms or masonry above the wye or tee branch shall be included in the price bid for service connections.

6. The Contractor shall make an accurate dimensional record of the service connections as the installations are made. The following information shall be recorded:

    a. Distance from nearest manhole to wye or tee connections at main sewer;

    b. Distance from main sewer to end of service line;

    c. Distance from property corner nearest to the lower side of the gravity sewer line;

d. Depth at end of service line.

These records shall be kept by the Contractor until all connections are made and then submitted to the Engineer prior to the final work claim.

7. The end of service pipes shall be marked with an E.M.S. sanitary marker #1253 (Green) as manufactured by Automation Products Company, Austin, Texas. The marker shall be placed in a horizontal position directly over the end of the service at a depth not to exceed 4' from finished grade. The location record map shall be noted that E.M.S. sanitary markers were placed over all services.

8. Service connections shall be required at locations as shown on the drawings. The exact locations of the service connections and stub tee or wyes shall be determined by the Engineer in the field.

P. SEWAGE COMBINATION AIR VALVE:

1. A Sewage Combination Air Valve (SCAV) shall be installed on the sewage force main as shown on the plans.

2. The SCAV shall be of the single body, double orifice design to allow large volumes of air to escape or enter through the large diameter air and vacuum orifice when filling or draining the pipeline.

3. When the pipeline is filled and pressurized the large air and vacuum orifice shall stay closed, but the smaller diameter air release orifice shall remain operative and open to allow small pockets of accumulated air to escape automatically and independently of the large orifice.

4. The large air and vacuum orifice shall shut-off when the free floating-center guided plug is raised into the orifice by the lifting force of the Concave-bottom float. The large orifice shut-off shall be without spillage. A Buna-N seat must be fastened to the valve cover, without distortion, for drip tight shut-off.

Q. POLYVINYL CHLORIDE (PVC) SEWER PIPE LAYING:

1. PVC pipe shall be used as specified in 2A-14.D.1. of this section

2. Installation of PVC pipe shall be in accordance with ASTM D-2321, latest edition, except that more stringent requirements as herein specified shall be used where applicable.

3. "O" ring joints shall be used for all PVC pipe.

4. Trench bottom should be level and pipe laid to line and grade and uniformly supported for its entire length on the lower quadrant. Pipe should never be blocked to grade.

5. For PVC pipe, bedding and primary backfill material shall consist of Class 1 or Class 2 soil (USGS Soil Classification System) placed in 6" layers. Where Class 2 soil is used, bedding primary backfill shall be compacted as specified in ASTM D-2321.

6. If sheeting is used, it shall be left in place at least up to the top of the pipe or the side fill shall be mechanically compacted at the point of removal as the sheeting is pulled.

7. After placement of primary backfill up to a level of 12" over the top of the pipe, remainder of backfill shall be placed as specified in Section -.J of these specifications.

8. If maximum permissible trench widths are exceeded, recommendations stated in ASTM D-2321 shall be followed.

R. DUCTILE IRON PIPE LAYING:

1. Cast iron sewers, where indicated on the drawings, shall be laid to line and grade and according to provisions regarding bedding, laying, and jointing of PVC pipe, except that joints shall be made with mechanical or push-on joints, according to the manufacturer's specifications and using manufacturer-recommended tools. A copy of the manufacturer's instructions shall be made available at the site of work at all times when pipe is being laid.

2. Cutting of pipe may be done with wheeled pipe cutters or with hammer and chisel, as the Contractor may elect; but the Contractor will be held responsible for breakage or damage caused by careless cutting or handling.

3. No pipe shall be laid on rock, blocking, or other unyielding objects, except where laid above ground on piers or in permanent tunnels.

4. Measurement and payment for cast iron sewer shall be by a unit price per foot for pipe laid, except to center of manholes where entering them, including trench excavation and backfill.

S. TESTING - GENERAL:

1. Testing shall consist of furnishing all labor and materials and performing tests for leakage on all sewer lines and manholes installed in the system.

2. Defective work as indicated by test specified herein shall be corrected immediately and the defective sections shall be retested.

3. The cost of testing and stoppage of infiltration and cleaning of sewer lines and manholes shall be included in the unit prices bid for pipe and manholes. The Contractor shall furnish all weirs, other materials, and labor required for all tests, the Engineer being responsible only for direction, recording date, and calculating infiltration rates.

T. INFILTRATION TESTS:

1. Before being put into service, weir tests shall be made of flow of water from all sewers before they are put into service.

2. No more than 3,000 feet of sewer in one section shall be weir tested at one time.

3. Suitable metal or wooden weirs shall be installed at the lower end of the section of sewer being tested, and measurements of flow shall be made.

4. Any leaks into the sewer of significant magnitude that can be located shall be repaired or corrected as authorized by the Engineer regardless of infiltration tests results.

U. WATER (HYDROSTATIC) TEST:

1. The leakage exfiltration or infiltration shall not exceed 200 gallons per inch of pipe diameter per mile per day (0.02 m3/mm of pipe dia./km/day) for any section of the system. An exfiltration or infiltration test shall be performed with a minimum positive head of 2 feet(600mm).

2. Inspection during pipe laying shall in no way relieve the Contractor of the responsibility for passing tests or correcting poor workmanship. Before acceptance, infiltration shall be reduced by repair of leaks to the allowable rate.

V. AIR TESTS:

1. The Contractor shall air test the completed sewer line between each two consecutive manholes. The air test shall as a minimum conform to the test

procedure described in ASTM C-828 for clay pipe, ASTM C-924 for concrete pipe and ASTM F-1417 for plastic pipe. If the test fails between manholes, the testing shall continue at closer intervals until the faulty construction is located and repaired.

2. Test methods and equipment used shall be approved by the Engineer prior to beginning the testing operation.

3. Test sections shall be cleaned and flushed and shall have all pipe openings plugged and adequately braced to withstand the test pressure.

4. Any section of the sewer line which fails to meet the requirements stated above shall be repaired as necessary to eliminate all detectable leaks and shall be retested until satisfactory test results can be obtained. The Engineer shall approve final test results.

5. The prescribed test pressure shall be in excess of the hydrostatic pressure of the groundwater above the top of the pipe. The pressure drop shall remain as indicated above.

W. MANHOLE EXFILTRATION TEST:

1. Each manhole indicated on the drawings shall be tested for water tightness.

2. All connecting piping shall be plugged and manhole filled with water, allowed to stand for one hour, and then refilled. If measurable water level drop occurs after a second one-hour period, the Contractor shall repair the leakage and retest at no additional cost to the Owner.

X. DEFLECTION TEST:

1. Deflection test shall be performed on all flexible pipe. The test shall be conducted after the final backfill has been in place at least 30 days.

2. No pipe shall exceed a deflection of 5%.

3. Deflection test shall be performed by using a go, no-go mandrel with a diameter equal to 95% of the inside diameter of the pipe. The test shall be performed without mechanical pulling devices, and shall
4. be performed by the Contractor at no additional cost to the Owner.

Y. CCTV TEST:

1. The Contractor shall provide a CCTV camera(s) to facilitate the survey and inspection of all gravity sewer main.

2. The CCTV camera shall be positioned to reduce the risk of picture distortion. In circular sewers the CCTV camera lens head shall be positioned centrally (i.e. in prime position) within the sewer. In non-circular sewers, picture orientation shall be taken at mid-height, unless otherwise agreed, and centered horizontally. In all instances the camera lens head shall be positioned looking along the axis of the sewer when in prime position. A positioning tolerance of ± 10% of the vertical sewer dimension shall be allowed when the camera is in prime position.
3. The surveying/inspecting equipment shall be capable of surveying/inspecting a length of sewer up to at least 1000 ft. when entry onto the sewer may be obtained at each end and up to 750 ft.
4. The speed of the CCTV camera in the sewer shall be limited to 30 LF per minute for surveys to enable all details to be extracted from the ultimate digital recording. Similar or slightly higher speed as agreed by the designated Engineer shall be provided for inspections.
5. The CCTV monitor display shall incorporate an automatically updated record in feet and tenths of a foot of the footage of the camera or center point of the transducer, whichever unit is being metered, from the cable calibration point. The relative positions of the two center points should also be noted.
6. The Contractor shall use a suitable metering device, which enables the cable length to be accurately measured; this shall be accurate to ±1% or 3 inches whichever is the greater.

Z. PRESSURE TESTING:

1. This section covers hydrostatic pressure and leakage testing of the sewer force main, which shall be performed by the Contractor, in accordance with the AWWA Specification C600, as specified herein, and as directed by the Engineer.

2. The pressure and leakage tests shall be performed on the entire line.

3. All concrete reaction blocking and anchorage shall be in place and ready for use before the line is initially filled with water.

4. The Contractor shall furnish all materials, equipment and labor necessary to connect the line to be tested and the source of water supply, together with test pumping equipment, water meter, pressure gauge, and other equipment, materials, and facilities required for the tests.

5. Test pressures shall be applied by means of a force pump of such design and capacity that the required pressure can be applied and maintained without interruption for the duration of the test.

6. The water meter and the pressure gauge shall be accurately calibrated and

shall be acceptable to the Inspector.

7. The pipeline shall be subjected to a pressure test for the purpose of testing the line for line stability and for defective materials or workmanship.

8. A test pressure of 1-1/2 times the working pressure or the pressure class of the pipe being tested, whichever is greater, shall then be applied and maintained for a period of not less than two hours for uncovered pipe and six hours for covered pipe, and for whatever longer period may be necessary to complete the inspection of the line and to locate any and all defective joints and pipeline materials. Test pressure shall not vary by more than □ 5 psi for the duration of the test. The test pressure shall be based on the lowest point in the section of the line being tested and corrected to the elevation of the test gauge.

9. If the pressure test discloses that repairs or replacements are needed, such repairs or replacements shall be made, the line refilled, and the test pressure applied as before; this operation shall be repeated until the line withstands the test pressure in a satisfactory manner.

10. A recording pressure gauge shall be used for the test and the chart for each test shall be signed and dated by the Contractor and submitted to the Engineer.

11. The Contractor shall conduct a leakage test after the pressure test has been satisfactorily completed.

12. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. Leakage shall not be measured by a drop in pressure in a test section over a period of time.

13. The maximum allowable leakage shall not exceed 10 gallons per inch of pipe diameter per mile of pipe per 24 hours. No pipe installation will be accepted if the leakage is greater than the maximum allowable.

14. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078/gal/h/in. of nominal valve size shall be allowed.

15. If any test of the pipeline indicates leakage in excess of the allowable amount, the Contractor shall locate and repair the defective joints and the line shall be retested at no additional cost to the Owner.

16. No portion of the pipeline and appurtenances which has not successfully met the pressure and leakage tests shall be eligible for payment.

AA. PAYMENT:

No separate payment will be made for the work of this Section, except as may be specifically set forth in the Bid Schedule. The cost of the work of this Section, and all costs incidental thereto, except the work which may be specifically set forth in the Bid Schedule, shall be included in the price bid for the item to which the work pertains.

SECTION 02200

SANITARY SEWAGE PUMP STATION

PART 1 - GENERAL

1.1 SCOPE:

A. Furnish all labor, materials, equipment and incidentals required to install, place in operation and field test submersible wastewater pumps, mixer, wetwells, valve boxes, concrete slabs, control panel and telemetry/SCADA as hereinafter specified. The station shall be complete with pumps, mixer, piping, valves, electrical work (including motor controls), telemetry/SCADA, instrumentation, structures, connections and appurtenances, tested and ready for service.

B. These specifications are intended to give a general description of what is required, but do not cover all details which will vary in accordance with the requirements of the equipment as offered. It is, however, intended to cover the furnishing, the shop testing, the delivery and complete installation and field testing, of all materials, equipment and appurtenances for the complete pumping units as herein specified, whether specifically mentioned in these specifications or not.

C. The Contractor shall confirm the pump, mixer, piping, and guide bar system can be accommodated and maintained with the hatch opening size.

D. Related Documents described elsewhere:

1. Shop Drawings, Working Drawings and Samples: Section 1340.

2. FDOT Standard Specifications for Road and Bridge Construction, current edition. Specific Sections but not limited to:

a. Prevention, Control, and Abatement of Erosion and Water Pollution: Section 104
b. Excavation for Structures and Pipe: Section 125
c. Reinforcing for Concrete: Section 415
d. Performance Turf: Section 570

1.2 SITE CONDITIONS:

A. Prior to submitting his bid, the Contractor shall satisfy himself as to the character and amount of different soil material, groundwater and the subsurface conditions to be encountered in the work to be performed. Information and data, when furnished, are for the Contractor's general information. However, it is expressly understood that any interpretation or conclusion drawn therefrom is totally the responsibility of the Contractor.

PART 2 – PRODUCTS

2.1 APPROVAL OF MATERIAL AND EQUIPMENT:

A. All materials and equipment shall be new and unused when delivered to the site and shall be subject to inspection by the Owner and Engineer before installation.

B. It is the intent of these Specifications that, to assure overall system quality and operational unity, the pumps, motors, starters, controls, and other auxiliary equipment and materials as shall be furnished and/or coordinated by the pump manufacturer who shall assume responsibility for the satisfactory operation of the pumping system including pumps, motors, mixers, controls, starters, telemetry and accessories.

C. Within 30 days after notice to proceed is issued, the Contractor shall submit, for the approval of the Engineer, shop drawings and/or manufacturer's description sheets for the following materials and/or equipment:

a.	Piping and Fittings	e.	Guide Rails
b.	Discharge Elbow	f.	Valves
c.	Submersible Pumps	g.	Impeller & Volute
d.	Mixer	h.	Mixer Propeller
e.	Wet well	h.	Access Hatches

D. Submittals shall include an electronic copy for each item. Drawings and manufacturer's descriptive materials shall include sufficient detail to clearly establish that the item submitted meets the specifications.

E. Items installed without approval of the Engineer shall be subject to removal and replacement at no additional cost to the Owner.

2.2 SUBMERSIBLE PUMPS:

1. Furnish and install two submersible non-clog wastewater pumps in the sewage pumping stations as detailed on the drawings.

2. The pumps shall be totally submersible, electrically operated, capable of pumping raw, unscreened sewage and each unit shall meet the following characteristics:

Shutoff Head (Feet)	155	
Design Capacity (GPM)	145	250
Design TDH (Feet)	148	116

Motor Horsepower (Maximum)	30
Electrical Service	230V / 3 Ph
Discharge Size (Inches)	4
Motor RPM (Maximum)	1800

3. The pumps shall be capable of handling raw, unscreened wastewater. The discharge elbow shall be permanently installed in the wet well along with the discharge piping. The pumps shall be automatically and firmly connected to the discharge connection elbow when lowered into place. The pumps shall be easily removable for inspection or service, having no bolts, nuts, or other fasteners to be disconnected. There shall be no need for personnel to enter the pump well. Sealing of the pumping unit to the discharge to the discharge connection elbow shall be accomplished by a mechanical, watertight contact.

4. All major parts such as the stator casing, oil casing, sliding bracket shall be of gray iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes and other irregularities. Where watertight sealing is required, O-rings made of nitrile rubber shall be used. All exposed nuts and bolts shall be of AISI type 316 stainless steel. All metal surfaces that come into contact with the sewage, other than stainless steel, shall be protected by a min. 6 mils thickness, factory applied 2-component epoxy resin coating on the exterior of the pump.

5. The impeller, volute and seal plate shall be of wear resistant chromium white iron A532 II C 15% CrMo-Hc. The impeller shall be a vortex design and shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in normal wastewater applications. The impeller shall be capable of passing a minimum three (3) inch solid sphere.

6. The motor shall be able to operate dry without damage while pumping under load. Motors shall be sufficiently cooled by the surrounding environment or pumped media such that pump is capable of continuous operation, in a totally, partially, or non-submerged condition. The pump shall be capable of running dry continuously in a totally dry condition. A water jacket shall not be required.

7. The pump manufacturer shall warrant the units being supplied to the Owner against defects in workmanship and material for a period of ten (10) year non-prorated under normal municipal use, operation and service. There shall also be a ten (10) year abrasion warranty on impeller, volute and seal plate. If any undue wear or abrasion of the wet end occurs, those parts should be replaced or repaired at no charge to Owner. The warranty shall be in printed form and apply to all similar units.

8. Submersible pumps shall be one of the models as follows:

a. KRT F 100-316/234XEG-S as manufactured by KSB.

b. 4X15M as manufactured by Wemco.

c. Absolutely no alternatives or equals will be considered.

2.3 SUBMERSIBLE PUMP GUIDE BAR ASSEMBLY:

1. Each pumping unit shall be equipped with a guide bar assembly as recommended by the pump manufacturer. Guide bars shall be utilized to direct the pump in proper alignment with the stationary discharge piping. Bars shall be a minimum of 2-inch diameter, 316 stainless steel. The pump shall be automatically connected to the discharge connection when lowered into place and shall be easily removed for inspection or service. There shall be no need for personnel to enter wet well. Sealing of the pumping unit to the discharge connection shall be accomplished by a simple linear downward motion of the pump. All material used to fabricate the upper guide holder and cable holder shall be 316 stainless steel. All bolts, anchors, and other fasteners shall be 316 stainless steel.

2. A sliding guide bracket shall be an integral part of the pump unit. The entire weight of the pumping unit shall be guided by no less than two guide bars that are a minimum 2" diameter; each made of SCH-40 316 stainless steel. No portion of the pump shall bear directly on the floor of the sump.

2.4 FLOAT MOUNTING ASSEMBLY:

1. A float pole assembly shall be provided for mounting and positioning of floats. The float pole assembly shall consist of a 1" SCH-10 pipe with lifting chain mounted to welded eye. Chain and pipe shall each be long enough to position the floats at the required depths. Float pole mounting assembly shall be provided with six (6) 3/8" dia. 316 stainless steel hooks for hanging floats cords. Floats must be mounted to pole with pipe clamps and shall be oriented so as to avoid flow from incoming pipes impinging on hanging floats to as great an extent possible. Sufficient amount of weights must be welded to bottom of pole for stability. Continuous cords are to run from pump(s) and level controls to control panel. No splices shall be made in wiring. All components of the assembly including but not limited to hooks, fasteners, chain, welded eye, pipe, clamps and weights must be of 316 stainless steel.

2.5 LIFTING CHAIN:

1. Each pumping unit shall be provided with a 316 stainless steel lifting chain, to permit raising the pump for inspection or repair. The lifting chain shall be provided with a shackle at each end of like strength and material for creating a lifting loop sufficient for standard lifting devices. The lifting chain shall be of sufficient length to extend from the pumping unit at one end to the top of the wet well at the other end, plus an additional five (5) feet. The access frame shall provide (3) 3/8" dia. 316 stainless steel hooks, per pump,

to attach the lifting chain and cables when not in use. The lifting chain shall be sized according to the pump manufacturers' recommendations but under no circumstances less than the pump weight with a minimum safety factor of 7.0 or a minimum 3/8" diameter.

2.6 ACCESS FRAME AND COVER:

1. DOORS, FRAME & COVER

a. The lift station shall be equipped with powder coated "forest green" access hatch frame and cover. The hatch shall be constructed to maximize open access to all appurtenances within the lift station.

b. Access frame and cover must be double-door, aluminum with odor-control gasket by USF.

c. Door leaves shall be diamond plate of a min. ¼" thick and designed to handle 300 psf loading.

d. Doors shall have lifting aids of tubular 316 stainless steel construction, with compression shocks to assist in opening and closing. Hinges shall be heavy-duty 316 stainless steel with tamper-proof fasteners.

e. Doors should open to 90 degrees and lock in that position by a 316 stainless steel automatic hold-open locking arm and release handle.

f. Doors must be capable of being locked by the required Master Lock Model No. M5KASTS with shackle diameter of 3/8". Lock must be included and keyed to match Jackson County's master key.

g. Doors must have 316 stainless steel flush, drop handle in each door.

h. All hardware shall be 316 stainless steel.

2. SAFETY GRATES

a. The lift station access hatch shall be provided with aluminum powder coated "safety orange" safety grates.

b. Safety grates should open to 90 degrees and lock in position by 316 stainless steel locking arm and release handle.

c. Hinges and all hardware must be 316 stainless steel.

2.7 VALVE VAULT/MANIFOLD:

1. VALVES AND ACCESSORIES

a. CHECK VALVES

i. Valve vault/manifold shall be equipped with check valves as indicated in the drawings.

ii. Check valves shall be external lever, non-slam, swing check, flanged, weight mounts either side, as manufactured by Mueller or American. Pressure rating shall be 150 psi minimum.

iii. Check valves shall be rated for raw sewage applications with epoxy coated interior and exterior and 316 stainless steel nuts and bolts.

iv. Check valves cover shall have ¼" port to accept pressure gauge assembly as indicated in the plans.

b. BALL VALVES

i. Valve vault/manifold shall be equipped with 316 stainless steel low torque, full port ball valves as indicated in the drawings.

ii. Ball valves shall be flanged, with 316 stainless steel operating handle and hardware, as manufactured by American. Pressure rating shall be 150 psi minimum.

c. PRESSURE GAUGE

i. Valve vault/manifold shall be equipped with tapped connection on the check valve with pressure gauge, diaphragm, necessary pipe nipples and shut-off valve. All materials including diaphragm shall be 316 stainless steel.

ii. Gauges shall be liquid filled, back mount and have minimum 3 ½ inch dial, with stainless steel casing. The psi range must be from (0) zero to a value greater than design pump shutoff but no more 1 ½ times the maximum pressure the pump provides at dead head.

d. EMERGENCY PUMP CONNECTION

i. Valve vault/manifold shall be equipped with emergency pump connection as indicated in the drawings.

ii. Emergency pump connections shall include a 316 stainless steel ball valve and quick connect camlock fitting. The 316 stainless steel camlock fittings must be provide with dust covers that have been tapped with a ¼" 316 stainless steel ball valve.

e. SPOOLS AND FITTINGS

i. A minimum 12” spool piece shall be installed between all ball valves and check valves.

ii. The spool piece shall have a flanged or plain end to accept the associated connection of the adjacent valves, accessories and fittings as indicated in the drawings.

f. PIPE SUPPORTS

i. Valve vaults/manifold assemblies shall have pipe supports spaced at a maximum distance of 1 foot for each inch in pipe diameter. (Example: 6” dia. pipe = 6’ spacing max.)

ii. Pipe supports shall be Cooper B Series B3094 flange type with a Cooper B-line B3088 base stand and B3089 pipe support adjuster or approved equal.

g. DOORS, FRAME & COVER

i. The valve vault/manifold shall be equipped with powder coated “forest green” access hatch frame and cover. The hatch shall be constructed to maximize open access to all appurtenances within the vault.

ii. Access frame and cover must be double-door, aluminum with odor-control O-ring gasket by USF.

iii. Door leaves shall be diamond plate of a min. ¼” thick and designed to handle 300 psf loading.

iv. Hinges shall be heavy-duty 316 stainless steel with tamper-proof fasteners.

v. Doors should open to 90 degrees and lock in that position by a 316 stainless steel automatic hold-open locking arm and release handle.

vi. Doors must be capable of being locked by the required Master Lock Model No. M5KASTS with shackle diameter of 3/8”. Lock must be included and keyed to match Jackson County’s master key.

vii. Doors must have 316 stainless steel flush, drop handle in each door.

h. All hardware shall be 316 stainless steel.

2.8 LEVEL CONTROL SYSTEM:

1. Functional Description. Float switches shall be supplied to control wet well level and alarm signal. A quantity of three floats shall be provided to control the liquid level in duplex

pump stations. One additional float switch shall be provided for a high water level alarm. The floats shall be mounted on the previously specified float mounting assembly.

a. The level control system shall be the float type, mounted in the wet well utilizing the float mounting assembly. Rising and falling liquid level in the wet well shall cause switches within the floats to open and close, providing start and stop signals for the level control components.

b. Sequence of Operation. The level control system shall start the motor for one pump when the liquid level in the wet well rises to the "lead pump start level". When the liquid is lowered to the "pump stop level", the system shall stop this pump. These actions shall constitute one pumping cycle. Should the wet well level rise to the "lag pump start level", the system shall start the second pump so that both pumps are operating to pump down the well. Both pumps shall stop at the same "stop" level.

c. Automatic Pump Alternation. The level control system shall utilize the alternator relay to select first one pump, then the second pump, to run as lead pump for a pumping cycle. Alternation shall occur at the end of a pumping cycle.

2. FLOAT SWITCHES

a. Four float switch assemblies shall be supplied for installation by the Contractor.

b. Cable shall be continuous with no splices from the float switch to the control cabinet.

c. All float switches shall be rated for explosion proof atmospheres and terminated into intrinsically safe relays, barriers as required or functionally equivalent to meet specifications.

d. All float switches and relays must have a ten (10) year warranty.

3. HIGH WATER ALARM WITH ALARM SILENCE

a. Pump station manufacturer shall furnish a float switch assembly, intrinsically safe relay, for high water alarm function. Should the wet well level rise to the high water alarm level, the float switch assembly and intrinsically safe relay shall energize the signal relay. The signal relay shall complete a 115-volt AC circuit for external alarm devices. The signal relay shall maintain the alarm signal until the wet well level has been lowered and the circuit has been manually reset.

b. An alarm silence switch and relay shall be provided to permit maintenance personnel to de-energize the external alarm device while corrective actions are underway. After silencing the alarm device, manual reset of the signal relay shall provide automatic reset of the alarm silence relay.

2.9 MIXER:

1. It is the intent that one mixer and mixer mast shall be supplied for installation into each fiberglass wet well structure.

2. The mixer shall have a Maximum Propeller Rotating Speed 1750 RPM with Stainless Steel, ASTM A276 Type 316 Titanium stabilizer propeller and motor shaft. Motor housing shall be Cast Iron, ASTM A48, Class 40B with 316 stainless steel hardware. The mixer shall be explosion proof and have both temperature protection and leak detection capabilities.

3. A 316 stainless steel lifting chain must be provided per manufacturer recommendations or minimum 3/16".

4. The contractor to provide a permanently installed guide mast assembly which allows for mixer installation, operation and retrieval without the need to enter the basin. The mast assembly shall allow for adjustment of mixer's vertical location. The mast shall be 2" square tube supplied with factory welded sockets at the top, bottom and intermediate levels as needed to provide support at a maximum of 10 ft intervals. Sockets shall insure easy mast rotation, and shall work in conjunction with supplied mounting brackets to secure the unit to the tank wall. The top mast bracket shall include a rotary positioning plate which allows the mast to be secured in a sufficient range of rotation for adjustments; adjustments shall be possible without the need to drain the basin. Wall extension brackets, if required, shall be provided to insure a straight and true installation. The mixer shall be guided along the mast through an integral mounting bracket fastened to the mixer motor end cap. An adjustable mixer stop bracket shall be furnished to support the mixer at manufacturers recommended height.

5. The mixer shall rest on the lower chair assembly which is affixed to the inside portion of each base elbow flange.

6. The mixer manufacturer shall warrant the mixer and motor to the Owner against defects in workmanship and materials for a period of ten (10) years, non-prorated, from date of first beneficial use.

2.10 WET WELL:

1. SUBMITTALS

   a. General - The manufacturer shall supply a complete set of scale drawings detailing dimensions of heights, diameter, elevations to invert, pipe sizes and any other necessary details.

   b. Anti-Flotation (Buoyancy) Calculations - A set of signed and sealed (by a third party State of Florida Professional Engineer) anti-flotation calculations shall be

provided which meet the following criteria:

i. Wet well weight and soil pressure on concrete base collar may be used to calculate down forces, but pump and piping weights shall not be used.
ii. Assume groundwater is at grade.
iii. A factor of safety of 1.2, minimum, must be used.
iv. The design calculations shall include the design conditions as noted on the drawings.

c. Engineering Design Report - Manufacturer shall provide a complete Composite Engineering Design (by a third party State of Florida Professional Engineer) using a Finite Element Analysis for the wet well. The calculations shall include:

i. Design Inputs
ii. Design of Cylindrical Shell
iii. Flat Top Head Design
iv. Bottom Head Design
v. Pump Anchorage on Flat Bottom
vi. Component Weight
vii. Buoyancy Calculations
viii. Lifting Trunnion Design
ix. Access Cover Opening Reinforcement
x. Design Summaries and Sketches
xi. P.E. Stamp for the Design

d. Mounting Plate Calculations - Pumps shall be anchored to a mounting plate. The complete design (by a third party State of Florida Professional Engineer) shall be submitted. Mounting plates are not permitted to be bolted through the bottom of the basin.

2. REFERENCED STANDARDS

a. ASTM D883, Standard Terminology Related to Plastics
b. ASTM D2583, Standard Test Method for Indentation Hardness of Rigid
c. Plastics by Means of a Barcol Impressor.
d. ASTM D3299, Standard Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
e. ASTM D3753, Standard Specification for Glass-Fiber Reinforced Polyester Manholes and Wetwells.
f. ANSI / AWWA D120-09, AWWA Standard for Thermosetting Fiberglass-Reinforced Plastic Tanks

3. MATIERIALS

a. Resin – The resins used shall be commercial grade unsaturated 100% polyester resins. Interior corrosion liner shall be a Vinyl Ester resin.

b. Cure System – Resin promotion and catalyst system used shall follow resin manufacturers' guidelines.

c. Fillers and additives – No fillers or resin extenders of any type shall be utilized. A maximum of two percent by weight of any commercial grade thixotropic agent may be added to resins for the purpose of viscosity control. The resulting reinforced plastic material must meet the requirement of this specification. No sand fillers will be allowed.

d. Reinforcing Materials – Reinforcing material shall be commercial grade "E" type glass fibers in the form of chopped strand mat, chopped roving, woven roving or continuous roving or a combination of the above. Uni-directional glass shall be used only in addition to any glass used. Glass fibers shall be treated with a coupling agent that facilitates bonding between the reinforcement and the resin.

e. Surfacing Materials – If reinforcing materials are used on the surface exposed to the contained substance, it shall be a commercial grade chemical-resistant glass that includes a C-Veil or Nexus liner that will provide a suitable bond with the resin and leaves a resin rich surface.

f. Interior Materials - A minimum of a 10mm interior laminate layer of the tank construction shall include the reinforcing materials, C-Veil or Nexus, and a commercial grade Premium Vinyl Ester resin for added chemical resistance.

4. FABRICATION

a. Exterior Surface – The exterior surface shall be relatively smooth with no sharp projections. Hand-work finish is acceptable if enough resin is present to eliminate fiber show. The exterior surface shall be free of blisters larger than 1/2 inch in diameter, delamination and fiber show.

b. Interior Surface – The interior surface shall be resin rich with no exposed fibers. The surface shall be free of crazing, delamination, blisters larger than 1/2 inch in diameter, and wrinkles of 1/8 inch or greater in depth. Surface pits shall be permitted if they are less than 3/4 inch in diameter and less than 1/16 inch deep.

c. Interior and Exterior of the lift station shall be either white or light gray in color.

d. Defects Not Permitted –
   i. Exposed fibers – Glass fibers not wet out with resin.
   ii. Resin runs: runs of resin and sand on the surface.
   iii. Dry areas: areas with glass not wet out with resin.
   iv. Delamination: separation in the laminate.
   v. Blisters – Light colored areas larger than ½ inch in diameter.
   vi. Crazing: cracks caused by sharp objects.
   vii. Pits or Voids – Air pockets.
   viii. Wrinkles – Smooth irregularities in the surface.

ix. Sharp Projection – Fiber or resin projections necessitating gloves for handling.

e. Installation of Brackets – Manufacturer or Manufacturer-certified field personnel shall glass in all stainless-steel fasteners and brackets, discharge piping brackets, etc. Manufacturer of wet well shall be responsible for integrity of all field glassing.

f. Markings – Each wet well shall have wet well data integrated into fiberglass and affixed inside and top outside walls at or near the top. Data on the inside of the wet well should be legible from the top of the completed lift station installation. Product data shall not be written in ink or paint. Production/serial numbers shall be kept on file by Manufacturer for a minimum of 20 years and shall be accompanied by project data for future reference and recall. Data required includes the following as an example:

i. Manufacturer's Name
ii. ASTM Designation
iii. Production or Serial Number
iv. Production date
v. Wet Well Depth
vi. Wet Well Diameter
vii. Warranty Length

g. Wet Well Top - Wet well top shall be concrete and designed for 300 PSF or H-2O Traffic loading as noted on the drawings. Bottom of top slab and around side of hatch opening shall be fiberglass lined and shall meet all the requirements of this specification. The wet well top flange shall have an outside diameter of at least 3.0 inches greater than the diameter of the wet well.

h. Wet Well Bottom – The bottom of the wet well shall be built to withstand full exterior water column with a maximum deflection 3/8".

i. Wet Well Penetrations – Cutouts/stub-outs must be installed by the manufacturer. If wet well manufacturer plans to field cut the inlets, then manufacturer must provide field crew to assure all connections are constructed correctly and are covered under the same ten (10) year structural warranty. Penetrations of FRP pipe will be performed using resin and reinforced hand lay-up procedures. All resin and fiberglass shall be the same type and grade as used in the manufacturer of the basin.

j. Pipe Installation – Discharge wall penetrations are to have sleeves large enough to accept O.D. of pipe discharge flange. All discharge sleeves shall be sealed via a gas tight-water tight Link Seal system or approved equal. Influent pipe connections shall be made with a Press Seal Boot with stainless steel band or approved equal.

k. Fiberglass wet well and valve box must ship completely assembled and the following items integrated: pipe, fittings, valves, pressure gauges, braces, brackets, guide rail systems, mixer mast system, odor reduction gasket hatch covers, vent pipe, valve box connection.

l. Mixer mast must be integrated into new wet well and must be heavy-duty 2" x 2" square type 316 SST with rubber compression insert upper mast bracket, and lower mixer chair assembly.

5. WARRANTY

a. The fiberglass Manufacturer shall warrant the fiberglass wet well against any defects for at least ten (10) years after the date of acceptance by the Owner. The warranty shall require the Manufacturer to supply all necessary labor, materials, and equipment to repair defects to the satisfaction of the Owner. The Contractor and/or Manufacturer shall not make any exemption or exception to the above stated conditions or warranty. Manufacturer's recommended installation procedures to assure 10-year warranty provided to the Owner to be included in submittal package.

2.11 CONTROL SYSTEM:

1. The Contractor shall furnish and install a Control System including panels, circuitry, emergency power capabilities, starters, relays and other required equipment for a fully functioning lift station.

a. CONTROL PANEL

i. The control panel and all appurtenances must be constructed of 316 stainless steel and completely powder coated "white", both inside and outside.

ii. The panel shall be designed to be pedestal mounted on a concrete pad with and air-break box and removeable/hinged expanded metal panels with stainless steel bug screen backing.

iii. All conduits shall terminate in the air-break box and all associated cables shall enter the bottom of the control panel with properly sized NEMA 4x compression glands to create an air/watertight connection.

iv. The control panel shall be sized properly to facilitate relay logic components, VFD's, telemetry/SCADA, mixer controls, integral metering socket and space for future controller.

v. Separate compartment integral to main panel must have utility metering socket/disconnect to accept power from utility with lightning/surge arrestor.

vi. Panel doors must provide an air/watertight seal when closed. Doors must have pad lockable three-point latches.

vii. Both the main doors and inner door dead front must have hold open latches that are capable of holding the doors in the open position until needed closure upon which will be performed manually.

viii. Black aluminum inner dead front door must have engraved labeling.

ix. The pump push to test run light switches, switches, remote telemetry key pad and remote VFD key pads must be mounted on the inner door dead front door.

x. The panel must have interior lighting sufficient for maintenance work during low light/night conditions.

xi. An additional compartment separate from the main control panel must be provided with a lightning arrestor/transient voltage and surge protector.

xii. An HOA switch must be provided for both pumps and the mixer as well as runtime meters for each.

b. VARIABLE FREQUENCY DRIVES

i. Variable Frequency Drives must be provided for control of the pump flows between phases of the development and electrical phase conversion.

ii. VFD's must be wastewater specific and be cooled via the use of heat sinks through the back of the enclosure. No air conditioning or fresh air inductive cooling systems that allow air in from the exterior of the control panel will be accepted.

iii. VFD's must have integral fuses that will be covered under the same ten (10) year warranty.

iv. VFD'S must have a written ten (10) year onsite warranty coverage for line anomalies – including lightning strikes, load anomalies, accidental exposure to moisture or corrosives, accidental collision or other physical damage, defects in product material or workmanship, normal product wear. The onsite service must be provided by an authorized distributor or local authorized service partner and include replacement drive material, drive repair labor, travel expenses and material freight costs.

c. CONTROLLER

i. The space provided in the panel for future controller must be wired with all dry contacts to accept controller without re-wiring. Full wiring shall be included with dry contacts to accept future SCADA control capabilities. A switch must be provided to enable the operator to select between relay logic or controller as the primary controls of the lift station, each of which must be capable of operating independent of the other but with the same float switches.

d. TELEMETRY/SCADA MONTITORING SYSTEM

i. The telemetry/SCADA monitoring system must be capable of providing both internet and cellular application monitoring.

ii. The monitor system must be able to provide:

1. Pump and mixer runtime reports
2. Number of starts per day for pumps and mixer
3. High level, excessive runtime, seal failure alarms
4. Fuel low level for bypass pump
5. Text, phone, email or combination of all notifications

iii. The monitor system shall have enough memory to backup a minimum of 3 years' worth of information.

iv. The monitor system must have a service plan that is pre-paid for ten (10) years.

v. The monitor system shall have a lifetime warranty that includes but not limited to return merchandise authorization, unit inspection, shipping, incorrect wiring, radio upgrades, software upgrades, setup and priority support and professional training.

e. ODOR SCRUBBER

i. Panel circuitry must be wired to accept an odor scrubber as needed in the future.

ii. Wiring must be to accommodate a minimum 1 hp drum scrubber/blower.

iii. Control circuit must consist of VFD, 24 hour time clock, HOA switch with 20 amp circuit breaker.

f. ELECTRICAL

i. Electrical wiring design and diagram must be provided by the panel integrator and stamped by third party State of Florida Licensed Engineer.

2. Upon completion and integration of the control panel, prior to shipment to the job site, the Owner's representative and Engineer must be invited to the panel facility to witness bench test and functionality of the panel.

2.12 EMERGENCY BACKUP PUMP:

1. The Contractor shall furnish and install an emergency backup/bypass pump to be located on a concrete pad as shown in drawings.

2. The pump shall be "forest green" with lockable, full enclosure.

3. The pump shall include a bolt on axel and trailer tongue to facilitate the owner with capability of towing pump to machine/mechanic shop for repairs.

4. Pump shall come with full tank of fuel and capable of being monitored through telemetry/SCADA system which will also alert Owner of low fuel level.

5. The pump shall be wired to the control panel to have 20 amp circuit for battery charge and other miscellaneous inputs.

6. The bypass/pump must be a Pioneer and sized to meet the same design points for the lift station pumps as mentioned in this specification.

2.12 SPARE/REPLACEMENT PARTS:

1. In addition to the parts required for the full operation of the sewage pump station, the Contractor shall furnish spare/backup parts as listed below:

   a. One complete set of floats and necessary float relays;
   b. Intrinsically safe relay;
   c. Phase monitor;
   d. Telemetry/SCADA unit;
   e. One full box (6) of each fuse type;
   f. One spare pump with guide claw;
   g. One spare mixer with guide claw;
   h. Each part shall be packaged and labeled with part description and in a container with associated lift station name/number as it would be identified by the Owner;
   i. Of which, shall be included with the bill of materials list from panel integrator

PART 3 – EXECUTION

3.1 INSPECTION AND TESTING :

1. Operating personnel shall be trained in operation and maintenance of equipment at start up. Instruction shall be given in operation, service, adjustments, and routine

maintenance. Recommended spare part lists and maintenance schedules shall be provided.

2. Field tests shall not be conducted until such time that the entire installation is complete and ready for testing.

3. The manufacturer shall furnish the services of a factory representative who shall have complete knowledge of proper operation and maintenance to inspect the final installation and supervise the initial start-up of the equipment. The manufacturer's representative shall be available for a minimum of eight (8) hours for each pumping station.

4. Upon completion of installation, the Contractor, in the presence of the Engineer(s), the maintenance entity representative and a qualified manufacturer's representative, shall perform a preliminary test on the system to insure the functioning of all component parts to the satisfaction of the Engineer(s).

5. Approval of the preliminary test by the Engineer shall not constitute final acceptance of the equipment furnished.

6. After the system is in full operation, a full operating test shall be performed in the presence of the Engineer, maintenance entity representative and a qualified manufacturer's representative. The Contractor shall furnish all labor, materials and equipment required for such test and shall correct any deficiencies noted, by repairing or replacing the defective component, and retesting as required until the equipment meets the satisfaction of the Engineer. A minimum of one complete 8-hour day shall be furnished to satisfy the full load operating test requirements.

7. When inspection meetings are required by these specifications between the contractor and engineer, the contractor is allowed one initial meeting and one follow-up meeting. Any additional meetings to inspect or test items that were not completed and part of "punch list" items that were to be addressed by the contractor, shall be at a cost of $500 per meeting to be deducted from the contractor's final payment.

8. If the equipment does not meet the final test, the Contractor shall, at his own expense, make such arrangements and adjustments in the equipment which is deemed necessary and shall conduct further tests until full satisfaction is indicated by the Owner and Engineer. The final test shall demonstrate that all items of these Specifications have been met as installed. These items shall include, but not be limited to, the following tests:

    a. that all units have been properly installed and are in correct alignment;

    b. that the pumps can be easily raised and lowered on the guide rail system throughout the full length, and that connections to the discharge elbow function properly;

    c. that the units operate without overheating or overloading any parts and without objectionable vibration;

d. that there are no apparent mechanical defects in any of the parts; and

e. that the pump sensors and controls perform satisfactorily with correct start, ramping, and stop elevations and proper level alarm functions.

If the pump performance fails to meet the Specifications, corrective measures shall be taken or pumps shall be removed and replaced with pumps which satisfy the conditions specified.

PART 4 – BASIS OF PAYMENT

4.1 PAYMENT:

No separate payment will be made for work under this section of the specifications, except as set forth in the Bid Schedule. The cost of such work and all costs incidental thereto shall be included in the price bid for the item to which the work pertains.

SECTION 02620

HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This section includes material and installation requirements necessary for furnishing and installing high-density polyethylene (HDPE) pipe, fittings, and specials in the locations and quantities as shown on the drawings.

B. Quantities shown on the plans may not be the exact length needed for trenchless installations.

C. The CONTRACTOR shall investigate this before the Bid and shall inform the ENGINEER prior to the Bid if additional HDPE pipe will be needed.

D. The CONTRACTOR will be responsible for any additional HDPE pipe needed after the Bid and additional costs incurred for the pipe shall not be required from the OWNER.

1.02 QUALITY CRITERIA

A. Reference to industry standards as contained herein shall be construed as to be in reference to the latest revision or edition. All HDPE pipe shall meet all American Water Works Association (AWWA) Standards.

B. The pipe fittings and specials shall be made by a Manufacturer experienced in producing pipe, fittings, and specials of the type, size, configuration, and quality specified herein. The manufacturer shall have produced pipe, fittings and specials having a record of at least 5 years successful performance.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit Shop Drawings showing the pipe lengths, design details, joint details, specials, etc., for the ENGINEER's approval. Pipe shall be fabricated in accordance with these plans.

B. The CONTRACTOR shall submit a notarized statement of certification from the pipe Manufacturer as to conformance with the specified American National Standards Institute (ANSI)/AWWA Specifications listed herein, and modifications thereto, at the time of submitting Shop Drawing data on the pipe and fittings.

1.04 DELIVERY, STORAGE AND HANDLING

A. The CONTRACTOR shall be responsible for the acceptability of all material furnished by him/her and shall assume responsibility for the replacement of all such material found damaged in shipping or defective in manufacture. This shall include furnishing all material and labor required for the replacement of installed material discovered to be defective prior to the final acceptance of the Work.

B. The CONTRACTOR shall keep the interior and all sealing surfaces of all pipe, fittings, and other accessories free from dirt and foreign matter. Consult the Manufacturer for specific storage recommendations.

C. The CONTRACTOR shall properly handle materials at all times to prevent damage in accordance with Manufacturer's recommendations. Pipe and fittings shall not be thrown, dropped, or dragged.

PART 2 - PRODUCTS

2.01 HDPE PIPE

A. The HDPE pipe shall be manufactured in accordance with American Society for Testing and Materials (ASTM) F714. All HDPE pipe used for force mains shall have an embedded green stripe on each side symbolizing wastewater and all HDPE pipe used for water mains shall have an embedded blue stripe on each side symbolizing water.

B. The HDPE pipe shall be rated for use with water at 73.4 degrees Fahrenheit (F) at a hydrostatic design stress of 800 psi and a minimum working pressure of 160 psi.

C. Dimension Ratio (DR) shall be DR11 for the HDPE pipe shown on the drawings. All HDPE pipe shall be ductile iron pipe size (DIPS).

D. Polyethylene extrusion compound from which the HDPE pipe is extruded shall comply with application requirements for PE-3408 high molecular weight polyethylene plastic material. Material shall be as described in ASTM D1248 and shall comply with the following:

1. Pipe resin shall have a minimum inherent viscosity of 2.5 when run according to ASTM D1601.

2. Exceed 5,000 hours on ESC as determined by ASTM D-1248-345434C.

3. Have a specific gravity of between 0.9141 and 0.955.

4. Contain a minimum of 2% and a maximum of 3% of carbon black and shall produce a finish product that is uniformly black.

E. Marking on the HDPE pipe shall include:

1. The nominal pipe or tubing size.

2. The type of plastic material (i.e., PE-3408).

3. The standard thermoplastic pipe dimension ratio or the pressure rating in psi for water at 73.4°F. (160 psi).

4. The ASTM designation with which the pipe complies.

5. The Manufacturer's name or trade mark and code.

2.02 FITTINGS AND JOINTS

A. Fittings shall be fabricated to the same standards as the pipe from the same raw materials by thermal fusion.

B. Jointing shall be by the thermal butt fusion method as recommended by the Manufacturer.

C. Fittings and joints shall have a pressure rating equal to the pipe and shall have machined fusion ends matched to pipe wall.

D. The CONTRACTOR shall use mechanical joint fusion welded adapters with ductile iron mechanical joint sleeves for transition connections as shown on the plans.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. The CONTRACTOR shall install of all HDPE pipe, fittings, specials, and appurtenances in accordance with the Manufacturer's instructions.

B. The CONTRACTOR shall securely close openings such as stubs, tees and other services along the lines with an approved stopper that fits into the pipe and is recommended by the pipe Manufacturer. This stopper shall be jointed in such a manner that it may be removed at some future time without injury to the pipe itself.

C. The CONTRACTOR shall temporarily close the end of the pipe with a close-fitting stopper at the close of each day's work and at other times when the pipe is not being laid.

D. Cleaning:

1. All necessary precautions shall be taken to prevent the entrance of mud, sand or other obstructing material into the pipelines.

2. As the work progresses, the interior of the main shall be cleaned of all dirt, jointing material, and superfluous materials of every description.

E. Experienced fusion technicians with a minimum of 5 years or more experience in field application involving large diameter (over 12 inches) HDPE pipe shall join piping. Experience record shall be submitted for review 15 days prior to trenchless installation activities.

F. If the CONTRACTOR feels that the length of HDPE pipe shown on the plans is not adequate, then the CONTRACTOR shall notify the ENGINEER prior to the Bid. The CONTRACTOR shall not ask for additional trenchless installation cost after the Bid.

G. Handling:

1. Pipe must be handled in a way to ensure that it is not gouged or scratched to a depth of more than 10% of the wall thickness.

2. Pipe shall not be bent to a radius of less than the Manufacturer's recommendation at any time during installation.

3. Pipe shall be handled at all times with strapping that a combined width at each load area of at least half the pipe diameter to prevent point damage to the pipe. No wire rope slings shall be used.

PART 4 – TESTING

4.01 TESTING IN THE TRENCH

A. The CONTRACTOR shall fill the pipeline with water after it has been laid; bleed off any trapped air.

B. The CONTRACTOR shall subject the lowest element in the system to a test pressure that is 1.5 times the design pressure and check for any leakage.

C. The CONTRACTOR shall apply the pressure test after backfilling has been completed but not sooner than a time which will allow sufficient curing of any concrete that may have been used, when in the opinion of the ENGINEER, local conditions require that the trenches be backfilled immediately after the pipe has been laid. Typical minimum concrete curing times are 36 hours for early strengths and 7 days for normal strengths.

1. The test procedures consist of two steps: the initial expansion and the test phase.

2. When test pressure is applied to a water-filled pipe, the pipe expands. During the initial expansion of the pipe under test sufficient make-up water must be added to the system at hourly intervals for 3 hours to maintain the test pressure.

3. After about 4 hours, initial expansion should be complete and the actual test can start.

4. When the test is to begin, the pipe is full of water and is subjected to a constant test pressure of 1.5 times the system design pressure.

5. The test phase should not exceed 3 hours, after which time any water deficiency must be replaced and measured. Add and measure the amount of make-up water required to return to the test pressure and compare this to the maximum allowance in Figure 4.1.

6. An alternate leakage test consists of maintaining the test pressure (described above) over a period of 4 hours, and then dropping the pressure by 10 psi (0.069 Mpa). If the pressure that remains is within 5% of the target value for 1 hour, then that is an indication that there is no leakage in the system.

NOTE: Under no circumstances shall the total time under test exceed 8 hours at 1 ½ times the system pressure rating. If the test is not complete within this time limit (due to leakage, equipment failure, etc.), the test section shall be permitted to "relax" for 8 hours prior to the next test sequence. Air testing is not recommended. Additional safety precautions may be required.

FIGURE 4.1
ALLOWANCE FOR EXPANSION UNDER TEST PRESSURE

Nominal Pipe Size Inches (1)	U.S. Gals/100 feet of Pipe (2)			Nominal Pipe Size Inches (1)	U.S. Gals/100 feet of Pipe (2)		
	1-Hour	2-Hour	3-Hour		1-Hour	2-Hour	3-Hour
2	0.08	0.12	0.15	20	2.80	5.50	8.00
3	0.10	0.15	0.25	22	3.50	7.00	10.50
4	0.13	0.25	0.40	24	4.50	8.90	13.30
5	0.21	0.41	0.63	28	5.50	11.10	16.80
6	0.30	0.60	0.90	30	6.20	12.60	19.10
8	0.50	1.00	1.50	32	7.00	14.30	21.50
10	0.75	1.30	2.10	36	9.00	18.00	27.00
12	1.10	2.30	3.40	42	12.00	24.00	36.00
14	1.40	2.80	4.20	48	15.00	27.00	43.00
16	1.70	3.30	5.00	54	18.00	30.00	50.00
18	2.20	4.30	6.50				

(1) mm* 0.03937
(2) multiply by 11.53 to convert to liter/100 meters of pipe

END OF SECTION

SECTION 02625

PIPE AND FITTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of pipes and pipe fittings required by this section is indicated on Drawings and/or specified in other sections.

B. Types of pipes and pipe fittings specified in this section include the following:

1. Ductile-Iron Pressure Pipes (Pressure Pipe).

2. Plastic Pipes (Pressure Pipes).

3. Miscellaneous Piping Materials/Products.

C. Pipes and pipe fittings furnished as part of factory-fabricated equipment, are specified as part of equipment assembly in other sections.

1.3 QUALITY ASSURANCE:

A. Manufacturer's Qualifications:

1. Firms regularly engaged in manufacture of pipes and pipe fittings of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Codes and Standards:

1. Welding:

a) Qualify welding procedures, welders, and operators shall be in accordance with American Society of Mechanical Engineers (ASME) B31.1, or ASME B31.9, as applicable, for shop and project site welding of piping work.

2. Brazing:

a) Certify brazing procedures, brazers, and operators shall be in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and job-site brazing of piping work.

3. NSF Labels:

a) Where plastic piping is indicated to transport potable water, provide pipes and pipe fittings bearing approval label by National Sanitation Foundation (NSF).

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Protect all material from weather damage by using covered storage. Use caps to prevent dirt and construction debris from accumulating inside the pipe and pipe fittings. When plastic piping is specified, store pipe to prevent direct exposure to sunlight and to prevent sagging or bending. Pipe should be raised above the ground surface.

B. Follow Manufacturer's recommendations.

1.5 SUBMITTALS

A. Submit welder's qualifications, including history, size and footage.

B. Submit schedule of pipe, pipe fittings, and anchorage components showing manufacturer and catalog number.

C. Submittals shall be in accordance with Section 01340.

PART 2 - PRODUCTS

2.1 GENERAL

A. Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or class) as indicated in the drawings (or attached schedule) and meeting the requirements of these specifications. Where type, grade or class is not indicated, provide proper selection as determined by installer for installation requirements, and comply with governing regulations and industry standards.

B. Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

C. All above ground piping shall be flanged and coated in accordance with these specifications.

D. All piping shall be manufactured no more than six (6) months prior to delivery to the project site. Date of manufacturing shall be clearly indicated on piping materials.

E. All pipe shall be color coded according to the table below in accordance with one of the two approved methods as follow:

1. Pipe that is color pigmented.

2. Three stripes ½" high, equally spaced around circumference of the pipe with permanent ink running the entire length. The designation listed in the table below shall be placed on the stripe in ¾" letters every 21 inches along the pipe length:

	COLOR	**DESIGNATION**
Sewer Force Main	Green	FORCE MAIN
Sewer Gravity Main	Green	GRAVITY SEWER
Potable Water Main	Blue	POTABLE WATER
Chlorine Gas & Solution	Yellow	CHLORINE

2.2 DUCTILE-IRON PRESSURE PIPES AND PIPE FITTINGS

A. Ductile-Iron Pipe:

1. American National Standards Institute (ANSI) A21.51.

2. American Water Works Association (AWWA) C151.

B. Ductile-Iron Fittings:

1. AWWA C153.

C. Rubber-Gasket Joints:

1. AWWA C111.

D. Ductile iron pressure pipe shall be American, U.S. Pipe, McWane or ENGINEER-approved equal.

E. Ductile iron pressure fittings shall be American, U.S. Pipe, McWane or ENGINEER-approved equal.

F. This item left blank intentionally.

G. Where ductile iron pipe and fittings are to be below ground or installed in a casing pipe, the coating shall be a minimum 1.0 mil thick in accordance with ANSI/AWWA A21.51.

H. Where ductile iron pipe and fittings are to be installed aboveground, pipe, fittings and valves shall be thoroughly cleaned and given one field coat (minimum 1.5 mils dry thickness) of rust inhibitor primer.

I. The intermediate and field coats of Alkyd shall also be applied by the CONTRACTOR (minimum 1.5 mil dry thickness each coat).

J. Primer and field coats shall be compatible and shall be applied in accordance with the Manufacturer's recommendations. Final field coat shall be blue and shall match all existing blue paint.

K. For ductile iron pipe, sizes:

1. 4 to 12 inches shall be Class 350.

2. 16 to 20 inches shall be Class 250.

3. 24 inches and above shall be Class 200.

L. All ductile iron pipe and fittings shall have an interior protective lining of cement-mortar with a seal coat of asphaltic material in accordance with ANSI/AWWA A21.4/C104. All ductile iron pipe shall meet AWWA requirements.

2.3 PLASTIC PIPES AND PIPE FITTINGS

A. Use Polyvinyl Chloride Pipe (PVC) AWWA C900 (latest revision) for potable water mains, sizes 4 to 12 inches. All C900 PVC pipe shall be DR 18 unless specified otherwise.

1. All PVC pipe larger than 12 inches shall be AWWA C905 DR 18.

2. Pipe shall be blue for potable water.

3. All PVC pipe shall meet AWWA requirements.

B. Use pressure-rated PVC conforming to American Society of Testing and Materials (ASTM) D-2241 for potable water mains 3 inches and less.

1. All pipe shall be SDR-21, 200 pounds per square inch (psi), unless specified otherwise.

2. The pipe color shall be blue.

C. Use Flexible Polyethylene Pipe (PE) PE4710 SDR 9 (200psi) CTS for all 2 inches and smaller potable water service tubing.

1. All HDPE water service tubing shall meet the requirements of:

a. AWWA 901.

b. ASTM D 3350.

c. ASTM D 2737.

D. Pressure-Pipe Fittings 3 inches and Larger:

1. Use mechanical joint, ductile iron Class 350, compact fittings manufactured in accordance with ANSI/AWWA C153/A21.53-84, as manufactured by U.S. Pipe, Clow or ENGINEER-approved equal.

E. PVC Pipe Fittings 2 inches and Less:

1. Use solvent weld push on type SCH 80 PVC.

2.4 PE PIPE AND FITTINGS

A. Polyethylene Pipe shall be in conformance with:
Section 02620 – High Density Polyethylene Pipe and Fittings

2.5 MISCELLANEOUS PIPING MATERIALS/PRODUCTS

A. Welding Materials:

1. Except as otherwise indicated, provide welding materials as determined by Installer to comply with installation requirements.

2. Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials.

B. Soldering Materials:

1. Except as otherwise indicated, provide soldering materials as determined by Installer to comply with Installation requirements.

C. Gaskets for Flanged Joints:

1. ANSI B16-21, full-faced for cast-iron flanges, raised-face for steel flanges, unless otherwise indicated.

2.6 TAPPING SLEEVES AND VALVES

A. All tapping valves will be resilient wedge type and designed for the use of tapping equipment. All tapping Valves will have an alignment ring to prevent misalignment with tapping sleeves. Tapping valves will close clockwise (right), open counter clockwise (left), and be equipped with a non-rising stem and standard 2-inch square-operating nut. The tapping valve will be mechanical joint (MJ) with the manufacturer's gaskets. Tapping valves will meet or exceed all the requirements for resilient wedge gate valves above.

B. All tapping sleeves for use on water mains 12-inch or less in diameter shall be constructed of type 304 stainless steel. The branch of the tapping sleeve may be either extruded or welded to the tapping sleeve. All welds on the sleeve shall be fully passive to restore stainless steel characteristics. The flange shall be stainless steel with a recess to accept standard tapping valves. The flange shall conform to AWWA C207 Class D-ANSI 150-lb drilling. Bolt holes shall be aligned such that they straddle the pipe centerline. The sleeve will be equipped with a ¾ inch stainless steel plug with a standard square head for hydrostatic testing. The gasket shall be of a 360-degree design and manufactured of gridded virgin GPR compounded for water service and complying with ASTM requirements. A 304 or 316 stainless steel armor shall be vulcanized to the gasket to bridge the gap between the securing lugs. All bolts and nuts shall be 304 or 316 stainless steel with 5/8-inch National Coarse (NC) threads. The lifter bar shall be of adequate design to provide a heavy bearing surface for all nuts. Nlyatron GS washers shall be provided for lubrication. Approved tapping sleeves are Ford Fast (DOT) Model, JCM Model 432, Romac Model SST, or Mueller Model H304.

C. Sleeves for use on pipe 14-inch in diameter and larger will be ductile iron mechanical joint type. Approved types are Mueller H-615, American Series 2800, or U.S. Pipe T-9.

2.7 POTABLE WATER SERVICES

All brass or bronze components shall be designed and manufactured in accordance with AWWA C800. Metal surfaces in contact with potable water shall be 'lead free" and conform to the UNS C89933, according to the latest revision of the Reduction of Lead in Drinking Water Act, 2011.

A. Service Taps and Saddles

1. 1-Inch Water Service Taps

2. For water service taps on DI and CI pipe, direct taps shall be allowed. Taps shall be made to receive a male AWWA Tapered (CC) thread pattern corporation stop.

3. For water service taps on PVC and AC, a service saddle with a single 2-inch wide
stainless steel band or strap shall be furnished. The saddle shall be of ductile

iron and with an epoxy, nylon, or PE coating (10 mils minimum) and have a female AWWA Taped (CC) thread pattern. Approved styles are Ford FC101, Romac 101N, Smith-Blair #315, JCM #405, or Cascade Model CNS1. No substitutes will be allowed.

4. For water service taps on HDPE pipe, an electro-fusion tapping tee (EFTT) shall be used. EFTT's shall have brass cutting teeth and CTS butt outlets and shall be NSF approved for potable water use, tested in accordance with AWWA C906, and approved for use on PE3408/PE4710 HDPE pipe. Approved styles include EFTT's as manufactured by Georg Fischer Central Plastics, or approved equal.

B. 1-1/2 and 2-Inch Water Service Taps

1. For all 1½-inch and 2-inch water service taps, a more stable saddle is required. Saddles for these taps shall have multiple stainless steel straps for a minimum combined strap width of 3¼-inches. The saddle body shall be ductile iron and with an epoxy, nylon, or PE coating (10 mils minimum). Approved styles are Ford FC202, Romac 202N, Smith-Blair #317, JCM #406, and Cascade Model CNS2. No substitutes will be allowed.

C. Services Valves

1. Inlet and outlet connections for service valves shall be as shown in Table 8.1.

Table 8.1 – Water Service Valves Connection Requirements

Service Size (inches)	Corporation Stop		Curb Stop	
	Inlet	Outlet	Inlet	Outlet
1	AWWA Taper / CC	CTS	CTS	FPT
1.5	FPT	FPT	CTS	FPT
2	FPT	FPT	CTS	FPT

A. Corporation Stops

1. Except for HDPE water mains, all water service taps shall be made using a brass or bronze quarter-turn ball-type valve at the connection to the main.

2. For 1-inch services, approved products include Ford FB1000-4, A.Y. McDonald #74701B-22, and Mueller 300™ P-25008N. No substitutions are allowed.

3. For 1½-inch or 2-inch services, with the valve shall be provided with a 2-inch square operating nut and installed with a valve box. Approved valves include Ford #B11-XXX, A.Y. McDonald #76101, and Mueller B-20200. No substitutes are allowed.

4. For services on HDPE water mains, the corporation stop shall be an integrated valve contained within the electro-fusion tapping tee.

B. Curb Stops

1. Curb stops for all water service taps shall be made using a brass or bronze quarter-turn ball-type valve at the terminal end of the water service prior to the meter setting. All brass or bronze components shall be designed and manufactured in accordance with AWWA C800. Metal surfaces in contact with potable water shall be "lead free" and conform to UNS C89833, according to the latest revision of the Reduction of Lead in Drinking Water Act, 2011.

2. Approved products include Ford B41-XXX-W, A.Y. McDonald #76102-22-W, and Mueller 300™ P-25170N. No substitutions are allowed.

3. Inlet and outlet connections shall be as shown in Table 8.1.

2.8 THRUST RESTRAINTS

A. Restraining gaskets and/or mechanical thrust restraints shall be used to provide resistance to thrust forces generated in pressurized pipelines at all valves, bends, tees, reducers, and caps or plugs. The length of restrained pipe on each side of the valve and/or fitting shall be sufficient to provide adequate resisting force to prevent separation of the pipe joints and fittings.

B. The minimum number of restrained joints required for resisting thrust forces shall be determined by the pipe size, material, type of valve or fitting, operating conditions, pipe trench, and soil type. Minimum restrained lengths for many typical applications are provided in the Construction Details, which have been calculated for various pipe material and fittings based on the following minimum design parameters:

Soil Designation: Good Sand (Unified Soil Classification: Type SM)
Safety Factor: 1.5
Trench Type: Type 2
Depth of Bury: 3 Feet
Test Pressure: 150 PSI

C. Any variations from the minimum restrained lengths provided in the Construction Details and the design parameters above shall be requested in writing by an active Florida Licensed Professional Engineer, in good standing with Florida Board of Professional Engineers. Such requests shall include suggested changes to design parameters, supporting documentation, and new restrained length calculations, signed and sealed by the Professional Engineer.

D. Where concrete thrust blocks are required in addition to, or in lieu of, restraining gaskets and/or mechanical restraints, then the thrust blocks shall be sized and installed in accordance with these specifications and the Standard Construction Details. Concrete thrust blocks shall have a load bearing area sufficient to resist the thrust forces at all valves and pipe fittings. Thrust forces shall be calculated using the same design criteria as for restrained lengths above.

E. Concrete shall be placed against undisturbed material, and shall not cover joints, bolts or nuts, or interfere with the removal of any joint. Joints shall be protected by felt roofing paper or plastic sheeting prior to placing concrete thrust block. Wooden side forms shall be provided to achieve the required shape for concrete thrust blocks.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All excavation and backfilling for underground piping shall be done in accordance with the applicable sections of these specifications.

B. All pipe, fittings, and valves shall be carefully handled at all times to prevent damage to the pipe or other installations on the job site.

C. All piping and appurtenances shall be laid in a clean, dry trench. Contractor shall make provisions for the removal of groundwater or surface runoff from the trench in accordance with these specifications.

D. Ductile-iron water mains and appurtenances shall be installed in accordance with AWWA C 600.

E. PVC pressure pipe shall be installed in accordance with AWWA C605.

F. All joints shall be wiped free of all dirt, sand and foreign material, and the pipe shall be carefully examined for defects before installation.

G. At times when pipe installation is not in progress, the open ends of the pipe shall be closed by approved means and shall remain closed until construction on that particular section is resumed, eliminating the possibility of any flow obstructions getting into the pipe.

H. Pipes and pipe fittings shall be installed in accordance with recognized industry practices which will achieve permanently leak-proof piping systems, capable of performing each indicated service without piping failure.

I. Each run shall be installed with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment.

J. Sizes (where indicated) shall be reduced by use of reducing fittings.

K. Piping shall be accurately aligned at connections, within a 1/16-inch misalignment tolerance.

L. Deviations from the piping location line and grade indicated on the construction plans shall not be made without the prior approval of the Engineer.

M. If mechanical fittings (which are designed for, or tested and found acceptable for use with polyethylene pipe) are utilized for transitions between pipe materials, repairs, joining pipe sections, saddle connections or at other locations, the recommendation of the mechanical fitting manufacturer must be followed. These procedures may differ from other pipe materials. Stiffeners shall be used if mechanical couplings are used.

3.2 INSTALLATION OF COPPER LOCATION WIRE AND DETECTABLE WARNING TAPE

A. All non-metallic water lines and sewer force mains (including service lines) shall be installed with underground 12-gauge insulated traceable copper wire, and underground locator marking tape.

B. The insulated copper wire shall be buried along with the water main and shall be a continuous strand attached to all fire hydrants and valves.

C. The detectable locator tape is not required over service lines.

1. Locator tape shall be installed a minimum of 12 inches below ground surface or pavement directly over the pipeline.

2. Detectable locator tape shall continuously run and where splicing is required, shall be over-lapped a minimum of 12 inches.

3. The locator tape shall be of an inert polyethylene material having a minimum thickness of 0.1 mm and shall be color-coded “Safety Green” as adopted by the American Public Works Association (APWA) and the Florida Utilities Coordination Committee.

4. Following placement of the detectable locator tape and traceable wire, the trench shall be backfilled with due caution to prevent displacement or damage to either.

5. After insulation and backfill has been completed, the CONTRACTOR shall perform a detection test in the ENGINEER’s presence using a commercially available pipe detector furnished by the CONTRACTOR.

6. Any undetectable tape or wire shall be replaced by the CONTRACTOR to the satisfaction of the ENGINEER at no additional expense to the OWNER.

3.3 PVC FITTINGS

A. PVC fittings will not be used on pressure pipe larger than 3 inches in diameter.

B. PVC pipe fittings shall be solvent weld push on SCH 80 PVC.

3.4 PIPING SYSTEM JOINTS

A. General:

1. Provide joints of type indicated in each piping system.

2. Weld pipe joints of steel water pipe in accordance with AWWA C 206.

B. Flanged Joints:

1. Match flanges within piping system and at connections with valves and equipment.

2. Clean flange faces and install gaskets.

3. Tighten bolts to provide uniform compression of gaskets.

C. Plastic Pipe/Tube Joints:

1. Comply with Manufacturer's instructions and recommendations.

2. Comply with applicable industry standards.

D. Heat Joining of Thermoplastic Pipe:

1. Comply with ASTM D 2657.

3.5 ANCHORAGE OF BENDS, TEES, AND PLUGS

A. Thrust blocks shall not be used on this project.

B. Mega lug, restrained joint connections shall be used on all fittings.

3.6 CLEANING/DISINFECTION, FLUSHING, AND INSPECTING

A. General:

1. Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings (if any).

2. Flush out piping systems with clean water before proceeding with required tests.

3. Inspect each run of each system for completion of joints, supports, and accessory items.

4. Flush pipe to achieve a velocity of 2.5 feet per second for a period to flush 1.5 times the volume of pipe installed.

5. Submit a flushing schedule 2 weeks prior to flushing.

B. The CONTRACTOR shall inspect pressure piping in accordance with procedures of ASME B 31.

C. The CONTRACTOR shall disinfect water mains and water service piping in accordance with AWWA C 651.

D. The CONTRACTOR shall submit a plan 2 weeks prior to disinfection.

E. The frequency and location of bacteriological testing shall be two consecutive days and every 1,200 feet of pipe.

F. The CONTRACTOR will be required to make a 1-inch tap every 1,200 feet and abandon the tap at the corporation stop after testing has been successfully completed.

G. The ENGINEER must be present when samples are taken.

H. The ENGINEER will deliver the samples to the CONTRACTORs testing laboratory.

I. The CONTRACTOR is responsible for testing costs.

J. The CONTRACTOR shall submit passing bacteriological test results to the ENGINEER within 7 business days prior to the final date of substantial completion to allow for the Florida Department of Environmental Protection (FDEP) certification process.

3.7 HYDROSTATIC TESTING

A. General:

1. Provide temporary equipment for testing, including pump and gauges.

2. Test piping system before insulation is installed, wherever feasible, and remove control devices before testing.

3. Test each natural section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating.

4. Fill each section with water and pressurize for indicated pressure and time.

B. Hydrostatic testing of PVC pipe shall be in accordance with AWWA C-605-7.3. The CONTRACTOR shall submit a testing plan 2 weeks prior to any testing. The test pressure shall be 150 psi.

C. Should any test of combined sections of pipe disclose leakage greater than the specified limit, the CONTRACTOR shall, at his own expense, locate and repair the defective joints until the leakage is within the specified allowance.

D. Pipe may be subjected to hydrostatic pressure, inspected and tested for leakage at any convenient time after partial completion of backfill.

E. The CONTRACTOR may test the system with joints exposed or backfilling complete at his option.

F. The ENGINEER shall be notified at least 48 hours before beginning testing, no exceptions.

G. Drain test water from piping systems after testing and repair work has been completed.

END OF SECTION

SECTION 02630

VALVES AND ACCESSORIES

PART 1 - GENERAL

1.1 SCOPE OF WORK

The CONTRACTOR shall furnish all labor, materials, equipment and incidentals required and install complete and ready for operation and test all buried and non-buried valves as shown on the Drawings and as specified herein.

1.2 SUBMITTALS

A. Submit materials required to establish compliance with these Specifications in accordance with Section 01300. Submittals shall include the following:

1. Certified drawings showing all important details of construction and dimensions.

2. Descriptive literature, bulletins and/or catalogs of the equipment.

3. The total weight of each item.

4. A complete bill of materials.

5. Additional submittal data, where noted with individual pieces of equipment.

B. Test Reports: Provide certified hydrostatic test data, per MANUFACTURERS standard procedure or MSS-SP-61 for all valves.

C. Certificates: For each valve specified to be manufactured, tested and/or installed in accordance with AWWA and other standards, submit an affidavit of compliance with the appropriate standards, including certified results of required tests and certification of proper installation.

D. MANUFACTURER's Installation and Application Data

E. Operating and Maintenance Data: Operating and maintenance instructions shall be furnished to the ENGINEER as provided in Section 01730. The instructions shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions and other information required to instruct operating and maintenance personnel unfamiliar with such equipment.

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

1. ASTM A48 - Specification for Gray Iron Castings.

2. ASTM A126 - Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.

3. ASTM A159 - Specification for Automotive Gray Iron Castings.

4. ASTM A240 - Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels.

5. ASTM A276 - Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.

6. ASTM A436 - Specification for Austenitic Gray Iron Castings.

7. ASTM A536 - Specification for Ductile Iron Castings.

8. ASTM B30 - Specification for Copper-Base Alloys in Ingot Form.

9. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings

B. American Water Works Association (AWWA):

1. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.

2. AWWA C500 - Gate Valves, 3-in Through 48-in NPS, for Water and Sewage Systems

3. AWWA C504 - Rubber-Seated Butterfly Valves

4. AWWA C507 - Ball Valves 6-in Through 48-in

5. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-in Through 24-in NPS

6. AWWA C509 - Resilient-Seated Gate Valves, 3-in Through 12-in NPS, for Water and Sewage Systems

7. AWWA C511 - Reduced Pressure Principle Backflow Prevention Assembly

8. AWWA C540 - Power-Actuating Devices for Valves and Sluice Gates

9. AWWA C550 - Protective Interior Coatings for Valves and Hydrants

10. AWWA C800 - Underground Service Line Valves and Fittings

11. AWWA C515 – Resilient Seated Valves for 14" and Larger

C. American National Standards Institute (ANSI):

1. ANSI B2.1 - Specifications, Dimensions, Gauging for Taper and Straight Pipe Threads (except dry seals).

2. ANSI B16.1 - Cast Iron Pipe Flange and Flanged Fittings Class 25, 125, 250 and 800

3. ANSI B16.10 - Face-to-Face and End-to-End Dimensions of Valves

4. ANSI B16.104 - Butterfly Valves

D. American Iron and Steel Institute (AISI).

E. Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS):

1. MSS-SP-61 - Pressure Testing of Steel Valves.

2. MSS-SP-67 - Butterfly Valves.

3. MSS-SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends.

4. MSS-SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.

5. MSS-SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Services.

6. MSS-SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends.

7. MSS-SP-80 - Bronze Gate, Globe, Angle and Check Valves.

8. MSS-SP-82 - Valve Pressure Testing Methods

9. MSS-SP-98 - Protective Epoxy Coatings for Interior of Valves and Hydrants.

F. National Electrical Manufacturers Association (NEMA).

G. Underwriters Laboratories (UL).

H. Factory Mutual Insurance (FM).

I. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Valves and appurtenances shall be products of well established firms who are fully experienced, minimum 10 years, reputable and qualified in the manufacture of the particular equipment to be furnished.

2. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

3. All units of the same type shall be the product of one MANUFACTURER.

B. Certifications:

1. The MANUFACTURER'S shall furnish an affidavit of compliance with Standards referred to herein as specified in paragraph 1.02C.

2. Refer to Part 3 for testing required for certain items in addition to that required by referenced standards.

C. Provide the services of a qualified and factory-trained service representative of the MANUFACTURER to provide operational and maintenance instruction, for a one-day, eight hour period for:

1. Valve motor operators.

2. Valve hydraulic operators.

3. Valve pneumatic operators.

4. Pressure regulating valves.

5. Air release, air and vacuum valves.

D. Inspection of the units may also be made by the ENGINEER or other representative of the OWNER after delivery. The equipment shall be subject to

rejection at any due to failure to meet any of the Specification requirements, even though submittal data may have been accepted previously. Equipment rejected after delivery shall be marked for identification and shall be removed from the job site at once.

1.5 SYSTEM DESCRIPTION

A. All of the equipment and materials specified herein is intended to be standard for use in controlling the flow of wastewater, sludges, reclaimed water, potable water, air or chemicals, depending on the individual systems, as noted on the Drawings.

B. Valves, appurtenances and miscellaneous items shall be installed as shown on the Drawings and as specified, so as to form complete workable systems.

C. Unless otherwise noted all powered valve operators shall have:

1. Valves smaller than 8 inches: electric operators 120V, single phase, 60 Hz.

2. Valves larger than 8 inches: electric operators 480 volt, 3 phase, 60 Hz.

3. Solenoid valves: 120 volt, single phase, 60 hz, NEMA 4 enclosure, continuous duty Class F coils and manual operator.

4. See other paragraphs for additional requirements.

D. Packing and Shipping:

1. Care shall be taken in loading, transporting and unloading to prevent injury to the valves, appurtenances, or coatings. Equipment shall not be dropped. All valves and appurtenances shall be examined before installation and no piece shall be installed which is found to be defective. Any damage to the coatings shall be repaired as acceptable to the ENGINEER.

2. Prior to shipping, the ends of all valves shall be acceptably covered to prevent entry of foreign material. Covers shall remain in place until after installation and connecting piping is completed.

a. All valves 3-in and larger shall be shipped and stored on site until time of use with wood or plywood covers on each valve end.

b. Valves smaller than 3-in shall be shipped and stored as above except that heavy cardboard covers may be used on the

openings.

c. Rising stems and exposed stem valves shall be coated with a protective oil film which shall be maintained until the valve is installed and put into use.

d. Any corrosion in evidence at the time of acceptance by the OWNER shall be removed, or the valve shall be removed and replaced.

E. Storage and Protection:

Special care shall be taken to prevent plastic and similar brittle items from being directly exposed to the sun, or exposed to extremes in temperature, to prevent deformation. See the individual piping specifications and MANUFACTURER's information for further requirements.

1.6 MAINTENANCE

A. Special tools and the MANUFACTURER's standard spare parts, if required for normal operation and maintenance, shall be supplied with equipment.

B. Provide all special tools required for normal maintenance.

C. Tools shall be packaged in a steel case, clearly and indelibly marked on the exterior to indicate equipment for which tools are intended.

D. Provide to the OWNER a list of all spare and replacement parts with individual prices and location where they are available.

E. Prices shall remain in effect for a period of not less than one year after start-up and final acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT - GENERAL

A. Reference is made to Division 1 for additional requirements, including nameplates, provisions for temporary pressure gages, protection against electrolysis and anchor bolts.

B. The use of a MANUFACTURER's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

C. Valves and appurtenances shall be of the size shown on the Drawings or as noted and as far as possible equipment of the same type shall be identical and

from one MANUFACTURER.

D. Valves and appurtenances shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.

E. Unless otherwise noted, items shall have a minimum working pressure of 150 psi or be of the same working pressure as the pipe they connect to, whichever is higher and suitable for the pressures noted where they are installed.

F. Joints, size and material - unless otherwise noted or required by the ENGINEER:

1. Except where noted, all joints referred to herein shall be of the same type, nominal diameter, material and with a minimum rating equal to the pipe or fittings they are connected to.

2. Valves and appurtenances shall be of the same nominal diameter as the pipe or fittings they are connected to.

3. All valves exposed to view, or in vaults.

a. 3-in and smaller - threaded ends

b. 4-in and larger flanged ends.

G. Provide all special adaptors as required to ensure compatibility between valves, appurtenances and adjacent pipe.

H. Valves and actuators located outdoors but not within a building; within maximum 2-ft above liquid; in vaults; or where otherwise noted shall be especially designed for submerged service where water may completely submerge the valve and operator. All other units shall be as a minimum weather tight.

2.2 VALVE ACTUATORS - GENERAL

A. The valve MANUFACTURER shall supply and integrally, rigidly mount all actuators, including any type of manual or powered actuators, on valves at the factory. The valves and their individual actuators shall be shipped as a unit.

B. Unless otherwise noted, valves shall be manually actuated; nonburied valves shall have an operating wheel, handle or lever mounted on the operator; buried valves and those with operating nuts shall have a non-rising stem with an AWWA 2-in nut. At least two tee handles shall be provided for all operating nuts.

C. Except as otherwise shown on the Drawings or specified herein, all valves 3-in diameter or larger, with the valve center line located 7-ft or more above the operating floor, shall be provided with chain wheel operators complete with chain guides and hot dipped galvanized steel chain, which loop within 4-ft of the operating floor.

D. All actuators shall be capable of moving the valve from the full open to full close position and in reverse and holding the valve at any position part way between full open or closed.

E. Each operating device shall have cast on it the word "OPEN" and an arrow indicating the direction of operation.

F. Floor boxes for operating nuts recessed in concrete shall be standard cast iron type, cast-in-place, with fastening top by Clow or equal.

G. Stem guides shall be of the adjustable wall bracket type, bronze bushed, with maximum spacing of 10-ft as manufactured by Clow; Rodney Hunt or equal. Extended operating nuts and/or stems shall have universal joints and pin couplings, if longer than 10-ft and a rating of at least five times the maximum operating torque. Stem adaptors shall be provided.

H. Where required by the installation, or as specified, provide the following: extended stem; floor stand and handwheel; position indicator and etched or cast arrow to show direction of rotation to open the valve; resilient seal around stem penetration of slab.

2.3 BUTTERFLY VALVES FOR FLUID SERVICE (METAL BODY)

A. Butterfly valves and operators up to 72 inches diameter shall conform to AWWA C504, Class 150B, except as hereinafter specified. The MANUFACTURER shall submit an affidavit of compliance stating that the valves have been manufactured and tested in accordance with AWWA C504 and specifically listing all exceptions. Valves shall have a minimum 150 psi pressure rating or higher as noted on the Drawings or in the Specifications and be manufactured by Val-Matic Pratt, Dezurik or equal.

B. Butterfly valves for above grade shall be flanged end with face to face dimensions in accordance with Table 2 of AWWA C504 Standard for short-body valve. All valves for dead end shut off service shall be flanged type. Butterfly valves for buried service shall be mechanical joint ends conforming to ANSI/AWWA C111/A21.11 and shall be mechanically restrained with Megalug Series 1100 or ENGINEER approved equal.

C. Valve seats shall be full resilient seats retained in the body or on the disc edge in accordance with AWWA C504. Valve discs shall be constructed of cast iron,

ASTM A48, Class 40; Ni-resist, ASTM A126, Class B; or ductile iron, ASTM A536, Grade 65-45-12.

1. For valves 24-inch in diameter and larger, when the resilient seats are attached to the body, discs shall have Type 316 stainless steel seating edges. When the resilient seat is attached to the disc, it shall be fastened with a one piece Type 316 stainless steel retaining ring, Type 316 stainless steel Nylock set screws and a mating Type 316 stainless steel ring shall be installed in the valve body.

2. Resilient seats shall be Hycar or equal. Seats shall be fully adjustable and replaceable with the valves in place for all valves.

D. The valve body shall be constructed of close grain cast iron per ASTM A126, Class B with integrally cast hubs for shaft bearing housings of the through boss- type. Permanently self-lubricating body bushings shall be provided and shall be sized to withstand bearing loads. Stuffing box of liberal dimensions shall be provided at the operator end of the vane shaft.

1. Packing shall be of the self compensating v-type. A sealing element utilizing O-rings shall also be acceptable for up to and including 24-in valves. Over 24-in, pull down seals using a square braid of graphited asbestos is an acceptable alternate.

2. Packing shall be held in place by a bolted corrosion resistant retainer plate or gland; retainer clips are not acceptable. For 30-in or larger, use a stuffing box with follower gland.

3. Replacement of seals, for all size butterfly valves, shall not require removal of the valve from the line. In addition, adjustment or replacement of seals on valves of 30-in or larger shall not require disturbing any part of the valve or operator assembly, except any packing follower gland.

E. The valve shaft shall be of Type 316 stainless steel and designed for both torsional and shearing stresses when the valve is operated under its greatest dynamic or seating torque. No reductions of shaft diameter will be allowed except at the operator connection. Any reduction shall have a full radius fillet.

F. In general, the butterfly valve actuator shall conform to the requirements of AWWA C504, insofar as applicable and as herein specified.

G. Gearing for the actuators where required shall be totally enclosed in a gear case in accordance with AWWA C504.

H. The manual actuators shall conform to AWWA C504, insofar as applicable. Actuators shall have permanent indicators with raised or engraved marks to

show position of the valve disc.

2.4 GATE VALVES (2-1/2-IN AND SMALLER)

A. Gate valves 2-1/2-in diameter and smaller shall have flanged, screwed, or solder ends as required and shall be brass, or bronze, or Type 304 stainless steel solid wedge, union bonnet, rising-stem gate valves such as Figures 47 and 48 as manufactured by Jenkins Brothers or equal products as manufactured by Crane; Fairbanks; Lukenhiemer or equal.

B. All water valves 2-1/2-in and 3-in unless noted otherwise, shall be brass body gates and shall be Jenkins No. 1240, or Hammond 1B-647.

2.5 GATE VALVES (3-IN AND LARGER)

A. General Requirements:

1. Unless otherwise specified below, these requirements shall apply to all gate valves.

2. Gate valves shall meet the requirements of AWWA C500 and AWWA C509 as applicable to the type of valve specified.

3. Buried and submerged valves shall be furnished with mechanical joints and stainless steel hardware; non-rising stem design.

4. Exposed valves shall be furnished with Class 125 flanged ends and hand wheel; provide valves with outside screw and yoke.

5. All-metal valves shall be manufactured of ASTM A536, Ductile Iron, with bronze mounting design.

6. Rising stem valves shall be sealed with adjustable and replaceable packing; valve design must permit packing replacement under operating system pressures with only moderate leakage.

7. Non-rising stem valves shall use a double O-ring stem seal, except that packing shall be used where geared operators are required.

8. Except as otherwise specified, valves shall be rated for the following working water pressures:

Valve Size	Pressure (psig)
3-in to 12-in	250
14-in to 20-in	250
24-in and greater	250

All valve bodies shall be hydrostatically tested to at least twice the rated working water pressure. In addition, valves shall be seat-tested, bi- directional at the rated working pressure, with seat leakage not to exceed one fluid ounce per inch of valve diameter per hour. Provide certificates of testing.

9. Flanged valves to have face-to-face dimensions per ANSI B16.1 and flanges per ANAI B16.10.

10. Exposed valves 16-in and larger to have valve by-pass.

11. All bonnet and packing gland bolts shall be zinc or cadmium electroplated steel; packing gland bolts shall have bronze nuts.

12. Exposed valves 16-in and greater indicated for horizontal stem installation shall be furnished with rollers, tracks and scrapers and enclosed bevel gear grease case.

13. Provide geared operator and chainwheel, chain and chain guides for valves with handwheel centerline more than 7-ft above operating level.

14. All valves shall be marked per AWWA Standards, including name of MANUFACTURER, valve size and working pressure and year of manufacture.

15. Unless otherwise indicated, valves 12-in and smaller shall be capable of installation in the vertical or horizontal position, sealing in both directions at the rated pressure.

16. Valve operation shall be counterclockwise for potable water; clockwise for wastewater and other non-potable waters. Provide permanent label showing “OPEN” and arrows.

17. Metal-seated valves shall be coated internally and externally with an asphaltic varnish, per AWWA C500. Resilient seated valves shall be coated, interior and exterior, with fusion bonded epoxy per AWWA C550.

B. Valve Applications:

1. Valves for Non-Potable Water Service:

    a. Resilient seat gate valves shall be ductile iron bodied, bronze mounted, with wedge type disk, hand wheel and rubber seat. Valves shall be manufactured in accordance with AWWA C509. Valves shall be suitable for above ground service, be designed for 150 psi working pressure, shall be of O-ring type, with non-rising stem, and opening counterclockwise. Valves shall have flanged ends. Valves shall be coated in accordance with AWWA C550.

    b. Resilient seated design manufactured by American R-B Clow, Mueller, M&H Valve Company or equal.

2. Valves for Wastewater Service (NOT USED)

3. At the CONTRACTOR's option and unless otherwise indicated, any of the listed valve styles may be used, at no additional cost to the OWNER.

C. Valve Requirements:

1. Double Disc (NOT USED)

2. Double Revolving Disc (NOT USED)

3. Solid Wedge (NOT USED)

4. Resilient Seated:

    a. Conform to AWWA C509. Also UL and FM approved.

    b. Internal and external epoxy coating of valve body, including bonnet, per AWWA C550.

    c. Gate shall be encapsulated with synthetic rubber. It shall be bonded and vulcanized in accordance with ASTM B429 Method B.

    d. No recesses in valve body.

D. Buried Valves:

1. Conform to the requirements above, except mechanical joint bell ends per AWWA C111. The valve shall be mechanically restrained with Megalug Series 1100 or ENGINEER approved equal. All exposed valve hardware (nuts, bolts, washers, etc.) including bonnet, bonnet cover,

stuffing box, gear adaptor and joints shall be Type 304 stainless steel.

2. Non-rising stem design, double o-ring seals for non-geared valves and shall incorporate packing for geared valves.

3. Provide valve box, 2-in operating nut and extension stem and stem cover.

E. Tapping Valves and Sleeves:

1. Tapping valves shall comply with the same requirements as resilient seated gate valves or double revolving disc gate valves except they shall have the flanged end and port opening modified for tapping service. Valves shall be capable of passing a full nominal sized cutter without damage to the valve. The tapping sleeve shall be gray cast iron or ductile iron mechanical joint type with the outlet flange conforming to MSS-SP- 60.

2. All water valves, 4-in and larger, shall be iron body gates, bronze trim, flanged ends, O.S. & Y. pattern, solid wedge, rising spindle, Jenkins No. 651, or Hammond 1R-1140.

2.6 PLUG VALVES

A. Plug valves shall be of the offset disc type, ¼ turn, non-lubricated, serviceable (able to be repacked) under full line pressure and capable of sealing in both directions at the rated pressure. The disc shall be completely out of the flow path when open. Plug valves specified herein shall be by DeZurik, Clow, M&H, Val- Matic, or equal. All Manufacturers, named or otherwise, must comply completely with the specification.

1. For clean liquid or screened sewage, all size plug valves shall have a minimum port area of 80 percent.

2. On sludge and scum lines, all valves 24-in and larger shall have a minimum 100 percent open port area; for all other valves, a minimum port area shall be 80 percent when measured by the percent cross-sectional area of equivalent size (nominal same diameter) pipe.

3. All plug valves for whatever service, shall be capable of passing "pigging" cleaning equipment (using a Girard or similar cleaning pig of full nominal pipeline diameter) in either direction and MANUFACTURER shall so certify that this may be done without the use of special equipment.

B. Valves shall be rated at minimum 175 psi W.O.G. (Water, Oil, and Gas)

working pressure for sizes 4-in to 12-in inclusive and at minimum 150 psi W.O.G. working pressure for sizes 14-in and larger.

1. All plug valves under this paragraph shall be performance, leakage and hydrostatically tested in accordance with AWW A C504, except as herein modified. ‘

2. At the above rated minimum working pressures, the valves shall be certified by the MANUFACTURER as permitting zero leakage for a period of at least one-half hour with pressure applied to the seating face.

3. At the request of the ENGINEER, the valve MANUFACTURER may have to perform a valve seat leakage test, witnessed by the ENGINEER to prove compliance with these Specifications.

C. Valve bodies shall be of cast iron, 30,000 psi tensile strength, ASTM A 126, Grade B, or of ductile iron, ASTM A536 and of the top entry, bolted bonnet design, cast with integral flanges conforming to the connecting piping. All exposed bolts, nuts and washers shall be zinc or cadmium-plated, except for buried or submerged valves, which shall have Type 316 stainless steel hardware.

The valve disc shall:

1. Be cast iron ASTM A 126, Grade B, or ductile iron, ASTM A536, Grade 65-45-12.

2. Be removable without removing the valve from the line.

3. Have an integral upper and lower shaft which shall have seals on the upper and lower journals to prevent entrance of solids into the journals.

4. Be one piece for valves up to 14-in and maximum two pieces for larger valves.

D. Shaft bearings shall be permanently lubricated, rigidly backed TFE, stainless steel or bronze at both upper and lower stem journals. The operator shaft shall have easily replaceable seals, which shall be externally adjustable and repackable without removing the bonnet from the valve, or shall have self adjusting packing.

E. The valve seating surface shall provide full 360 degree seating by contact of a resilient seating material on the disc mating with welded-in high nickel content overlay seating surface in the body.

1. The seating design shall be resilient and of the continuous interface type having consistent opening and closing torques and shall be non-

jamming in the closed position. Screw-in seats shall not be acceptable.

2. Discs shall have a full resilient facing of neoprene or Buna-N.

F. The methods of mounting the actuator to the valve shall provide an air gap between the two. Actuator shall clearly indicate valve position and an adjustable stop shall be provided. Construction of actuator housing shall be semi-steel. Hardware on actuators shall be of the same materials as the valves.

G. Unless otherwise required, due to location or operation, each valve 6-in and smaller shall be provided with its own securely attached lever. Provide adjustable limit stops for both opening and closing and a clearly marked position indicator.

H. Plug valves shall be installed so that the direction of flow through the valve and the shaft orientation is in accordance with the MANUFACTURER's recommendations. Unless otherwise noted, shaft shall be horizontal, with plug opening up.

2.7 BALL VALVES

A. Ferrous Ball Valves:

1. Ball valves for mainline or water service shall be either ductile iron or carbon steel body, full bore, fire-safe, rated for a line pressure of 150 psig. Except as noted, ball valves shall comply with AWWA C507.

2. The design of the valve shall be such that it shall provide suitable seating in both directions. In order to determine the position of the ball within the valve (open or closed), there shall be an easily visible, permanent, indicator located conspicuously on the valve. Ball valves shall have Type 316 stainless steel seating surfaces. Seats shall be Type 304 stainless steel. The fully open port area shall be approximately 100 percent of the nominal pipe area.

3. Valve shafts shall be ground and polished and shall be Type 304 stainless steel. Teflon-lined bearings shall be supplied in both trunnions of the valve body.

4. The valves shall be constructed so that the seals, seats and balls are accessible for replacement without dismantling the piping. The valves shall not require lubrication but shall have stuffing boxes which can be packed with the valve in service without undue leakage. Ball valves shall be as manufactured by Henry Pratt Co., Aurora, IL; Williamette, Portland, or equal.

5. Valve actuators shall conform to AWWA C507 and as specified herein.

B. Ball valves for water piping shall be manual or electric actuated (as shown on the Drawings), bronze, resilient seated, regular port, threaded two piece bolted body type valves. The body and cap shall be of brass, ASTM B30, the ball and stem of Type 316 stainless steel and the seats and seals of TFE. The valves shall have full floating ball and shall be non lubricated. Valve seats shall be easily accessible and replaceable. Valves shall be rated to 250 psi and shall be as manufactured by Neles-Jamesbury; WKM or equal.

2.8 CHECK VALVES

A. Swing check valves, sizes 2-1/2 inches through 12 inches shall be spring and lever operated with bronze disc facing and flanged ends with a maximum working pressure of 175 psig and test pressure of 350 psig.

B. Swing check valves, sizes 14 inches through 24 inches shall be spring and lever operated with bronze disc facing and flanged ends with a maximum working pressure of 150 psig and test pressure of 300 psig.

C. Swing check valves, sizes 4 inches and smaller shall use bronze disc ASTM B584.

D. Valves shall meet all applicable parts of ANSI/AWWA C508 Standard.

E. Valves for above grade shall be flanged end. Flanged end dimensions and drilling shall comply with ANSI B16.1, Class 125. Swing check valves for buried service shall be mechanical joint ends.

F. The valve body shall be constructed of ductile or cast iron per ASTM A126, Class B, or ASTM A536, bronze mounted (IBBM).

G. Valves shall be located above grade unless otherwise noted in the Drawings and Specifications.

H. Valves shall have an O-ring sealed stuffing box.

I. Valves shall have adjustable spring tension to control opening and closing of the clapper.

J. Valves shall be installed so that the direction of flow through the valve and the shaft orientation is in accordance with the MANUFACTURER'S recommendations.

K. Swing check valves specified herein shall be by Mueller Company, Model No. 2600 for above grade installations, or ENGINEER approved equal. All

Manufacturers, named or otherwise, must comply completely with the specification.

2.9 AIR RELEASE VALVES

A. Air release valve assembly shall be furnished and installed on the reuse water transmission main and sanitary sewer force main as shown on the drawings.

B. Air release or valve assembly shall consist of a combination short body, air release- vacuum breaker valves, installed in a utility box with vented cover, gate valve, fittings, tapping saddle and connecting piping to the main.

C. Air release valves shall be installed to release any small accumulations of air, which may collect while pipe is in operation and under pressure.

D. Air release valves on a HDPE pipe shall utilize an electrofusion corp saddle with stainless steel outlet as manufactured by Central Plastics or equal.

E. The air release valves shall be Val-Matic Model 42 or engineer approved equal.

F. The small orifice assembly air release valve shall automatically release air accumulations from the pipe while under positive pressure.

G. When the valve body fills with air, the float ball shall fall to open the small orifice and exhaust the air to atmosphere.

H. When the air has been exhausted, the float ball shall be buoyed up and tightly close the small orifice.

I. The small orifice assembly shall be furnished with cast iron body and cover (ASTM A126-B).

J. The float ball shall be constructed of stainless steel and attached to a stainless steel lever mechanism.

K. A resilient, Buna-N seat shall be attached to the lever mechanism for drop-tight closure.

L. Valves shall be corrosion resistant, suitable for reuse water transmission main application, and shall automatically function to release to the atmosphere both large and small amounts of air that accumulate in the pipeline.

M. Once the air has been exhausted, both valves shall seal tightly to prevent liquid leakage.

N. The valve shall also function to admit air into a line, tank, or chamber under

emergency conditions or when it is being drained.

O. The capacity and pressure rating of the valve is dependent on the diameter of the precision orifice in the cover.

P. The Orifice Size shall be 5/32-inch. A large inlet connection is required for proper air and water exchange.

Q. The reuse water and sewer force main air release valves inlet size shall be 2-inch NPT for reuse water mains.

R. The air release valves outlet size shall be 1/2-inch NPT for reuse water and sewer force mains.

S. The Air Release Valves shall be automatic float operated valves designed to release accumulated air from a piping system while the system is in operation and under pressure and installed in a concrete box as shown on the drawings.

T. Box and like shall be of the necessary size to the valve.

U. To connect the air valve, a corporation stop shall be tapped into the main using the procedures as recommended by the ductile iron pipe manufacturer.

V. The corporation stop shall be Mueller H-10045 or approved equal.

W. The valve body shall be threaded with NPT inlets and outlets.

X. The body inlet connection shall be hexagonal for a wrench connection.

Y. The valve shall have two additional NPT connections for the addition of gauges, testing and draining.

Z. The valve body and cover shall be constructed of ASTM A126 Class B cast iron working pressures of 300 psig, with resilient seats, rubber covered floats and no levers.

AA. The cover shall be bolted to the valve body and sealed with a flat gasket.

BB. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating.

CC. Floats shall be unconditionally guaranteed against failure including pressure surges.

DD. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure.

EE. The orifice, float and linkage mechanisms shall be constructed of Type 304 stainless steel.

FF. Non-metallic floats or linkage mechanisms are not acceptable.

GG. The manufacturer shall demonstrate a minimum of five (5) years experience in the manufacture of air valves.

HH. The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512.

II. The manufacturer shall provide test certificates, dimensional drawings; parts list drawings, and operation and maintenance manuals.

JJ. The exterior of the valve shall be coated with a universal alkyd primer.

KK. Air Release Valves shall be as manufactured by A.R.I.

2.10 AIR/VACUUM VALVES (NORMAL OPERATION)

A. The large orifice assembly air and vacuum valve shall automatically exhaust air from a pipeline during the initial filling of the pipeline.

B. The large orifice assembly shall not blow shut while exhausting air, even while venting air at sonic velocity.

C. When all air has been exhausted from the pipeline, the large orifice float ball shall be buoyed up to seat tightly against a resilient seat ring.

D. The large orifice float ball shall remain tightly closed while the pipeline is under positive pressure.

E. Should the pipeline pressure fall below atmospheric pressure (such as during draining or a line break), the large orifice float ball shall automatically fall away from the seat ring and permit air to enter the pipeline.

F. The large orifice assembly shall be furnished with cast iron body and cover (ASTM A126-B).

G. A resilient, Buna-N seat ring shall be affixed to the valve cover.

H. The float ball shall be constructed of stainless steel with a minimum pressure rating of 1,000 psi. [The float ball shall be free floating within the valve body; guide stems, linkages or levers attached to the float are not acceptable.]

I. Unit shall be manufactured by A.R.I. Special type for use with non-clean fluids shall be provided.

2.11 COMBINATION AIR AND AIR/VACUUM OR VACUUM RELIEF VALVES

A. Valves shall be corrosion resistant, suitable for reuse water transmission and sanitary sewer force main application. Combination air valve assembly shall be furnished and installed on the reuse water transmission main as shown on the drawings.

B. Combination air valve assembly shall consist of a single body, combination air release and air/vacuum valves, installed in a utility box with vented cover, gate valve, fittings, tapping saddle and connecting piping to the reuse water or sewer force main. Utility box and like shall be of the necessary size to the valve.

C. Combination air valves shall be automatic float operated valves and installed to release large accumulations of air during the filing of the piping system and close upon liquid entry.

D. The valve shall open during draining or if a negative pressure occurs.

E. The valve shall also release accumulated air from a piping system while the system is in operation and under pressure.

F. The capacity and pressure rating of the valve is dependent on the diameter of the precision orifice in the cover.

G. The large orifice diameter shall be 2-inch and the air release orifice shall be 3/32."

H. A large inlet connection is required for proper air and water exchange.

I. The reuse water or sewer force main combination air valves inlet and outlet size shall be 2-inch NPT.

J. To connect the air valve, a corporation stop shall be tapped into the main using the procedures as recommended by the ductile iron pipe manufacturer.

K. The corporation stop shall be Mueller H-10045 or approved equal.

L. The single body valve shall be threaded with NPT inlets and outlets. The NPT inlets and outlets shall be equal to the nominal valve size.

M. The body inlet connection shall be hexagonal for a wrench connection.

N. The valve shall have two additional NPT connections for the addition of

gauges, testing and draining.

O. The combination air valve shall be furnished with cast iron body and cover (ASTM A126-B).

P. The float ball, guide shafts, and bushings shall be constructed of type 304 stainless steel and attached to a stainless steel lever mechanism.

Q. A resilient, Buna-N seat shall be attached to the lever mechanism for drop-tight closure. Non-metallic floats or linkage mechanisms are not acceptable.

R. Single body combination valves shall have an expanded outlet to provide full are around the guide mechanism.

S. The valve shall have a double guided plug and an adjustable threaded orifice.

T. The plug shall be protected against direct water impact by an internal baffle.

U. The plug shall have a precision orifice drilled through the center stem.

V. The cover shall be bolted to the valve body and sealed with a flat gasket.

W. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating.

X. Floats shall be unconditionally guaranteed against failure including pressure surges.

Y. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure.

Z. The exterior of the valve shall be coated with a universal alkyd primer.

AA. The manufacturer shall demonstrate a minimum of five- (5) years experience in the manufacture of air valves.

BB. The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512.

CC. The manufacturer shall provide test certificates, dimensional drawings; parts list drawings, and operation and maintenance manuals.

DD. Air Valves shall be as manufactured by A.R.I.

2.12 PRESSURE RELIEF VALVES FOR AIR

A. Pressure relief valves shall be designed for air and built to ASME standards and

shall be National Board Certified.

B. The Valve shall have a one-piece brass body, chrome steel ball on brass seat, silicone rubber seal, and stainless steel spring.

C. The Preset pressure limit of 100 psi shall be tested and sealed by the manufacturer.

D. The pressure relief valve shall have a bubble tight seal within 10% of set pressure.

E. The pressure relief valve shall be manufactured by Control Devices, Inc. or ENGINEER approved equal.

2.13 INSULATING FITTINGS

Fittings shall be of type to provide control of electrolysis and equal to "Dielectric" as manufactured by Watts Regulator Co., or equal.

2.14 SURFACE PREPARATION AND SHOP COATINGS

A. Notwithstanding any of these Specifications, all coatings and lubricants in contact with non-potable water shall be certified as acceptable for use with that fluid.

B. In case of a conflict, the requirements of this Section govern.

C. If the MANUFACTURER's requirement is not to require finished coating on any interior surfaces, then MANUFACTURER shall so state and no interior finish coating will be required, if acceptable to the ENGINEER.

D. The exterior surface of various parts of valves, operators, floor-stands and miscellaneous piping shall be thoroughly cleaned of all scale, dirt, grease or other foreign matter and thereafter one shop coat of an approved rust-inhibitive primer such as Inertol Primer No. 621 shall be applied in accordance with the instructions of the paint MANUFACTURER or other primer compatible with the finish coat provided.

E. Unless otherwise noted, interior ferrous surfaces of all valves shall be given a shop finish of an asphalt varnish conforming to AWWA C509, (except mounting faces/surfaces) or epoxy AWWA C550 with a minimum thickness of 4 mil.

F. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating.

G. Mounting surfaces shall be especially coated with a rust preventative.

H. Special care shall be taken to protect uncoated items and plastic items, especially from environmental damage.

2.15 FACTORY INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES

A. Factory inspection, testing and correction of deficiencies shall be done in accordance with the referenced Standards and as noted herein.

B. See Division 1 for additional requirements. Also refer to Part 1 of this Section, especially for required submission of test data to the ENGINEER.

C. In addition to all tests required by the referenced Standards, the following shall also be factory tested:

1. Pressure regulating valves shall be factory tested at the specified pressures and flows.

2. The non-cavitating butterfly valves, to demonstrate its non-cavitating capabilities.

3. All types of air and vacuum valves.

2.16 VALVE BOXES

A. Valve boxes shall be provided for all buried valves.

B. Valve boxes shall consist of cast iron base and adjustable top section with cover, which shall be marked "Water, Sewer, or Reuse."

C. Cast iron extensions shall be provided as required to meet grade.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. All valves and appurtenances shall be installed per the MANUFACTURER's instructions in the locations shown, true to alignment and rigidly supported.

B. Any damage to the above items shall be repaired to the satisfaction of the ENGINEER before they are installed.

C. Install all brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings, or otherwise required.

D. Before setting these items, the CONTRACTOR shall check all Drawings and

figures which have a direct bearing on their location.

E. The CONTRACTOR shall be responsible for the proper location of valves and appurtenances during the construction of the Work.

F. All materials shall be carefully inspected for defects in construction and materials. All debris and foreign material shall be cleaned out of openings, etc.

G. All valve flange covers shall remain in place until connected piping is in place.

H. All operating mechanisms shall be operated to check their proper functioning and all nuts and bolts checked for tightness.

I. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the OWNER.

J. Where installation is covered by a Referenced Standard, installation shall be in accordance with that Standard, except as herein modified, and the CONTRACTOR shall certify such. Also note additional requirements in other parts of this Specification.

K. Unless otherwise noted, joints for valves and appurtenances shall be made up utilizing the same procedures as specified under the applicable type connecting pipe joint and all valves and other items shall be installed in the proper position as recommended by the MANUFACTURER.

L. CONTRACTOR shall be responsible for verifying MANUFACTURER'S torqueing requirements for all valves.

3.2 INSTALLATION OF MANUAL OPERATIONAL DEVICES

A. Unless otherwise noted, all operational devices shall be installed with the units of the factory, as shown on the Drawings or as acceptable to the ENGINEER to allow accessibility to operate and maintain the item and to prevent interference with other piping, valves and appurtenances.

B. For manually operated valves 3-inch in diameter and smaller, valve operators and indicators shall be rotated to display toward normal operation locations.

C. Floor boxes, valve boxes, extension stems and low floor stands shall be installed vertically centered over the operating nut, with couplings as required and the elevation of the box top shall be adjusted to conform with the elevation of the finished floor surface or grade at the completion of the Contract.

D. Boxes and stem guides shall be adequately supported during concrete pouring to maintain vertical alignment.

3.3 INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES

A. See also Division 1. Take care not to over pressure valves or appurtenances during pipe testing.

B. If any unit proves to be defective, it shall be replaced or repaired to the satisfaction of the ENGINEER.

C. Functional Test:

1. Prior to plant start-up, all items shall be inspected for proper alignment, quite operation, proper connection and satisfactory performance.

2. All units shall be operated continuously while connected to the attached piping for at least 8 hours, without vibration, jamming, leakage, or overheating and perform the specified function.

D. The various pipe lines in which the valves and appurtenances are to be installed are specified to be field tested.

E. During these tests any defective valve or appurtenance shall be adjusted, removed and replaced, or otherwise made acceptable to the ENGINEER.

F. Various regulating valves, strainers, or other appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the ENGINEER.

3.4 IDENTIFICATION OF VALVES

A. All valves shall be designated by distinguishing numbers and/or letters on required chart(s) and/or diagram(s).

B. The CONTRACTOR shall install approved brass tags for all designated items with numbers and/or letters on the tags corresponding to those on the chart(s) and/or diagram(s).

C. Each valve identification tag to be minimum 19 gauge polished brass: 2-inch diameter.

D. Each tag to designate appropriate service (1/4 inch stamped black-filled letters) and appropriate valve number (1/2 inch stamped black-filled number).

E. Tags shall be securely fastened to valves with approved stainless steel screws

or rivets, or brass jack chain, in a manner to permit easy reading.

F. CONTRACTOR shall prepare piping flow diagrams (or re-use those on the contract plans) indicating valve numbers, service, normal position, etc., of each valve.

G. Diagrams shall be mounted on an ornamental iron frame with hinged plexiglass face for wall mounting. Four (4) frames with plexiglass are required.

H. The requirements for valve identification specified above applies equally to all valves installed under this and under other sections of these specifications.

3.5 CLEANING

All items (including valve interiors) shall be cleaned prior to installation, testing, disinfection and final acceptance.

3.6 DISINFECTION

Disinfection of valves and appurtenances shall be in accordance with AWWA Requirements.

3.7 SETTING VALVES AND BOXES

A. Valves and valve boxes as specified in the preceding paragraphs shall be installed where shown on the drawings unless otherwise directed.

B. Valves shall be set plumb with the base of the valve box centered over the valve and resting on compacted backfill.

C. The top section of the box shall be set to allow equal movement above and below finished grade.

D. After being correctly positioned, fill shall be carefully tamped around the valve box for a distance of 4-feet on all sides of the box.

E. In paved areas, top of the cover shall be flush with the finished paving.

F. In off-street areas, the cover shall be set 1-inch above existing grade unless otherwise directed by the ENGINEER and a concrete pad shall be poured around the top of the box as shown in the standard details.

END OF SECTION

SECTION 02630

PIPING SPECIALTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions, apply to work of this section.

B. All fittings, valves, service saddles, etc. Shall meet the requirements of the Safe Drinking Water Act, including the Reduction of Lead in Drinking Water Act (Public Law 111-380).

1.02 QUALITY ASSURANCE

Manufacturer's Qualifications: Firms regularly engaged in manufacture of piping specialties, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 3 years.

PART 2 - PRODUCTS

2.01 FIRE HYDRANTS

A. All fire hydrants shall be 5-1/4 inch hydrants with two 2-1/2 inch connection and one pumper connection designed for 150 psi working pressure, and shall conform to the requirements of AWWA C-502-73 (Latest Revision).

B. Hydrants shall have mechanical joint inlets, shall be for a 3-foot bury, and shall have a compression type main valve which opens against pressures.

C. The hydrant main valve operating parts, including valve seal, valve seal insert, cross arm, and upper valve washer shall be all bronze, meeting either of the following ASTM B-61, or B-150 per C-502.

D. The inside of hydrants shall be coated in accordance with AWWA standards except for bronze and threaded machine parts.

E. Hydrant upper barrel shall be provided with an e-coat primer and top coated with a Hydrant Red 2-component polyurethane finish or fusion bonded epoxy coated and Fire Hydrant Red in color.

F. The barrel section of the hydrant shall be made in two or more sections, with a flange located at least two inches above the finished grade line, and provided with a break flange, flange clips or lugs at ground line.

G. Undercut bolts for the break connection are not acceptable.

H. The hydrants shall open left (counterclockwise).

I. The hydrants shall have pentagon shaped operating nuts and cap nuts measuring 1-1/2 inch from pint to flat.

J. The bonnet shall be of dry type top design, shall be weather proof and utilize a cast or ductile iron weather shield integral with the external wrench operating nut.

K. The weather shield nut shall be pentagon in shape.

L. The hydrants stem shall have "O" ring seals, and stem threads and bearing shall be protected with automatic self-oiling or grease case lubricant systems.

M. The nozzle threads shall be coated with anti-seize compound to facilitate removal of caps.

N. Hydrants stems (upper or lower) shall be stainless steel.

O. All exposed or external nuts and bolts (bonnet, break flange, and shoe bolts and nuts) shall be stainless steel, no exceptions.

P. All fire hydrants shall be American AVK model 27, or approved equal.

Q. The external color shall be red and the primer color shall not be yellow.

R. After installation the fire hydrants shall be free of scratches and paint chipping.

S. All fire hydrants shall be painted after installation if in the opinion of the ENGINEER the coating is not satisfactory.

T. Two fire hydrant wrench shall be supplied for this project.

U. All fire hydrants shall be covered with plastic when installed and removed when the line is placed into service.

2.02 CORPORATION STOPS

A. Corporation stops 2 inches and smaller shall be brass ball style valves and comply with ANSI/AWWA C800, manufactured by A.Y. McDonald, Ford, or approved equal.

B. Inlets shall have iron pipe threads and outlets shall have compression connections.

2.03 CURB STOPS

A. Corporation stops 2 inches and smaller shall be brass ball style valves with lock wings, manufactured by A.Y. McDonald, or approved equal.

B. Inlets shall have compression connection and outlets shall have iron pipe threads.

C. Curb stops shall included brass meter coupling to match existing or new meter connection threads.

2.04 SERVICE SADDLES

A. All service saddles shall meet the requirements of ASNI/AWWA C800.

B. A service saddle shall have ductile iron body and double u-bolt or straps, Romac model 202U, Ford model F202, or approved equal.

2.05 HOSE BIBBS AND SAMPLE TAPS

Hose bibbs and sample taps shall be Crane No. 58 or approved equal.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

Appendix A

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

GEOTECHNICAL ENGINEERING REPORT

INDIAN SPRINGS SEWER EXTENSION PHASE II
JACKSON COUNTY, FLORIDA

PREPARED FOR:

ALDAY-HOWELL ENGINEERING, INC.
3017 HIGHWAY 71 NORTH
MARIANNA, FLORIDA 32446

1026 PIERSON DRIVE
LYNN HAVEN, FLORIDA 32444
TELEPHONE (850) 258.0994

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

October 10, 2019

Mr. Eric Worrell, P.E.
Alday-Howell Engineering, Inc.
3017 Highway 71 North
Marianna, Florida 32446

SUBJECT: Indian Springs Sewer Extension Phase II – Geotechnical Services
Jackson County, Florida
MEI Project No. M119-105-041

Dear Mr. Worrell:

This letter forwards the results of our geotechnical exploration for the Indian Springs Sewer Extension Phase II in Jackson County, Florida. The purpose of this exploration was to evaluate the subsurface conditions present at the proposed man-hole locations and lift station locations, and to provide pipe bedding and backfill recommendations. Our exploration consisted of One (1) 25-feet deep Standard Penetration Test (SPT) boring at the proposed lift station location and Twelve (12) 5-feet to 16-feet deep power auger borings at the man-hole location.

Project Description

The site is located on the east side of the Merritt's Mill Pond in the existing Indian Springs Golf Club neighborhood in Jackson County, Florida. The phase II sewer extension will be performed on Seminole Drive, Appalachee Drive, Shawnee Trail, and Jackson Bluff Road. At the time of our exploration, the existing roadways were paved. All borings were performed along the shoulders of the roadways. Upon completion of the borings, the holes were backfilled using a tremie pipe and cement slurry.

If any of the project information noted above is incorrect or has changed, please inform Magnum Engineering, Inc. so that we may amend the recommendations presented in this report, if necessary.

Figure #1 attached shows the approximate location of each boring and Figure #2 shows the logs of borings for the power augers and SPT borings performed.

Subsurface Conditions

Man Hole Locations

Based upon the results of the power auger borings, the soils at the proposed man-hole locations generally encountered slightly silty fine sands, slightly clayey fine sands, and clayey fine sands throughout the depth of the borings.

Lift Station Location

Based upon the results of the SPT boring (LS-1), the soils at the proposed lift station location generally encountered clayey fine sands and sandy clays from the ground surface to approximately 15 feet below existing grade underlain by slightly clayey and slightly silty fine sands to the boring termination depth of 25 feet below existing grade.

Please refer to the attached logs of borings presented as Figure #2 for a more detailed description of the soils encountered

Groundwater Conditions

Groundwater was only encountered in borings LS-1 at a depth of 20.0 feet below existing grade at the time of drilling (September 12, 2019), which was during a period of slightly below normal seasonal rainfall. Groundwater levels will fluctuate with rainfall and could vary several feet during typical seasonal fluctuations. Larger fluctuations are possible under severe weather conditions. We recommend that the Contractor verify the actual groundwater levels at the time of construction to determine potential impacts groundwater will have on construction procedures.

Backfill Recommendations

Based on the results of the borings, the native soils encountered within the depth of our borings will be suitable for backfill.

Backfill beneath the pipe should be hand or mechanically compacted to a minimum soil density of 95% of the Standard Proctor test (ASTM D698). The existing soils excavated from the trenches can be used for this purpose. Soils placed around and to not less than 12 inches above the pipe should be placed by hand and hand tamped in maximum 6-inch lifts. Mechanical placement and compaction may be acceptable provided the contractor can demonstrate doing so without the formation of voids or displacing the pipe.

Backfill soils over the pipe should be placed in lifts compacted to a minimum soil density of 95% of the Standard Proctor test (ASTM D698). While it is not uncommon to eliminate compaction requirements for backfill soils not subject to future vehicular traffic, we recommend that they be incorporated throughout this project to provide increased resistance to buoyant forces and adequate subgrade support as the right-of-way will result in construction equipment operating over the backfilled trench.

If soils are difficult to compact during placement of the utility line due to excessive moisture or fines content, we should be notified to provide additional recommendations. It may be an option for the saturated soils to be over-excavated and replaced with FDOT No. 57 stone, or for soils with excess fines to be over-excavated and replaced with clean sands.

Based on our findings, the recommended safe side-slope for temporary open cuts is 2(H):1(V) as measured from the bottom of the trench excavation. Temporary sideslopes are defined as those which will be open to weather for a period of 1 to 2 weeks. Significant rainfall events can destabilize open cuts via erosion from runoff and/or laterally flowing groundwater. Control of surface water runoff from adjacent areas should be a routine maintenance item during the course of construction. Control of laterally flowing groundwater, if necessary, to maintain stable sideslopes, may require localized dewatering via ditches and/or temporary underdrains.

Lift Station Recommendations

Based on the subsurface conditions encountered in test borings LS-1, we recommend that the lift station be founded on the medium dense slightly silty and slightly clayey fine sands encountered in the boring between 15 feet and 25 feet below existing grade.

If dewatering is required to install the lift station, a well point or sump pump dewatering system would be most effective given the soil conditions encountered in the test borings. The dewatering system should remain in operation until such time that removing it will not create any unstable buoyant forces on the structure. The soils excavated during the installation of the lift station will be suitable for use as backfill around the structure.

As noted above, the lift station can bear on the firm, undisturbed slightly silty and slightly clayey fine sands encountered at about 15 feet to 25 feet below existing grade. A gravel or rock bed is advisable at the bottom of the structure to provide a firm, stable platform that will be less likely to be disturbed during steel and concrete placement. This can be accomplished by “choking” angular gravel or rock into the sand with a mechanical plate tamper until a non-yielding matrix is obtained. Typically, 8 inches to 12 inches of angular gravel or rock will provide a stable platform

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor’s responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor’s safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. Magnum Engineering, Inc. is not assuming responsibility for construction site safety or the contractor’s activities; such responsibility is not being implied and should not be inferred.

Warranty and Limitations of Study

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied. Magnum Engineering, Inc. is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

Soil conditions at other locations may differ from those encountered in the test borings, and the passage of time may cause the soils conditions to change from those described in this report.

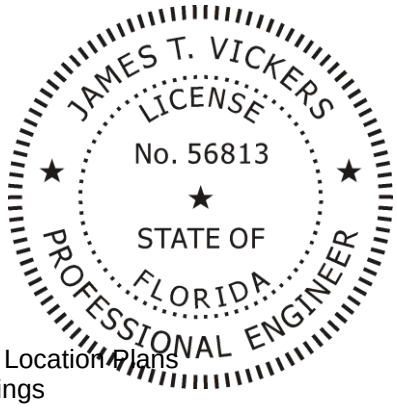
This report is intended for use by the designers of this project. While we have no objections to it being provided for review by parties to this project, it is not a specification document and is not to be used as a part of the specifications. If desired, we can assist in the development of specifications for this project based upon our exploration.

The nature and extent of variation and change in the subsurface conditions at the site may not become evident until the course of construction. Construction monitoring by the geotechnical engineer or his representative is therefore considered necessary to verify the subsurface conditions and to check that the soils connected construction phases are properly carried out. If significant variations or changes are in evidence, it may be necessary to reevaluate the recommendations in this report.

Furthermore, if the project characteristics are altered significantly from those discussed in this report, or if the project information contained in this report is incorrect and additional information becomes available, a review must be made by this office to determine if any modifications in the recommendations will be necessary.

We hope this letter provides sufficient information for the present. If you have any questions or comments, please feel free to call.

Sincerely,
MAGNUM ENGINEERING, INC.



JAMES T. VICKERS, P.E.
Sr. Geotechnical Engineer
Florida Reg. No. 56813

Attachments: Figure #1 to #4 – Boring Location Plans
Figure #5 – Logs of Borings

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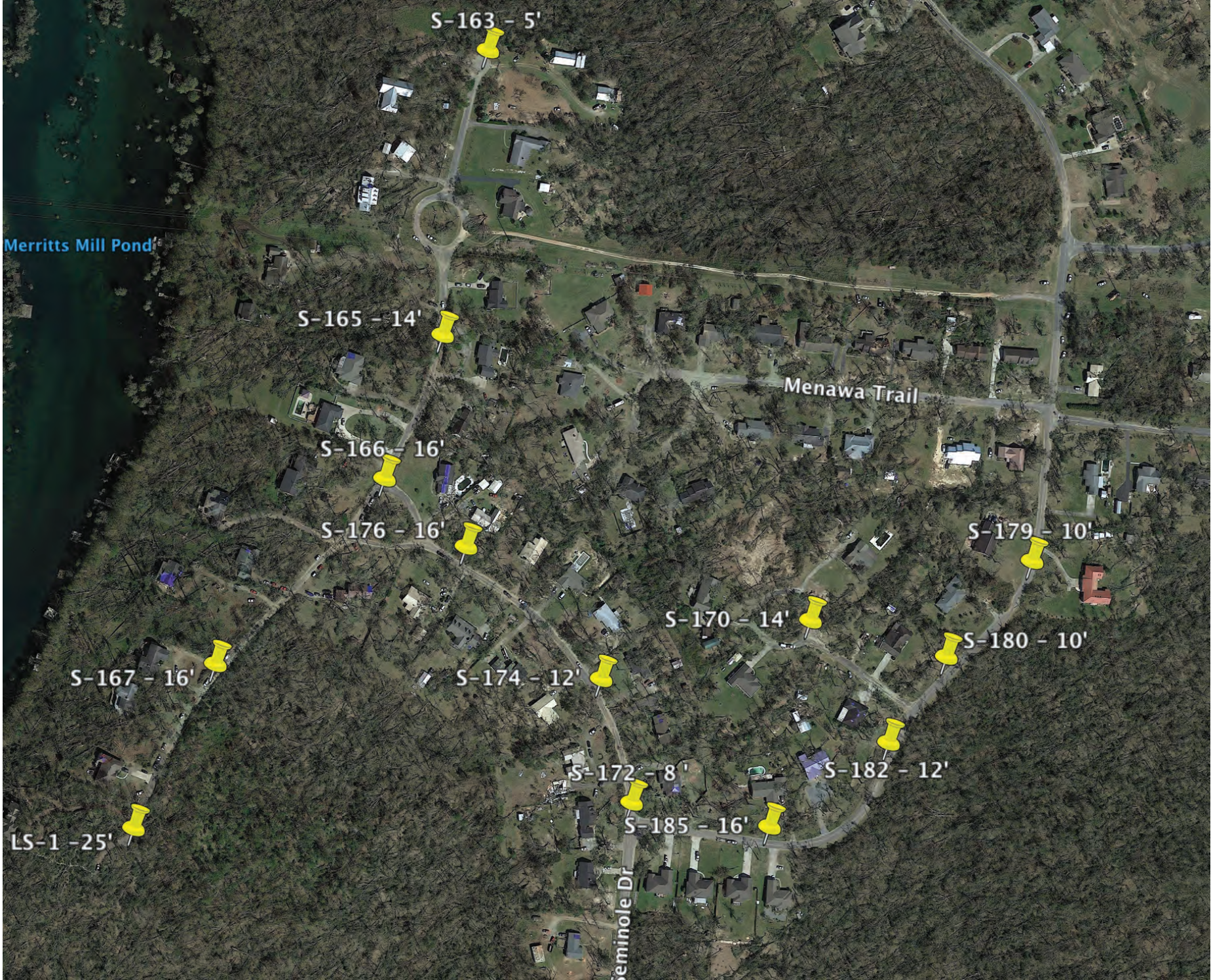
BORING LOCATION PLANS

FIGURES # 1 THRU #4


S-163 - 5'
Merritts Mill Pond
S-165 - 14'
Menawa Trail
S-166 - 16'
S-176 - 16'
S-179 - 10'
S-170 - 14'
S-180 - 10'
S-167 - 16'
S-174 - 12'
S-172 - 8'
S-182 - 12'
S-185 - 16'
LS-1 -25'
eminole Dr

MAGNUM ENGINEERING INC
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LOGS OF BORINGS

FIGURE # 5

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER LS-1

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 20.0 ft
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Brown/Orange Clayey Fine SAND (SC)	AU									
5		Red/Orange/Tan Sandy CLAY (CL)	SS		5-8-12-15 (20)							
		Tan/Gray Clayey Fine SAND (SC)	SS		6-9-11-14 (20)							
10		Brown/Orange Clayey Fine SAND (SC)	SS		8-12-17-21 (29)							
		Red/Orange/Tan Sandy CLAY (CL)	SS		7-15-20 (35)							
15		Tan/Orange Slightly Clayey Fine SAND (SP-SC)	SS		5-8-9 (17)							
20		▽ Tan/Gray Slightly Silty Fine SAND (SP-SM)	SS		6-7-7 (14)							
25		Boring Termination Depth at 25.0 feet.										

GEOTECH BH COLUMNS INDIAN SPRINGS SEWER.GPJ GINT STD US LAB.GDT 10/22/19

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER S-163

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Reddish Orange Clayey Fine SAND (SC)	AU									
1												
2												
3												
4												
5		Boring Termination Depth at 5.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER S-165

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Brown/Orange Slightly Silty Fine SAND (SP-SM)	AU									
2.5												
		Brown/Orange Clayey Fine SAND (SC)										
5.0												
7.5												
10.0												
12.5												
		Boring Termination Depth at 14.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER S-166

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Brown/Orange Slightly Clayey Fine SAND (SP-SC)										
		Brown/Orange Clayey Fine SAND (SC)	AU									
5												
10		Brown Slightly Silty Fine SAND with Trace of Clay (SP-SM)										
15												
		Boring Termination Depth at 16.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER S-167

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Reddish Orange Clayey Fine SAND (SC)	AU									
5												
10												
15		Boring Termination Depth at 16.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER S-170

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan/Orange Slightly Silty Fine SAND (SP-SM)	AU									
2.5												
		Tan/Orange Clayey Fine SAND (SC)										
5.0												
7.5												
10.0												
12.5												
		Boring Termination Depth at 14.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER S-172

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan/Orange Slightly Clayey Fine SAND (SP-SC)	AU									
2.5		Tan/Orange Clayey Fine SAND (SC)										
5.0												
7.5		Boring Termination Depth at 8.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER S-174

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan Slightly Silty Fine SAND (SP-SM)	AU									
2.5												
5.0												
		Tan/Gray Slightly Silty Fine SAND (SP-SM)										
7.5												
		Tan/Gray Slightly Silty Fine SAND with Trace of Clay (SP-SM)										
10.0												
		Boring Termination Depth at 12.0 feet.										

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Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER S-176

CLIENT Alday-Howell Engineering, Inc. **PROJECT NAME** Indian Springs Sewer

PROJECT NUMBER M119-105-041 **PROJECT LOCATION** Marianna, Florida

DATE STARTED 9/12/19 **COMPLETED** 9/12/19 **GROUND ELEVATION** _____ **HOLE SIZE** _____

DRILLING CONTRACTOR GeoDrill Tech, LLC **GROUND WATER LEVELS:**

DRILLING METHOD Power Auger Boring **DEPTH TO GROUNDWATER AT TIME OF DRILLING** ---

LOGGED BY J. Governale **CHECKED BY** J. Vickers **ESTIMATED SEASONAL HIGH GWT** ---

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Brown Slightly Silty Fine SAND (SP-SM)										
		Tan Slightly Silty Fine SAND (SP-SM)										
5												
			AU									
10												
15												
		Boring Termination Depth at 16.0 feet.										

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BORING NUMBER S-179

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan Slightly Silty Fine SAND (SP-SM)										
2.5		Tan Clayey Fine SAND (SC)	AU									
5.0												
7.5												
10.0		Boring Termination Depth at 10.0 feet.										

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Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, Florida 32444
Telephone: 8502658332

BORING NUMBER S-180

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan Slightly Silty Fine SAND (SP-SM)	AU									
2.5												
5.0												
		Tan/Gray Clayey Fine SAND (SC)										
7.5												
10.0		Boring Termination Depth at 10.0 feet.										

GEOTECH BH COLUMNS INDIAN SPRINGS SEWER.GPJ GINT STD US LAB.GDT 10/22/19

Magnum Engineering, Inc.
1026 Pierson Drive
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Telephone: 8502658332

BORING NUMBER S-182

CLIENT Alday-Howell Engineering, Inc.
PROJECT NAME Indian Springs Sewer
PROJECT NUMBER M119-105-041
PROJECT LOCATION Marianna, Florida
DATE STARTED 9/12/19 **COMPLETED** 9/12/19
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR GeoDrill Tech, LLC
GROUND WATER LEVELS:
DRILLING METHOD Power Auger Boring
DEPTH TO GROUNDWATER AT TIME OF DRILLING ---
LOGGED BY J. Governale **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Tan Slightly Silty Fine SAND (SP-SM)										
2.5		Tan Slightly Clayey Fine SAND (SP-SC)	AU									
5.0												
7.5												
10.0												
		Boring Termination Depth at 12.0 feet.										

Magnum Engineering, Inc.
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Telephone: 8502658332

BORING NUMBER S-185

CLIENT Alday-Howell Engineering, Inc. **PROJECT NAME** Indian Springs Sewer

PROJECT NUMBER M119-105-041 **PROJECT LOCATION** Marianna, Florida

DATE STARTED 9/12/19 **COMPLETED** 9/12/19 **GROUND ELEVATION** _____ **HOLE SIZE** _____

DRILLING CONTRACTOR GeoDrill Tech, LLC **GROUND WATER LEVELS:**

DRILLING METHOD Power Auger Boring **DEPTH TO GROUNDWATER AT TIME OF DRILLING** ---

LOGGED BY J. Governale **CHECKED BY** J. Vickers **ESTIMATED SEASONAL HIGH GWT** ---

NOTES _____ **AFTER DRILLING** ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Brown/Orange Slightly Clayey Fine SAND (SP-SC)	AU									
5												
		Brown/Orange Clayey Fine SAND (SC)										
10												
15												
		Boring Termination Depth at 16.0 feet.										