

**CONTRACT DOCUMENTS
TECHNICAL SPECIFICATIONS**

FOR



**Manatee County
End of Service Life – Project Package B**

September 2018

PROJECT OWNER:

County of Manatee, Florida
c/o Manatee County Purchasing Division
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GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE AND INTENT

A. Description

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

B. Work Included

The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, shop drawings, working drawings and other means of construction necessary or proper for performing and completing the work. He shall obtain and pay for all required permits necessary for the work, other than those permits such as the DEP permit and railroad permit, which may have already been obtained. He shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the County, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all incidental costs. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.

The cost of incidental work described in these General Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made.

The Contractor shall be solely responsible for the adequacy of his workmanship, materials and equipment.

C. Public Utility Installations and Structures

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

The Contractor shall protect all installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the County. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor, which are shown on the Plans or have been located in the field by the utility, shall be repaired by the Contractor, at his expense, as approved by the County. No separate payment shall be made for such protection or repairs to public utility installations or structures.

Public utility installations or structures owned or controlled by the County or other governmental body, which are required by this contract to be removed, relocated, replaced or rebuilt by the Contractor not identified in any separate bid item shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various contract items. No separate payment shall be made.

Where public utility installations or structures owned or controlled by the County or other governmental body are encountered during the course of the work, and are not indicated on the Plans or in the Specifications, and when, in the opinion of the County, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the County, for the contractor to accomplish. If such work is accomplished by the utility having jurisdiction, it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be in accordance with the General and Supplemental General Conditions.

The Contractor shall give written notice to County and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight hours in advance of breaking ground in any area or on any unit of the work. This can be accomplished by making the appropriate contact with the "Sunshine State One-Call of Florida, Inc. Call Center ("Call Sunshine") and per all requirements provided for in the Florida Underground Facilities Damage Prevention and Safety Act (Florida Statutes, Title XXXIII, Chapter 556).

The maintenance, repair, removal, relocation or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the County.

1.02 PLANS AND SPECIFICATIONS

A. Plans

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

B. Copies Furnished to Contractor

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

C. Supplementary Drawings

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

D. Contractor to Check Plans and Data

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

E. Specifications

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

F. Intent

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

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

The inclusion of the Related Requirements (or work specified elsewhere) in the General part of the specifications is only for the convenience of the Contractor, and shall not be interpreted as a complete list of related Specification Sections.

1.03 MATERIALS AND EQUIPMENT

A. Manufacturer

All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the County, that the manufacturer or subcontractor deal directly with the County. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.

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

B. Delivery

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

C. Tools and Accessories

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

Spare parts shall be furnished as specified.

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

D. Installation of Equipment.

The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character.

Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise by the County during installation. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.

The Contractor shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified. Anchor bolts shall be as approved by the County and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.

The Contractor shall furnish all materials and labor for, and shall properly bed in non-shrink grout, each piece of equipment on its supporting base that rests on masonry foundations.

Grout shall completely fill the space between the equipment base and the foundation. All metal surfaces coming in contact with concrete or grout shall receive a coat of coal tar epoxy equal to Koppers 300M or provide a 1/32-inch neophrene gasket between the metal surface and the concrete or grout.

E. Service of Manufacturer's Engineer

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

1.04 INSPECTION AND TESTING

A. General

Inspection and testing of materials will be performed by the County unless otherwise specified.

For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Three (3) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the County as a prerequisite for the acceptance of any material or equipment.

If, in the making of any test of any material or equipment, it is ascertained by the County that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the County.

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

The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the County formally takes over the operation thereof.

B. Costs

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

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

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

C. Inspections of Materials

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

D. Certificate of Manufacture

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

E. Shop Tests of Operating Equipment

Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the work until the County notifies the Contractor, in writing, that the results of such tests are acceptable.

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

F. Preliminary Field Tests

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

G. Final Field Tests

Upon completion of the work and prior to final payment, all equipment and piping installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment and instruments necessary for all acceptance tests, at no additional cost to the County. The Supplier shall assist in the final field tests as applicable.

H. Failure of Tests

Any defects in the materials and equipment or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor. The decision of the County as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make these corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees of specified requirements, the County, notwithstanding its partial payment for work, and materials and equipment, may reject the materials and equipment and may order the Contractor to remove them from the site at his own expense.

In case the County rejects any materials and equipment, then the Contractor shall replace the rejected materials and equipment within a reasonable time. If he fails to do so, the County may, after the expiration of a period of thirty (30) calendar days after giving him notice in writing, proceed to replace such rejected materials and equipment, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under his Contract.

I. Final Inspection

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

1.05 TEMPORARY STRUCTURES

A. Temporary Fences

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

1.06 TEMPORARY SERVICES

A. First Aid

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

1.07 LINES AND GRADES

A. Grade

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

B. Safeguarding Marks

The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or removing without authorization such established points, stakes and marks.

The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

C. Datum Plane

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

1.08

ADJACENT STRUCTURES AND LANDSCAPING

A. Responsibility

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

Contractor is expressly advised that the protection of buildings, structures, tunnels, tanks, pipelines, etc. and related work adjacent and in the vicinity of his operations, wherever they may be, is solely his responsibility. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the Work shall be performed by and be the responsibility of the Contractor.

Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the County. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the County.

Prior to the beginning of any excavations, the Contractor shall advise the County of all buildings or structures on which he intends to perform work or which performance of the project work will affect.

B. Protection of Trees

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

C. Lawn Areas

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

D. Restoration of Fences

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

1.09 PROTECTION OF WORK AND PUBLIC

A. Barriers and Lights

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

B. Smoke Prevention

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

C. Noise

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

D. Access to Public Services

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

E. Dust prevention

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

1.10 CUTTING AND PATCHING

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

1.11 CLEANING

A. During Construction

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

B. Final Cleaning

At the conclusion of the work, all equipment, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished and new operating condition.

1.12 MISCELLANEOUS

A. Protection Against Siltation and Bank Erosion

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

B. Protection of Wetland Areas

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

C. Existing Facilities

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

D. Use of Chemicals

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS/REQUIREMENTS INCLUDED

- A. The work included, but is not limited to, in this contract consists of the following:
- Force Main 8:
1. Construction of approximately 1,360 LF of 6-inch force main from Lift Station 8 to a manhole north of the intersection of Marina Drive and Clark Drive.
- Force Main 15:
2. Construction of approximately 1,800 LF of 6-inch force main from Lift Station 15 to a proposed manhole west of the intersection of Pine Avenue and South Bay Blvd.
- Force Main 1:
3. Construction of approximately 2,850 LF of 6-inch force main from Lift Station 1 to a point of connection to existing force main north of the intersection of Cortez Road West and Gulf Drive North.
 4. Construction of approximately 760 LF of 10-inch force gravity sewer from Manhole 18496 to Manhole 20192, running along 5th Street South, Gulf Drive North, and 6th Street South.
- All Projects:
5. Projects include restoration of pavement and asphalt that will be disturbed by the construction of the force mains; restoration of all concrete, brick, and shell driveways; landscaping, grass, removal and replacement of mailboxes and signs.
- B. The Contractor shall furnish all shop drawings, working drawings, labor, materials, equipment, tools, services and incidentals necessary to complete all work required by these Specifications and as shown on the Contract Drawings.
- C. The Contractor shall perform the work complete, in place and ready for continuous service and shall include any repairs, replacements, and/or restoration required as a result of damages caused prior to acceptance by the County.
- D. The Contractor shall furnish and install all materials, equipment and labor which is reasonably and properly inferable and necessary for the proper completion of the work, whether specifically indicated in the Contract Documents or not.

1.02 CONTRACTS

Construct all the Work under a single contract.

1.03 WORK SEQUENCE

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

- B. The Contractor shall, if necessary and feasible, construct the work in stages to accommodate the County's use of the premises during the construction period; coordinate the construction schedule and operations with the County's Representative.
- C. The Contractor shall, where feasible, construct the Work in stages to provide for public convenience and not close off public use of any facility until completion of construction to provide alternative usage.

1.04 CONSTRUCTION AREAS

- A. The Contractor shall: Limit his use of the construction areas for work and for storage, to allow for:
 - 1. Work by other Contractors.
 - 2. County's Use.
 - 3. Public Use.
- B. Coordinate use of work site under direction of County's Representative.
- C. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.
- D. Move any stored products under the Contractor's control, which interfere with operations of the County or separate contractor.
- E. Obtain and pay for the use of additional storage of work areas needed for Contractor operations.

1.05 COUNTY OCCUPANCY

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

1.06 PARTIAL COUNTY OCCUPANCY

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

SECTION 01015

CONTROL OF WORK

PART 1 GENERAL

1.01 WORK PROGRESS

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

1.02 PRIVATE LAND

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

1.03 WORK LOCATIONS

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

1.04 OPEN EXCAVATIONS

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

1.05 DISTRIBUTION SYSTEMS AND SERVICES

- A. The Contractor shall avoid interruptions to water, telephone, cable TV, sewer, gas, or other related utility services. He shall notify the County and the appropriate agency well in advance of any requirement for dewatering, isolating, or relocating a section of a utility, so that necessary arrangements may be made.
- B. If it appears that utility service will be interrupted for an extended period, the County may order the Contractor to provide temporary service lines at the Contractor's expense. Inconvenience of the users shall be kept to the minimum, consistent with existing conditions. The safety and integrity of the systems are of prime importance in scheduling work.

1.06 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. The Contractor shall assume full responsibility for the protection of all buildings, structures and utilities, public or private, including poles, signs, services to building utilities, gas pipes, water pipes, hydrants, sewers, drains and electric and telephone cables and other similar facilities, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operation shall be repaired by the Contractor at his expense.
- B. The Contractor shall bear full responsibility for obtaining locations of all underground structures and utilities (including existing water services, drain lines and sewers). Services to buildings shall be maintained and all costs or charges resulting from damage thereto shall be paid by the Contractor.
- C. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the unit prices established in the Bid.
- D. If, in the opinion of the County, permanent relocation of a utility owned by the County is required, he may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work as classified in the General Conditions. If relocation of a privately-owned utility is required, the County will notify the utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the County and utility and shall have no claim for delay due to such relocation. The Contractor shall notify public utility companies in writing at least 48 hours (excluding Saturdays, Sundays and legal holidays) before excavating near their utilities.

1.07 TEST PITS

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

1.08 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition equal or better to that existing before the damage was done, or he shall make good the damage in another manner acceptable to the County.
- B. All sidewalks which are disturbed by the Contractor's operations shall be restored to their original or better condition by the use of similar or comparable materials. All curbing shall be restored in a condition equal to the original construction and in accordance with the best modern practice.
- C. Along the location of this work, all fences, walks, bushes, trees, shrubbery and other physical features shall be protected and restored in a thoroughly workmanlike manner unless otherwise shown on the drawings. Fences and other features removed by the Contractor shall be replaced in the location indicated by the County as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be regraded and sodded to equal or exceed original conditions.
- D. Trees close to the work which drawings do not specify to be removed, shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification to the County. All injuries to bark, trunk, limbs and roots of trees shall be repaired by dressing, cutting and painting according to approved methods, using only approved tools and materials.
- E. The protection, removal and replacement of existing physical features along the line of work shall be a part of the work under the Contract and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Bid.

1.09 MAINTENANCE OF TRAFFIC

- A. Open pits, trenches, unpaved streets, debris, or other obstructions due to construction that will prevent the normal flow of traffic during an extended construction stoppage, for any reason, shall be minimized. In the event an extended construction stoppage is found to be necessary, Contractor shall, at his own expense, provide normal traffic flow during extended construction stoppage. Extended stoppage will be defined by the County.
- B. All excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary roadways, erect wheel guards or fences, or take other safety measures which are satisfactory to the County.

- C. Any changes to the traffic pattern require a Traffic Control Plan as detailed in section 01570 of this specification.

1.10 WATER FOR CONSTRUCTION PURPOSES

- A. In locations where public water supply is available, the Contractor may purchase water for all construction purposes.
- B. The Contractor shall be responsible for paying for all water tap fees incurred for the purpose of obtaining a potable water service or temporary use meter.

1.11 MAINTENANCE OF FLOW

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

1.12 CLEANUP

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

1.13 COOPERATION WITHIN THIS CONTRACT

- A. All firms or person authorized to perform any work under this Contract shall cooperate with the General Contractor and his subcontractors or trades and shall assist in incorporating the work of other trades where necessary or required.
- B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the County.

1.14 PROTECTION OF CONSTRUCTION AND EQUIPMENT

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

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

1.15 CONSTRUCTION WITHIN RIGHT-OF-WAY

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01030

SPECIAL PROJECT PROCEDURES

PART 1 GENERAL

1.01 PERMITS

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

1.02 CONNECTIONS TO EXISTING SYSTEM

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

1.03 RELOCATIONS

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

1.04 EXISTING UNDERGROUND PIPING, STRUCTURES AND UTILITIES

- A. The attention of the Contractor is drawn to the fact that during excavation, the possibility exists of the Contractor encountering various utility lines not shown on the Drawings. The Contractor shall exercise extreme care before and during excavation to locate and flag these lines as to avoid damage to the existing lines.
- B. It is the responsibility of the Contractor to ensure that all utility or other poles, the stability of which may be endangered by the close proximity of excavation, are temporarily stayed in position while work proceeds in the vicinity of the pole and that the utility or other companies concerned be given reasonable advance notice.
- C. The existing utility locations are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping to be encountered. The Contractor shall be responsible for notifying the various utility companies to locate their respective utilities in advance of construction in conformance with all requirements provided for in the Florida Underground Facilities Damage Prevention and Safety Act (Florida Statutes, Title XXXIII, Chapter 556).

- D. The existing piping and utilities that interfere with new construction shall be rerouted as shown, specified, or required. Before any piping and utilities not shown on the Drawings are disturbed, the Contractor shall notify the County and shall provide suggestions on how best to resolve the issue.
- E. The Contractor shall exercise care in any excavation to locate all existing piping and utilities. All utilities which do not interfere with complete work shall be carefully protected against damage. Any existing utilities damaged in any way by the Contractor shall be restored or replaced by the Contractor at his expense as directed by the County.
- F. It is intended that wherever existing utilities such as water, sewer, gas, telephone, electrical, or other service lines must be crossed, deflection of the pipe within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated in the Drawings. However, when in the opinion of the County this procedure is not feasible, he may direct the use of fittings for a utilities crossing as detailed on the Drawings. No deflections will be allowed in gravity sanitary sewer lines or in existing storm sewer lines.

1.05 SUSPENSION OF WORK DUE TO WEATHER

Refer to FDOT Standards and Specifications Book, Section 8.

1.06 HURRICANE PREPAREDNESS PLAN

- A. Within 30 days of the date of Notice to Proceed, the Contractor shall submit to the County a Hurricane Preparedness Plan. The plan should outline the necessary measures which the Contractor proposes to perform at no additional cost to the County in case of a hurricane warning.
- B. In the event of inclement weather, or whenever County shall direct, Contractor shall insure that he and his Subcontractors shall carefully protect work and materials against damage or injury from the weather. If, in the opinion of the County, any portion of work or materials is damaged due to the failure on the part of the Contractor or Subcontractors to protect the work, such work and materials shall be removed and replaced at the expense of the Contractor.

1.07 POWER SUPPLY

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

1.08 SALVAGE

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

1.09 DEWATERING

- A. The Contractor shall do all groundwater pumping necessary to prevent flotation of any part of the work during construction operations with his own equipment.
- B. The Contractor shall pump out water and wastewater which may seep or leak into the excavations for the duration of the Contract and with his own equipment. He shall dispose of this water in an appropriate manner.

1.10 ADDITIONAL PROVISIONS

- A. Before commencing work on any of the existing pipelines, structures or equipment, the Contractor shall notify the County, in writing, at least 10 calendar days in advance of the date he proposes to commence such work.
- B. The Contractor shall provide, at his own expense, all necessary temporary facilities for access to and for protection of, all existing facilities. The County's personnel must have ready access at all times to the existing facilities. The Contractor is responsible for all damage to existing structures, equipment and facilities caused by his construction operations and must repair all such damage when and as ordered by the County.

1.11 CONSTRUCTION CONDITIONS

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

1.12 PUBLIC NUISANCE

- A. The Contractor shall not create a public nuisance including but not limited to encroachment on adjacent lands, flooding of adjacent lands, excessive noise or dust.
- B. Sound levels must meet Manatee County Ordinance #87-34, (which amends Ordinance 81-3, The Manatee County Noise Control Ordinance). Sound levels in excess of such ordinance are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the County for excessive noise shall not relieve the Contractor of the other portions of this specification.
- C. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

1.13 WARRANTIES

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

- B. The material shall be warranted to be free from defects in workmanship, design and materials. If any part of the system should fail during the warranty period, it shall be replaced at no expense to the County. All material and installation costs shall be 100% borne by the Contractor.
- C. The manufacturer's warranty period shall run concurrently with the Contractor's warranty or guarantee period. No exception to this provision shall be allowed. The Contractor shall be responsible for obtaining warranties from each of the respective suppliers or manufacturers for all the material specified under these contract specifications,
- D. In the event that the manufacturer is unwilling to provide a three-year warranty commencing at the time of County acceptance, the Contractor shall obtain from the manufacturer a four (4) year warranty starting at the time of equipment delivery to the job site. This four-year warranty shall not relieve the Contractor of the three-year warranty starting at the time of County acceptance of the equipment.

1.14 FUEL STORAGE & FILLING

- A. If the contractor is storing fuel on site, or doing his own fuel filling of portable equipment (other than hand-held equipment), he is responsible for any required response, clean-up or reporting required, at no additional cost to the county.
- B. The Contractor shall prepare and submit a fuel storage / spill abatement plan prior to start of construction if required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01045
CUTTING AND PATCHING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

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

PART 2 PRODUCTS

2.01 MATERIALS

Comply with specifications and standards for each specific product involved.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect existing conditions of project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of work.
- C. Report unsatisfactory or questionable conditions to County. Do not proceed with work until County has provided further instructions.

3.02 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value to integrity of affected portion of work.
- B. Provide devices and methods to protect other portions of project from damage.
- C. Provide protection from elements for that portion of the project which may be exposed by cutting and patching work and maintain excavations free from water.

3.03**PERFORMANCE**

- A. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.
- C. Fit and adjust products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- D. Restore work which has been cut or removed; install new products to provide completed work in accordance with the requirements of the Contract Documents.
- E. Replace surfaces airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- F. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.

END OF SECTION

SECTION 01050

FIELD ENGINEERING AND SURVEYING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall provide and pay for field surveying service required for the project.
- B. The Contractor shall furnish and set all necessary stakes to establish the lines and grades as shown on the Contract Drawings and layout each portion of the Work of the Contract.

1.02 QUALIFICATION OF SURVEYOR AND ENGINEER

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

1.03 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the Project are designated on the Contract Drawings.
- B. Locate and protect all survey monumentation, property corners and project control points prior to starting work and preserve all permanent reference points during construction. All costs associated with the replacement of all survey monumentation, property corners and project control points shall be borne by the Contractor.

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

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

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

Establish replacements based on original survey control.

1.04 PROJECT SURVEY REQUIREMENTS

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

1.05 RECORDS

The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings per Section 01720.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

PART 1 GENERAL

1.01 REQUIREMENTS

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

- A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents, or applicable codes established stricter standards.
- B. Publication Date: The most recent publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.

1.03 ABBREVIATIONS, NAMES AND ADDRESSES OR ORGANIZATIONS

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

AA	Aluminum Association 818 Connecticut Avenue, N.W. Washington, DC 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capital Street, N.W. Washington, DC 20001
ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AISC	American Institute of Steel Construction 1221 Avenue of the Americas New York, NY 10020
AISI	American Iron and Steel Institute 1000 16th Street NW Washington, DC 20036

ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 179I Tullie Circle, N.E. Atlanta, GA 30329
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
AWS	American Welding Society 2501 N.W. 7th Street Miami, FL 33125
CRSI	Concrete Reinforcing Steel Institute 180 North LaSalle Street, Suite 2110 Chicago, IL 60601
FDEP	Florida Department of Environmental Protection 3900 Commonwealth Blvd. Tallahassee, FL 32399
FDOT	Florida Department of Transportation Standards Specifications for Road and Bridge Construction Maps & Publication Sales - Mail Station 12 605 Suwannee St. Tallahassee, FL 32399-0450
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, DC 20407
MCPW UTIL STD	Manatee County Utility Engineering 4410-B 66th St. W. Bradenton, FL 34210

MLSFA	Metal Lath/Steel Framing Association 221 North LaSalle Street Chicago, IL 60601
MMA	Monorail Manufacturer's Association 1326 Freeport Road Pittsburgh, PA 15238
NAAMM	National Association of Architectural Metal Manufacturers 221 North LaSalle Street Chicago, IL 60601
NEMA	National Electrical Manufacturer's Assoc. 2101 L Street N.W. Washington, DC 20037
OHSA	Occupational Safety and Health Assoc. 5807 Breckenridge Pkwy., Suite A Tampa, FL 33610-4249
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 20076
PCI	Prestressed Concrete Institute 20 North Wacker Drive Chicago, IL 60606
SDI	Steel Door Institute 712 Lakewood Center North Cleveland, OH 44107
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association 8224 Old Court House Road Vienna, VA 22180
SSPC	Steel Structures Painting Council 402 24 th Street, Suite 600 Pittsburgh, PA 15213
SWFWMD	Southwest Florida Water Management District 2379 Broad Street Brooksville, FL 34604-6899
UL	Underwriter's Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE

- A. The scope of this section of the Contract Documents is to further define the items included in each Bid Item in the Bid Form section of the Contract Documents. Payment will be made based on the specified items included in the description in this section for each bid item.
- B. All contract prices included in the Bid Form section will be full compensation for all shop drawings, working drawings, labor, materials, tools, equipment and incidentals necessary to complete the construction as shown on the Drawings and/or as specified in the Contract Documents to be performed under this Contract. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction in the manner set up for each item in this section of the Specifications. Payment for all items listed in the Bid Form will constitute full compensation for all work shown and/or specified to be performed under this Contract.

1.02 ESTIMATED QUANTITIES

The quantities shown are approximate and are given only as a basis of calculation upon which the award of the Contract is to be made. The County does not assume any responsibility for the final quantities, nor shall the Contractor claim misunderstanding because of such estimate of quantities. Final payment will be made only for satisfactorily completed quantity of each item.

1.03 WORK OUTSIDE AUTHORIZED LIMITS

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

1.04 MEASUREMENT STANDARDS

Unless otherwise specified for the particular items involved, all measurements of distance shall be taken horizontally or vertically.

1.05 AREA MEASUREMENTS

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

1.06 LUMP SUM ITEMS

Where payment for items is shown to be paid for on a lump sum basis, no separate payment will be made for any item of work required to complete the lump sum items. Lump sum contracts shall be complete, tested and fully operable prior to request for final payment. Contractor may be required to provide a break-down of the lump sum totals.

1.07 UNIT PRICE ITEM

Separate payment will be made for the items of work described herein and listed on the Bid Form. Any related work not specifically listed, but required for satisfactory completion of the work shall be considered to be included in the scope of the appropriate listed work items.

No separate payment will be made for the following items and the cost of such work shall be included in the applicable pay items of work. Final payments shall not be requested by the Contractor or made by the County until as-built (record) drawings have been submitted and approved by the County.

1. Shop Drawings, Working Drawings.
2. Clearing, grubbing and grading except as hereinafter specified.
3. Trench excavation, including necessary pavement removal and rock removal, except as otherwise specified.
4. Dewatering and disposal of surplus water.
5. Structural fill, backfill, and grading.
6. Replacement of unpaved roadways, and shrubbery plots.
7. Cleanup and miscellaneous work.
8. Foundation and borrow materials, except as hereinafter specified.
9. Testing and placing system in operation.
10. Any material and equipment required to be installed and utilized for the tests.
11. Pipe, structures, pavement replacement, asphalt and shell driveways and/or appurtenances included within the limits of lump sum work, unless otherwise shown.
12. Maintaining the existing quality of service during construction.
13. Maintaining or detouring of traffic.
14. Appurtenant work as required for a complete and operable system.
15. Seeding and hydromulching.
16. As-built Record Drawings.

BID ITEM – MOBILIZATION

Measurement and payment for this Bid Item shall include full compensation for the required 100 percent (100%) Performance Bond, 100 Percent (100%) Payment Bond, all required insurance for the project and the Contractor's mobilization and demobilization costs as shown in the Bid Form. Mobilization includes, but it not limited to: preparation and movement of personnel, equipment, supplies and incidentals such as safety and sanitary supplies/facilities.

Payment for mobilization shall not exceed 10 percent (10%) of the total Contract cost unless the Contractor can prove to the County that his actual mobilization cost exceeds 10 percent (10%).

Partial payments for this Bid Item will be made in accordance with the following schedule:

Percent of Original Contract Amount:	Percent Allowable Payment of Mobilization/Demobilization Bid Item Price:
5	25
10	35
25	45
50	50
75	75
100	100

These payments will be subject to the standard retainage provided in the Contract. Payment of the retainage will be made after completion of the work and demobilization.

BID ITEM	DESCRIPTION	UNITS
1,31,51	Mobilization	LS

BID ITEM – MAINTENANCE OF TRAFFIC

Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the lump sum price bid for all maintenance of traffic, including coordination with FDOT, including all other local agencies, and all equipment and manpower necessary to comply with the FDOT Design Standards 600 Series.

Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM	DESCRIPTION	UNITS
2,32,52	Maintenance of Traffic	LS

BID ITEM – PRECONSTRUCTION VIDEO

Payment for all work included in this Bid Item will be made at the applicable Contract lump sum bid for the preconstruction video of the existing site conditions. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work, ready for approval and acceptance by the County.

Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor In accordance with the Contract Documents.

BID ITEM	DESCRIPTION	UNITS
3,33,53	Preconstruction Video	LS

BID ITEM – EROSION AND SEDIMENT CONTROL

Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the lump sum price bid for erosion and sediment control, including permitting if required, coordination with federal, state and local agencies and all equipment and manpower necessary to comply with necessary agencies.

Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM	DESCRIPTION	UNITS
4,34,54	Erosion and Sediment Control	LS

BID ITEM – CLEARING AND GRUBBING

Payment for all work included under this Bid Item shall be quantified by the Contractor and paid for as a lump sum amount for all of the areas that will require clearing and grubbing for the pipe installation and in accordance with the plans and specifications. Clearing and grubbing shall include the removal and disposal of trees, tree roots, rock, abandoned pipe and other features not part of the proposed improvements. The Contractor shall include the cost of any and all permitting required for the burning of removed trees and vegetation.

Unless otherwise indicated herein these documents or in the construction plans, clearing and grubbing includes a ten (10) foot strip along the pipeline route. The contractor will be responsible for making their own determination as to the acreage and quantity of clearing and grubbing.

Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor In accordance with the Contract Documents.

BID ITEM	DESCRIPTION	UNITS
5,35,55	Clearing and Grubbing	LS

BID ITEM – UTILITY LOCATES

Payment for all work included in this Bid Item will be made at the applicable Contract lump sum bid for the location of existing utilities in the project area. Payment shall represent full compensation for all labor, materials, necessary equipment, restoration, and incidentals necessary to complete the work and identified on the plans, ready for approval and acceptance by the County.

Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor In accordance with the Contract Documents.

BID ITEM	DESCRIPTION	UNITS
6,36,56	Utility Locates	LS

BID ITEM – PROJECT SIGNS

Payment for all work included in this Bid Item will be made at the applicable Contract lump sum bid for the necessary signage required during construction. At least two (2) project signs should be used per project. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work, ready for approval and acceptance by the County.

Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor In accordance with the Contract Documents.

BID ITEM	DESCRIPTION	UNITS
7,37,57	Project Signs	LS

BID ITEM – RECORD DRAWINGS

Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the lump sum price bid for as-built record drawings in accordance with the contract documents or any other required certifications to put proposed project into service. All items are subject to approval by the Engineer and the County.

Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor In accordance with the Contract Documents.

BID ITEM	DESCRIPTION	UNITS
8,38,58	Record Drawings	LS

BID ITEM – PIGGING AND PRESSURE TESTING

Payment for all work included in this Bid Item will be made at the applicable Contract lump sum bid for test pigging and pressure testing the proposed force main. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals

necessary to complete the work, ready for approval and acceptance by the County.

Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor In accordance with the Contract Documents.

BID ITEM	DESCRIPTION	UNITS
9,39,59	Pigging and Pressure Testing	LS

BID ITEM – PVC (C-900) FORCE MAINS

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter PVC force main (AWWA C-900, CL-150, CL-235) pipe as shown on the Contract Drawings and listed on the Bid Form.

Measurement and Payment shall be made for the actual length of the listed diameter pipe and installed and will represent full compensation for all labor, materials, restraints, excavation, including rock, dewatering, bedding, backfill, compaction, testing and equipment required to complete these Bid Items, including removal of existing abandoned pipelines that may be in conflict. No additional compensation shall be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

BID ITEM	DESCRIPTION	UNITS
10,40,60	6" DR 18 PVC Pipe	LF

BID ITEM – HDPE PIPE

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter HDPE pipe by directional drill and associated connection pipe sections as shown on the Contract Drawings and listed on the Bid Form. As part of the testing methods for the HDPE pipe installation, the Contractor shall televise or pull a mandrill through the installed HDPE pipe to verify sound installation.

Measurement and Payment shall be made for the actual length of the listed diameter pipe directional drilled and installed, and will represent full compensation for all labor, materials, excavation, including rock, dewatering, bedding, backfill, compaction, testing, pipe restraints, mud trailer, and equipment required to complete these Bid Items. No additional compensation shall be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement. No additional compensation shall be made for extensive dewatering or any water treatment services or equipment that may be required for contaminated groundwater.

BID ITEM	DESCRIPTION	UNITS
11,41,61	6" DR 11 HDPE Pipe	LF

BID ITEM – PVC (SDR 26) GRAVITY SEWER

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter PVC gravity sewer pipe as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made for the actual length of the listed diameter pipe and installed and will represent full compensation for all labor, materials, restraints, excavation, including rock, dewatering, bedding, backfill, compaction, testing and equipment required to complete these Bid Items, including removal of existing abandoned pipelines that may be in conflict. No additional compensation shall be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

BID ITEM	DESCRIPTION	UNITS
62	10" SDR 26 PVC Pipe	LF

BID ITEM - DUCTILE IRON FITTINGS, WASTEWATER

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid for furnishing and installing each listed ductile iron fitting (Protecto 401 epoxy lined) as shown on the Contract Drawings and listed on the Bid Form. Payment will be made for each fitting installed and will represent full compensation for all labor, material, excavation, stainless steel hardware, mechanical joint restraints, including rock, bedding, backfill, compaction, testing and equipment required to complete these Bid Items.

BID ITEM	DESCRIPTION	UNITS
12,42,63	6" 45° Bend	EA
13,64	6" 22.5° Bend	EA
14,43,65	6" 11.25° Bend	EA

BID ITEM – PLUG VALVES

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each valve for furnishing and installing the listed diameter valve, box, cover, pipe adaptor, and concrete pad as shown on the Contract Drawings and listed on the Bid Form. All Plug Valves shall be "true" full 100% port eccentric plug valves. Payment shall represent full compensation for all labor, material, excavation, including rock as necessary, bedding, backfill, compaction, testing and equipment required to complete these Bid Items.

BID ITEM	DESCRIPTION	UNITS
15,44,66	6" Plug Valves	EA

BID ITEM – BELL JOINT PIPE RESTRAINTS

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each restraint required to restrain the piping required by the Contract Drawings. Measurement will be based on each complete restraint furnished and installed except where specifically included in another pay item. Payment shall represent full compensation for all labor, material, equipment, excavation, including rock, bedding,

backfill, compaction, and testing required to complete this Bid Item. This Bid Item includes the installation of stainless steel hardware, restraints used in restraining PVC and ductile iron pipe of the specified type acceptably furnished and installed as shown on the drawings or where directed by the Project Representative and in accordance with the pipe and restraint manufacturer's requirements. The work shall include, but is not limited to, all bolts, nuts, washers, gaskets, and all other related and necessary materials, work and equipment required or associated with this item.

BID ITEM	DESCRIPTION	UNITS
16,45,67	6" Bell Joint Pipe Restraints	EA

BID ITEM – AIR RELEASE VALVES

Payment for all work included in this Bid Item shall be at the applicable Contract unit price bid per each air release valve for furnishing and installing the listed diameter air release valve, box, cover and concrete pad as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock as necessary, bedding, backfill, compaction testing, disinfection and equipment required to complete these Bid Items.

BID ITEM	DESCRIPTION	UNITS
17,46	2" ARV Type 2 (Above Ground)	EA
68	2" ARV Type 2 (Below Ground)	EA

BID ITEM – FORCE MAIN CONNECTIONS

Payment for all work included, but is not limited to, under these Bid Items shall represent full compensation in accordance with the lump sum price bid for proposed connections to force mains. Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the lump sum price bid for all labor, fittings, excavation, dewatering, bedding, backfill, compaction, testing, equipment, the temporary shutdown of the existing lift station to connect the proposed force main, and all temporary line stops for force main connections. Bid item should also include the following provisions for each lift station:

LS 8 – Marina Drive and 73rd Street– 2 septic storage trucks

LS 15 – 58th Pine Avenue and South Bay Blvd– 2 septic storage trucks

LS 1 –Cortez Road West and Gulf Drive North– 2 septic storage trucks

Coordinate with Nick Wagner (Lift Station Superintendent) with Manatee County for shutdown of Lift Stations. At least four days' notice needs to be provided to Nick to coordinate shutdown. Phone Number: 941-792-8811 EXT 5377. Connection must also be made outside of peak hours between 9PM and 5AM.

Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM	DESCRIPTION	UNITS
18,47,69	Connection to Existing Force Mains	LS

BID ITEM – CONNECTION TO MANHOLE

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each manhole connection. Payment shall represent full compensation for all labor, materials, and equipment. For manhole connection this pay items includes, but not limited to, rebuilding the existing bench, coring, fittings, bypass pumping, grout, and relining the manhole.

BID ITEM	DESCRIPTION	UNITS
19,70	Connection to Manhole	EA

BID ITEM – GROUT FILL ABANDONED EXISTING PIPELINES

Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the unit price bid per cubic yard of grout fill that is required to abandon all of the existing pipelines to be deactivated. Payment will include all equipment, labor, fittings, temporary connections, line-stops, and appurtenances required to maintain operations and abandon the existing force mains in accordance with County standards.

BID ITEM	DESCRIPTION	UNITS
20,48,71	Grout Fill Abandoned Existing Pipelines	CY

BID ITEM – PAVEMENT REPAIR AND ROAD RESTORATION

Payment for all work included in these Bid Items will be made at the applicable Contract unit price listed below for soil, crushed concrete, milling and asphaltic concrete, for the roadway restoration as listed on the Bid Form. Payment shall represent full compensation for all labor, materials and equipment for cutting the edges of existing roadway, compacting subgrade, furnishing and installing the crushed concrete, asphaltic concrete and all incidentals necessary to complete the roadway restoration as shown on the Contract Drawings and included in the Specifications, all ready for approval and acceptance by the County.

BID ITEM	DESCRIPTION	UNITS
21,72	Soil Subgrade	CY
22,73	Crushed Concrete Base	SY
23,74	Structural Course Asphalt Base – SP 12.5	TN
24,75	Friction Course Overlay – FC 12.5	TN
25,76	Milling	SY

BID ITEM – SODDING

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per square yard or each for furnishing and installing like-for-like sod along the project alignment. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work, ready for approval and acceptance by the County.

BID ITEM	DESCRIPTION	UNITS
26,77	Sodding	SY

BID ITEM – SIDEWALK REPAIR

Payment for all work included under this Bid Item will be made at the Contract unit price bid per square yard of concrete sidewalk installed as shown in the Contract Drawings and as listed on the Bid Form. Measurement will be based on the actual number of square yards of concrete sidewalk installed, tested, completed and approved. No payment for restoration of a private driveway within or outside the right-of-way shall be made under this Bid Item. Sidewalks shall meet the requirements of the Manatee County Transportation Design Standards.

BID ITEM	DESCRIPTION	UNITS
27,78	Sidewalk Repair	SY

BID ITEM - REMOVE AND REPLACE RIP RAP

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per ton for removal and replacement of existing rip rap as shown on the Drawings and listed on the Bid Form. Measurement will be per actual ton of rip rap to be removed and replaced. Payment shall represent full compensation for removal of existing rip rap and all labor, material and equipment for compacting subgrade, forming, furnishing, and reinstalling the rip rap as specified and all incidentals necessary for completion of this Bid Item.

BID ITEM	DESCRIPTION	UNITS
28	Remove and Replace Rip Rap	TON

BID ITEM - REMOVE AND REPLACE EXFILTRATION TRENCH

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per square yard of exfiltration trench and replacement of existing exfiltration trench as shown on the Drawings and listed on the Bid Form. Measurement will be per actual square yard of exfiltration trench to be removed and replaced. Payment shall represent full compensation for removal of existing exfiltration trench and all labor, materials and equipment reinstalling the exfiltration trench as detailed in the contract plans.

BID ITEM	DESCRIPTION	UNITS
29	Remove and Replace Exfiltration Trench	SY

BID ITEM - REMOVE AND RELOCATE FENCE

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per linear foot for removal and reinstallation of existing fence (as shown on the Drawings and listed on the Bid Form). Measurement will be per actual number of linear feet of fence removed and reinstalled. Payment shall represent full compensation for all labor, material and equipment to properly reinstall existing fence.

BID ITEM	DESCRIPTION	UNITS
30	Remove and Replace Fence	LF

BID ITEM – PRECAST CONCRETE DOGHOUSE MANHOLE

Payment for work under this Bid Item shall be made at the Contract unit price bid for each doghouse manhole furnished and installed including frame and cover, connections, construction of invert, all protective coatings, drop connections, sealing of lift holes, and lining, within these Specifications.

Measurement shall be for each manhole installed complete and accepted. Payment shall be made per unit price for the category of depth as determined by the proposed rim and invert. All stubs and plugs shown or called for on the Contract Drawings shall be included in the unit price bid for manholes. Excavation, including rock as necessary, bedding, backfill, dewatering, sheeting, testing and any and all other items necessary for a completed system in accordance with the Contract Documents shall be included. Payment shall represent full compensation for all labor, materials, equipment and incidental items necessary to complete each concrete manhole structure, ready for approval and service by the County.

BID ITEM	DESCRIPTION	UNITS
49,79	Doghouse Manhole	EA

BID ITEM - DRIVEWAY RESTORATION

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid per square yard of shell, concrete, or brick paver driveway restoration as listed on the Bid Form. Measurement of driveway restoration will be per the actual number of square yards replaced. Payment shall represent full compensation for all labor, materials and equipment for cutting the edges of existing driveways or removing and salvaging brick pavers, compacting subgrade, furnishing and installing the shell, concrete, or brick, including all incidentals necessary to complete the driveway restoration as shown on the Contract Drawings and included in the Specifications, all ready for approval and acceptance by the County.

BID ITEM	DESCRIPTION	UNITS
50,80	Shell Driveway	SY
81	Brick Driveway	SY
82	Concrete Driveway	SY

BID ITEM - PRECAST CONCRETE MANHOLE

Payment for work under this Bid Item shall be made at the Contract unit price bid for each manhole furnished and installed including frame and cover, fiberglass liner as required, construction of invert, protective coatings, drop connections if applicable, sealing of lift holes, rainwater protector, etc.

Measurement shall be for each manhole installed complete and accepted. Payment shall be made per unit price for the category of depth as determined by the proposed rim and invert. All stubs and plugs shown or called for on the Contract Drawings shall be included in the unit price bid for manholes. Excavation, including rock as necessary, bedding, backfill, dewatering, sheeting, testing and any and all other items necessary for a completed system in accordance with the Contract Documents shall be included. Payment shall represent full compensation

for all labor, materials, equipment and incidental items necessary to complete each concrete manhole structure, ready for approval and service by the County.

BID ITEM	DESCRIPTION	UNITS
83	Concrete Manhole	EA

BID ITEM – MANHOLE ABANDONMENT

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for each manhole abandonment as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, bedding, backfill, compaction, testing and disinfection and equipment required to complete these Bid Items.

BID ITEM	DESCRIPTION	UNITS
84	Manhole Abandonment	EA

BID ITEM – LATERAL RECONNECTION

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for each lateral reconnection as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, materials, equipment, fittings, connections, excavation, including rock, bedding, backfill, compaction, testing and disinfection and equipment required to complete these Bid Items.

BID ITEM	DESCRIPTION	UNITS
85	Lateral Reconnection	EA

BID ITEM – REMOVE AND REINSTALL CATCH BASIN

Payment for all work included in this Bid Item shall be per each catch basin removed and reinstalled as shown in the construction plans. Payment shall represent full compensation for all labor, excavation, compaction, materials equipment, grouting, and preparation required to complete this Bid Item.

BID ITEM	DESCRIPTION	UNITS
86	Remove and Replace Catch Basin	EA

BID ITEM – MAILBOX REMOVAL AND REPLACEMENT

Payment for all work included in this Bid Item shall be per each mailbox removed and replaced/relocated as shown in the construction plans. Payment shall represent full compensation for all labor, excavation, compaction, material, preparation, installation and equipment required to complete this Bid Item.

BID ITEM	DESCRIPTION	UNITS
87	Mailbox Removal and Replacement	EA

BID ITEM – PERMIT ALLOWANCE

The County is allowing for a City of Holmes Beach and City of Anna Maria Right-of-Way permitting allowance of up to \$5,000. Contractor shall include this allowance in his bid. Payment will only be made for the actual Permit Fee. Contractor shall provide justification for payment at time of billing.

BID ITEM	DESCRIPTION	UNITS
88	Permit Allowance	LS

BID ITEM – CONTRACT CONTINGENCY

Payment for all work under this Bid Item shall be made only at the County's discretion. This Bid Item shall not exceed 10% of the Bidders Total Base Bid. The Bidder shall calculate and enter a dollar amount for this Bid Item.

BID ITEM	DESCRIPTION	UNITS
89	Contract Contingency	LS

BID ALTERNATIVE 1 - CLOSE TOLERANCE HDD

Payment for all work included under this Bid Alternative shall be made at the Contract unit price bid per the schedule of prices for furnishing and Certa-Lok PVC DR 18 pipe by close tolerance directional drill and associated connection pipe sections as shown on the Contract Drawings. As part of the testing methods for the HDPE pipe installation, the Contractor shall televise or pull a mandrill through the installed HDPE pipe to verify sound installation.

Measurement and Payment shall be made for the actual length of the listed diameter pipe close tolerance directional drilled and installed, and will represent full compensation for all labor, materials, excavation, including rock, dewatering, bedding, backfill, compaction, testing, pipe restraints, mud trailer, and equipment required to complete these Bid Items. No additional compensation shall be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement. No additional compensation shall be made for extensive dewatering or any water treatment services or equipment that may be required for contaminated groundwater.

BID ITEM	DESCRIPTION	UNITS
11A,41A,61A	6" Close Tolerance HDD	LF

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01152

REQUESTS FOR PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

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

1.02 FORMAT AND DATA REQUIRED

- A. Submit payment requests in the form provided by the County with itemized data typed in accordance with the Bid Form.
- B. Provide construction photographs in accordance with Contract Documents.

1.03 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the County requires substantiating data, Contractor shall submit suitable information with a cover letter.
- B. Submit one copy of data and cover letter for each copy of application.

1.04 PREPARATION OF APPLICATION FOR FINAL PAYMENT

Fill in application form as specified for progress payments.

1.05 SUBMITTAL PROCEDURE

- A. Submit applications for payment at the times stipulated in the Agreement.
- B. Number: Three (3) copies of each application; all signed and certified by the Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01153

CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.01 DEFINITION

- A. Change Order: A written order signed by the Owner, the Architect/Engineer and the Contractor authorizing a change in the Project Plans and/or Specifications and, if necessary, a corresponding adjustment in the Contract Sum and/or Contract Time, pursuant to Article V of the General Conditions of the Construction Agreement.
- B. Administrative Change Adjustment: Minor change order under 10% of project cost or 20% time, does not have to be Board approved.
- C. Field Directive: A written order issued by Owner which orders minor changes in the Work not involving a change in Contract Time, to be paid from the Owner's contingency funds.
- D. Field Order: Minor Change to contract work that does not require adjustment of contract sum or expected date of completion.

1.02 REQUIREMENTS INCLUDED

- A. The Contractor shall promptly implement change order procedures:
 - 1. Provide full written data required to evaluate changes.
 - 2. Maintain detailed records of work done on a time-and-material/force account basis.
 - 3. Provide full documentation to County on request.
- B. The Contractor shall designate a member of the Contractor's organization who:
 - 1. Is authorized to accept changes to the Work.
 - 2. Is responsible for informing others in the Contractor's employ of the authorized changes into the Work.

1.03 PRELIMINARY PROCEDURES

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

- B. Contractor may initiate changes by submitting a written notice to the Project Manager, containing:
 - 1. Description of the proposed changes.
 - 2. Statement of the reason for making the changes.
 - 3. Statement of the effect on the Contract Sum and the Contract Time.
 - 4. Statement of the effect on the work of separate contractors.
 - 5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

1.04 FIELD ORDER CHANGE

- A. In lieu of a Change Order, the Project Manager may issue a Field Order for the Contractor to proceed with additional work within the original intent of the Project.
- B. Field Order will describe changes in the work, with attachments of backup information to define details of the change.
- C. Contractor must sign and date the Field Order to indicate agreement with the terms therein.

1.05 DOCUMENTATION OF PROPOSALS AND CLAIMS

- A. Support each quotation for a lump sum proposal and for each unit price which has not previously been established, with sufficient substantiating data to allow the County to evaluate the quotation.
- B. On request, provide additional data to support time and cost computations:
 - 1. Labor required.
 - 2. Equipment required.
 - 3. Products required.
 - a. Recommended source of purchase and unit cost.
 - b. Quantities required.
 - 4. Taxes, insurance and bonds.
 - 5. Credit for work deleted from Contract, similarly documented.
 - 6. Overhead and profit.
 - 7. Justification for any change in Contract Time.
- C. Support each claim for additional costs and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal.
 - 1. Name of the County's authorized agent who ordered the work and date of the order.
 - 2. Date and time work was performed and by whom.
 - 3. Time record, summary of hours work and hourly rates paid.
 - 4. Receipts and invoices for:
 - a. Equipment used, listing dates and time of use.
 - b. Products used, listing of quantities.
 - c. Subcontracts.

1.06 PREPARATION OF CHANGE ORDERS

- A. Project Manager will prepare each Change Order.
- B. Change Order will describe changes in the Work, both additions and deletions, with attachments as necessary to define details of the change.
- C. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.07 LUMP SUM/FIXED PRICE CHANGE ORDER

- A. Project Manager initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by the Contractor, or requests from the County, or both.
- B. Once the form has been completed, all copies should be sent to Contractor for approval. After approval by Contractor, all copies should be sent to County for approval. The County will distribute executed copies after approval by the Board of County Commissioners.

1.08 UNIT PRICE CHANGE ORDER

- A. Contents of Change Orders will be based on, either:
 - 1. County's definition of the scope of the required changes.
 - 2. Contractor's Proposal for a change, as approved by the County.
 - 3. Survey of completed work.
- B. The amounts of the unit prices to be:
 - 1. Those stated in the Agreement.
 - 2. Those mutually agreed upon between County and Contractor.

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

- A. Refer to Article V.5.6 of the General Conditions of the Construction Agreement.

1.10 CORRELATION WITH CONTRACTOR'S SUBMITTALS

- A. Periodically revise Schedule of Values and Application for Payment forms to record each change as a separate item of work, and to record the adjusted Contract Sum.
- B. Periodically revise the Construction Schedule to reflect each change in Contract Time. Revise sub schedules to show changes for other items of work affected by the changes.
- C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The County shall schedule the pre-construction meeting, periodic progress meetings and special meetings, if required, throughout progress of work.
- B. Representatives of contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- C. The Contractor shall attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules.

1.02 PRE-CONSTRUCTION MEETING

- A. Attendance:
 - 1. County's Engineer.
 - 2. County's Project Manager
 - 3. Contractor.
 - 4. Resident Project Representative.
 - 5. Related Labor Contractor's Superintendent.
 - 6. Major Subcontractors.
 - 7. Major Suppliers.
 - 8. Others as appropriate.
- B. Suggested Agenda:
 - 1. Distribution and discussion of:
 - a. List of major subcontractors.
 - b. Projected Construction Schedules.
 - c. Coordination of Utilities
 - 2. Critical work sequencing.
 - 3. Project Coordination.
 - a. Designation of responsible personnel.
 - b. Emergency contact persons with phone numbers.
 - 4. Procedures and processing of:
 - a. Field decisions.
 - b. Submittals.
 - c. Change Orders.
 - d. Applications for Payment.
 - 5. Procedures for maintaining Record Documents.
 - 6. Use of premises:
 - a. Office, work and storage areas.
 - b. County's REQUIREMENTS.
 - 7. Temporary utilities.
 - 8. Housekeeping procedures.

9. Liquidated damages.
10. Equal Opportunity Requirements.
11. Laboratory testing.
12. Project / Job meetings: Progress meeting, other special topics as needed.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULE & PROJECT RESTRAINTS

PART 1 GENERAL

1.01 GENERAL

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

1.02 CONSTRUCTION SCHEDULING GENERAL PROVISIONS

- A. No work shall be done between 7:00 p.m. and 7:00 a.m. nor on weekends or legal holidays without written permission of the County. However, emergency work may be done without prior permission.
- B. Night work may be established by the Contractor as regular procedure with the written permission of the County. Such permission, however, may be revoked at any time by the County if the Contractor fails to maintain adequate equipment and supervision for the proper execution and control of the work at night.
- C. Due to potential health hazards and requirements of the State of Florida and the U.S. Environmental Protection Agency, existing facilities must be maintained in operation.
- D. The Contractor shall be fully responsible for providing all temporary piping, plumbing, electrical hook-ups, lighting, temporary structure, or other materials, equipment and systems required to maintain the existing facility's operations. All details of temporary piping and temporary construction are not necessarily shown on the Drawings or covered in the Specifications. However, this does not relieve the Contractor of the responsibility to ensure that construction will not interrupt proper facility operations.
- E. The Contractor shall designate an authorized representative of his firm who shall be responsible for development and maintenance of the schedule and of progress and payment reports. This representative of the Contractor shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the commitments of the Contractor's schedule.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

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

2.02 FORM OF SCHEDULES

- A. Prepare schedules using the latest version of Microsoft Project, or other County approved software, in the form of a horizontal bar chart diagram. The diagram shall be time-scaled and sequenced by work areas. Horizontal time scale shall identify the first work day of each week.
- B. Activities shall be at least as detailed as the Schedule of Values. Activity durations shall be in whole working days. In addition, man-days shall be shown for each activity or tabulated in an accompanying report.
- C. Diagrams shall be neat and legible and submitted on sheets at least 8-1/2 inches by 11 inches suitable for reproduction. Scale and spacing shall allow space for notations and future revisions.

2.03 CONTENT OF SCHEDULES

- A. Each monthly schedule shall be based on data as of the last day of the current pay period.
- B. Description for each activity shall be brief, but convey the scope of work described.
- C. Activities shall identify all items of work that must be accomplished to achieve substantial completion, such as items pertaining to Contractor's installation and testing activities; items pertaining to the approval of regulatory agencies; contractor's time required for submittals, fabrication and deliveries; the time required by County to review all submittals as set forth in the Contract Documents; items of work required of County to support pre-operational, startup and final testing; time required for the relocation of utilities. Activities shall also identify interface milestones with the work of other contractors performing work under separate contracts with County.
- D. Schedules shall show the complete sequence of construction by activities. Dates for beginning and completion of each activity shall be indicated as well as projected percentage of completion for each activity as of the first day of each month.

- E. Submittal schedule for shop drawing review, product data, and samples shall show the date of Contractor submittal and the date approved submittals will be required by the County, consistent with the time frames established in the Specifications.
- F. For Contract change orders granting time extensions, the impact on the Contract date(s) shall equal the calendar-day total time extension specified for the applicable work in the Contract change orders.
- G. For actual delays, add activities prior to each delayed activity on the appropriate critical path(s). Data on the added activities of this type shall portray all steps leading to the delay and shall further include the following: separate activity identification, activity description indicating cause of the delay, activity duration consistent with whichever set of dates below applies, the actual start and finish dates of the delay or, if the delay is not finished, the actual start date and estimated completion date.
- H. For potential delays, add an activity prior to each potentially delayed activity on the appropriate critical path(s). Data for added activities of this type shall include alternatives available to mitigate the delay including acceleration alternatives and further show the following: separate activity identification, activity description indicating cause of the potential delay and activity duration equal to zero work days.

2.04 SUPPORTING NARRATIVE

- A. Status and scheduling reports identified below shall contain a narrative to document the project status, to explain the basis of Contractor's determination of durations, describe the Contract conditions and restraints incorporated into the schedule and provide an analysis pertaining to potential problems and practical steps to mitigate them.
- B. The narrative shall specifically include:
 - 1. Actual completion dates for activities completed during the monthly report period and actual start dates for activities commenced during the monthly report period.
 - 2. Anticipated start dates for activities scheduled to commence during the following monthly report period.
 - 3. Changes in the duration of any activity and minor logic changes.
 - 4. The progress along the critical path in terms of days ahead or behind the Contract date.
 - 5. If the Monthly Status Report indicates an avoidable delay to the Contract completion date or interim completion dates as specified in the Agreement, Contractor shall identify the problem, cause and the activities affected and provide an explanation of the proposed corrective action to meet the milestone dates involved or to mitigate further delays.
 - 6. If the delay is thought to be unavoidable, the Contractor shall identify the problem, cause, duration, specific activities affected and restraints of each activity.
 - 7. The narrative shall also discuss all change order activities whether included or not in the revised/current schedule of legal status. Newly introduced change order work activities and the CPM path(s) that they affect, must be specifically identified. All change order work activities added to the schedule shall conform with the sequencing and Contract Time requirements of the applicable Change Order.

8. Original Contract date(s) shall not be changed except by Contract change order. A revision need not be submitted when the foregoing situations arise unless required by County. Review of a report containing added activities will not be construed to be concurrence with the duration or restraints for such added activities; instead the corresponding data as ultimately incorporated into the applicable Contract change order shall govern.
9. Should County require additional data, this information shall be supplied by Contractor within 10 calendar days.

2.05 SUBMITTALS

- A. Contractor shall submit estimated and preliminary progress schedules (as identified in the Terms and Conditions of the Contract and the General Conditions), monthly status reports, a start-up schedule and an as-built schedule report all as specified herein.
- B. All schedules, including estimated and preliminary schedules, shall be in conformance with the Contract Documents.
- C. The finalized progress schedule discussed in the Contract Documents shall be the first monthly status report and as such shall be in conformance with all applicable specifications contained herein.
- D. Monthly Status Report submittals shall include a time-scaled (days after notice to proceed) diagram showing all contract activities and supporting narrative. The initial detailed schedule shall use the notice to proceed as the start date. The finalized schedule, if concurred with by County, shall be the work plan to be used by the contractor for planning, scheduling, managing and executing the work.
- E. The schedule diagram shall be formatted as above. The diagram shall include (1) all detailed activities included in the preliminary and estimated schedule submittals, (2) calendar days prior to substantial completion, (3) summary activities for the remaining days. The critical path activities shall be identified, including critical paths for interim dates, if possible.
- F. The Contractor shall submit progress schedules with each application for payment.

2.06 MONTHLY STATUS REPORTS

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

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

2.07 STARTUP SCHEDULE

- A. At least 60 calendar days prior to the date of substantial completion, Contractor shall submit a time-scaled (days after notice to proceed) diagram detailing the work to take place in the period between 60 days prior to substantial completion, together with a supporting narrative. County shall have 10 calendar days after receipt of the submittal to respond. Upon receipt of County's comments, Contractor shall make the necessary revisions and submit the revised schedule within 10 calendar days. The resubmittal, if concurred with by County, shall be the Work Plan to be used by Contractor for planning, managing, scheduling and executing the remaining work leading to substantial completion.
- B. The time-scaled diagram shall use the latest schedule of legal status for those activities completed ahead of the last 60 calendar days prior to substantial completion and detailed activities for the remaining 60-day period within the time frames outlined in the latest schedule of legal status.
- C. Contractor will be required to continue the requirement for monthly reports, as outlined above. In preparing this report, Contractor must assure that the schedule is consistent with the progress noted in the startup schedule.

2.08 REVISIONS

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

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01340

SHOP DRAWINGS, PROJECT DATA AND SAMPLES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall submit to the County for review and approval: working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this section called data), and material samples (hereinafter in this section called samples) as are required for the proper control of work, including, but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.
- B. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the County. This log should include the following items:
 - 1. Submittal description and number assigned.
 - 2. Date to County.
 - 3. Date returned to Contractor (from County).
 - 4. Status of Submittal (No exceptions taken, returned for confirmation or resubmittal, rejected).
 - 5. Date of Resubmittal and Return (as applicable).
 - 6. Date material released (for fabrication).
 - 7. Projected date of fabrication.
 - 8. Projected date of delivery to site.
 - 9. Projected date and required lead time so that product installation does not delay contact.
 - 10. Status of O&M manuals submitted.

1.03 CONTRACTOR'S RESPONSIBILITY

- A. It is the duty of the Contractor to check all drawings, data and samples prepared by or for him before submitting them to the County for review. Each and every copy of the Drawings and data shall bear Contractor's stamp showing that they have been so checked. Shop drawings submitted to the County without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the contract Documents.
- B. Determine and verify:
 - 1. Field measurements.
 - 2. Field construction criteria.
 - 3. Catalog numbers and similar data.
 - 4. Conformance with Specifications and indicate all variances from the Specifications.

- C. The Contractor shall furnish the County a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.
- D. The Contractor shall not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the County, with No Exceptions Taken or Approved As Noted.
- E. The Contractor shall submit to the County all drawings and schedules sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for checking and appropriate action from the time the County receives them.
- F. All material & product submittals, other than samples, may be transmitted electronically as a pdf file. All returns to the contractor will be as a pdf file only unless specifically requested otherwise.
- G. The Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by County of the necessary Shop Drawings.

1.04 COUNTY'S REVIEW OF SHOP DRAWINGS AND WORKING DRAWINGS

- A. The County's review of drawings, data and samples submitted by the Contractor shall cover only general conformity to the Specifications, external connections and dimensions which affect the installation.
- B. The review of drawings and schedules shall be general and shall not be construed:
 - 1. As permitting any departure from the Contract requirements.
 - 2. As relieving the Contractor of responsibility for any errors, including details, dimensions and materials.
 - 3. As approving departures from details furnished by the County, except as otherwise provided herein.
- C. If the drawings or schedules as submitted describe variations and show a departure from the Contract requirements which the County finds to be in the interest of the County and to be so minor as not to involve a change in Contract Price or time for performance, the County may return the reviewed drawings without noting any exception.
- D. When reviewed by the County, each of the Shop and Working Drawings shall be identified as having received such review being so stamped and dated. Shop Drawings stamped "REJECTED" and with required corrections shown shall be returned to the Contractor for correction and resubmittal.
- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals, the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the County on previous submissions. The Contractor shall make any corrections required by the County.

- F. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the County.
- G. The County shall review a submittal/resubmittal a maximum of three (3) times after which cost of review shall be borne by the Contractor. The cost of engineering shall be equal to the County's actual payroll cost.
- H. When the Shop and Working Drawings have been completed to the satisfaction of the County, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the County.
- I. No partial submittals shall be reviewed. Incomplete submittals shall be returned to the Contractor and shall be considered not approved until resubmitted.

1.05 SHOP DRAWINGS

- A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, drawings, setting drawings, schedule drawings, manufacturer's scale drawings and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above.
- B. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the County and shall bear the Contractor's stamp of approval and original signature as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval and original signature shall be returned to the Contractor for resubmission.
- C. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:
 - 1. Number and title of the drawing.
 - 2. Date of Drawing or revision.
 - 3. Name of project building or facility.
 - 4. Name of contractor and subcontractor submitting drawing.
 - 5. Clear identification of contents and location of the work.
 - 6. Specification title and number.
- D. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility of executing the work in accordance with the Contract, even though such drawings have been reviewed.

- E. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.
- F. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.
- G. All manufacturers or equipment suppliers who proposed to furnish equipment or products shall submit an installation list to the County along with the required shop drawings. The installation list shall include at least five installations where identical equipment has been installed and have been in operation for a period of at least one (1) year.
- H. Only the County will utilize the color "red" in marking shop drawing submittals.

1.06 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's fabrication and erection drawings for structures such as roof trusses, steelwork, precast concrete elements, bulkheads, support of open cut excavation, support of utilities, groundwater control systems, forming and false work; underpinning; and for such other work as may be required for construction of the project.
- B. Copies of working drawings as noted above, shall be submitted to the County where required by the Contract Documents or requested by the County and shall be submitted at least thirty (30) days (unless otherwise specified by the County) in advance of their being required for work.
- C. Working drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the County, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor; the County and Engineer shall not have responsibility therefor.

1.07 SAMPLES

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

- B. Samples shall be of sufficient size and quantity to clearly illustrate:
1. Functional characteristics of the product, with integrally related parts and attachment devices.
 2. Full range of color, texture and pattern.
 3. A minimum of two samples of each item shall be submitted.
- C. Each sample shall have a label indicating:
1. Name of product.
 2. Name of Contractor and Subcontractor.
 3. Material or equipment represented.
 4. Place of origin.
 5. Name of Producer and Brand (if any).
 6. Location in project.
(Samples of finished materials shall have additional markings that will identify them under the finished schedules.)
 7. Reference specification paragraph.
- D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the County. Review of a sample shall be only for the characteristics or use named in such and shall not be construed to change or modify any Contract requirements.
- E. Reviewed samples not destroyed in testing shall be sent to the County or stored at the site of the work. Reviewed samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the reviewed samples. If requested at the time of submission, samples which failed testing or were rejected shall be returned to the Contractor at his expense.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01370

SCHEDULE OF VALUES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall submit to the County a Schedule of Values allocated to the various portions of the work, within 10 days after date of Notice to Proceed.
- B. Upon request of the County, the Contractor shall support the values with data which will substantiate their correctness.
- C. The Schedule of Values shall be used only as the basis for the Contractor's Applications for Payment.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Schedule of Values will be considered for approval by County upon Contractor's request. Identify schedule with:
 - 1. Title of Project and location.
 - 2. Project number.
 - 3. Name and address of Contractor.
 - 4. Contract designation.
 - 5. Date of submission.
- B. Schedule of Values shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- C. Follow the table of contents for the Contract Document as the format for listing component items for structures:
 - 1. Identify each line item with the number and title of the respective major section of the specification.
 - 2. For each line item, list sub values of major products or operations under item.
- D. Follow the bid sheets included in this Contract Documents as the format for listing component items for pipe lines.
- E. The sum of all values listed in the schedule shall equal the total Contract sum.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01380

CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall employ a competent photographer to take construction record photographs or perform video, recording including furnishing all labor, materials, equipment and incidentals necessary to obtain photographs and/or video recordings of all construction areas.
- B. Preconstruction record information shall consist of video recordings on digital video disks (DVD).
- C. Construction progress information shall consist of photographs and digital photographs on a recordable compact disc (CD-R).

1.02 QUALIFICATIONS

- A. All photography shall be done by a competent camera operator who is fully experienced and qualified with the specified equipment.
- B. For the video recording, the audio portion should be done by a person qualified and knowledgeable in the specifics of the Contract, who shall speak with clarity and diction so as to be easily understood.

1.03 PROJECT PHOTOGRAPHS

- A. Provide one print of each photograph with each pay application.
- B. Provide one recordable compact disc with digital photographs with each pay application.
- C. Negatives:
 - 1. All negatives shall remain the property of photographer.
 - 2. The Contractor shall require that photographer maintain negatives or protected digital files for a period of two years from date of substantial completion of the project.
 - 3. Photographer shall agree to furnish additional prints to County at commercial rates applicable at time of purchase. Photographer shall also agree to participate as required in any litigation requiring the photographer as an expert witness.
- D. The Contractor shall pay all costs associated with the required photography and prints. Any parties requiring additional photography or prints shall pay the photographer directly.
- E. All project photographs shall be a single weight, color image. All finishes shall be smooth surface and glossy and all prints shall be 8 inches x 10 inches.

- F. Each print shall have clearly marked on the back, the name of the project, the orientation of view, the date and time of exposure, name and address of the photographer and the photographers numbered identification of exposure.
- G. All project photographs shall be taken from locations to adequately illustrate conditions prior to construction, or conditions of construction and state of progress. The Contractor shall consult with the County at each period of photography for instructions concerning views required.

1.04 VIDEO RECORDINGS

- A. Video, recording shall be done along all routes that are scheduled for construction. Video, recording shall include full, recording of both sides of all streets and the entire width of easements plus 10 feet on each side on which construction is to be performed. All video recording shall be in full color.
- B. A complete view, in sufficient detail with audio description of the exact location shall be provided.
- C. The engineering plans shall be used as a reference for stationing in the audio portion of the recordings for easy location identification.
- D. Two complete sets of video recordings shall be delivered to the County on digital video disks (DVD) for the permanent and exclusive use of the County prior to the start of any construction on the project.
- E. All video recordings shall contain the name of the project, the date and time of the video, recording, the name and address of the photographer and any other identifying information required.
- F. Construction shall not start until preconstruction video recordings are completed, submitted and accepted by the County. In addition, no progress payments shall be made until the preconstruction video recordings are accepted by the County.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01510

TEMPORARY AND PERMANENT UTILITIES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

The Contractor shall be responsible for furnishing all requisite temporary utilities, i.e., power, water, sanitation, etc. The Contractor shall obtain and pay for all permits required as well as pay for all temporary usages. The Contractor shall remove all temporary facilities upon completion of work.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with Federal, State and Local codes and regulations and with utility company requirements.
- C. Comply with County Health Department regulations.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

Materials for temporary utilities may be "used". Materials for electrical utilities shall be adequate in capacity for the required usage, shall not create unsafe conditions and shall not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

Arrange with the applicable utility company for temporary power supply. Provide service required for temporary power and lighting and pay all costs for permits, service and for power used.

2.03 TEMPORARY WATER

- A. The Contractor shall arrange with Manatee County Utilities Customer Service office to provide water for construction purposes, i.e., meter, pay all costs for installation, maintenance and removal, and service charges for water used.
- B. The Contractor shall protect piping and fitting against freezing.

2.04 TEMPORARY SANITARY FACILITIES

- A. The Contractor shall provide sanitary facilities in compliance with all laws and regulations.
- B. The Contractor shall service, clean and maintain facilities and enclosures.

PART 3 EXECUTION

3.01 GENERAL

- A. The Contractor shall maintain and operate systems to assure continuous service.
- B. The Contractor shall modify and extend systems as work progress requires.

3.02 REMOVAL

- A. The Contractor shall completely remove temporary materials and equipment when their use is no longer required.
- B. The Contractor shall clean and repair damage caused by temporary installations or use of temporary facilities.

END OF SECTION

SECTION 01570

TRAFFIC REGULATION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall be responsible for providing safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the Contractor and which interfere with the driving or walking public.
- B. The Contractor shall remove temporary equipment and facilities when no longer required, restore grounds to original or to specified conditions.

1.02 TRAFFIC CONTROL

- A. The necessary traffic control shall include, but not be limited to, such items as proper construction warning signs, signals, lighting devices, markings, barricades, channelization and hand signaling devices. The Contractor shall be responsible for installation and maintenance of all devices and detour routes and signage for the duration of the construction period. The Contractor shall utilize the appropriate traffic plan from the FDOT Maintenance of Traffic Standards, Series 600 of the FDOT Roadway & Traffic Design Standards, Latest Edition.
- B. Should there be the necessity to close any portion of a roadway carrying vehicles or pedestrians the Contractor shall submit a Traffic Control Plan (TCP) at least 5 days before a partial or full day closure, and at least 8 days before a multi-day closure. TCP shall be submitted, along with a copy of their accreditation, by a certified IMSA or ATSA Traffic Control Specialist.
 - 1. At no time will more than one (1) lane of a roadway be closed to vehicles and pedestrians without an approved road closure from the County Transportation Department. With any such closings, adequate provision shall be made for the safe expeditious movement of each.
 - 2. All traffic control signs must be in place and inspected at least 1 day in advance of the closure. Multi-day closures notification signs shall be in place at least 3 days in advance of the closure. All signs must be covered when no in effect, and checked twice a day by the Worksite Traffic Supervisor when they are in effect.
- C. The Contractor shall be responsible for removal, relocation, or replacement of any traffic control device in the construction area which exists as part of the normal preconstruction traffic control scheme. Any such actions shall be performed by the Contractor under the supervision and in accordance with the instructions of the applicable highway department unless otherwise specified.
- D. The Contractor will consult with the County immediately on any vehicular or pedestrian safety or efficiency problem incurred as a result of construction of the project.

- E. The Contractor shall provide ready access to businesses and homes in the project area during construction. The Contractor shall be responsible for coordinating this work with affected homeowners.
- F. When conditions require the temporary installation of signs, pavement markings and traffic barriers for the protection of workers and traffic, the entire array of such devices shall be depicted on working drawings for each separate stage of work. These drawings shall be submitted to the County for review and approval prior to commencement of work on the site.
- G. Precast concrete traffic barriers shall be placed adjacent to trenches and other excavations deeper than six inches below the adjacent pavement surface.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01580

PROJECT IDENTIFICATION AND SIGNS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

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

1.02 PROJECT IDENTIFICATION SIGN (COUNTY)

- A. Two painted sign, of not less than 32 square feet (3 square meters) area, with painted graphic content to include:
 - 1. Title of Project.
 - 2. Name of County.
 - 3. Names and titles of authorities as directed by County.
 - 4. Prime Contractor.
- B. Graphic design, style of lettering and colors: As approved by the County.
- C. Erect on the site at a lighted location of high public visibility, adjacent to main entrance to site, as approved by the County

1.03 INFORMATIONAL SIGNS

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

1.04 QUALITY ASSURANCE

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

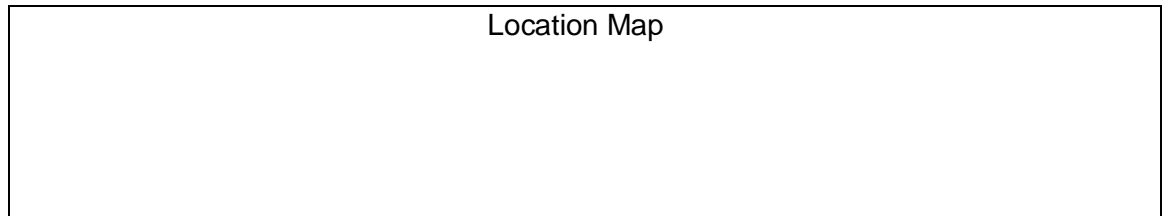
1.05 PUBLIC NOTIFICATION

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

EXAMPLE:

PLEASE PARDON THE INCONVENIENCE WHILE THE ROADWAY IS BEING
RECONSTRUCTED IN YOUR NEIGHBORHOOD

This project consists of utility improvements and the reconstruction of ??? Boulevard from U.S. ??? to ??? Street West. The project is expected to begin in August, 200X and be completed in July 200X.



WE HOPE TO KEEP ANY INCONVENIENCE TO A MINIMUM. HOWEVER, IF YOU
HAVE ANY PROBLEMS, PLEASE CONTACT THE FOLLOWING:

- | | | |
|----|-------------------------------|---------------------|
| A. | Contractor | Project Manager |
| | Contractor Address | PM Address |
| | Contractor Phone (Site Phone) | PM Phone No. & Ext. |
| B. | Project Inspector | |
| | Inspector Phone Number | |

AFTER HOURS EMERGENCY NUMBER – (941) 747-HELP
THANK YOU FOR YOUR UNDERSTANDING AND PATIENCE
MANATEE COUNTY GOVERNMENT – PROJECT MANAGEMENT DEPT.

PART 2 PRODUCTS

2.01 SIGN MATERIALS

- A. Structure and Framing: May be new or used, wood or metal, in sound condition structurally adequate to work and suitable for specified finish.
- B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.
 - 1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.
- C. Rough Hardware: Galvanized.
- D. Paint: Exterior quality, as specified in the Contract Documents.

PART 3 EXECUTION

3.01 PROJECT IDENTIFICATION SIGN

- A. Paint exposed surface or supports, framing and surface material; one coat of primer and one coat of exterior paint.
- B. Paint graphics in styles, size and colors selected.

3.02 MAINTENANCE

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

3.03 REMOVAL

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

END OF SECTION

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SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Material and equipment incorporated into the work:
 - 1. Conform to applicable specifications and standards.
 - 2. Comply with size, make, type and quality specified, or as specifically approved in writing by the County.
 - 3. Manufactured and Fabricated Products:
 - a. Design, fabricate and assemble in accordance with the best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
 - c. Two or more items of the same kind shall be identical and manufactured by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
 - 4. Do not use material or equipment for any purpose other than that for which it is specified.
 - 5. All material and equipment incorporated into the project shall be new.

1.02 MANUFACTURER'S INSTRUCTIONS

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to County. Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions and in conformity with specified requirements. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with County prior to proceeding. Do not proceed with work without clear instructions.

1.03 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site.
 - 1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 - 2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals and that products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.04 SUBSTITUTIONS AND PRODUCT OPTIONS

Contractor's Options:

- 1. For products specified only by reference standard, select any product meeting that standard.
- 2. For products specified by naming one or more products or manufacturers and "or equal", Contractor must submit a request for substitutions of any product or manufacturer not specifically named in a timely manner so as not to adversely affect the construction schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01620

STORAGE AND PROTECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Provide secure storage and protection for products to be incorporated into the work and maintenance and protection for products after installation and until completion of Work.

1.02 STORAGE

- A. Store products immediately on delivery and protect until installed in the Work, in accord with manufacturer's instructions, with seals and labels intact and legible.
- B. Exterior Storage
 - 1. Provide substantial platform, blocking or skids to support fabricated products above ground to prevent soiling or staining.
 - a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
 - b. Prevent mixing of refuse or chemically injurious materials or liquids.
- C. Arrange storage in manner to provide easy access for inspection.

1.03 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
 - 1. State of storage facilities is adequate to provide required conditions.
 - 2. Required environmental conditions are maintained on continuing basis.
 - 3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings and finishes is not acceptable under requirements of these Contract Documents.
- B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.
 - 1. Equipment shall not be shipped until approved by the County. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the County.
 - 2. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the County until such time as the equipment is to be installed.

3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
4. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.
5. Lubricants shall be changed upon completion of installation and as frequently as required, thereafter during the period between installation and acceptance.
6. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

1.04 PROTECTION AFTER INSTALLATION

- A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.
- B. Control traffic to prevent damage to equipment and surfaces.
- C. Provide coverings to protect finished surfaces from damage.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

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

1.02 SUBSTANTIAL COMPLETION

- A. The Contractor shall submit the following items when the Contractor considers the work to be substantially complete:
 - 1. A written notice that the work, or designated portion thereof, is substantially complete.
 - 2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, the County shall make an inspection to determine the status of completion.
- C. Project record documents and operations and maintenance manuals must be submitted before the project shall be considered substantially complete.
- D. If the County determines that the work is not substantially complete:
 - 1. The County shall notify the Contractor in writing, stating the reasons.
 - 2. The Contractor shall remedy the deficiencies in the work and send a second written notice of substantial completion to the County.
 - 3. The County shall reinspect the work.
- E. When the County finds that the work is substantially complete:
 - 1. The Engineer shall prepare and deliver to the County a tentative Certificate of Substantial Completion (Manatee County Project Management Form PMD-8) with a tentative list of the items to be completed or corrected before final payment.
 - 2. The Engineer shall consider any objections made by the County as provided in Conditions of the Contract. When the Engineer considers the work substantially complete, he will execute and deliver to the County a definite Certificate of Substantial Completion (Manatee County Project Management Form PMD-8) with a revised tentative list of items to be completed or corrected.

1.03 FINAL INSPECTION

- A. When the Contractor considered the work to be complete, he shall submit written certification stating that:
 - 1. The Contract Documents have been reviewed.
 - 2. The work has been inspected for compliance with Contract Documents.
 - 3. The work has been completed in accordance with Contract Documents.
 - 4. The equipment and systems have been tested in the presence of the County's representative and are operational.
 - 5. The work is completed and ready for final inspection.
- B. The County shall make an inspection to verify the status of completion after receipt of such certification.
- C. If the County determines that the work is incomplete or defective:
 - 1. The County shall promptly notify the Contractor in writing, listing the incomplete or defective work.
 - 2. The Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to County that the work is complete.
 - 3. The County shall reinspect the work.
- D. Upon finding the work to be acceptable under the Contract Documents, the County shall request the Contractor to make closeout submittals.
- E. For each additional inspection beyond a total of three (3) inspections for substantial and final completion due to the incompleteness of the work, the Contractor shall reimburse the County's fees.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO COUNTY

- A. Project Record Documents (prior to substantial completion).
- B. Operation and maintenance manuals (prior to substantial completion).
- C. Warranties and Bonds.
- D. Evidence of Payment and Release of Liens: In accordance with requirements of General and Supplementary Conditions.
- E. Certification letter from Florida Department of Transportation and Manatee County Department of Transportation, as applicable.
- F. Certificate of Insurance for Products and Completed Operations.
- G. Final Reconciliation, Warranty Period Declaration, and Contractor's Affidavit (Manatee County Project Management Form PMD-9).

1.05 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the County.
- B. Statement shall reflect all adjustments to the Contract Sum:
 - 1. The original Contract Sum.
 - 2. Additions and deductions resulting from:
 - a. Previous Change Orders
 - b. Unit Prices
 - c. Penalties and Bonuses
 - d. Deductions for Liquidated Damages
 - e. Other Adjustments
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.
 - 5. Sum remaining due.
- C. Project Management shall prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.06 FINAL APPLICATION FOR PAYMENT

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

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SECTION 01710

CLEANING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

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

1.02 DISPOSAL REQUIREMENTS

Conduct cleaning and disposal operations to comply with all Federal, State and Local codes, ordinances, regulations and anti-pollution laws.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute periodic cleaning to keep the work, the site and adjacent properties free from accumulation of waste materials, rubbish and wind-blown debris, resulting from construction operations.
- B. Provide on-site containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 DUST CONTROL

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

3.03 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- C. Prior to final completion or County occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire work is clean.

END OF SECTION

SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall maintain at the site for the County one record copy of:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. County's field orders or written instructions.
6. Approved shop drawings, working drawings and samples.
7. Field test records.
8. Construction photographs.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for inspection by the County.

1.03 MARKING DEVICES

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

1.04 RECORDING

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

B. Record information concurrently with construction progress.

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

D. Drawings; Legibly mark to record actual construction:

1. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc. Locations of drainage ditches, swales, water lines and force mains shall be shown every 200 feet (measured along the centerline) or alternate lot lines, whichever is closer. Dimensions at these locations shall indicate distance from centerline of right-of-way to the facility.
2. Field changes of dimension and detail.
3. Changes made by Field Order or by Change Order.
4. Details not on original contract drawings.
5. Equipment and piping relocations.
6. Locations of all valves, fire hydrants, manholes, water and sewer services, water and force main fittings, underdrain cleanouts, catch basins, junction boxes and any other structures located in the right-of-way or easement, shall be located by elevation and by station and offset based on intersection P.I.'s and centerline of right-of-way. For facilities located on private roads, the dimensioning shall be from centerline of paving or another readily visible baseline.
7. Elevations shall be provided for all manhole rim and inverts; junction box rim and inverts; catch basin rim and inverts; and baffle, weir and invert elevations in control structures. Elevations shall also be provided at the PVI's and at every other lot line or 200 feet, whichever is less, of drainage swales and ditches. Bench marks and elevation datum shall be indicated.
8. Slopes for pipes and ditches shall be recalculated, based on actual field measured distances, elevations, pipe sizes, and type shown. Cross section of drainage ditches and swales shall be verified.
9. Centerline of roads shall be tied to right-of-way lines. Elevation of roadway centerline shall be given at PVI's and at all intersections.
10. Record drawings shall show bearings and distances for all right-of-way and easement lines, and property corners.
11. Sidewalks, fences and walls, if installed at the time of initial record drawing submittal, shall be located every 200 feet or alternate lot lines, whichever is closer. Dimensions shall include distance from the right-of-way line and the back of curb and lot line or easement line.
12. Sanitary sewer mainline wyes shall be located from the downstream manhole. These dimensions shall be provided by on-site inspections or televising of the sewer following installation.
13. Elevations shall be provided on the top of operating nuts for all water and force main valves.
14. Allowable tolerance shall be ± 6.0 inches for horizontal dimensions. Vertical dimensions such as the difference in elevations between manhole inverts shall have an allowable tolerance of $\pm 1/8$ inch per 50 feet (or part thereof) of horizontal distance up to a maximum tolerance of ± 2 inch.
15. Properly prepared record drawings on mylar, together with two copies, shall be certified by a design professional (Engineer and/or Surveyor registered in the State of Florida), employed by the Contractor, and submitted to the County.

- E. Specifications and Addenda; Legibly mark each Section to record:
 - 1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
 - 2. Changes made by field order or by change order.
- F. Shop Drawings (after final review and approval):
 - 1. Five sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

1.05 SUBMITTAL

- A. Prior to substantial completion and prior to starting the bacteria testing of water lines, deliver signed and sealed Record Documents and Record Drawings to the County. These will be reviewed and verified by the inspector. If there are any required changes or additions, these shall be completed and the entire signed and sealed set resubmitted prior to final pay application.
- B. The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings. Record drawings shall be certified by the professional(s) (Engineer or Surveyor licensed in Florida), as stipulated by the Land Development Ordinance and submitted on signed and sealed paper drawings, signed and dated mylar drawings together with an AutoCAD version on a recordable compact disk (CD).
- C. The CD shall contain media in AutoCad Version 2004 or later, or in any other CAD program compatible with AutoCad in DWG or DXF form. All fonts, line types, shape files or other pertinent information used in the drawing and not normally included in AutoCad shall be included on the media with a text file or attached noted as to its relevance and use.
- D. Accompany submittal with transmittal letter, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Title and number of each Record Document.
 - 5. Signature of Contractor or his authorized representative.

Note: The data required to properly prepare these record drawings shall be obtained at the site, at no cost to the County by the responsible design professional or his/her duly appointed representative. The appointed representative shall be a qualified employee of the responsible design professional or a qualified inspector retained by the responsible design professional on a project-by-project basis.

PART 2 STANDARDS

**2.01 MINIMUM RECORD DRAWING STANDARDS FOR ALL RECORD DRAWINGS
SUBMITTED TO MANATEE COUNTY**

- A. Record drawings shall be submitted to at least the level of detail in the contract documents. It is anticipated that the original contract documents shall serve as at least a background for all record information. Original drawings in CAD format may be requested of the County.
- B. Drawings shall meet the criteria of paragraph 1.04 D above.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01730

OPERATING AND MAINTENANCE DATA

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Compile product data and related information appropriate for County's maintenance and operation of products furnished under Contract.

Prepare operating and maintenance data as specified in this and as referenced in other pertinent sections of Specifications.

- B. Instruct County's personnel in maintenance of products and equipment and systems.
- C. Provide three (3) sets of operating and maintenance manuals for each piece of equipment provided within this Contract.

1.02 FORM OF SUBMITTALS

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

- B. Format:

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

- C. Binders:

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

1.03

MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit three copies of complete manual in final form.
- B. Content for each unit of equipment and system, as appropriate:
 - 1. Description of unit and component parts.
 - a. Function, normal operating characteristics and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - 2. Operating Procedures:
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shut-down and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
 - 3. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.
 - d. Alignment, adjusting and checking.
 - 4. Servicing and lubricating schedule.
 - a. List of lubricants required.
 - 5. Manufacturer's printed operating and maintenance instructions.
 - 6. Description of sequence of operation by control manufacturer.
 - 7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. List of predicted parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
 - 8. As installed control diagrams by controls manufacturer.
 - 9. Each contractor's coordination drawings.
 - a. As installed color coded piping diagrams.
 - 10. Charts of valve tag numbers, with location and function of each valve.
 - 11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
 - 12. Other data as required under pertinent sections of specifications.

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

1.04 SUBMITTAL SCHEDULE

- A. Submit one copy of completed data in final form fifteen days prior to substantial completion.
1. Copy will be returned after substantial completion, with comments (if any).
- B. Submit two copies of approved data in final form. Final acceptance will not be provided until the completed manual is received and approved.

1.05 INSTRUCTION OF COUNTY'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct County's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.
- B. Operating and maintenance manual shall constitute the basis of instruction.
1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01740

WARRANTIES AND BONDS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Compile specified warranties and bonds.
- B. Compile specified service and maintenance contracts.
- C. Co-execute submittals when so specified.
- D. Review submittals to verify compliance with Contract Documents.
- E. Submit to County for review and transmittal.

1.02 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors.
- B. Number of original signed copies required: Two each.
- C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
 - 1. Product or work item.
 - 2. Firm, with name of principal, address and telephone number.
 - 3. Scope.
 - 4. Date of beginning of warranty, bond or service and maintenance contract.
 - 5. Duration of warranty, bond or service maintenance contract.
 - 6. Provide information for County's personnel:
 - a. Proper procedure in case of failure.
 - b. Instances which might affect the validity of warranty or bond.
 - 7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.
- B. Format:
 - 1. Size 8-1/2 inch x 11 inch punched sheets for standard 3-ring binder. Fold larger sheets to fit into binders.
 - 2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:
 - a. Title of Project.
 - b. Name of Contractor.
- C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.04 TIME OF SUBMITTALS

- A. Make submittals within ten days after date of substantial completion and prior to final request for payment.
- B. For items of work, where acceptance is delayed materially beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.05 SUBMITTALS REQUIRED

- A. Submit warranties, bonds, service and maintenance contracts as specified in respective sections of Specifications.
- B. Approval by the County of all documents required under this section is a pre-requisite to requesting a final inspection and final payment

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

DIVISION 2 SITE WORK

SECTION 02064

MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to modify, alter and/or convert existing structures as shown or specified and as required for the installation of piping, mechanical equipment and appurtenances. Existing piping and equipment shall be removed and dismantled as necessary for the performance of facility alterations in accordance with the requirements herein specified.

PART 2 PRODUCTS

- A. Epoxy mortar shall be fiberglass fiber mixed with an epoxy filler.
- B. Non-shrink grout shall be a sand-cement, non-metallic formulation, having a 28-day strength of 4,000 psi and 0.0 percent shrinkage per ASTM C1090.
- C. Liners to be installed in existing manholes and wetwells shall be spray-applied, monolithic, reinforced urethane resin. Urethane resin-based manhole liner material shall be resistant to hydrogen sulfide gas, and other common contents found in a sanitary sewer environment.
- D. Approved manhole and wet well liner products are Raven 405, SprayWall, Green Monster, or SpectraShield.

PART 3 EXECUTION

3.01 GENERAL

- A. The Contractor shall cut, repair, reuse, excavate, demolish or otherwise remove parts of the existing structures or appurtenances, as indicated on the Contract Drawings, herein specified, or necessary to permit completion of the work under this Contract. The Contractor shall dispose of surplus materials resulting from the above work in an approved manner. The work shall include all necessary cutting and bending of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.
- B. The Contractor shall dismantle and remove all existing equipment, piping, and other appurtenances required for the completion of the work. Where called for or required, the contractor shall cut existing pipelines for the purpose of making connections thereto. Anchor bolts for equipment and structural steel removed shall be cut off one inch below the concrete surface. Surface shall be finished as specified in the Contract Documents.

- C. At the time that a new connection is made to an existing pipeline, additional new piping, extending to and including a new valve, shall be installed. Pipe restraint devices, if required, is part of the installation shall also be installed as directed by the County.
- D. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or otherwise altered except with the express approval of and to the extent approved by the County.
- E. When removing materials or portions of existing utility pipelines and/or structures or when making openings in walls and partitions, the Contractor shall take all precautions and use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work, and not to damage the structures or contents by falling or flying debris. Unless otherwise permitted, line drilling will be required in cutting existing concrete.
- F. Materials and equipment removed in the course of making alterations and additions shall remain the property of the County, except that items not salvageable, as determined by the County, shall become the property of the Contractor to be disposed of by him off the work site at his own place of disposal. Operating equipment shall be thoroughly cleaned, lubricated, and greased for protection during prolonged storage.
- G. All alterations to existing utility pipes and structures shall be done at such time and in such manner as to comply with the approved time schedule. So far as possible before any part of the work is started, all tools, equipment, and materials shall be assembled and made ready so that the work can be completed without delay.
- H. All workmanship and new materials involved in constructing the alterations shall conform to the General Specifications for the classes of work insofar as such specifications are applicable.
- I. All cutting of existing concrete or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective section of these Specifications covering the new work. When not covered, the work shall be carried on in the manner and to the extent directed by the Resident Project Representative.
- J. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.
- K. Non-shrink grout shall be used for setting wall castings, sleeves, leveling pump bases, doweling anchors into existing concrete and elsewhere as shown.
- L. Where necessary or required for the purpose of making connections, the Contractor shall cut existing pipelines in a manner to provide an approved joint. Where required, he shall use flanges, or provide Dresser Couplings, all as required.
- M. The Contractor shall provide flumes, hoses, piping and other related items to divert or provide suitable plugs, bulkheads, or other means to hold back the flow of water or other liquids, all as required in the performance of the work under this Contract.

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

3.02 CONNECTING TO EXISTING PIPING AND EQUIPMENT

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

3.03 REMOVAL AND ABANDONMENT OF ASBESTOS CEMENT PIPE AND APPURTENANCES

- A. All work associated with the removal or abandonment of existing asbestos cement pipe and appurtenances shall be performed by a licensed asbestos abatement contractor or subcontractor registered in the State of Florida. After removal of the facilities, all trenches shall be backfilled in accordance with the Contract Documents. The cost of disposing of the removed materials shall be borne by the Contractor.
- B. The asbestos abatement contractor or subcontractor shall contact the appropriate regulatory agencies prior to removal or abandonment of any asbestos material and shall obtain all required permits and licenses and issue all required notices. The Contractor shall be responsible for all fees associated with permits, licenses and notices to the governing regulatory agencies. An asbestos manifest form must accompany each and every shipment of such pipe or pipe material waste to the Manatee County Lena Road Landfill. Prior to each shipment, a minimum of 24 hours notice to the Landfill field office (Phone #748-5543) is required.
- C. All work associated with removal or abandonment of asbestos cement pipe and appurtenances shall be performed in accordance with the standards listed below and all other applicable local, State, or Federal standards.
 - 1. Florida Administrative Code, Chapter 62-257, "Asbestos Program".
 - 2. National Emission Standards Hazardous Air Pollution (NESHAP), 40 CFR, Part 61, Subpart M, latest revision.
 - 3. Occupational Safety and Health Act, 29 CFR, 1910.1001 – Asbestos.
 - 4. Title 40 CFR, Part 763, Asbestos.
 - 5. Florida Statute Title XXXII, Chapter 469, Asbestos Abatement.
- D. All asbestos cement nipples between tees and valves shall be replaced.

3.04 IN-PLACE GROUTING OF EXISTING PIPE

- A. Where water and wastewater utility pipes are to be abandoned in place, they shall be filled with a sand/cement grout as specified herein. When such pipes are constructed with asbestos cement materials, the abandonment activities shall be performed by a licensed asbestos abatement contractor as specified in these Specifications.

- B. Grout shall be injected within the pipe sections indicated on the Drawings. The ends of these sections shall be capped and/or plugged. The grouting program shall consist of pumping sand-cement grout with suitable chemical additives at pressures necessary to fill the pipe sections shown on the Drawings to prevent the potential for future collapse.
- C. The pump used for grouting should be a continuous flow, positive displacement model with a pugmill type mixing vat having a minimum shaft speed of 60 rpm and incorporated as an integral part of the equipment. Alternate equipment may be used subject to the approval of the County. The rate of pumping shall not exceed six (6) cubic feet per minute. The pumping pressures shall be in the range of 100 to 150 psi.
- D. The Contractor shall provide standpipes and/or additional means of visual inspection as required by the County to determine if adequate grout material has filled the entire pipe section(s). The Contractor shall make necessary provisions for the County's representative to monitor all grouting operations.
- E. All pipe to be abandoned shall be capped or plugged with a fitting or material that will prevent soil or other material from entering the pipe. All caps and plugs shall be subject to approval by the County.
- F. All tees, crosses, and valves left in service shall be plugged and restrained.

END OF SECTION

SECTION 02100
SITE PREPARATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section covers clearing, grubbing and stripping of the project site and/or along the pipeline route.
- B. The Contractor shall clear and grub all of the area within the limits of construction or as required, which includes, but is not limited to utility easements. The width of the area to be cleared shall be reviewed by the County prior to the beginning of any clearing.
- C. The Contractor's attention is directed to any Soil Erosion and Sediment Control Ordinances in force in Manatee County. The Contractor shall comply with all applicable sections of these ordinances.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CLEARING

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

3.02 GRUBBING

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

3.03 STRIPPING

In areas so designated, topsoil shall be stockpiled. Topsoil so stockpiled shall be protected until it is placed as specified. The County shall have the option to receive all excess topsoil materials. The Contractor shall pay all equipment and labor cost to

deliver excess top soil material to a remote site chosen by the County within a five-mile radius of the construction site. Should County not choose to receive any or all excess topsoil materials, the Contractor shall dispose of said material at no additional cost to County.

3.04 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

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

3.05 PRESERVATION OF TREES

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

3.06 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

- A. The Contractor shall exercise extreme care to avoid unnecessary disturbance of developed private property adjacent to proposed project site. Trees, shrubbery, gardens, lawns and other landscaping, which are not designated by the County to be removed, shall be replaced and replanted to restore the construction easement to the condition existing prior to construction.
- B. All soil preservation procedures and replanting operations shall be under the supervision of a nursery representative experienced in such operations.
- C. Improvements to the land such as fences, walls, outbuildings and other structures which of necessity must be removed, shall be replaced with equal quality materials and workmanship.
- D. The Contractor shall clean up the construction site across developed private property directly after construction is completed upon approval of the County.

3.07 PRESERVATION OF PUBLIC PROPERTY

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

END OF SECTION

SECTION 02221

TRENCHING, BEDDING AND BACKFILL FOR PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals necessary to perform all excavation, backfill, fill, grading, trench protection or other related work required to complete the piping work shown on the Drawings and specified herein. The work shall include, but not be limited to: vaults; duct conduit; pipe; roadways and paving; backfilling; required fill or borrow operations; grading; disposal of surplus and unsuitable materials; and all related work such as sheeting, bracing and dewatering.
- B. Prior to commencing work, the Contractor shall examine the site and review test borings if available, or undertake his own subsurface investigations and take into consideration all conditions that may affect his work.
- C. The Contractor is responsible for the protection of every tree which is scheduled to remain in the project area. This includes trees which may or may not be shown on the plans. Every tree shall be adequately protected in place at no additional cost to the County. This includes, but is not limited to protecting the root systems and adjusting grades as necessary for tree/root protection.

1.02 PROTECTION

- A. Sheeting and Bracing in Excavations:
 - 1. In connection with construction of underground structures, the Contractor shall properly construct and maintain cofferdams. These shall consist of: sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction and to protect adjacent structures, existing yard pipe and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.
 - 2. Trench sheeting for pipes: no sheeting is to be withdrawn if driven below, mid-diameter of any pipe and no wood sheeting shall be cut off at a level lower than one foot above the top of any pipe unless otherwise directed by the County. During the progress of the work, the County may direct the Contractor in writing to leave additional wood sheeting in place. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given for an alternate method of removal.

3. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. Unless otherwise approved or indicated on the Drawings or in the Specification, all sheeting and bracing shall be removed after completion of the piping or structure, care being taken not to disturb or otherwise injure the pipeline or finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools specifically made for that purpose, by watering, or as may otherwise be directed.
4. The Contractor shall construct, to the extent he deems it desirable for his method of operation, the cofferdams and sheeting outside the neat lines of the pipeline trench or foundation unless otherwise indicated on the Drawings or directed by the County. Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing and cofferdams shall be adequate to withstand all pressures to which the pipeline or structure will be subjected. Pumping, bracing and other work within the cofferdam shall be done in a manner to avoid disturbing any construction of the pipeline or the enclosed masonry. Any movement or bulging which may occur shall be corrected by the Contractor at his own expense so as to provide the necessary clearances and dimensions.
5. Drawings of the cofferdams and design computations shall be submitted to the County and approved prior to any construction. However, approval of these drawings shall not relieve the Contractor of the responsibility for the cofferdams. The drawings and computations shall be prepared and stamped by a Registered Professional Engineer in the State of Florida and shall be in sufficient detail to disclose the method of operation for each of the various stages of construction, if required, for the completion of the pipeline and substructures.

B. Dewatering, Drainage and Flotation

1. The Contractor shall construct and place all pipelines, concrete work, structural fill, bedding rock and limerock base course, in-the-dry. In addition, the Contractor shall make the final 24" of excavation for this work in-the-dry and not until the water level is a minimum of 6" below proposed bottom of excavation.
2. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavation and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.
3. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
4. Wellpoints may be required for dewatering the soil prior to final excavation for deeper in-ground structures or piping and for maintaining the lowered groundwater level until construction has been completed to avoid the structure, pipeline, or fill from becoming floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from wellpoints shall be continuous and standby pumps shall be provided.

5. The Contractor shall furnish all materials and equipment to perform all work required to install and maintain the proposed drainage systems for handling groundwater and surface water encountered during construction of structures, pipelines and compacted fills.
6. Where required, the Contractor shall provide a minimum of two operating groundwater observation wells at each structure to determine the water level during construction of the pipeline or structure. Locations of the observation wells shall be at structures and along pipelines as approved by the County prior to their installation. The observation wells shall be extended to 6 inches above finished grade, capped with screw-on caps protected by 24" x 24" wide concrete base and left in place at the completion of this Project.
7. Prior to excavation, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions to the County for approval. Such approval shall not relieve the Contractor of the responsibility for the satisfactory performance of the system. The Contractor shall be responsible for correcting any disturbance of natural bearing soils for damage to pipeline or structures caused by an inadequate dewatering system or by interruption of the continuous operation of the system as specified.
8. As part of his request for approval of a dewatering system, the Contractor shall demonstrate the adequacy of the proposed system and wellpoint filter sand by means of a test installation. Discharge water shall be clear, with no visible soil particles in a one quart sample. Discharge water shall not flow directly into wetlands or Waters of the State as defined by FDEP and SWFWMD.
9. During backfilling and construction, water levels shall be measured in observation wells located as directed by the County.
10. Continuous pumping will be required as long as water levels are required to be below natural levels.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. Materials for use as fill and backfill shall be described below. For each material, the Contractor shall notify the County of the source of the material and shall furnish the County, for approval, a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of such material.
2. Additional materials shall be furnished as required from off-site sources and hauled to the site.

B. Structural Fill

1. Structural fill in trenches shall be used below spread footing foundations, slab-on-grade floors and other structures as backfill within three feet of the below grade portions of structures.

2. Structural fill material shall be a minimum of 60 percent clean sand, free of organic, deleterious and/or compressible material. Minimum acceptable density shall be 98 percent of the maximum density as determined by AASHTO T-180. Rock in excess of 2-1/2" in diameter shall not be used in the fill material. If the moisture content is improper for attaining the specified density, either water shall be added or material shall be permitted to dry until the proper moisture content for compaction is reached.

C. Common Fill

1. Common fill material shall be free from organic matter, muck or marl and rock exceeding 2-1/2" in diameter. Common fill shall not contain broken concrete, masonry, rubble or other similar materials. Existing soil may be used to adjust grades over the site with the exception of the construction area.
2. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the County, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials by the Contractor.

D. Crushed Stone

1. Crushed stone may be used for pipe bedding, manhole bases, as a drainage layer below structures with underdrains and at other locations indicated on the Drawings.
2. Crushed stone shall be size No. 57 with gradation as noted in Table 1 of Section 901 of Florida Department of Transportation, Construction of Roads and Bridges.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION AND BACKFILLING

- A. Excavation for all trenches required for the installation of pipes and electrical ducts shall be made to the depths indicated on the Drawings and in such manner and to such widths as will give suitable room for laying the pipe or installing the ducts within the trenches.
- B. Rock shall be removed to a minimum 6" clearance around the bottom and sides of all the pipe or ducts being laid.
- C. Where pipes or ducts are to be laid in limerock bedding or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench is no more than slightly disturbed.
- D. Where the pipes or ducts are to be laid directly on the trench bottom, the lower part of the trenches shall not be excavated to grade by machinery. The last of the material being excavated manually, shall be done in such a manner that will give a flat bottom true to grade so that pipe or duct can be evenly supported on undisturbed material. Bell holes shall be made as required.

- E. Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed and inspected and the trench filled with suitable compacted material to the mid-diameter of the pipe.
- F. Backfilling over ducts shall begin not less than three days after placing concrete encasement.
- G. All backfilling shall be prosecuted expeditiously and as detailed on the Drawings.
- H. Any space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth, free from stones having a diameter greater than 2" and thoroughly compacted with a tamper as fast as placed, up to a level of one foot above the top of the pipe.
- I. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.
- J. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted by rolling, ramming, or puddling, as the County may direct, sufficiently to prevent subsequent settling.

END OF SECTION

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SECTION 02223

EXCAVATION BELOW GRADE AND CRUSHED STONE OR SHELL REFILL

PART 1 GENERAL

1.01 SCOPE OF WORK

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

PART 2 PRODUCTS (NOT USED)

PART 3 MATERIALS

3.01 EXCAVATION AND DRAINAGE

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

3.02 REFILL

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

END OF SECTION

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SECTION 02260

FINISH GRADING

PART 1 GENERAL

1.01 WORK INCLUDED

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

1.02 PROTECTION

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

PART 2 PRODUCTS

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

PART 3 EXECUTION

3.01 SUB-SOIL PREPARATION

- A. The Contractor shall rough grade sub-soil systematically to allow for a maximum amount of natural settlement and compaction. Uneven areas and low spots shall be eliminated. Debris, roots, branches or other organics, stones, and sub-soil shall be removed by the Contractor and disposed of in a manner consistent with the latest Manatee County Standards as well as any affected regulatory agency. Should contaminated soil be found, the Contractor shall notify the County.
- B. The Contractor shall cut out areas to sub-grade elevation to stabilize base material for paving and sidewalks.
- C. The Contractor shall bring sub-soil to required profiles and contour grades gradually; and blend slopes into level areas.
- D. The Contractor shall slope the structure grade a minimum of two (2) inches in ten (10) feet unless indicated otherwise on the Drawings.

- E. The Contractor shall cultivate sub-grade to a depth of 3 inches where the topsoil is to be placed. He shall repeat cultivation in areas where equipment use has compacted sub-soil.
- F. The Contractor shall not make grade changes which causes water to flow onto adjacent lands.

3.02 PLACING TOPSOIL

- A. The Contractor shall place topsoil in areas where seeding, sodding and planting is to be performed. He shall place from the following minimum depths, up to finished grade elevations:
 - 1. 6 inches for seeded areas
 - 2. 4-1/2 inches for sodded areas
 - 3. 24 inches for shrub beds
 - 4. 18 inches for flower beds
- B. The Contractor shall use topsoil in a dry state as determined by the County. He shall place the material during dry weather.
- C. The Contractor shall use fine grade topsoil eliminating rough and low areas to ensure positive drainage. He shall maintain levels, profiles and contours of the sub-grades.
- D. The Contractor shall remove stone, roots, grass, weeds, debris, and other organics or foreign material while spreading the material.
- E. The Contractor shall manually spread topsoil around trees, plants and structures to prevent damage which may be caused by grading equipment.
- F. The Contractor shall lightly compact and place the topsoil.

3.03 SURPLUS MATERIAL

- A. The Contractor shall remove surplus sub-soil and topsoil from site at his expense.
- B. The Contractor shall leave stockpile areas and entire job site clean and raked, ready for landscaping operations.

END OF SECTION

SECTION 02276

TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

- A. The work specified in this Section consists of the design, provision, maintenance and removal of temporary erosion and sedimentation controls as necessary.
- B. Temporary erosion controls include, but are not limited to: grassing, mulching, netting, watering, and the reseeding of on-site surfaces and spoil and borrow area surfaces, interceptor ditches at ends of berms and other such work at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the County.
- C. Temporary sedimentation controls include, but are not limited to: silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which shall ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the County.
- D. The Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.02 REFERENCE DOCUMENTS

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

PART 2 PRODUCTS

2.01 EROSION CONTROL

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

2.02 SEDIMENTATION CONTROL

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

PART 3 EXECUTION

3.01 EROSION CONTROL

- A. Minimum procedures for grassing shall be:
 - 1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.
 - 2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
 - 3. Apply mulch loosely and to a thickness of between 3/4-inch and 1-1/2 inches.
 - 4. Apply netting over mulched areas on sloped surfaces.
 - 5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

3.02 SEDIMENTATION CONTROL

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

3.03 PERFORMANCE

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

END OF SECTION

SECTION 02325

ROAD AND RAILROAD CROSSINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

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

1.02 OPERATIONS ON MANATEE COUNTY OR STATE OF FLORIDA PROPERTY

- A. All work affecting Manatee County, Florida Department of Transportation, any other governmental agency's right-of-way or facilities, or railroad right-of-way shall be carried out to the full satisfaction of the applicable Department's authorized representative. The Contractor shall be responsible to meet any and all requirements of the Department of Transportation, railroad, or other agency pertaining to the specific project and shall conduct all his work accordingly.
- B. Prior to the start of the jacking operation, a detailed jacking plan shall be submitted to the County for review and approval. No work shall be permitted until the submittals are accepted. A Bore Path Report shall be submitted within three (3) days of completion of the bore.
- C. Prior to construction, a minimum of three working days written notice prior to start of the actual work shall be given to the County and to the Florida Department of Transportation or other applicable agency.
- D. The Contractor shall install, maintain and leave in place any sheeting, underpinning, cribbing and other related items (other than that required for the jacking pits) to support any structures or facility on the right-of-way owned by either Manatee County, Florida Dept. of Transportation or other governmental agency or railroad entity. The Contractor, at his expense, may be directed by the Department of Transportation, other applicable agency, or the County, to leave sheeting in place.
- E. The Contractor shall perform all necessary soil test borings to determine actual soil conditions and shall utilize the results of said borings to determine the procedures required for each jack and bore operation, including, but not limited to, the presence of rock and necessary dewatering requirements.
- F. No wires, equipment, or other appurtenances shall be permitted to be placed across or pass across State property without the express written permission of the Department of Transportation's authorized representative.
- G. All equipment used by the Contractor on State property may be inspected by the State and shall not be used if it is deemed unsatisfactory by an authorized State representative. State highways shall be kept free of obstructions at all times.

- H. No blasting shall be permitted under or adjacent to any State highways.
- I. The Contractor shall be responsible for all damages arising from his negligence or failure to comply with any State or Manatee County regulations or requirements or deviations from the Contract Documents.
- J. All State highway crossings shall be performed and completed in a manner fully satisfactory to the Department of Transportation and Manatee County.
- K. Traffic control requirements and procedures are detailed in Section 01570 of this specification.

1.03 SHOP DRAWINGS

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

1.04 SUBMITTALS

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

PART 2 PRODUCTS

2.01 MATERIALS

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

PART 3 EXECUTION

3.01 JACKING SLEEVE

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

- B. The Contractor shall shore the jacking pits with sheeting or such other materials as required. Sheeting shall be driven to a sufficient depth below the invert of the steel sleeve to resist any pressure developed by the soil outside the jacking pit. Sheeting shall terminate not less than 3-feet, 6-inches above existing grade.
- C. The sections of steel sleeve shall be field welded in accordance with the applicable portions of AWWA C-206 for field welded water pipe joints. Steel sleeve shall receive one coat of Tnemec 46H-413 Hi-Build Tnemec-tar applied in accordance with manufacturer's recommendation.
- D. At the completion of the jacking operations, the Contractor shall be required to leave all sheeting in place. The top of the sheeting shall be cut off 36-inches below finished grade.
- E. The Contractor shall be responsible for preventing voids outside the steel sleeves. Should they occur, the Contractor may be directed to fill them with grout in a method approved by the County. The Contractor shall exercise care in the sleeve removal to prevent voids.
- F. The Contractor shall be responsible for furnishing, installing and removing the thrust block or restraint which was employed in driving the sleeve forward. No additional payment for the jacking restraint shall be made other than the unit price for this item. The entire jacking operation shall be discussed and accepted by the County prior to commencing jack and bore operation. After completion, the backup structures shall be removed in part or whole to permit construction of the pipeline in the sleeve.

3.02 INSTALLING PIPE IN SLEEVE

- A. The Contractor shall install the pipe in full conformity with the Contract Documents. The pipe shall be installed to the lines and grades required within the sleeve and placed to the approval of the County. The pipe shall be braced to the side and the top of the sleeve to prevent flotation or motion.
- B. A bulkhead shall be placed at the ends of the sleeve to keep the surrounding soil and material from migrating into the voids in the sleeve.

3.03 TESTING

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

END OF SECTION

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SECTION 02444

FENCING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, material, equipment and incidentals necessary for complete installation of chain link fence systems. The fencing shall be installed according to manufacturer's specifications unless otherwise directed or authorized by the County.
- B. The Contractor's security fencing is at his expense and option and is not covered in this Section.

1.02 QUALITY ASSURANCE

- A. Standards of Manufacture shall comply with the standards of the Chain Link Fence Manufacturer's Institute for "Galvanized Steel Chain Link Fence Fabric" and as herein specified.
- B. Provide each type of steel fence and gates as a complete unit produced by a single manufacturer, including, but not limited to accessories, fittings, fasteners and appurtenances complete and ready for use.
- C. Acceptable Manufacturers: Anchor, Cyclone, or approved equal
- D. Erector Qualifications: The Contractor or approved subcontractor, must have a minimum of two years experience in similar fence installation.

1.03 SUBMITTALS

- A. Product Data:

For Steel Fences and Gates, the Contractor shall submit for review and approval to the County, five (5) copies of the manufacturer's technical data, details of fabrication, installation instructions and procedures for steel fences and gates. The Contractor shall be responsible for a copy of each instruction to be given to the Installer.

- B. Samples:

The Contractor shall submit two samples approximate size 6-inches long, or 6-inches square of fabric material, framework members and typical accessories to the County for review and approval.

- C. Certificates:

The Contractor shall provide manufacturer's certification that materials meet or exceed the Contract Document requirements.

PART 2 PRODUCTS

2.01 GENERAL

- A. The pipe sizes indicated are commercial pipe sizes.
- B. The tube sizes indicated are nominal outside dimension.
- C. Framework and appurtenances shall be finished with not less than minimum weight of zinc per sq. ft. and shall comply with the following:
 - 1. Pipe: ASTM A53 (1.8 oz. zinc psf)
 - 2. Square tubing: ASTM A 123 (2.0 oz. zinc psf)
 - 3. Hardware and Accessories: ASTM A 153 (zinc weight per Table I).
- D. All fence components shall be galvanically compatible.
- E. Vinyl coatings for fabric, posts, rails, gates, and all other fittings and components shall be thermally fused polyvinyl chloride; heavy mil coating per ASTM F 668. Coating shall be 6-gauge black vinyl finish.

2.02 FABRIC

Fabric shall be 0.148 inch (9 gage) steel wire, 2-inch diamond mesh and both top and bottom salvages shall be twisted and barbed for fabric over 60-inches high. Finish shall be hot dipped galvanized, ASTM A 392, Class II.

2.03 POSTS, RAILS AND BRACES

- A. End, Corner and Pull Posts:
 - 1. The Contractor shall furnish end, corner and pull posts of the minimum size and weight as follows:
 - a. Up to 5 foot fabric height
 - (1) 2.375-inch OD pipe weighing 3.65 pounds per linear ft.
 - (2) 2.50-inch square tubing weighing 5.59 pounds per linear foot.
 - b. Over 5 foot fabric height
 - (1) 2.875-inch OD pipe weighing 5.79 pounds per linear foot.
 - (2) 2.50-inch square tubing weighing 5.59 lbs. per linear foot.
- B. Line Post:
 - 1. The Contractor shall furnish line posts of the minimum sizes and weight as follows. Post shall be spaced 10 foot o.c. maximum, unless otherwise indicated:
 - a. Up to 5 foot fabric height.
 - (1) 1.90-inch OD pipe weighing 2.72 pounds per linear foot.
 - b. Over 5 foot fabric height.
 - (1) 2.375-inch OD pipe weighing 3.65 pounds per linear foot.

C. Gate Posts:

1. The Contractor shall furnish gate posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:
 - a. Up to 6 feet wide.
 - (1) 2.875-inch OD pipe weighing 5.79 pounds per linear foot.
 - (2) 2-1/2 inch square tubing weighing 5.59 pounds per linear foot.
 - b. Over 6 feet and up to 13 feet wide.
 - (1) 4-inch OD pipe weighing 9.11 pounds per linear foot.
 - c. Over 13 feet and up to 18 feet wide.
 - (1) 6.625 inches OD weighing 18.97 pounds per linear foot.
 - d. Over 18 feet.
 - (1) 8.625 inches OD weighing 28.55 pounds per linear foot.

D. Top Rails:

1. The Contractor shall furnish the following top rails unless otherwise indicated:
 - a. 1.660-inch OD pipe weighing 2.27 pounds per linear foot.

E. Post Brace Assembly:

1. The Contractor shall furnish bracing assemblies at the end, gate, at both sides of corner and pull posts, with the horizontal brace located at mid-height of the fabric.
2. Use 1.660-inch OD pipe weighing 2.27 pounds per linear foot for horizontal brace and 3/8-inch diameter rod with turnbuckles for diagonal truss.

F. Tension Wire:

1. The Contractor shall furnish tension wire consisting of galvanized 0.177 inch (7 gage) coiled spring wire as per ASTM A824 at the bottom of the fabric only.

G. Barbed Wire Supporting Arms:

1. The Contractor shall furnish pressed steel, wrought iron, or malleable iron barbed wire supporting arms, complete with provisions for anchorage to posts and attaching three rows of barbed wire to each arm. Supporting arms may be attached either to posts or integral with post top weather cap. The Contractor shall provide a single 45 degree arm for each post where indicated.

H. Barbed Wire:

1. The Contractor shall furnish barbed wire. It shall be 2 strand, 12-1/2 gauge wire with 14 gauge, 4-point barbs spaced 5-inch o.c., galvanized, complying with ASTM A121, Class 3.

- I. Post Tops:
 - 1. The Contractor shall furnish post tops. Tops shall be pressed steel, wrought iron, or malleable iron of ASTM F626 designed as a weathertight closure cap (for tubular posts). The Contractor shall furnish one cap for each post unless equal protection is afforded by a combination of post top cap and barbed wire supporting arm. The Contractor shall furnish caps with openings to permit through passage of the top rail.
- J. Stretcher Bars:
 - 1. The Contractor shall furnish stretcher bars. Bars shall be one piece lengths equal to the full height of the fabric, with a minimum cross-section of 3/16-inch x 3/4-inch. The Contractor shall provide one stretcher bar for each gate and end post and two bars for each corner and pull post, except where fabric is integrally woven into the post.
- K. Stretcher Bar Bands:
 - 1. The Contractor shall furnish stretcher bar bands. Bands shall be steel, wrought iron, or malleable iron, a maximum space of 15-inch o.c. to secure stretcher bars to end, corner, pull and gate posts.

2.04 GATES

- A. The Contractor shall provide fabricated gate perimeter frames of tubular members. Additional horizontal and vertical members shall ensure proper gate operation and attachment of fabric, hardware and accessories. The maximum space of the frame members shall not be more than 8-inches apart. Fabrication is as follows:
 - 1. Up to 5 feet high, or leaf width 8 feet or less.
 - a. 1.660-inch OD pipe weighing 2.27 pounds per linear foot.
 - b. 1.5-inch sq. tubing weighing 2.27 pounds per linear foot.
 - 2. Over 5 feet high, or leaf width exceeding 8 feet.
 - a. 1.90 inch OD pipe weighing 2.72 pounds per linear foot.
 - b. 2-inch square tubing weighing 2.60 pounds per linear foot.
- B. The Contractor shall assemble gate frames by welding or with special malleable or pressed steel fittings and rivets for rigid connections. He shall use the same fabric width as for the fence, unless otherwise indicated in the Contract Documents or authorized by the County. He shall install the fabric with stretcher bars at vertical edges. The bars may also be used at the top and bottom edges. The contractor shall attach stretchers to the gate frame at a maximum spacing of 15-inch o.c. He shall attach the hardware with rivets or by other means which will prevent removal or breakage.
- C. The Contractor shall install diagonal cross-bracing consisting of 3/8-inch diameter adjustable length truss rods on gates as necessary to ensure frame rigidity without sag or twist.

- D. The Contractor shall install barbed wire above the gates. He shall extend the end members of gate frames 12-inches above the top member which will be prepared for three strands of wire. The Contractor shall provide necessary clips for securing wire to extensions.
- E. Gate Hardware:
 - 1. The Contractor shall furnish the following hardware and accessories for each gate.
 - a. Hinges: Pressed or forged steel or malleable iron to suit gate size, non-lift-off type, offset to permit 180 degrees gate opening. Provide 1-1/2 pair of hinges for each leaf over six feet nominal height.
 - b. Latch: Forked type of plunger-bar type to permit operation from either side of gate with padlock eye as integral part of latch.
 - c. Keeper: Provide keeper for all vehicle gates, which automatically engages the gate leaf and holds it in the open position until manually released.
 - d. Double Gates: Provide gate stops for double gates, consisting of mushroom type of flush plate with anchors. Set in concrete to engage the center drip drop rod or plunger bar. Include locking device and padlock eyes as an integral part of the latch, using one padlock for locking both gate leaves.
 - e. Where gates are between masonry piers, provide "J" with 4-inch square anchor plate to masonry contractor for building in.

2.05 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Wire Ties: The Contractor shall tie fabric to line posts. He shall use 9 gauge wire ties spaced 12-inches o.c. For tying fabric to rails and braces, he shall use 9 gauge wire ties spaced 24-inches o.c. For tying fabric to tension wire, he shall use 11 gauge hog rings spaced 24-inches o.c. The finish of ties shall match the fabric finish.
- B. Concrete: The Contractor shall provide portland cement concrete in compliance with ASTM C-150 and the Contract Documents. Aggregates shall comply with ASTM C-33. The Contractor shall mix the materials to obtain a minimum 28-day compressive strength of 2500 psi, using a minimum of 4 sacks of cement per cubic yard, a maximum size aggregate of 1-inch, a maximum 3-inch slump and air entrainment of 2 percent to 4 percent.
- C. Privacy Decorative Slating (PDS) shall be PVC, bottom locking, non-fin type, sized to match the fabric height and color in both the fence and gates.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The Contractor shall not start the fence installation prior to the final grade completion, and the finish elevations established, unless otherwise authorized by the County.
- B. The Contractor shall repair damaged coatings in the shop or in the field by recoating utilizing manufacturers recommended repair compounds and as applied per manufacturer's recommendations.

C. Excavation:

1. For post footings, the Contractor shall drill holes in firm, undisturbed or compacted soil of the diameters and spacings shown or called out in the Contract Documents.
 - a. For holes not shown or called out on the Contract Documents, the Contractor shall excavate minimum diameters recommended by the fence manufacturer.
 - b. Post holes shall be in true alignment and of sufficient size to provide a permanent concrete foundation. Concrete shall be poured against undisturbed earth sides and bottom. All holes shall be 48-inches deep with posts and corner posts placed in the concrete to a depth of 36-inches. The gate posts shall be set in the concrete to a depth of 42-inches below the surface in firm, undisturbed soil. Holes shall be well centered on the posts. A minimum diameter of 12-inches shall be required for all post holes.
 - c. Excavated soil shall be removed from the County's property.
 - d. If solid rock is encountered near the surface, the Contractor shall drill into rock at least 12-inches for line posts and at least 18-inches for end, pull, corner or gate posts. Hole shall be drilled to at least 1-inch greater diameter than the largest dimension of the post to be place.
 - e. If the Contractor encounters solid rock below solid overburden, he shall drill to the full depth required; however, rock penetration need not exceed the minimum depths specified.

D. Setting Posts:

1. The Contractor shall remove loose and foreign materials from the sides and bottoms of holes, and moisten soil prior to placing concrete.
 - a. Center and align posts in holes above bottom of excavation.
 - b. Place concrete around posts in a continuous pour and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations. The top of concrete shall extend 2-inches above finish grade.
 - c. Trowel finish tops of footings and slope or dome to direct water away from posts. Extend footings for gate posts to the underside of bottom hinge. Set keeps, stops, sleeves and other accessories into concrete as required.
 - d. Keep exposed concrete surfaces moist for at least 7 days after placement, or cure with membrane curing materials, or other acceptable curing method.
 - e. Grout-in posts set into sleeved holes, concrete constructions, or rock excavations with non-shrink portland cement grout, or other acceptable grouting material.

E. Concrete Strength:

The Contractor shall allow the concrete to attain at least 75% of its minimum 28-day compressive strength no sooner than 7 days after placement, before rails, tension wires, barbed wire, or fabric is installed. The Contractor shall not stretch and tension fabric or wires and shall not hang gates until the concrete has attained its full design strength.

F. Top Rails:

The Contractor shall run the rail continuously through post caps or extension arms and bend to radius for curved runs. He shall provide expansion coupling as recommended by fencing manufacturer.

G. Brace Assemblies:

The Contractor shall install braces so that posts are plumb when diagonal rod is under proper tension.

H. Tension Wire:

The Contractor shall install tension wires by weaving through the fabric and tying to each post with not less than 0.170 inch galvanized wire, or by securing the wire to the fabric.

I. Fabric:

The Contractor shall leave approximately 3-inches between finish grade and bottom salvage, except where the bottom of the fabric extends into the concrete. He shall pull the fabric taut and tie it to posts, rails and tension wires. He shall install fabric on the security side of the fence and anchor it to the framework so that the fabric remains in tension after the pulling force is released.

J. Stretcher Bars:

The Contractor shall thread through or clamp the bars to the fabric 4-inches o.c. and secure them to posts with metal bands spaced 15-inches o.c.

K. Barbed Wire:

The Contractor shall install 3 parallel wires on each extension arm on the security side of fence, unless otherwise indicated. He shall pull the wire taut and fasten securely to each extension arm.

L. Gate:

The Contractor shall install gates plumb, level and secure for full opening without interference. He shall install ground-set items in concrete for anchorage, as recommended by the fence manufacturer. He shall adjust hardware for smooth operation and lubricate where necessary.

M. Tie Wires:

The Contractor shall use U-shaped wire, conforming to the diameter of the attached pipe, and shall clasp the pipe and fabric firmly with twisted ends of at least 2 full turns. He shall bend the end of the wire to minimize hazard to persons or clothing.

N. Fasteners:

The Contractor shall install nuts for tension band and hardware bolts on the side of fence opposite the fabric side. Pen ends of bolts or score threads to prevent removal of nuts.

3.02 INSTALLATION

Fence shall be constructed such that each run of fence between corner posts or gate posts has equal spacing between the line posts. Spacing shall not exceed 10 feet, and shall not exceed 8 feet for fabric with privacy decorative slatting.

END OF SECTION

SECTION 02480

LANDSCAPING

PART 1 GENERAL

1.10 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment, and incidentals required to install trees, ground cover, and shrubs, to place accessory planting materials, to maintain and guarantee all planted areas. All work shall be in strict accordance with sound nursery practice and shall include maintenance and watering of all of the work of this Contract until final completion and acceptance by the County.
- B. The landscaping shall be performed by a contractor or subcontractor who specializes in landscaping and who is fully familiar and experienced in projects of this type and scope. The landscaping contractor or subcontractor shall be subject to the approval of the County.
- C. The Contractor shall provide all landscaping complete and ready for use as specified in the Contract Documents and as shown on the Drawings.

1.02 SUBMITTALS

- A. The Contractor shall submit to the County for review and approval, shop drawings and complete written maintenance instructions for each type of plant furnished under this Contract.
- B. The Contractor shall submit representative samples of any or all of required accessory planting materials as requested by the County.

1.03 OBSTRUCTIONS BELOW GROUND

- A. The County may change the location of plant material if underground construction, utilities or obstructions are encountered in excavation of planting areas or pits.
- B. The Contractor shall make such changes without additional compensation from the County.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Plant species and size shall conform to those indicated in the Plant List and in plan locations shown on the Drawings. Nomenclature shall conform to the Florida Department of Agriculture: "Grades and Standards for Nursery Plants". The designated authority for identification of plants shall be in conformance with FDOT Standard Specification Section 580-2.1.1 Plants.

- B. Plants shall be sound, healthy, vigorous, free from plant diseases, insects, pests, or their eggs and shall have healthy normal root systems. Plants shall be nursery grown stock, freshly dug. No heeled in, cold storage, or collected stock shall be accepted.
- C. Shape and Form
1. Plant material shall be symmetrical, typical for the variety and species, and shall conform to the measurements specified in the Plant List.
 2. Plants used where symmetry is required shall be matched as nearly as possible.
 3. Plants shall not be pruned prior to delivery except as authorized by the County.
 4. All plants shall have been transplanted or root pruned at least once in the past three years.
 5. Unless otherwise noted, street trees shall be free of branches up to six feet, with the single leader well branched, and with straight trunks.
 6. Shrubs shall have been transplanted twice, have fully developed root systems, be heavily canned with foliage to base, fulfill dimensions required, and be typical of species.
 7. Ground covers shall have sturdy fibrous root systems and shall be heavily leafed.
- D. Measurement: The height and/or width of trees shall be measured from the ground or across the normal spread of branches with the plants in their normal position. This measurement shall not include the immediate terminal growth.
- E. Substitutions in plant species or size shall be made only with the written approval of the County.
- F. Ground cover plants shall be planted in beds of four inches of approved topsoil. The beds shall be thoroughly disked into the soil. The compacted and settled finished surface shall be set to the required grade. Plants shall be spaced as described in the Contract Documents or shown on the Contract Drawings, or otherwise directed by the County in accordance with the best practices of the trade.
- G. Planting Soil
1. Soil for backfilling around plants and planting beds shall be a good grade of garden loam as approved by the County. Soil shall be free of heavy clay, coarse sand, stones, lumps, sticks, or other foreign material. The soil shall not be delivered or used in a muddy condition.
 2. The soil shall be taken from ground that has never been stripped. There shall be a slight acid reaction to the soil with no excess of calcium or carbonate. The soil shall be free from excess weeds or other objectionable material.
 3. Soil for trees and shrubs shall be delivered in a loose, friable condition. All trees shall average approximately one cubic yard per tree, except Sabal Palmetto, which shall be planted with clean sand. There shall be a minimum of 4-inches of planting soil in ground cover areas and 1/8 cubic yard per shrub or vine.
 4. No marl shall be allowed in ground cover planting beds.
- H. Before plants are backfilled with planting soil, fertilizer tablets, Agriform 20-10-5 or equal, shall be placed in each pit. The Contractor shall provide three tablets for each tree and one for each shrub or vine.

- I. Tree Staking: All tree staking and bracing shall be included herein in accordance with sound nursery practice and shall be in accordance with the Contract Documents. The Contractor shall furnish all materials required for staking and bracing as approved.
- J. Landscaping stones shall be inert and nonleaching. The Contractor shall provide physical samples for approval prior to installation. Crushed limerock shall not be acceptable.

PART 3 EXECUTION

3.01 PLANTING PROCEDURES

- A. Plant Locations: All plants shall be located as shown on the Drawings, to dimensions if shown, to scale if not dimensioned. Large areas or beds shall be scaled and the plants spaced evenly. Approval by the County is required before any plants may be installed.
- B. Tree Pits: Pits for trees shall be at least two feet greater in diameter than the specified diameter of the ball. Pits shall be of sufficient depth to allow a 12-inch layer of planting soil under the ball when it is set to grade. Bottom of pit shall be loosened prior to backfilling.
- C. Digging and Handling
 - 1. Plants shall be handled at all times so that roots or balls are adequately protected from sun or drying winds. Tops or roots of plant allowed to dry out will be rejected.
 - 2. Balled and burlapped plants shall be moved with firm, natural balls of soil, not less than one foot diameter of ball to every one inch caliper of trunk, and a depth of not less than 2/3 of ball diameter. No plant shall be accepted when the ball of earth surrounding its roots has been cracked or broken. All trees, except palms, shall be dug with ball and burlapped. Root pruning shall have been done at minimum of four weeks before planting at the job.
 - 3. Bare root plants shall be dug with spread of root and of sufficient depth to insure full recovery of plant.
- D. Cabbage Palms (Sable Palmetto):
 - 1. Cabbage Palms shall be taken from moist black sand areas. Only a minimum of fronds shall be removed from the crown to facilitate moving and handling. Clear trunk or overall height shall be as specified after the minimum of fronds have been removed.
 - 2. Cabbage Palms buds shall be tied to a suitable support with a burlap strip, to be left in place until the tree is well established in its new location.
 - 3. Cabbage Palms shall be planted in sand, thoroughly washed in during planting operations, and with a dished or saucer depression left at the soil line for future waterings. Palms with marred or burned trunks will be accepted at the discretion of the County only.
 - 4. Trees moved by winch or crane shall be thoroughly protected from chain marks, girdling or bark slippage by means of burlap, wood battens, or other approved method.

- E. When balled or burlapped plants are set, planting soil shall be carefully tamped under and around the base of the balls to prevent voids. All burlap, rope, wires, etc., shall be removed from the sides and tops of balls, but no burlap shall be pulled from underneath. Roots of bare rooted plants shall be properly spread out and planting soil carefully worked in among them.
- F. All plants shall be set straight or plumb, in locations shown on the Drawings. Except as otherwise specified, plants shall be planted in pits which shall be set at such level that, after settlement, they bear the same relation to the finished grade or the surrounding ground as they bore to the grade of the soil from which they are taken.
- G. Pruning shall be carefully done by experienced plantsmen. Prune immediately upon acceptance by the County, including any broken branches, thinning small branches and tipping back main branches (except main leaders).
- H. Excess soil and debris shall be disposed of off the project site unless ordered stockpiled by the County.

3.02 NORMAL MAINTENANCE OF PLANT MATERIALS

- A. Plant material maintenance shall begin when planting operations start and shall extend until final acceptance of work.
- B. Maintain all plant materials under this Contract to the satisfaction of the County. Maintenance shall include necessary watering, cultivation, weeding, pruning, spraying, tightening and repair to guy wires, removal of dead material, resetting, and other work required to conform with referenced standards and accepted nursery standards as approved.
- C. Plant materials which are in a tilted or in a leaning position shall be properly righted.
- D. After final acceptance by the County and until one calendar year after acceptance of all plantings, the landscaping contractor or subcontractor shall make monthly inspections of materials and report in writing to the County the conditions of the plants and the necessary requirements to keep the plants in a healthy growing condition.

3.03 TREE AND PLANT PROTECTION

- A. The Contractor shall remove all trees (if any) within the limit of landscaping shown on the detail sheet except those designated to be salvaged (if any). Prior to removal of said trees, the Contractor shall obtain a tree removal permit, if required. All other trees in the vicinity of the work shall be protected against damage by the Contractor until all work under the Contract has been completed.
- B. Consult with the County, and remove agreed-on roots and branches which interfere with construction. Employ qualified tree surgeon to remove, and to treat cuts.
- C. Provide temporary barriers to a height of six feet around each group of trees and plants.

- D. Protect root zones of trees and plants
 - 1. Do not allow vehicular traffic or parking.
 - 2. Do not store materials or products.
 - 3. Prevent dumping or refuse or chemically injurious materials or liquids.
 - 4. Prevent puddling or continuous running water.
- E. Carefully supervise excavating, grading, and filling, and subsequent construction operations, to prevent damage.
- F. In case of inadvertent damage to any tree or plant by the Contractor or any of his subcontractors or employees, the Contractor shall provide replacement of each such damaged tree or plant with a new one of acceptable type, size and quality.
- G. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed, and when approved by the County.
- H. Clean and repair damage caused by installation, fill and grade the areas of the site to required elevations and slopes, and clean the area.

3.04 GUARANTEE

The life and satisfactory condition of all plant material planted shall be guaranteed by the Contractor for a minimum of one calendar year. Guarantee shall include complete replacement with material of the same kind and size as in the original work if not in a healthy condition, as determined by the County, at the end of the guarantee period.

3.05 REPLACEMENT

- A. At the end of the guarantee period, any plant required under this Contract that is dead or not in satisfactory growth as determined by the County, shall be removed. Plants replaced shall be guaranteed for 90 days after date of replacement.
- B. Replacement of plants necessary during guarantee period shall be the responsibility of the Contractor, except for possible replacements of plants resulting from removal, vandalism, acts of neglect on the part of others, or acts of God.
- C. All replacements shall be plants of the same kind and size as specified in the Drawings. They shall be furnished and planted as herein specified. The cost shall be the responsibility of the Contractor.

END OF SECTION

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SECTION 02485

SEEDING AND SODDING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials and equipment necessary to satisfactorily return all construction areas to their original conditions or better.
- B. Work shall include furnishing and placing seed or sod, fertilizing, planting, watering and maintenance until acceptance by County.

1.02 RELATED WORK NOT INCLUDED

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

1.03 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.01 MATERIALS

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

- B. Seeding/Grassing: The Contractor shall grass all unpaved areas disturbed during construction which do not require sod. All grassing shall be completed in conformance with FDOT Specifications, Sections 570 and 981. The grassed areas shall be mulched and fertilized in accordance with FDOT Specifications, except that no additional payment will be made for mulching, fertilizing and/or watering.
- C. Sodding: Sod shall be provided as required on the construction drawings or at locations as directed by the County in accordance with Florida Department of Transportation, Specifications Section 575 and 981. The Contractor shall furnish bahia grass sod or match existing sod. Placement and watering requirements shall be in accordance with FDOT Specifications Section 575, except that no additional payment will be made for placement and/or watering. This cost shall be included in the Contract price bid for sodding.
- D. Topsoil: Topsoil stockpiled during excavation may be used as necessary. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the County. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants and grassing specified herein.
- E. Water: It is the Contractor's responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements that may be necessary to ensure an adequate supply of water to meet the needs for his work. He shall also furnish all necessary hose, equipment, attachments and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

PART 3 EXECUTION

3.01 INSTALLATION

- A. When the trench backfill has stabilized sufficiently, the Contractor shall commence work on lawns and grassed areas, including fine grading as necessary and as directed by the County.
- B. Finish Grading: Areas to be seeded or sodded shall be finish graded, raked, and debris removed. Soft spots and uneven grades shall be eliminated. The County shall approve the finish grade of all areas to be seeded or sodded prior to seed or sod application.
- C. Protection: Seeded and sodded areas shall be protected against traffic or other use by placing warning signs or erecting barricades as necessary. Any areas damaged prior to acceptance by the County shall be repaired by the Contractor as directed by the County.

3.02 CLEANUP

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

3.03 LANDSCAPE MAINTENANCE

- A. Any existing landscape items damaged or altered during construction by the Contractor shall be restored or replaced as directed by the County.
- B. Maintain landscape work for a period of 90 days immediately following complete installation of work or until County accepts project. Watering, weeding, cultivating, restoration of grade, mowing and trimming, protection from insects and diseases, fertilizing and similar operations as needed to ensure normal growth and good health for live plant material shall be included at no additional cost to the County.

3.04 REPAIRS TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATORS

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

END OF SECTION

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SECTION 02513

ASPHALT CONCRETE PAVING

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials and equipment necessary to complete all milling asphalt pavement and asphalt concrete paving (including restoration of driveways) as called out on the Contract Documents or as shown on the Drawings.

1.02 QUALITY ASSURANCE

- A. Qualifications of Asphalt Concrete Producer: The only materials permitted shall be furnished by a bulk asphalt concrete producer exclusively engaged in the production of hot-mix, hot-laid asphalt concrete.
- B. Qualification of Testing Agency: The County may employ a commercial testing laboratory to conduct tests and evaluations of asphalt concrete materials and design. The Contractor shall:
 - 1. Provide asphalt concrete testing and inspection service acceptable to County.
 - 2. Include sampling and testing asphalt concrete materials proposed, and tests and calculations for asphalt concrete mixtures.
 - 3. Provide field testing facilities for quality control testing during paving operations.
- C. Requirements of Regulatory Agencies: The Contractor shall comply with the applicable requirements of:
 - 1. Manatee County Utility Operations Department
 - 2. Manatee County Transportation Department
 - 3. State of Florida Dept. of Transportation

1.03 PAVING QUALITY REQUIREMENTS

- A. General: In addition to other specified conditions, the Contractor shall comply with the following minimum requirements:
 - 1. In-place asphalt concrete course shall be tested for compliance with requirements for density, thickness and surface smoothness.
 - 2. Final surface shall be provided of uniform texture, conforming to required grades and cross sections.
 - 3. A minimum of four inch diameter pavement specimens for each completed course shall be taken from locations as directed by the County.
 - 4. Holes from test specimens shall be repaved as specified for patching defective work.

- B. Density:
1. When subjected to 50 blows of standard Marshall hammer on each side of an in-place material specimen, densities shall be comparable to a laboratory specimen of same asphalt concrete mixture.
 2. The minimum acceptable density of in-place course material shall be 98% of the recorded laboratory specimen density.
- C. Thickness: In-place compacted thicknesses shall not be acceptable if less than the minimum thicknesses shown on the Drawings.
- D. Surface Smoothness:
1. Finished surface of each asphalt concrete course shall be tested for smoothness, using a 10 ft. straightedge applied parallel to and at right angles to centerline of paved areas.
 2. Surface areas shall be checked at intervals directed by County.
 3. Surfaces shall not be acceptable if they exceed the following:
 - a. Base Course: 1/4 in. in 10 ft.
 - b. Surface Course: 3/16 in. in 10 ft.
 - c. Crowned Surfaces:
 - (1) Test crowned surfaces with a crown template, centered and at right angles to the crown.
 - (2) Surfaces will not be acceptable if varying more than 1/4 in. from the template.

1.04 SUBMITTALS

- A. Samples: The Contractor may be required to provide samples of materials for laboratory testing and job-mix design.
- B. Test Reports: The Contractor shall submit laboratory reports for following materials tests:
1. Coarse and fine aggregates from each material source and each required grading:
 - a. Sieve Analysis: ASTM C 136 (AASHTO T 27).
 - b. Unit Weight of Slag: ASTM C29 (AASHTO T 19).
 - c. Soundness: ASTM C 88 (AASHTO T 104) for surface course aggregates only.
 - d. Sand Equivalent: ASTM D 2419 (AASHTO T 176).
 - e. Abrasion of Coarse Aggregate: ASTM C131 (AASHTO T 96),for surface course aggregates only.
 2. Asphalt cement for each penetration grade:
 - a. Penetration: ASTM D5 (AASHTO T49).
 - b. Viscosity (Kinematic): ASTM D2170 (AASHTO T 201).
 - c. Flash Point: ASTM D92 (AASHTO T 48).
 - d. Ductility: ASTM D 113 (AASHTO T 51).
 - e. Solubility: ASTM D 4 (AASHTO T 44).
 - f. Specific Gravity: ASTM D 70 (AASHTO T 43).

3. Job-mix design mixtures for each material or grade:
 - a. Bulk Specific Gravity for Coarse Aggregate: ASTM C 117(AASHTO T 85).
 - b. Bulk Specific Gravity for Fine Aggregate: ASTM C 128(AASHTO T 84).
4. Uncompacted asphalt concrete mix: Maximum Specific Gravity: ASTM D 2041 (AASHTO T 209).
5. Compacted asphalt concrete mix:
 - a. Bulk Density: ASTM D 1188 (AASHTO T 166).
 - b. Marshall Stability and Flow: ASTM D 1559.
6. Density and voids analysis:
 - a. Provide each series of asphalt concrete mixture test specimens, in accordance with A.I. MS-2 "Mix Design Methods for Asphalt Concrete".
 - b. Use Marshall method of mix design unless otherwise directed or acceptable to the County.
 - c. Report the quantity of absorbed asphalt cement in pounds of dry aggregate, percent air voids, and percent voids in mineral aggregate.
7. Sampling and testing of asphalt concrete mixtures for quality control during paving operations:
 - a. Uncompacted asphalt concrete mix.
 - (1) Asphalt Cement Content: ASTM D 2172 (AASHTO T 164).
 - (2) Penetration of Recovered Asphalt Cement: ASTM D 5(AASHTO T 49).
 - (3) Ductibility of Recovered Asphalt Cement: ASTM D 113(AASHTO T 51).
 - b. Compacted asphalt concrete mix:
 - (1) Bulk Density: ASTM D 1188 (AASHTO T 166).
 - Marshall Stability and Flow: ASTM D1559).
 - c. Perform at least one test for each day's paving.
8. Asphalt plant inspection: ASTM D 290.
9. Additional testing:
 - a. Retesting shall be required if previous tests indicate insufficient values, or if directed by the County.
 - b. Testing shall continue until specified values have been attained.
10. Asphalt concrete materials which do not comply with specified requirements shall not be permitted in the work.

1.05 JOB CONDITIONS

A. Weather Limitations:

1. Apply bituminous prime and tack coats only when the ambient temperature in the shade is 50 degrees F. and when the temperature has not been below 35 degrees F. for 12 hours immediately prior to application.
2. Do not apply when the base surface is wet or contains an excess of moisture which would prevent uniform distribution and the required penetration.
3. Construct asphalt concrete surface course only when atmospheric temperature is above 40 degrees F., when the underlying base is dry, and when weather is not rainy.
4. Base course may be placed when air temperature is not below 30 degrees F. and rising, when acceptable to the County.

B. Grade Control: Establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.

- C. Traffic Control: Maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Soil Cement or Shell Base Course: as specified in FDOT Section 270, "Material for Base and Stabilized Base", and as called for in the Contract Documents.
- B. Aggregate for Asphalt Concrete, General:
 - 1. Sound, angular crushed stone, crushed gravel, or crushed slag: ASTM D 692.
 - 2. Sand, stone, or slag screening: ASTM D 1073.
 - 3. Provide aggregate in gradations for various courses to comply with local highway standards.
- C. Surface Course Aggregates:
 - 1. Provide natural sand, unless sand prepared from stone, slag, or gravel or combinations are required to suit local conditions.
- D. Asphalt Cement: Comply with ASTM D 946 for 85-100 penetration grade.
- E. Prime Coat:
 - 1. Cut-back liquid asphalt.
 - 2. Medium-Curing type: ASTM D 2027, Grade MC-70.

2.02 ASPHALT-AGGREGATE MIXTURES

- A. Job-mix criteria:
 - 1. Provide job-mix formulas for each required asphalt-aggregate mixture.
 - 2. Establish a single percentage of aggregate passing each required sieve size, a single percentage of asphalt cement to be added to aggregate, and a single temperature at which asphalt concrete is to be produced.
 - 3. Comply with the mix requirements of local governing highway standards.
 - 4. Maintain material quantities within allowable tolerances of the governing standards.

2.03 TRAFFIC AND PARKING MARKING MATERIALS

- A. Traffic lane marking paint with chlorinated rubber base.
- B. Factory mixed, quick drying and non bleeding, FS TT-P-115C, Type III.
- C. Color: Driving Lane Dividers - White
No Parking Zone - Yellow
Parking Dividers - White

PART 3 EXECUTION

3.01 SURFACE PREPARATION

A. Subbase Preparation:

1. The Contractor shall remove from the area all organic substance encountered to a depth of six or eight inches (6" or 8"), or to such depth and width as directed by the County. The entire area shall be plowed and dragged prior to placing a stabilizing additive, if required to meet minimum bearing value.
2. Subbase shall be compacted to a minimum density of 98 percent of the maximum as determined by the Modified Proctor Density AASHTO T180, and shall have a minimum bearing value of 40 pounds per square inch as determined by the Florida Bearing Test.

B. Base Course:

1. Check subgrade for conformity with elevations and section immediately before placing base material.
2. Place base material in compacted layers not more than 6 inches thick, unless continuing tests indicate the required results are being obtained with thicker layers.
3. In no case will more than 8-inches of compacted base be placed in one lift.
4. Spread, shape, and compact all base material deposited on the subgrade during the same day.
5. Compact base course material to be not less than 95% of maximum density: ASTM D 1557, Method D (98 percent maximum density: AASHTO T-180).
6. Test density of compacted base course: ASTM D 2167.
7. Conduct one test for each 250 sq. yds. of in-place material, but in no case not less than one daily for each layer.

C. Loose and Foreign Material:

1. Remove loose and foreign material from compacted subbase surface immediately before application of paving.
2. Use power brooms or blowers, and brooming as required.
3. Do not displace subbase material.

D. Prime Coat:

1. Uniformly apply at rate of 0.20 to 0.5 gal. per sq. yd. over compacted and cleaned subbase surface.
2. Apply enough material to penetrate and seal, but not flood the surface.
3. Allow to cure and dry as long as required to attain penetration and evaporation of volatile, and in no case less than 24 hours unless otherwise acceptable to the County.
4. Blot excess asphalt with just enough sand to prevent pick-up under traffic.
5. Remove loose sand before paving.

- E. Tack Coat:
1. Dilute material with equal parts of water and apply to contact surfaces of previously constructed asphalt concrete or portland cement concrete and similar surfaces.
 2. Apply at rate of 0.05 to 0.15 gal. per sq. yd. of surface.
 3. Apply tack coat by brush to contact surfaces of structures projecting into or abutting asphalt concrete pavement.
 4. Allow surfaces to dry until material is at condition of tackiness to receive pavement.

3.02 MANHOLE FRAME / VALVE BOX ADJUSTMENTS (IF APPLICABLE)

- A. Placing Manhole frames:
1. Surround manhole frames set to elevation with a ring of compacted asphalt concrete base prior to paving.
 2. Place asphalt concrete mixture up to 1 in. below top of frame, slope to grade, and compact by hand tamping.
- B. Adjust manhole frames to proper position to meet paving.
- C. If permanent covers are not in place, provide temporary covers over openings until completion of rolling operations.
- D. Set cover manhole frames to grade, flush with surface of adjacent pavement.

3.03 PREPARING THE MIXTURE

- A. Comply with ASTM D 995 for material storage, control, and mixing, and for plant equipment and operation.
- B. Stockpiles:
1. Keep each component of the various-sized combined aggregates in separate stockpiles.
 2. Maintain stockpiles so that separate aggregate sizes shall not be intermixed.
- C. Heating:
1. Heat the asphalt cement at the mixing plant to viscosity at which it can be uniformly distributed throughout mixture
 2. Use lowest possible temperature to suit temperature-viscosity characteristics of asphalt.
 3. Do not exceed 350 degrees F. (176.6 degrees C.).

- D. Aggregate:
1. Heat-dry aggregates to reduce moisture content to not more than 2.0%.
 2. Deliver dry aggregate to mixer at recommended temperature to suit penetration grade and viscosity characteristics of asphalt cement, ambient temperature, and workability of mixture.
 3. Accurately weigh or measure dry aggregates and weigh or meter asphalt cement to comply with job-mix formula requirements.
- E. Mix aggregate and asphalt cement to achieve 90-95% of coated particles for base mixtures and 85-90% of coated particles for surface mixture, when tested in accordance with ASTM D 2489.
- F. Transporting:
1. Transport asphalt concrete mixtures from mixing site in trucks having tight, clean compartments.
 2. Coat hauling compartments with a lime-water mixture to prevent asphalt concrete mixture from sticking.
 3. Elevate and drain compartment of excess solution before loading mix.
 4. Provide covers over asphalt concrete mixture when transporting to protect from weather and to prevent loss of heat.
 5. During periods of cold weather or for long-distance deliveries, provide insulation around entire truck bed surfaces.

3.04 EQUIPMENT

- A. Provide size and quantity of equipment to complete the work specified within project time schedule.
- B. Bituminous Pavers: Self-propelled that spread hot asphalt concrete mixtures without tearing, shoving or gouging surfaces, and control pavement edges to true lines without use of stationary forms.
- C. Rolling Equipment:
1. Self-propelled, steel-wheeled and pneumatic-tired rollers that can reverse direction without backlash.
 2. Other type rollers may be used if acceptable to the County.
- D. Hand Tools: Provide rakes, lutes, shovels, tampers, smoothing irons, pavement cutters, portable heaters, and other miscellaneous small tools to complete the work specified.

3.05 PLACING THE MIX

- A. Place asphalt concrete mixture on prepared surface, spread and strike-off using paving machine.
- B. Spread mixture at a minimum temperature of 225 degrees F. (107.2 degrees C.).

- C. Inaccessible and small areas may be placed by hand.
- D. Place each course at thickness so that when compacted, it will conform to the indicated grade, cross-section, finish thickness, and density indicated.
- E. Paver Placing:
 - 1. Unless otherwise directed, begin placing along centerline of areas to be paved on crowned section, and at high side of sections on one-way slope, and in direction of traffic flow.
 - 2. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips.
 - 3. Complete base courses for a section before placing surface courses.
 - 4. Place mixture in continuous operation as practicable.
- F. Hand Placing:
 - 1. Spread, tamp, and finish mixture using hand tools in areas where machine spreading is not possible, as acceptable to County.
 - 2. Place mixture at a rate that will insure handling and compaction before mixture becomes cooler than acceptable working temperature.
- G. Joints:
 - 1. Carefully make joints between old and new pavements, or between successive days' work, to ensure a continuous bond between adjoining work.
 - 2. Construct joints to have same texture, density and smoothness as adjacent sections of asphalt concrete course.
 - 3. Clean contact surfaces free of sand, dirt, or other objectionable material and apply tack coat.
 - 4. Offset transverse joints in succeeding courses not less than 24 inches.
 - 5. Cut back edge of previously placed course to expose an even, vertical surface for full course thickness.
 - 6. Offset longitudinal joints in succeeding courses not less than 6 inches.
 - 7. When the edges of longitudinal joints are irregular, honeycombed, or inadequately compacted, cut back unsatisfactory sections to expose an even, vertical surface for full course thickness.

3.06 COMPACTING THE MIX

- A. Provide sufficient rollers to obtain the required pavement density.
- B. Begin rolling operations as soon after placing when the mixture will bear weight of roller without excessive displacement.
- C. Do not permit heavy equipment, including rollers to stand on finished surface before it has thoroughly cooled or set.
- D. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

- E. Start rolling longitudinally at extreme lower side of sections and proceed toward center of pavement. Roll to slightly different lengths on alternate roller runs.
- F. Do not roll centers of sections first under any circumstances.
- G. Breakdown Rolling:
 - 1. Accomplish breakdown or initial rolling immediately following rolling of transverse and longitudinal joints and outside edge.
 - 2. Operate rollers as close as possible to paver without causing pavement displacement.
 - 3. Check crown, grade, and smoothness after breakdown rolling.
 - 4. Repair displaced areas by loosening at once with lutes or rakes and filling, if required, with hot loose material before continuing rolling.
- A. Second Rolling:
 - 1. Follow breakdown rolling as soon as possible, while mixture is hot and in condition for compaction.
 - 2. Continue second rolling until mixture has been thoroughly compacted.
- I. Finish Rolling:
 - 1. Perform finish rolling while mixture is still warm enough for removal of roller marks.
 - 2. Continue rolling until roller marks are eliminated and course has attained specified density.
- J. Patching:
 - 1. Remove and replace defective areas.
 - 2. Cut-out and fill with fresh, hot asphalt concrete.
 - 3. Compact by rolling to specified surface density and smoothness.
 - 4. Remove deficient areas for full depth of course.
 - 5. Cut sides perpendicular and parallel to direction of traffic with edges vertical.
 - 6. Apply tack coat to exposed surfaces before placing new asphalt concrete mixture.

3.07 MARKING ASPHALT CONCRETE PAVEMENT

- A. Cleaning:
 - 1. Sweep surface with power broom supplemented by hand brooms to remove loose material and dirt.
 - 2. Do not begin marking asphalt concrete pavement until acceptable to the County.
- B. Apply paint with mechanical equipment.
 - 1. Provide uniform straight edges.
 - 2. Not less than two separate coats in accordance with manufacturer's recommended rates.

3.08 CLEANING AND PROTECTION

- A. Cleaning: After completion of paving operations, clean surfaces of excess or spilled asphalt materials to the satisfaction of the County.
- B. Protection:
 - 1. After final rolling, do not permit vehicular traffic on asphalt concrete pavement until it has cooled and hardened, and in no case sooner than 6 hours.
 - 2. Provide barricades and warning devices as required to protect pavement.
 - 3. Cover openings of structures in the area of paving until permanent coverings are placed (if applicable).

END OF SECTION

SECTION 02575

PAVEMENT REPAIR AND RESTORATION

PART 1 GENERAL

1.01 SCOPE OF WORK

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

1.02 GENERAL

- A. The Contractor shall take before and after photographs.
- B. The Contractor shall repair in a manner satisfactory to the County or State, all damage done to existing structures, pavement, driveways, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, utility poles, utility pipe lines, conduits, drains, catch basin, flagstones, or stabilized areas or driveways and including all obstructions not specifically named herein, which results from this Project.
- C. The Contractor shall keep the surface of the backfilled area of excavation in a safe traffic bearing condition and firm and level with the remaining pavement until the pavement is restored in the manner specified herein. All surface irregularities that are dangerous or obstructive to traffic are to be removed. The repair shall conform to applicable requirements of Manatee County Transportation Department requirements for pavement repair and as described herein, including all base, subbase and asphalt replacement.
- D. All materials and workmanship shall meet or exceed the County requirements and as called for in the Contract Documents and nothing herein shall be construed as to relieve the Contractor from this responsibility.
- E. All street, road and highway repair shall be made in accordance with the FDOT and County details indicated on the Drawings and in accordance with the applicable requirements and approval of affected County and State agencies.

PART 2 PRODUCTS

2.01 PAVEMENT SECTION

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

- B. Asphalt or crushed concrete or approved equal base material shall be furnished and installed under all pavement sections restored under this Contract. Asphalt base shall have a minimum 6" compacted thickness, meet requirements for FDOT ABC III (Minimum Marshall Stability of 1000) and be furnished, installed and tested in accordance with the requirements of the FDOT Standards. Crushed concrete base shall be 10" minimum compacted thickness. Crushed concrete aggregate material shall have a minimum LBR of 140 compacted to 98% T-180 AASHTO density. Asphalt base and crushed concrete base are acceptable. Other bases shall be submitted for approval.
- C. Prime and tack will be required and applied in accordance with Section 300 - FDOT Specifications: Prime and Tack Coat for Base Courses.

PART 3 EXECUTION

3.01 CUTTING PAVEMENT

- A. The Contractor shall saw cut in straight lines and remove pavement as necessary to install the new pipelines and appurtenances and for making connections to existing pipelines.
- B. Prior to pavement removal, the Contractor shall mark the pavement for cuts nearly paralleling pipe lines and existing street lines. Asphalt pavement shall be cut along the markings with a rotary saw or other suitable tool. Concrete pavement shall be scored to a depth of approximately two (2) inches below the surface of the concrete along the marked cuts. Scoring shall be done by use of a rotary saw, after which the pavement may be broken below the scoring with a jackhammer or other suitable equipment.
- C. The Contractor shall not machine pull the pavement until it is completely broken and separated along the marked cuts.
- D. The pavement adjacent to pipe line trenches shall neither be disturbed nor damaged. If the adjacent pavement is disturbed or damaged, irrespective of cause, the Contractor shall remove and replace the pavement. In addition, the base and sub-base shall be restored in accordance with these Specifications, Florida Dept. of Transportation Standard Specifications and as directed by the County.

3.02 PAVEMENT REPAIR AND REPLACEMENT

- A. The Contractor shall repair, to meet or exceed original surface material, all existing concrete or asphaltic pavement, driveways, or sidewalks cut or damaged by construction under this Contract. He shall match the original grade unless otherwise specified or shown on the Drawings. Materials and construction procedures for base course and pavement repair shall conform to those of the Florida Dept. of Transportation.
- B. The Contractor's repair shall include the preparation of the subbase and base, place and maintain the roadway surface, any special requirements whether specifically called for or implied and all work necessary for a satisfactory completion of this work. Stabilized roads and drives shall be finished to match the existing grade. Dirt roads and drives shall have the required depth of backfill material as shown on the Contract Drawings.

- C. The asphaltic concrete repairs shall be in accordance with the Manatee County Public Works Standards, Part I Utilities Standards Manual, Detail UG-12. The asphaltic concrete repairs shall extend the full width and length of the excavation or to the limits of any damaged section. The edge of the pavement to be left in place shall be cut to a true edge with a saw or other approved method so as to provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities. The existing asphalt beyond the excavation or damaged section shall be milled 25' back from the saw cut. Final overlay shall match existing with no discernable "bump" at joint.

3.03 MISCELLANEOUS RESTORATION

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

3.04 SPECIAL REQUIREMENTS

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

3.05 CLEANUP

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

3.06 MAINTENANCE OR REPAIR

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

END OF SECTION

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SECTION 02615

DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install ductile iron pipe and restrained joint ductile iron pipe and cast iron or ductile iron restrained joint fittings, complete, as shown on the Drawings and specified in these Standards.
- B. Fittings are noted on the drawings for the Contractor's convenience and do not relieve him from laying and jointing different or additional items where required.
- C. The Contractor shall furnish all labor, materials, equipment and incidentals required to install push-on joint or restrained joint ductile iron pipe, complete as shown on the Drawings and Specifications.
- D. Newly installed pipe shall be kept clean and free of all foreign matter. All DI pipe installed underground shall be poly wrapped unless noted otherwise on the plans.

1.02 SUBMITTALS

- A. The Contractor shall submit to the County, within ten days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate shop drawings for all ductile iron pipe and fittings.
- B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Ductile iron pipe shall conform to ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51. Thickness of pipe shall be Class 50 or pressure Class 350. All pipe not buried shall be Class 53. All ductile iron pipe shall be clearly marked on the outside of the barrel to readily identify it from cast iron.
- B. Unrestrained joint pipe shall be supplied in lengths not to exceed 21 feet. Unless otherwise called for in the Contract Documents, unrestrained joint pipe shall be either the rubber-ring type push-on joint or standard mechanical joint pipe as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company, or approved equal.

- C. All mechanical joint fittings shall be pressure rated for 350 psi and meet the requirement of AWWA C110 or AWWA C153 except flanged fittings shall be rated for 250 psi. Rubber gaskets shall conform to AWWA C111 for mechanical and push-on type joints and shall be EPDM (Ethylene-Propylene Diene Monomer) rubber for potable water and reclaimed water pipelines. Standard gaskets shall be such as Fastite as manufactured by American Cast Iron Pipe Company, or an approved equal. Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non-chlorinated organic solvents or non-aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used where both classes of contaminants are found.
- D. Water Main and Reclaimed Water Main Coatings: All ductile iron pipe used in water and reclaimed water systems shall have a standard thickness cement lining on the inside in accordance with AWWA C104 and a standard 1-mil asphaltic exterior coating per AWWA C151. All ductile iron or gray iron fittings used in water and reclaimed water systems shall have standard thickness cement linings on the inside per AWWA C104 and an asphaltic exterior coating or they shall have factory-applied fusion bonded epoxy coatings both inside and outside in accordance with AWWA C550.
- E. Wastewater Main Coatings: All ductile iron pipe and fittings used in wastewater sewer systems shall have a factory applied dry film thickness 40-mil Protecto 401 or 40-mil Novocoat SP2000W amine cured novalac ceramic epoxy lining on the inside. The interior lining application is to be based on the manufacturer's recommendation for long-term exposure to raw sewage. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of lined pipe has passed holiday testing at the time of production per ASTM G62. The lining shall have a minimum ten year warranty covering failure of the lining and bond failure between liner and pipe. Exterior coatings for ductile iron pipe and fittings used in wastewater systems shall be either an asphaltic coating per AWWA C151 or a factory-applied epoxy coating per AWWA C550.
- F. Restrained joints shall be provided at all horizontal and vertical bends and fittings, at casings under roads and railroads and at other locations shown on the Contract Drawings. Restrained joint pipe fittings shall be designed and rated for the following pressures: 350 psi for pipe sizes up to and including 24" diameter; 250 psi for pipe sizes 30" diameter and above.

2.02 IDENTIFICATION

- A. Each length of pipe and each fitting shall be marked with the name of the manufacturer, size and class and shall be clearly identified as ductile iron pipe. All gaskets shall be marked with the name of the manufacturer, size and proper insertion direction.
- B. Pipe shall be polyethylene-wrapped blue for water mains, purple (Pantone 522 C) for reclaimed water mains and green for sewer mains, per AWWA C105. Pipe need not be entirely polyethylene wrapped if soil testing, which is performed by the

Engineer of Record or the Contractor in accordance with AWWA C105, indicates that the soil at the site is not corrosive. If soil testing indicates that the soil at the site is not corrosive, pipe may be spiral wrapped with color coded polyethylene at a six-inch minimum spacing, or the ductile iron pipe (DIP) may be painted with a minimum 1-inch wide color coded stripe on the top and both sides of the DIP.

- C. All above ground potable water mains and appurtenances shall be painted safety blue.

END OF SECTION

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SECTION 02617

INSTALLATION AND TESTING OF PRESSURE PIPE

PART 1 GENERAL

1.01 INSTALLING PIPE AND FITTINGS

- A. The Contractor shall install all pipe in accordance with the recommendations of the pipe manufacturer and as specified herein.
- B. The Contractor shall take care in handling, storage and installation of pipe and fittings to prevent injury to the pipe or coatings. All pipe and fittings shall be examined before installation and pipe which is deemed to be defective by the County shall not be installed.
- C. The Contractor shall thoroughly clean and keep thoroughly clean, all pipe and fittings prior to during and after installation.
- D. The Contractor shall lay the pipe to the lines and grades shown on the Contract Drawings with bedding and backfill as shown on the Drawings or called out in the Contract Documents. Blocking under the pipe shall not be permitted except through casing sleeves.
- E. The Contractor shall keep the open ends of all pipe closed with a tightly fitting plug when installation is not in progress or the potential exists for dirt or debris to enter the pipe.
- F. The pipe or accessories shall not be dropped into the trench under any circumstances.
- G. The Contractor shall construct all water mains pursuant to the provisions of "Recommended Standards for Water Works", Part 8, incorporated by reference in Rule 17-555.330(3), F.A.C.
- H. As a marker for the Surveyor, a PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor on the top of pipe for potable water mains, reclaimed water mains and sanitary force mains at intervals no greater than 200 feet apart and at locations where there is a substantial grade change. The pipe markers shall indicate the pipe diameter and shall be labeled PWM in "safety" blue, RWM in purple, and FM in green, for potable water mains, reclaimed water mains and sanitary force mains, respectively. As a marker for the Surveyor, a PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor on the top of all pipe fittings (other than sanitary sewer service wyes, potable water saddles and reclaimed water saddles). The markers for fittings shall indicate the type of fitting and shall be labeled PWF in "safety" blue, RWF in purple, and FMF in green, for potable water fittings, reclaimed water fittings, and sanitary force main fittings, respectively. The Contractor is responsible for making the aforementioned markers available to the Surveyor. The Contractor shall field locate the mains and fittings when markers are not made available to the Surveyor.

- I. A PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor at the beginning and end of each horizontal directional drill (HDD). The HDD Contractor shall provide a certified report and bore log indicating the horizontal and vertical location every 25 linear feet or less along the pipe.
- J. A 2" PVC pipe marker with a painted end cap shall be inserted by the Contractor at the ROW line indicating each individual new service location or stub out. The marker shall be a 6 foot length of PVC pipe inserted 2 feet into the ground and shall be painted "safety" blue for potable water, purple for reclaimed water, and green for sewer.

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1.02

PROCEDURE FOR TESTING WATER LINES, FORCE MAINS AND RECLAIMED WATER LINES

- A. A 48-hour notice is needed prior to testing. A letter stating the reasons testing should be scheduled ahead of other jobs must accompany all emergency testing requests.
- B. County and Contractor must be present for all testing, except for testing tapping valves and sleeves.
- C. All pressure pipe lines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipe lines shall be subjected to a hydrostatic pressure test for two (2) hours at full working pressure, but not less than 180 psi for water/reclaimed (150 psi for force main). Maximum length of pipe to be tested at one time is 2,600 feet. If line is longer than 2,600 feet and cannot be sectioned in 2,600 feet (max.) lengths, the allowable leakage will be figured at 2,600 feet.
- D. Allowable leakage shall be determined by AWWA C600 table for hydrostatic tests. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof; to maintain the test pressure after the air in the pipe line has been expelled and the pipe has been filled with water.
- E. All digging on the job site in the right-of-way must be completed before any testing of water or sewer. Any digging or boring across water or sewer lines after they have been tested may result in a retest of the lines at the County's request.
- F. If any revisions or changes are made after initial testing, lines will be re-tested at the County's request.
- G. Disconnect water supply during test.
- H. All force mains will be tested from the valves in the valve vault at the lift station to the point of connection whether it be against a valve on another force main or into a manhole.
- I. All services to be aboveground during test. The services should be the correct length so they will be one (1) foot inside right-of-way line.
- J. All fire hydrant gate valves to be open during test.
- K. All visible leaks are to be repaired, regardless of the amount of leakage.

- L. Check gauge pressure periodically during test. If test pressure drops to 175 psi for water/reclaimed lines or to 145 psi for force mains during test, the line must be repumped back to 180 psi for water/reclaimed (150 psi force mains) and the amount of leakage measured. The test will continue on with the remaining time left. At the end of the test, the line must be repumped again back to 180 psi (150 psi for force main) and the amount of leakage measured and added to any previous leakage determined earlier in the test.
- M. After the line passes the test, the pressure will be blown off from the opposite end of line from the gauge location. Fire hydrants, services and end-of-line blow offs will be opened to demonstrate they were on line during the test.
- N. At end of test, the test gauge must return to zero. The pressure gauge must read 0 psi to a maximum of 300 psi in 5 psi increments.
- O. The section of line being tested must be identified on the charge sheet. The length and size of pipe, the exact area being tested and the valves being tested against, must be identified. Use Station numbers if available.
- P. A punch list must be made at the end of all tests.
- Q. A copy of the charge sheet will be given to the County and the Contractor at the end of the test.

1.03 INSPECTION/TESTING PROCEDURE COVERING BORED PIPE LINES OR CASING AND CONDUITS INSTALLED ACROSS PREVIOUSLY TESTED AND/OR COUNTY ACCEPTED WATER AND SEWER PIPE WITHIN DEVELOPMENT PROJECTS UNDER ACTIVE CONSTRUCTION

- A. Prior to testing water and sewer lines, every effort will be made to install sleeves for underground utilities that will cross these water and sewer lines or services.
- B. Where it has not been possible to pre-install sleeves prior to testing and bores or conduits are required, it is the responsibility of the utility company and/or their Contractor performing the work to provide Manatee County Utility Operations Department or the Engineer of Record with accurate horizontal and vertical as-built information of the sleeves, bores and conduits installed by said utility company. This applies to all bores and conduits crossing water and sewer lines.
- C. Procedures to be followed for installation of conduits, pipe lines and bores that will cross, or be closer than 5'-0" horizontally and 18 inches vertically to, previously tested water and sewer lines that are still under the ownership of the developer/contractor.
 - 1. Notify the County and obtain the best as-built information available. Allow sufficient time for the County to field locate the existing pipe lines.
 - 2. Submit drawings of proposed location to the County and Manatee County Utility Operations Dept. Utility Locations Section for review.
 - 3. Obtain a County Right-of-Way Use Permit if the work area is within a dedicated area of right-of-way.
 - 4. Perform installation in the presence of a County representative. Call (941) 792-8811, ext. 5061 or ext. 5069 with at least two (2) working days notice.

5. Submit two (2) copies of as-built information to the County to incorporate into the record drawings to be submitted to the County.
 6. Failure to follow steps 2) thru 5) will result in additional charges for retesting the previously tested water and sewer lines.
- D. Procedures to be followed for installation of conduits, pipe lines and bores crossing or closer than 5'-0" horizontally and 18 inches vertically to previously tested water and sewer lines that have been previously accepted by Manatee County:
1. Obtain record drawing information from the County.
 2. If roadway has been dedicated to Manatee County, obtain Right-of-Way Use Permit and copy the Project Management Department Locations Section with proposed location drawing.
 3. Follow procedures in "Sunshine State One-Call", paying special attention to the requirements of Section VII.
- E. Should water or sewer lines be damaged during the bore pipe line or casing installation, the cost of any repairs and retesting will be paid for by the utility company that installed the bore. The actual clearance between a bored casing crossing a water or sewer pipe should not be less than 18 inches.

1.04 DETECTION

- A. Direct buried pipe shall have 3" detectable metallic tape of the proper color placed directly above the pipe and 12" below finished grade or 6" detectable tape between 12" and 24" below finished grade.
- B. Direct buried or horizontal directional drilled non-metallic pipe shall also have tracer wire installed along the pipe alignment. The tracer wire to be used shall be a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.

END OF SECTION

SECTION 02618
PIPELINE CLEANING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to clean all new lines 4" and larger, and existing pipelines as specified in this specification and as indicated on the Drawings.
- B. This work shall include the furnishing and installation of all pig launching and retrieval devices and the appropriate pigs for the cleaning procedure, and all necessary excavations, shutdowns, fittings and valves required.

1.02 RELATED WORK

- A. The contractor is responsible for all necessary supply water.
- B. The contractor is responsible for all necessary bypass pumping.
- C. The contractor is responsible for the proper disposal of any materials removed from the pipe lines as a result of the cleaning procedure.

1.03 SUBMITTALS

- A. The Contractor shall submit prior to construction, a cleaning plan, Shop Drawings, and layout diagram for approval to the County.
- B. The Contractor shall submit to the County a list of materials to be furnished, and the names of suppliers.

1.04 QUALIFICATIONS

- A. The Contractor performing this work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner.
- B. The Contractor shall also be capable of providing crews as needed to complete this work without undue delay.
- C. The County reserves the right to approve or disapprove the Contractor, based on the submitted qualifications.

PART 2 PRODUCTS

2.01 GENERAL

- A. The contractor shall be responsible for furnishing pigs in sufficient numbers and sizes, of appropriate densities, coatings and configurations to properly clean the piping systems.
- B. All pigs used for the cleaning of sewer or reclaimed water lines shall not be used in the cleaning of potable water lines.

2.02 MATERIALS

- A. The pig launching and retrieval equipment shall be of the latest design and construction and shall include the means to maintain constant monitoring of the in-line flows and pressures of the system being cleaned and the constant location of the cleaning pigs in the system. Launching and retrieval systems shall be fabricated, designed and manufactured according to ANSI standards and capable of withstanding working pressures of 150 psi. Launching and receiving devices shall be sized one diameter larger than the system to which it will be attached with a minimum length of 2.5 times the diameter.
- B. The contractor shall have available for immediate use an electronic pig detector for use in the system being cleaned to provide a means of tracking the passage of the pig in the system to locate areas of potential or suspected blockage and other disparities in the system.
- C. The pig shall be constructed of elastomer polyurethane with an open cell construction and a density equal to or suitable for use in the piping system being cleaned. Pig configuration shall consist of a parabolic nose with a concave base and coated with a resilient surface material that will maintain a peripheral seal and will effectively clean the piping system without over abrading the interior pipe wall. Pig characteristics shall include the ability to navigate through 90 degree bends, 180 degree turns, bi-directional fittings, full port valves, reduce its cross sectional area and return to its original design configuration and be propelled by hydraulic pressure.

PART 3 EXECUTION

3.01 PIPELINE CLEANING

- A. The cleaning of the pipe line shall be done by the controlled and pressurized passage of a polyurethane pig of varying dimensions, coatings and densities as determined by the County through the piping system.
- B. A series of pigs shall be entered into the system at a point as near to the beginning as is logistically and mechanically feasible.

- C. A launching assembly shall be used as the entrance point for the pig. This assembly shall allow for the following:
1. The entering of pigs into the system by providing the means to induce flow from an external source, independent of the flows and pressures immediately available from the system, on the back of the pig to develop sufficient pressure to force the pig through the system.
 2. A means to control and regulate the flow.
 3. A means to monitor the flows and pressures.
 4. A means to connect and disconnect from the system without any disruption to the operation of the system.
- D. The pig shall be removed or discharged from the system at a point as near to the end as is logistically and mechanically feasible.
- E. The contractor shall be responsible for the retrieval of the pig at the discharge point. This may include setting a trap that will not disrupt normal flow and operations but will capture the pig and any debris. A retrieval assembly may also be used but said assembly shall be able to connect and disconnect from the system without any disruption to the operation of the system.
- F. Alternative launching and retrieval methods shall be done with the prior approval of the County.
- G. Any pig that cannot progress through the piping system shall be located by the contractor and removed by excavation of the pipe in order to remove the blockage. All pipe repairs shall be the responsibility of the contractor and shall be performed with as little disruption to the system as possible.
- H. Any increase in pressure that cannot be accounted for, i.e. fittings or valves or additional cleaning runs, shall be investigated, per the Engineers' approval, by locating the pig at the beginning of the increased pressure and excavating to determine the cause of the pressure increase. All pipe repairs shall be the responsibility of the contractor and shall be performed with as little disruption to the system as possible.
- I. Final flushing of the cleansed lines shall be performed after the last successful run of the pig as determined by the County. The contractor shall be responsible for all applicable flushing and disinfection requirements for potable water lines.

3.02**ACCEPTANCE**

- A. The contractor shall maintain and provide a report at the end of the cleaning procedure containing the following:
1. The pressures in the pipe during the pigging procedure.
 2. Any inline problems encountered during the procedure including all excavations with detailed locations, reason for the excavation and any corrective measures taken to the pipeline.
 3. A record of the pigs used, their sizes, styles and other pertinent information regarding what materials were used during the cleaning.
 4. An analysis of the condition of the pipeline before and after the cleaning procedure.

END OF SECTION

SECTION 02619 HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment and incidentals required to install all pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents by Horizontal Directional Drilling (HDD).

1.02 GENERAL

- A. All existing structures, water and sewer lines, storm drains, utilities, driveways, sidewalks, signs, mail boxes, fences, trees, landscaping, and any other improvement or facility in the construction area that the Contractor disturbs for his own construction purposes shall be replaced to original condition at no additional cost to the County.
- B. For "Navigable Waters of the U.S." reference 33 of the Code of Federal Regulations, Part 329.
- C. For "Waters of the U.S." reference 33 of the Code of Federal Regulations, Part 323.
- D. For "Waters of the State" reference Section 62-301 of the Florida Administrative Code.

1.03 TESTING

- A. In place soil compaction tests shall be performed by a qualified testing laboratory.
- B. Compaction tests shall be taken at every excavation, except in the road crossings or road shoulders; tests are to be taken according to current FDOT Standards.
- C. All pipe shall be tested in accordance with the appropriate material specifications.
- D. Reference Standards: American Society for Testing and Materials (ASTM), D1557, Moisture-Density Relations of Soils Using 10-lb. Rammer and 18-in. Drop.
- E. The density of soil in place shall be a minimum of 95 percent in accordance with ASTM test 1557-70T, Method A or C.

1.04 QUALIFICATIONS

- A. Pipe Manufacture: All pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

- B. Drilling Supervisor: The Contractor shall provide a competent boring specialist who shall remain on the project site during the entirety of the directional boring operation. This includes, but is not limited to, drilling fluid preparation, seaming, boring and pulling. The boring specialist shall have a minimum of five years of experience in supervising directional bores of similar nature, diameter, materials and lengths.
- C. Pipe Fusion: All boring and fusing equipment shall be certified for operation. The Contractor responsible for thermal butt fusing pipe and fittings shall have manufacturer certification for performing such work or a minimum of five years of experience performing this type of work. If no certification is available, written documentation of the required work experience shall be submitted for approval.
- D. Drilling Fluid Specialist: The personnel responsible for supervising the supply, mixing, monitoring fluid quality, pumping and re-circulation system proposed for the drilling fluid shall have a written certification issued by the Drilling Fluid manufacturer for performing such work or a minimum of five years of experience performing this type of work. If no certification is available, written documentation of the required work experience for the proposed personnel shall be submitted for review and approval.

1.05 SUBMITTALS

- A. Detailed description including specifications and catalog cuts for:
 - 1. Shop drawings and catalog data for all HDD equipment.
 - 2. The pipe manufacturer's maximum degree of radial bending allowed for the pipe when full and when empty and pullback force recommended setting.
 - 3. Steering and tracking devices including specific tracer wire.
 - 4. Drilling fluids; the drilling fluid submittal shall include the ratio of mixture to water, including any additives, based on the Contractor's field observations prior to construction, knowledge and experience with drilling in similar conditions, and any soil data provided in the Contract Documents, which shall be verified by the fluid specialist.
 - 5. Shop drawings for the breakaway swivel, including the method of setting the swivels' break point and set point to be used.
 - 6. Shop drawings for sizing of the mandrel for pull through testing
 - 7. Pipe assembly procedure, details of support devices, and staging area layout including methods to avoid interference with local streets, driveways, and sidewalks.
 - 8. Details of pipe fusion procedures and copies of the fusion technician qualification certification or documentation.
 - 9. Drilling fluid technician qualification certification or documentation
- B. If the Contractor proposes any changes to the pull-back distance or profile shown on the drawings, he may be required to submit a complete design for the proposed pipe including an analysis for pull-back forces, external loads including full hydrostatic pressure if empty, external forces due to borehole collapse, ovalization during pull-back, thermal stress while exposed to Sun-light, shortening after release of pull-back force, and tensile stress during pull-back.

- C. Bore Plan: For all contiguous piping installations over 300 feet in length or any installations for piping larger than 4" in diameter, the Contractor shall submit a Bore Plan that includes the following:
1. Contact information and experience for the drilling fluid specialist.
 2. The number of passes the bore will include to get the product pipe installed.
 3. The pilot bore and all reaming bore sizes including the final pullback with the product pipe.
 4. Drilling rod length in feet.
 5. The pilot bore, pre-ream bores (if any) and pullback production rate in minutes per (drilling) rod to maintain adequate mud flow.
 6. Details of the entry and exit pit locations along with entry and exit angles for the bore, drawn to scale, depicting the position of all required equipment, access points, existing facilities to remain in place, existing traffic lanes to be maintained in operation, office trailers and storage sites.
 7. The method of fusing or joining pipe of adjacent bores to ensure that the joint is on grade with the installed pipe.
- D. Furnish a Bore Path Report to the County within seven days of the completion of each bore path. Data collected by the County Representative does not relieve the Contractor from the responsibility of recording his own data. Include the following in the report:
1. Location of project, project name and number
 2. Name of person collecting data, including title, position and company name
 3. Investigation site location (Contract plans station number or reference to a permanent structure within the project right-of-way)
 4. Driller's Log & identification of the detection method used
 5. Elevations and offset dimensions of installed pipe as referenced to the drawings
 6. Data log of pullback force during product pipe installation
 7. All failed bores. Include length of pipe left in place and explanation of failed installation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Incidental materials that may or may not be used to install the product depending on field requirements are not paid for separately and will be included in the cost of the installed product.
- B. Drilling Fluids shall use a mixture of bentonite clay or other approved stabilizing agent mixed with potable water with a pH of 8.5 to 10.0 to create the drilling fluid for lubrication and soil stabilization. Vary the fluid viscosity to best fit the soil conditions encountered. Contractor shall have appropriate additives for drilling fluid available for different soil conditions that may be encountered. Do not use any other chemicals or polymer surfactants in the drilling fluid without written consent from the County. Certify to the County in writing that any chemicals to be added are environmentally safe and not harmful or corrosive to the product pipe.

- C. For drilling operations that will be below waters of the State of Florida, only bentonite free drilling fluids shall be used. Acceptable products are BioMax, manufactured by M-I Swaco, Inc., P.O. Box 2216, Laurel, Mississippi 39440, Phone: (800) 731-7331 or Bio-Bore, manufactured by Baroid Drilling Fluids, Inc., P.O. Box 1675, Houston, Texas 77251, Phone: (731) 987-5900 or approved equal.
- D. Identify the source of water for mixing the drilling fluid. Approvals and permits are required for obtaining water from such sources as streams, rivers, ponds or fire hydrants. Any water source used other than potable water may require a pH test.
- E. The tracer wire to be used for all directional drills shall be a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.
- F. Breakaway connectors shall be supplied by DCD Design & Manufacturing, Condux International, Inc. or approved equal.

PART 3 EXECUTION

3.01 SITE CONDITIONS

- A. Carry out excavation for entry, exit, recovery pits, slurry sump pits, or any other excavation as specified in the Contract documents. Sump pits are required to contain drilling fluids if vacuum devices are not operated throughout the drilling operation, unless approved by the County.
- B. Within 48 hours of completing installation of the boring product, clean the work site of all excess slurry or spoils. Take responsibility for the removal and final disposition of excess slurry or spoils. Ensure that the work site is restored to pre-construction conditions or as identified on the plans.
- C. Exposure of product pipe to sunlight shall be limited to 14 consecutive days unless approved by the County.
- D. The pipe shall be supported at intervals along its length with rollers or Teflon pads to minimize frictional forces when being pulled, and to hold the pipe above the ground. Surface cuts or scratches greater than or equal to the maximum defect depth in 3.08 E are not acceptable.

3.02 DAMAGE RESTORATION & REMEDIATION

- A. The Contractor shall take responsibility for restoration for any damage caused by heaving, settlement, separation of pavement, escaping drilling fluid (frac-out), or the directional drilling operation, at no cost to the County.
- B. When required by the County, provide detailed plans which show how damage to any roadway facility will be remedied. These details will become part of the Record Drawings Package. Remediation Plans must follow the same guidelines for development and presentation of the Record Drawings. When remediation plans are required, they must be approved by the County before any work proceeds.

- C. For HDD operations that will be below waters of the State of Florida, the contractor shall be responsible for any damage caused by the drilling operation, including, but not limited to, fracturing of the channel bottom. Any State or Federal required environmental cleanup due to the release of drilling fluids into State waters shall be at the Contractor's expense. The Contractor may at his own expense increase the depth of his drilling operations upon the approval from the County.

3.03 QUALIFICATIONS FOR REJECTION OF DIRECTIONAL BORE

- A. The County may reject any portion of the work that is deemed to be non-responsive to the Contract requirements or not in conformance with approved plans and submittals, and for other factors including the following:
1. Failed Bore: When there is any indication that the installed product has sustained damage, stop all work, notify the County and investigate damage. The County may require a pressure and / or mandrel test at no additional cost to the County and shall have a County representative present during the test. Perform all testing within 24 hours unless otherwise approved by the County. Furnish a copy of the test results and all bore logs to the County for review and approval. The County is allowed up to 5 working days to approve or determine if the product installation is not in compliance with the specifications.
 2. Obstructions: If an obstruction is encountered during boring which prevents completion of the installation in accordance with the design location and specification, the pipe may be taken out of service and left in place at the discretion of the County.
 3. Pull-back Failure: If the installed breakaway device should fail during pull back.
 4. Loss of Drilling Fluids: If the drilling fluid is "lost" during the pull back of the product and cannot be regained within the required timeframe of the manufacturer or if more than a reasonable amount of fluid is used to fill an unknown void and flow cannot be regained. No pipe shall be pulled without visible flow of drilling fluid.
 5. Test Failure: If the pipe shall fail a hydraulic pressure test or mandrel test as specified by the County.
 6. Damaged Pipe: If at any time when the product is pulled back and any exposed areas have a greater than allowable "gouging" or visible marring of the pipe per the table in 3.08 E.
 7. Alignment Tolerance Exceeded: If the vertical and horizontal limits are not within tolerances.
 8. Defective Material: Any other defect in material or workmanship which would affect the quality, performance, or installation life of the installed pipeline.
- B. Remediation: All rejected bores shall be at the Contractors expense to correct and provide a satisfactory installed product. The Contractor shall submit to the County a revised installation plan and procedure for approval before resuming work. The County may require non-compliant installations to be filled with excavatable flowable fill or to be completely removed at no additional cost to the County.

3.04

PRODUCT LOCATING AND TRACKING

- A. The County recognizes walkover, wire line, and wire line with surface grid verification, or any other system as approved by the County, as the accepted methods of tracking directional bores. Use a locating and tracking system capable of ensuring that the proposed installation is installed as intended. The locating and tracking system must provide information on:
1. Clock and pitch information
 2. Depth
 3. Transmitter temperature
 4. Battery status
 5. Position (x,y)
 6. Azimuth, where direct overhead readings (walkover) are not possible (i.e. sub aqueous)
- B. Ensure proper calibration of all equipment before commencing directional drilling operation.
- C. Prepare the Driller's Log. Take and record alignment readings or plot points such that elevations on top of and offset dimensions from the center of the product to a permanent fixed feature are provided. Such permanent fixed feature must have prior approval of the County. Provide elevations and dimensions at all bore alignment corrections (vertical and horizontal) with a minimum distance between points of 10 feet. Provide a sufficient number of elevations and offset distances to accurately plot the vertical and horizontal alignment of the installed product.
- D. Installation Location Tolerances: The pilot hole shall be drilled on a bore path with no deviations greater than ten (10) percent of depth of cover over the length of the bore. If the pilot bore does deviate from the bore path by more than ten (10) percent of depth of cover, the Contractor shall notify the Owner/Engineer prior to pull back. The Owner/Engineer may require the Contractor to pull back and re-drill the pilot bore to correct any deviations. The alignment deviations shall not exceed two (2) feet throughout the length of the bore.

It shall be the Contractors responsibility to notify the Owner/Engineer when the pilot bore activities are taking place. The Contractor shall provide the Owner/Engineer a printout of the pilot bore plan for review prior to pull back.

3.05

PRODUCT BORE HOLE DIAMETER

Minimize potential damage from soil displacement/settlement by limiting the ratio of the bore hole to the product size. The size of the back reamer bit or pilot bit, if no back reaming is required, will be limited relative to the product diameter to be installed as follows:

Table 2-1. Recommended Relationship between Product Diameter and Reamed Diameter

Product Diameter	Reamed Diameter
< 8"	Diameter of product + 4"
8" – 24"	Diameter of product x 1.5
> 24"	Diameter of product + 12"
*Horizontal Directional Drilling Good Practices Guidelines – HDD Consortium	

3.06 EQUIPMENT REQUIREMENTS

- A. The HDD equipment selected by the Contractor shall be capable of drilling, steering, tracking, reaming and installing the pipeline through all the subsurface conditions that may be present at the site.
- B. Match equipment to the size of pipe being installed. Obtain the County's approval for installations differing from the above chart. Ensure that the drill rod can meet the bend radius required for the proposed installation.
- C. All HDD equipment shall have an electronic data logger to record pull back force during all pipe installations.
- D. All HDD equipment that has the capability to exceed the maximum recommended pulling force shall have a breakaway swivel properly attached to the product pipe that will release if the pullback force exceeds the pipe manufacturers recommended pulling force.

3.07 THRUST / PULLBACK REQUIREMENTS

The Contractor shall provide as part of the required working drawings submittal complete data regarding the operational and maximum thrust or pulling forces to be used for the initial drill head and back-reamer installations, and the final pull-back of the pipe. Gages or other measurement tools shall be used to monitor the forces being used.

3.08 INSTALLATION PROCESS

- A. Ensure adequate removal of soil cuttings and stability of the bore hole by monitoring the drilling fluids such as the pumping rate, pressures, viscosity and density during the pilot bore, back reaming and pipe installation. Relief holes can be used as necessary to relieve excess pressure down hole. Obtain the County's approval of the location and all conditions necessary to construct relief holes to ensure the proper disposition of drilling fluids is maintained and unnecessary inconvenience is minimized to other facility users.
- B. The Contractor shall determine the pull-back rate in order to allow the removal of soil cuttings without building excess down-hole pressure and to avoid local heaving, or spills. Contain excess drilling fluids at entry and exit points until they are recycled and separated from excavated materials, or removed from the site or vacuumed during drilling operations. Ensure that entry and exit pits and storage

tanks are of sufficient size to contain the expected return of drilling fluids and soil cuttings. The bored hole shall always be maintained full of drilling fluids for support of surfaces, and the fluid re-circulation equipment shall operate continuously until the pipe installation is completed and accepted by the County.

- C. Ensure that all drilling fluids are disposed of or recycled in a manner acceptable to the appropriate local, state, or federal regulatory agencies. When drilling in suspected contaminated ground, test the drilling fluid for contamination and appropriately dispose of it. Remove any excess material upon completion of the bore. If in the drilling process it becomes evident that the soil is contaminated, contact the County immediately. Do not continue drilling without the County's approval.
- D. The timing of all boring processes is critical. Install a product into a bore hole within the same day that the pre-bore is completed to ensure necessary support exists. Once pullback operations have commenced, the operation shall continue without interruption until the pipe is completely pulled into the borehole.
- E. All prepared pipe that is being used for installation shall be adequately supported off the ground along the entire length to avoid damaging of the material during pullback due to ground surface conditions. Surface cuts or scratches greater than or equal to the maximum defect depth are not acceptable.

Pipe Size	Max. Defect Depth
In.	In.
4	1/16
6	1/11
8	5/32
10	3/16
12	1/4
> 12	Per Pipe Manufacturer's Recommendations

- F. The drilling fluid specialist shall remain on the project site during the entirety of the directional boring operation to ensure proper mixture and production of drilling fluids needed for the bore.
- G. Upon successful completion of the pilot hole, the borehole shall be reamed to a minimum of 25 percent greater than the outside diameter of the pipe being installed.
- H. For bores with more than two radii of curvature (entrance and exit), the borehole should be reamed up to 50 percent larger than the outside diameter of the carrier pipe. Prereaming may be necessary dependent on size of material to be pulled.
- I. Additional passes for prereaming may be required for larger pipe. Incremental increases shall be used as needed until appropriate bore hole size has been achieved.
- J. Prereaming must be accomplished with no product attached to the reamer head on all bore pipe 6" and larger. The bore product maybe pulled back on final pass of prereaming upon prior approval from the County.

- K. After reaming the borehole to the required diameter, the pipe shall be pulled through the hole. In front of the pipe shall be a breakaway swivel and barrel reamer to compact the borehole walls.
- L. The Contractor shall not attempt to ream at a rate greater than the drilling equipment and drilling fluid system are designed to safely handle.
- M. Install all piping such that their location can be readily determined by electronic designation (tracer wire) after installation.
 - 1. For non-conductive installations, externally attach two (2) tracer wires; see Section 2.01 – Materials, Part I. above, to the top of product pipe and secure in place with duct tape or 10-mil thickness polyethylene pressure sensitive tape at every joint and at 5 foot intervals.
- N. Connect any break in the conductor line before construction with an electrical clamp, or solder, and coat the connection with a rubber or plastic insulator to maintain the integrity of the connection from corrosion. Clamp connections must be made of brass or copper and of the butt end type with wires secured by compression. Soldered connections must be made by tight spiral winding of each wire around the other with a finished length minimum of 3 inches overlap. Tracking conductors must extend 2 feet beyond bore termini. Test conductors for continuity. Each conductor that passes must be identified as such by removing the last 6 inches of the sheath. No deductions are allowed for failed tracking conductors. Upon completion of the directional bore, the Contractor shall demonstrate to the County that the wire is continuous and unbroken through the entire run of the pipe by providing full signal conductivity (including splices) when energizing for the entire run in the presence of the County Representative. If the wire is broken, the Contractor shall repair or replace it at no additional cost to the County.

3.09 PIPELINE TESTING

- A. HYDROSTATIC TESTING
 - 1. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.7.
- B. MANDREL DEFLECTION TESTING PROCESS
 - 1. The deflection test for flexible pipe systems shall be performed by pulling a mandrel through the pipe line. The mandrel shall have a diameter equal to 80 percent of the inside diameter of the pipe system being tested. When the mandrel cannot be pulled through the pipe line the Contractor shall locate and correct the defect to the satisfaction of the County. After the defect is corrected and trench backfilled, the section of line shall then be retested to compliance.
 - 2. Deflection tests shall be performed not sooner than 30 days after completion of placement and densification of backfill. The pipe shall be cleaned and inspected for offsets and obstructions prior to testing.

3. The mandrel types that can be used are:
 - a. a rigid, nonadjustable, odd number of legs (9 legs minimum), mandrel having an effective length not less than its nominal diameter; and (2) be fabricated of steel, fitted with pulling rings at each end, stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size and be furnished in a suitable carrying case labeled with the same data as stamped or engraved on the mandrel.
 - b. If approved by the County, a smaller diameter piece of similar pipe material that is approximately 3 feet long and meets the 80% reduction of the inside diameter of the pipe being tested.
 4. The mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded or that "necking" has not occurred. Prior to use, the mandrel shall be inspected by County personnel. Use of an unapproved mandrel or a mandrel altered or modified after inspection will invalidate the test. If the mandrel fails to pass, the pipe will be deemed overdeflected or necked.
 5. Overdeflected or necked pipe shall be abandoned and reinstalled. The replaced pipe shall be tested for deflection not sooner than 30 days after installation.
- D. The following deficiencies in the flexible pipe system installation shall be corrected by the Contractor at no cost to the County:
1. Overdeflections
 2. Stretched or "Necked" Pipe
 3. Damaged Pipe
 4. Improper Pipe Welds
 5. Infiltration Points
 6. Debris in the line
- E. The County will not accept a credit, maintenance bond, or any other form of compensation in lieu of corrective measures that may be required to correct any sections of flexible pipe system that are improperly installed or do not meet the requirements of these specifications. In addition, all corrective measures proposed by the Contractor shall be approved by the County. In addition, should repairs of the flexible pipe system be accomplished by the use of any unauthorized materials or procedure, the County will require replacement of those substandard portions or repairs made to conform to the requirements of these specifications.

END OF SECTION

SECTION 02619B
CLOSE TOLERANCE HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL REQUIREMENTS AND CONTRACTOR QUALIFICATIONS

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment and incidentals required to install all pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents by Horizontal Directional Drilling (HDD

This section covers close tolerance horizontal directional drilled pipelines. Close tolerance HDD (CTHDD) or (ArrowBore™) is used in gravity flow installations and shallow depth pressure main installations. The pipe shall be installed in a manner that causes minimal disruption to the surface topography (no pressure humping of drives, yards and streets).

The contractor shall will need to be trained and licensed to provide CTHDD trenchless services within the industry. The contractor's crew leader shall have completed a minimum of 3 similar installations. Similar installations shall consist of critical line, grade and tight fitted hole bores for gravity flow and pressure main applications in an urbanized area with geological conditions similar to those at the site. River crossing installations and cable or phone duct installations are not considered similar installations due to the significantly different HDD techniques that are involved.

1.02 GENERAL

All existing structures, water and sewer lines, storm drains, utilities, driveways, sidewalks, signs, mail boxes, fences, trees, landscaping, and any other improvement or facility in the construction area that the Contractor disturbs for his own construction purposes shall be replaced to original condition at no additional cost to the County.

1.03 QUALIFICATIONS

Pipe Manufacture: All pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

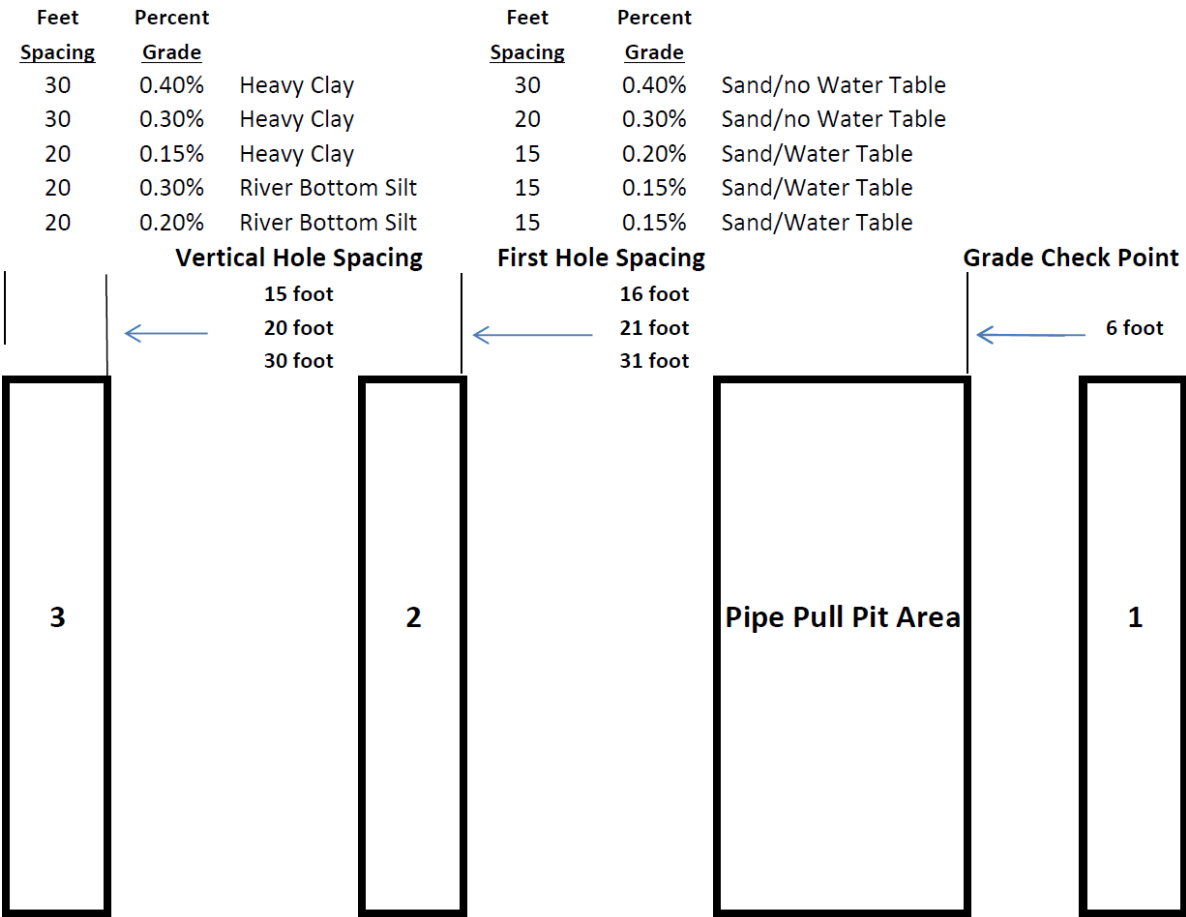
The contractor shall submit, to the Owner/Engineer, the names of the directional boring machine operator and directional boring machine navigational equipment operator. Both of these individuals shall have a minimum of three years each of directional boring experience and a minimum of one-year each in critical line and grade installations. If neither have such experience, then they need to show proof of formal training by an experience industry professional.

The Contractor shall submit, to the Owner/Engineer, in writing, the planned procedure for performing the bore within the allowable tolerances as listed in section, TESTING AND INSPECTION FOR ACCEPTANCE OF THE MAINLINE, of these specifications. The procedure shall, at a minimum, include the following:

Verification method for pilot bore location. The contractor shall, to the satisfaction of the Owner/Engineer, provide a means for accurately verifying the location of the pilot bore at certain points throughout the bore. Verification must be by visible detection or physical measurement along with the use of existing electronic detection. Electronic detection alone will not be allowed.

**Recommended Vertical Sight Relief Hole Spacing
For Gravity Sewer Installations.**

Soil conditions and the % of grade will determine the spacing.
For grades above .50% spacing can vary based on the operators experience.
Spacing should never exceed 40 foot (only in special situations).



Pilot bore stem placement and stability. To the satisfaction of the Owner/Engineer, the contractor must use CTHDD approved tooling that will provide a method to control the pilot bore stem in the correct alignment prior to back reaming.

If the Contractor does not meet the experience requirements set forth in the first two paragraphs of this section, the contractor must satisfy the following:

The contractor must, to the satisfaction of the City, show that he has been trained to provide CTHDD technology within the industry and has completed the educational program that provides the contractor a reasonably high probability of successfully completing the bore.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Technical Specifications, solely for the purposes of assisting the contractor in preparing its bid. By making this report available to the contractor, the Owner/Engineer makes no representations that the report is a true and accurate representation of the existing conditions. The contractor shall continue to be responsible to make all normal and customary examinations of the contract documents and site conditions.
- B. No individual bore shall exceed the total distance between any two manholes, fire hydrants or mainline valves and tees unless approved by the Owner/Engineer prior to start of the installation.
- C. Depths and grades shall be as shown on the plans for gravity flow installation. Adjustments can be made for pressure mains as needed based on existing utility locations and approval by the design engineer. Pressure mainlines shall be installed at a serviceable depth.
- D. For the equipment proposed to be used, the contractor shall supply, to the Owner/Engineer, the manufacturer's specifications for the directional boring equipment. This submittal shall detail thrust and pullback. Additionally, the contractor shall supply, to the Owner/Engineer, the manufacturer's specifications for the navigational equipment that details the precisions of beacon and maximum line and grade deviations. Contractor will only use CTHDD approved tooling based on the soil conditions.
- E. The exact CTHDD procedure for completing the bore shall be the responsibility of the contractor. However, in order to prevent pipe deflection in the bored hole, the following requirements must be met:

- i. The maximum annular space around the greater diameter of the pipe shall be no greater than 1/4" to 1/2", i.e., for a 14" O.D. PVC pipe the back reamer shall be no larger than 14 1/2" inches. Multiple back reams will not be allowed.
- ii. The contractor shall not leave any unfilled reamed bore holes. All reamed bore holes that are not used for pipe placement shall be grouted with a mixture that meets the Owner/Engineer's approval. In general, this applies to bore holes that are created by pulling the pipe from the ground surface rather than from an excavated pit, but may apply elsewhere. The displaced volume for pilot bore stems alone is not of sufficient volume to require grouting, i.e., pilot bore from machine to grade position than is not reamed.
- iii. Any vertical sight relief holes used to visibly verify the location of the pilot bore stem shall be filled with an earthen material unless they are located in areas that receive traffic bearing loads in which case they shall be filled with an engineer approved backfill like, "flowable fill" (CLSM).

2.02 MEASUREMENT AND PAYMENT

Open excavation projects using Close Tolerance Horizontal Directional Drilling will be paid based on the agreed units that would be normally paid if open excavation was used.

If the utility owner call out in the bid items Close Tolerance Horizontal Directional Drilling the unit price shown will be paid without additional payments for restoration units. Unless noted other wise.

PART 3 EXECUTION

3.01 TESTING AND INSPECTION FOR ACCEPTANCE OF SANITARY SEWERS

Refer to Section 02623 for gravity sewer testing requirements.

Refer to Section 02619 for pressure pipe testing requirements.

3.02 DRILLING FLUID DISPOSAL

The Contractor is responsible for drilling fluid disposal and all other restoration. Contractor must comply with all regulations regarding the proper disposal of drilling fluid. Cleaning, flushing, and hydrostatic testing of the pipe shall be conducted as specified elsewhere in our standards.

SECTION 02620

POLYETHYLENE (PE) PRESSURE PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install polyethylene pressure pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents and these Standards.
- B. Newly installed pipe shall be kept clean and free of all foreign matter & gouges.
- C. All pipe shall be correctly color coded / identified.

1.02 QUALIFICATIONS

All polyethylene pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

1.03 SUBMITTALS

- A. The Contractor shall submit to the County, within ten days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate shop drawings for all polyethylene pipe and fittings.
- B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.
- C. The Contractor shall submit shop drawings showing installation method and the proposed method and specialized equipment to be used.

PART 2 PRODUCTS

2.01 POLYETHYLENE PRESSURE PIPE

- A. Polyethylene pipe 4" diameter and larger shall be high-density bimodal PE3408/PE 100/PE4710 polyethylene resin with a minimum cell classification of 445574 per ASTM D3350, Class 200, DR 11, Performance Pipe DriscoPlex 4000, or an approved equal, meeting the requirements of AWWA C906. All pipe materials used in potable water systems shall comply with NSF Standard 61. Outside diameters of water, reclaimed water and pressure sewer HDPE pipes shall be ductile-iron sizing system (DIPS).
- B. Polyethylene tubing 2 inches in diameter and smaller for potable water and reclaimed water shall be high density PE 3408 polyethylene resin per ASTM D2737, Pressure Class 200, Copper Tube Size (CTS), SDR 9, Performance Pipe DriscoPlex 5100, Endot EndoPure, Charter Plastics or an approved equal, meeting the requirements of AWWA C901. Butt fusion or CTS brass connections shall be used. All pipe materials used in potable water systems shall comply with NSF Standard 61.

- C. Polyethylene pipe 3 inches in diameter (for potable water and reclaimed water), and 3 inches in diameter and smaller (for wastewater force mains) shall be high-density PE 3408 polyethylene, per ASTM D2737, Pressure Class 160, iron pipe size (IPS) outside diameter, DR 11, Performance Pipe DriscoPlex 4100 or an approved equal, meeting the requirements of ASTM D 3035 and AWWA C901.

2.02 JOINTS

- A. Where PE pipe is joined to PE pipe, it shall be by thermal butt fusion. Thermal fusion shall be accomplished in accordance with the written instructions of the pipe manufacturer and fusion equipment supplier. The installer of the thermal butt fused PE pipe shall have received training in heat fusion pipe joining methods and shall have had experience in performing this type of work.
- B. Where thermal butt fusion cannot be used, or when specifically called for on the plans, electro-fused couplings may be used. Fusion shall be in accordance with the written instructions of the fitting manufacturer.
- C. Flanged joints, mechanical joints, tapping saddles, and molded fittings shall be in accordance with AWWA C901, C906 or C909, ASTM D3350 and D3140, as applicable. Fusion and mechanical connections are allowed, chemical (solvents, epoxies, etc.) are not allowed.

2.03 DETECTION

- A. Direct buried HDPE pipe shall have 3" detectable metallic tape of the proper color placed directly above the pipe and 12" below finished grade or 6" detectable tape between 12" and 24" below finished grade.
- B. Direct buried or horizontal directional drilled HDPE pipe shall also have tracer wire installed along the pipe alignment. The tracer wire to be used shall be a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.

2.04 IDENTIFICATION

- A. Pipe shall bear identification markings in accordance with AWWA C906.
- B. Pipe shall be color coded blue for water, purple (Pantone 522 C) for reclaimed water or green for pressure sewer using a solid pipe color or embedded colored stripes. Where stripes are used, there shall be a minimum of three stripes equally spaced.

PART 3 EXECUTION

3.01 INSTALLING POLYETHYLENE PRESSURE PIPE AND FITTINGS

All polyethylene pressure pipe shall be installed by direct bury, directional bore, or a method approved by the County prior to construction. If directional bore is used, or if directed by the County, the entire area of construction shall be surrounded by silt barriers during construction.

3.02**INSPECTION AND TESTING**

All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak test per section 02617.

END OF SECTION

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SECTION 02622

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS (AWWA SPECIFICATIONS C-900 & C-905)

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to install the plastic piping, fittings and appurtenances complete and ready for use as specified in the Contract Documents and these Standards.

1.02 DESCRIPTION OF SYSTEM

The Contractor shall install the piping in the locations as shown on the Drawings.

1.03 QUALIFICATIONS

All plastic pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, qualified and specializes in the manufacture of the items to be furnished. The pipe and fittings shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications.

1.04 SUBMITTALS

- A. The Contractor shall submit shop drawings to the County including, but not limited to, dimensions and technical specifications for all piping.
- B. The Contractor shall submit to the County, samples of all materials specified herein.
- C. The Contractor shall submit and shall comply with pipe manufacturer's recommendation for handling, storing and installing pipe and fittings.
- D. The Contractor shall submit pipe manufacturer's certification of compliance with these Specifications.

1.05 TOOLS

The Contractor shall supply special tools, solvents, lubricants, and caulking compounds required for proper installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pressure Class-Rated Polyvinyl Chloride (PVC) Pipe

1. Pressure class-rated PVC pipe and accessories four to twelve inches (4"-12") in diameter, shall meet the requirements of AWWA Specification C-900 "Polyvinyl Chloride (PVC) Pressure Pipe". Pipe shall be Class 250, meeting requirements of Dimension Ratio (DR) 18 and shall have the dimension of ductile iron outside diameters. Each length of pipe shall be hydrostatically tested to four (4) times its class pressure by the manufacturer in accordance with AWWA C-900.
2. Fourteen inch (14") thru thirty-six (36") PVC pipe for sewer force mains shall meet AWWA C-905 requirements for dimension ratio (DR) 18. Each length of pipe shall be tested at twice the pressure rating (PR 235 psi) for a minimum dwell of five seconds in accordance with AWWA C-905.

PVC pipe shall not be used for potable and reclaim waterlines 16 inches and larger.

Pipe shall be listed by Underwriters Laboratories. Provisions shall be made for expansion and contraction at each joint with an elastomeric ring, and shall have an integral thickened bell as part of each joint. PVC Class pipe shall be installed as recommended by the manufacturer. Pipe shall be furnished in nominal lengths of approximately 20 feet, unless otherwise directed by the County. Pipe and accessories shall bear the NSF mark indicating pipe size, manufacturer's names, AWWA and/or ASTM Specification number, working pressure, and production code.

3. Rubber gaskets shall conform to AWWA C111 for mechanical and push-on type joints and shall be EPDM (Ethylene-Propylene Diene Monomer) rubber for potable water and reclaimed water pipelines. Standard gaskets shall be such as Fastite as manufactured by American Cast Iron Pipe Company, or an approved equal.
4. PVC pipe 3" and less in diameter may be constructed using pipe conforming to ASTM D2241 with push-on joints. Pipe shall be 200 psi pipe-SDR 21 unless otherwise specified by the County. This PVC pipe shall not be used for working pressures greater than 125 psi.
5. Pipe shall be blue for potable water mains, green for sewage force mains and purple for reclaimed water mains. All potable water pipe shall be NSF certified and copies of lab certification shall be submitted to the County.
6. Where colored pipe is unavailable, white PVC color coded spiral wrapped pipe shall be installed.

B. Joints

1. The PVC joints for pipe shall be of the push-on type unless otherwise directed by the County so that the pipe and fittings may be connected on the job without the use of solvent cement or any special equipment. The push-on joint shall be a single resilient gasket joint designed to be assembled by the positioning of a continuous, molded resilient ring gasket in an annular recess in the pipe or fitting socket and the forcing of the plain end of the entering pipe into the socket, thereby compressing the gasket radially to the pipe to form a positive seal. The gasket and annular recess shall be designed and shaped so that the gasket is locked in place against displacement as the joint is assembled.

The resilient ring joint shall be designed for thermal expansion or contraction with a total temperature change of at least 75 degrees F in each joint per length of pipe. The bell shall consist of an integral wall section with a solid cross section elastomeric ring which shall meet requirements of ASTM F-477. The thickened bell section shall be designed to be at least as strong as the pipe wall. Lubricant furnished for lubricating joints shall be nontoxic, shall not support the growth of bacteria, shall have no deteriorating effects on the gasket or pipe material, and shall not impart color, taste, or odor to the water. Gaskets shall be suitable for use with potable water, reclaimed water or sanitary sewer as applicable.

2. Restrained joints shall be provided at all horizontal and vertical bends and fittings, at casings under roads and railroads and at other locations shown on the Contract Drawings. PVC joints for pipe shall be restrained by the following methods: thrust blocks, restraining glands such as Certa-Lok Restraining Joint Municipal Water Pipe by the Certain Teed Corporation of Valley Forge, PA, or approved equal. All Grip, Star Grip by Star Products, MJR by Tyler Pipe, Tyler, Texas. Restrained joint PVC pipe shall be installed in strict accordance with the manufacturer's recommendation.

C. Fittings

1. 1. All fittings for class-rated PVC pipe shall be ductile iron with mechanical joints and shall conform to the specifications for ductile iron fittings, unless otherwise directed. Class 200, C-900 PVC fittings are allowable for sewage force main applications up to and including 12" diameter only. DR ratio shall be the same as the pipe.
2. 2. The manufacturer of the pipe shall supply all polyvinyl chloride accessories as well as any adapters and/or specials required to perform the work as shown on the Drawings and specified herein. Standard double bell couplings will not be accepted where the pipe will slip completely through the coupling.

PART 3 EXECUTION

3.01 INSTALLATION

The Contractor shall install the plastic pipe in strict accordance with the manufacturer's technical data and printed instructions. Direct bury pipe shall have 3" detectable metallic tape of the proper color placed directly above the pipe 12" below finished grade or 6" detectable tape between 12" and 24" below grade.

3.02 INSPECTION AND TESTING

All pipe lines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipe lines shall be subjected to a hydrostatic pressure test for two (2) hours at full working pressure, but not less than 180 psi for water/reclaimed (150 psi for force main). All visible leaks shall be repaired and retested for approval by the County. Prior to testing, the pipe lines shall be supported in a manner approved by the County to prevent movement during tests.

END OF SECTION

SECTION 02623
POLYVINYL CHLORIDE (PVC) PIPE (GRAVITY SEWER)

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, equipment, materials, pipe and incidentals and shall construct gravity sewers, complete, as shown on the drawings and as herein specified.
- B. The work shall include furnishing, laying and testing gravity sewer pipe.

1.02 SUBMITTALS DURING CONSTRUCTION

- A. The Contractor shall submit prior to construction, Shop Drawings, Working Drawings and Samples for approval to the County.
- B. The Contractor shall submit to the County not less than fourteen (14) calendar days after the date of the Notice to Proceed, a list of materials to be furnished, the names of suppliers and an expected schedule of delivery of materials to the site.
- C. The Contractor shall furnish in duplicate to the County sworn certificates that all tests and inspections required by the Specifications under which the pipe is manufactured have been satisfied.
- D. The pipe manufacturer shall inspect all pipe joints for out-of-roundness and pipe ends for squareness. The Contractor shall furnish to the County, a manufacturer's Notarized Affidavit stating all pipe meets the requirements of ASTM, ASCE, ANSI, the Contract Documents, as well as all applicable standards regarding the joint design with respect to square ends and out-of-round joint surfaces.

1.03 INSPECTION AND TESTS

- A. All pipe and accessories installed under this Contract shall be inspected and tested as required by the Standard Specifications to which the material is manufactured. The pipe shall be tested at the place of manufacture or taken to an independent laboratory by the manufacturer.
- B. Each length of pipe shall be subject to inspection and approval at the factory, point of delivery and site of work. Sample of pipe to be tested shall be selected at random by the County or the testing laboratory and shall be delivered by the Contractor to the testing laboratory approved by the County.
- C. When the specimens tested conform to applicable standards, all pipe represented by such specimens shall be considered acceptable based on the test parameters measured. Copies of test reports shall be submitted to the County prior to the pipe installation. Acceptable pipe shall be stamped with an appropriate monogram under the supervision of the testing laboratory.

- D. All pipe test specimens failing to meet the applicable standards shall be rejected. The Contractor may provide two additional test specimens from the same shipment or delivery for each failed specimen. The pipe shall be acceptable if both of these additional specimens meet the requirements of the applicable standards.
- E. Pipe which has been deemed unacceptable by the County shall be removed from the work site by the Contractor and shall be replaced with acceptable pipe.

PART 2 MATERIALS

2.01 GENERAL

- A. The sizes of gravity sewer pipe shall be shown on the Drawings.
- B. Each length of pipe shall bear the name or trademark of the manufacturer, the location of the manufacturing plant and the class or strength classification of the pipe. The markings shall be plainly visible on the pipe barrel.

2.02 POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE

- A. Polyvinyl chloride (PVC) gravity sewer pipe and fittings, 4-15 inches in diameter, shall be SDR 26, meeting the requirements of ASTM D 3034. Joining of pipe sections and fittings shall be by water-tight push-on joints using elastomeric gaskets in accordance with ASTM D 3212.
- B. Polyvinyl chloride (PVC) pipe, 16-48 inches in diameter, for gravity sewers, shall be DR 25, with cast-iron (CI) outside diameter, meeting the requirements of AWWA C905.
- C. All PVC sewer pipe bell ends shall be field inspected for out-of-roundness and spigot ends shall be field inspected for out-of-roundness and for squareness of the pipe end. Any materials not in conformance with the tolerances of ASTM D 3212 or AWWA C905 shall be removed from the work site.
- D. All PVC sewer pipe sections shall also be field inspected for excessive cross-section deflection. Any pipe section visually found to have a pipe deflection, before installation, of 2 percent of the Base Inside Diameter or greater shall be removed from the work site. After installation and backfill, pipe deflection shall not be allowed to be 5 percent or greater of the Base Inside Diameter. Any length of pipe found installed having excessive deflection shall be dug up and either reinstalled or removed from the work site.
- E. Six inch PVC fittings for sewer laterals shall also be SDR 26, molded in one piece, with elastomeric joints in accordance with ASTM D-3034. Fittings not currently available in molded form may be fabricated in accordance with ASTM D-3034 with manufacturer's standard pipe bells and gaskets.

2.03 JOINING PVC GRAVITY SEWER AND FITTING

- A. The PVC joints shall be of the push-on type with a single rubber gasket conforming to ASTM F 477.

- B. Wyes and riser fittings shall be gasketed connections. Rubber doughnuts are not to be used.
- C. Joints between pipes of different materials shall be made using stainless steel shielded couplings (as provided by Fernco) or Protecto 401 mechanical joint connections. Metal piping shall not be threaded into plastic fittings, valves, or couplings, nor shall plastic piping be threaded into metal valves, fittings, or couplings.

2.04 INDENTIFICATION AND DETECTION

- A. PVC gravity sewer pipe shall bear identification markings in accordance with ASTM D 3034 or AWWA C905.
- B. PVC gravity sewer pipe shall be color-coded green using a solid pipe color pigment.

PART 3 EXECUTION

3.01 PIPE DISTRIBUTION

The Contractor shall not distribute material on the job faster than it can be used to good advantage. He shall unload pipe, which cannot be physically lifted by workers from the trucks, by a forklift or other approved means. He shall not drop pipe of any size from the bed of the truck to the ground. He shall not distribute more than one weeks supply of material in advance of laying, unless otherwise approved by the County.

3.02 PIPE PREPARATION AND HANDLING

- A. The Contractor shall inspect all pipe and fittings prior to lowering them into trench. Cracked, broken, or otherwise defective materials are not acceptable and shall not be used. The Contractor shall clean the ends of the pipe thoroughly. He shall remove foreign matter and dirt from inside of pipe and keep the pipe clean during and after laying.
- B. The Contractor shall use proper implements, tools and facilities for the safe and proper protection of the work. He shall lower the pipe into the trench in a manner to avoid any physical damage to the pipe, remove all damaged pipe from the job site and under no circumstances shall the pipe be dropped or dumped into trenches.

3.03 LINE AND GRADE

- A. The Contractor shall not deviate more than 1/2-inch for line and 1/4-inch for grade from the line design and design grade established by the County provided that such variation does not result in a level or a reverse sloping invert. He shall measure the grade at the pipe invert and not at the top of the pipe. The Contractor shall furnish, set and control the line and grade by laser beam method. Other methods of controlling line and grade may be submitted to the County for approval

if using the laser beam method proves to be impractical because of other conditions.

- B. The Contractor shall use the laser beam method of maintaining line and grade. The Contractor shall submit evidence to the County that a qualified operator shall handle the equipment during the course of construction. A "Caution-Laser Light" placard shall be displayed in a conspicuous place. When "in the pipe" method is used, grade boards shall be installed for the first 50 feet of pipe. The Contractor shall check the line and grade at any additional points at which offset stakes have been placed and when requested by the County. A fan shall be provided to circulate the air if bending of the beam due to air temperature variations becomes apparent with "in the pipe" units. However excessive air velocity shall not be permitted to cause pulsating or vibrating of the beam. If, in the opinion of the County, the beam cannot be accurately controlled, this method of setting line and grade shall be discontinued. When the above ground method is used, the set-up shall be checked with the three grade boards including one set at the upstream manhole. If the laser has a gradient indicator, two boards may be used to check the set-up. The grade board at the up-stream manhole shall be retained to check into as pipe laying progresses.

3.04 PREPARATION OF TRENCH

- A. The Contractor shall provide pipe bedding material under all the pipe for the full trench width. The minimum depth of bedding material below the pipe barrel shall be as follows

Minimum Depth of

<u>Pipe Size</u>	<u>Bedding Under Pipe Barrel</u>
15" & Smaller	4 inches
18" to 36"	6 inches
42" & Large	9 inches

- B. The depth of pipe bedding material under the pipe bell shall not be less than three inches under normal trench conditions.
- C. The Contractor shall hand-grade bedding to proper grade ahead of the pipe laying operation. The bedding shall provide a firm, unyielding support along the entire pipe length.
- D. Should the Contractor excavate the trench below the required depth for pipe bedding material placement without direction from the County, the Contractor shall fill the excess depth with pipe bedding material as specified herein to the proper subgrade.
- E. The Contractor shall excavate bell holes at each joint to permit proper assembly and inspection of the entire joint.

3.05 DEWATERING

The Contractor shall prevent water from entering the trench during excavation and pipe laying operations to properly grade the bottom of the trench and allow for proper compaction of the backfill. Pipe shall not be laid in water.

3.06

LAYING AND JOINTING PIPE AND FITTINGS

- A. The Contractor shall lay pipe upgrade with spigot ends pointing in direction of flow. After a section of pipe has been lowered into the prepared trench, he shall clean the end of the pipe to be joined, the inside of the joint and, if applicable, the rubber ring immediately prior to joining the pipe. The Contractor shall assemble the joint in accordance with the recommendations of the manufacturer of the type of joint used. He shall provide all special tools and appliances required for the jointing assembly.
- B. The Contractor shall lay all pipe uniformly to line and grade so that the finished sewer shall present a uniform bore. Variations from line and grade in excess of the tolerances specified under LINE AND GRADE are not acceptable and the work shall be rejected.
- C. The Contractor shall check the pipe for alignment and grade after the joint has been made. The pipe bedding shall form a continuous and uniform bearing and support for the pipe barrel between joints. Sufficient pressure shall be applied to the joint to assure that the joint is "home" as defined in the standard installation instructions provided by the pipe manufacturer. The Contractor shall place sufficient pipe cover material to secure the pipe from movement prior to installing the next joint to assure proper pipe alignment and joint makeup.
- D. Pipe 21" and smaller intended to be in straight alignment shall be laid so that the inside joint space does not exceed 3/8" in width. If interior joints on 24" and larger pipe laid either in straight alignment or on a curve are greater than 3/8", the Contractor shall thoroughly clean the joint surfaces and fill and seal the entire joint with premixed mortar conforming to ASTM C-387 only after the trench has been backfilled, unless otherwise approved by the County. Trowel smooth on the inside surface. Water shall not be allowed to rise in or around, or pass over any joint before it has substantially set.
- E. When the Contractor lays pipe within a movable trench shield, he shall take all necessary precautions to prevent pipe joints from pulling apart when moving the shield ahead.
- F. The Contractor shall prevent excavated or other foreign material from getting into the pipe during the laying operation. He shall close and lock the open end of the last laid section of pipe to prevent entry of foreign material or creep of the gasketed joints when laying operations cease, at the close of the day's work, or whenever the workers are absent from the job.
- G. The Contractor shall plug or close off the pipes which are stubbed off with temporary plugs.
- H. The Contractor shall take all necessary precautions to prevent the "uplift" or floating of the line prior to the completion of the backfilling operation.

- I. The Contractor shall make connections of non-reinforced pipe to manholes or concrete structures, so that a standard pipe joint is located at a minimum of 18" outside the edge of structure.
- J. When field cutting and/or machining the pipe is necessary, the Contractor shall use only tools and methods recommended by the pipe manufacturer and approved by the County.
- K. Service lateral shall be constructed by the Contractor as shown on the standard sewer details and located approximately as shown on the Contract Drawings.

3.07 LAYING PLASTIC PIPE

- A. Polyvinyl chloride (PVC) pipe shall be installed by the Contractor in accordance with the instructions of the manufacturer, as shown on the Drawings and as called out in the Contract Documents.
- B. The Contractor shall lay the pipe, bedding and backfill to lines and grade shown on the Drawings and called out in the Contract Documents. Blocking under the pipe will not be permitted.
- C. The Contractor shall install a green metallic tape as shown in these Standards below finish grade along the entire pipeline PVC sewer main pipe route.
- D. The Contractor shall use care in the handling, storage and installation of pipe. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's recommendation.

3.08 BACKFILL IN THE PIPE ZONE

- A. The pipe zone shall be considered to include the full width of the excavated trench from the bottom of the trench to a point above the top outside surface of the barrel of the pipe.
- B. The Contractor shall pay particular attention to the area of the pipe zone from the flow line to the springline of the pipe to insure that firm support is obtained to prevent any lateral movement of the pipe during the final backfilling of the pipe zone.
- C. The Contractor shall take care to insure that the pipe does not rest directly on the bell or pipe joint, but is uniformly supported on the barrel throughout its entire length.
- D. After the pipe is laid by the Contractor to line and grade, he shall place and carefully compact pipe bedding material for the full width of the trench to the springline of the pipe. He shall place the material around the pipe in 6-inch layers and thoroughly hand tamp with approved tamping sticks supplemented by "walking in" and slicing with a shovel to assure that all voids are filled.
- E. The Contractor shall backfill and carefully compact the area above the pipe springline with pipe cover material to a point 12" above the top outside surface of

the pipe barrel. Pipe bedding material may, at the Contractor's option, be substituted for pipe cover material.

3.09 EXCESS TRENCH WIDTH

- A. Normal trench widths shall be as shown on the Drawings. If the normal trench width below the top of the pipe is exceeded for any reason, the Contractor shall furnish an adequate support for the pipe. The County may determine that the pipe being used is strong enough for the actual trench width or the Contractor may furnish a stronger pipe or a concrete cradle for approval.
- B. Concrete thickness under the pipe shall be one-third of the nominal diameter of the pipe, but not less than four inches. Concrete block or brick may be used for adjusting and maintaining proper grade and elevation of pipe. After the pipe is laid to line and grade, the Contractor shall place 3,000 psi concrete under the pipe for the full width of the trench to form a cradle of the required length and thickness with the concrete brought up to a level equal to 1/4 of the inside pipe diameter below the springline of the pipe. Start and terminate the concrete cradle at the face of a pipe bell or collar. Do not encase pipe joints at the ends of the concrete cradle.
- C. After the concrete has taken initial set, the Contractor shall place cover material over the concrete cradle and up to a level 12" above the pipe barrel and for the full width of the trench. Cover material shall be placed by hand or by equally careful means.

3.10 CONNECTING DISSIMILAR PIPE MATERIALS

The Contractor shall use the following method to connect dissimilar pipe materials. Use concrete closure collars only when approved by the County and then only to make connections between dissimilar pipe when standard rubber gasketed joints or shielded couplings are impracticable. Before the closure collars are poured, wash the pipe to remove all loose material and soil from the surface on which the concrete will be placed. Wet nonmetallic pipe thoroughly prior to pouring the collars. Wrap and securely fasten a light gauge of sheet metal or building-felt around the pipe to insure that no concrete shall enter the line. Place reinforcement as shown on the plans. Make entire collar in one pour using 3,000 psi concrete and extend a minimum 12" on each side of the joint. The minimum thickness around the outside diameter of the pipe shall be 6". No collar shall be poured in water. After the collars are poured and have taken their initial set, cure by covering with well-moistened earth.

3.11 PIPE BULKHEADS

- A. Connections for future sewers shall be bulkheaded by the Contractor in the following manner:
 - 1. All wyes and bell-and-spigot pipe sewers 18" in diameter or smaller shall be bulkheaded with caps or disc stoppers with factory-fabricated resilient joints. The disk or cap shall be banded or otherwise secured to withstand all test pressures without leakage.

2. Connections 21" and 24" in diameter shall be bulkheaded with a four-inch brick wall, using clay brick or concrete brick. The wall shall be capable of withstanding all test pressures without leakage.
3. Connections 27" in diameter and larger shall be bulkheaded with an eight-inch wall, using clay brick or concrete brick. The wall shall be capable of withstanding all test pressures without leakage.

3.12 AIR TEST FOR GRAVITY SEWERS - GENERAL

- A. Gravity sewers shall be required to pass the low pressure air test. All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.10.
- B. Air loss rates may be measured by the County. These tests shall be performed by the Contractor under the observation of the County Inspector.
- C. The groundwater height above the installed pipe shall be determined by attaching a transparent plastic tube to a pipe nipple in the manhole and using the plastic tube as a manometer. A test hole may be dug directly above the sewer main for visual inspection.
- D. The ends of branches, laterals, tees, wyes and stubs included in a test section shall be plugged to prevent air leakage. All plugs shall be secured to prevent blowout due to internal pressure. A test section is defined as the length of sewer between manholes.
- E. The Contractor shall repair all visible leaks in manholes and pipe, even if the leakage test requirements are met.

3.13 TELEVISION INSEPTION OF GRAVITY SEWERS

- A. TV inspection of the entire length of the inside of new gravity sewer mains shall be conducted by the Contractor. The County Inspector shall have been notified and shall be present during the TV inspection.
- B. The sewer pipelines shall be thoroughly cleaned of all dirt, debris or obstructions before the TV inspection. Water shall be added to the upstream manhole until it is seen flowing from the most downstream point of the system to be inspected.
- C. The TV camera shall be a self-propelled, 360 degree pan-head, high resolution, color type and shall have dual DVD recording capability. The camera shall be equipped with a depth gauge calibrated to ¼-inch increments to accurately record the depth of the water in the pipeline. A calibration report shall be submitted with each digital video disk (DVD), which shall include a drawing of the depth gauge, indicating the marks on the gauge, and what depth each mark represents.
- D. The County Inspector shall be present and will observe the TV monitor along with the camera operator as the camera progresses through the pipe. All pipelines will be inspected with the camera progressing in an upstream direction when possible. The camera operator shall record the manhole numbers and the distance the camera has progressed from the downstream manhole as the inspection proceeds.

The operator shall stop the progress of the camera and record the distance at all locations along the pipeline where unusual or defective features are encountered. The operator shall record the distance and depth of the water in the pipe at all locations where the depth is greater than or equal to 75% of the maximum depth as listed in the table below. The camera operator shall make records where cracked, dented or deformed pipe is found, or at joints that are not properly installed, or where infiltration is observed, or at any other abnormality or where any other defective feature is encountered.

- E. Pipe grade between manholes shall not deviate by more than the maximum depth as list below from the design grade line, as measured with the television (TV) camera's depth gauge during the TV inspection, provided that such deviation does not result in a level or a reverse slope. Joint deflection and longitudinal pipe deflection between manholes that exceeds the maximum depth or more than two deflections that exceed 75% of the maximum depth, as measured with the television camera's depth gauge during the TV inspection, shall not be accepted.

Pipe Sizes	Water Holding Depth (inches)	
		Maximum
8 inch to 15 inch		1.00
18 inch to 21 inch		2.00
24 inch and greater		2.50

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

3.14 PIPE RING DEFLECTION TESTING OF GRAVITY SEWERS (MANDREL)

- A. The Contractor shall perform a pipe ring deflection test on all new gravity sanitary sewer mains. The rigid ball or mandrel used for the ring deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside diameter of the pipe depending on which is specified in the ASTM C 3034, to which the pipe is manufactured. The test shall be performed without mechanical pulling devices.
- B. The allowable ring deflection is 5 percent of the inside pipe diameter. Pipes that have a ring deflection that exceeds this amount shall not be accepted.

3.15 FINAL SEWER CLEANING

- A. Prior to final acceptance and final manhole-to-manhole inspection of the sewer system by the County, the Contractor shall flush and clean all parts of the system, remove all accumulated construction debris, rocks, gravel, sand, silt and other foreign material from the sewer system at or near the closest downstream manhole.

- B. During the final manhole-to-manhole inspection of the sewer system, the County may require the Contractor to reflush and clean any section or portion of the line if any foreign matter is still present in the system.

END OF SECTION

SECTION 02627
SANITARY SEWER MANHOLE REHABILITATION

PART 1 GENERAL

1.01 DESCRIPTION

- A. This specification consists of all work, materials, labor and equipment required for manhole rehabilitation for the purpose of eliminating infiltration and exfiltration, providing corrosion protection, adjusting final grade of manhole top, repair of voids and restoration of the structural integrity of the manhole. All such work shall comply with these Specifications and the specific product manufacture's recommendations. Any conflict between the product manufacture's recommendations and any portion of the Contract Documents shall be resolved prior to beginning the work.

1.02 PRODUCT AND MANUFACTURER QUALIFICATION REQUIREMENTS

- A. Since sewer products are intended to have a 50-year design life, and in order to minimize the County's risk, only proven products with substantial successful long term track records will be allowed. At a minimum, products and installers must meet all of the following criteria to be deemed commercially acceptable:
1. For a Product to be considered commercially acceptable, the product must have a minimum of two (2) million square feet and ten (10) year history of successful wastewater collection system installations in the United States. In addition, products must provide Third Party Test Results supporting the long-term performance and structural strength of the product and such data shall be satisfactory to the Owner. No product will be allowed without Independent Third Party Testing verification.
 2. For an installing Contractor to be considered commercially acceptable, the installer must have a certification from the manufacturer as a licensed and fully trained installer of the product. The installer must also have a minimum of one (1) million square feet of successful wastewater collection system installations on underground concrete/masonry structures and ten (10) years of rehabilitation experience.

1.03 SUBMITTALS:

- A. Product
 - 1. Technical data sheets showing the physical and chemical properties.
 - 2. Material Safety Data Sheets (MSDS).
 - 3. Third Party Testing results.
 - 4. Verification of minimum installation requirements set forth in section 1.02.A.1 above.
- B. Installer
 - 1. Verification of "certified applicator" status.
 - 2. Verification of minimum installation requirements set forth in section 1.02.A.2 above.
- C. Written certification from the product manufacturer that each of the proposed rehabilitation products is compatible with each other.
- D. Submit with Each Project:
 - 1. Description, layout, and application sequencing plan.
 - 2. Rehabilitation system application requirements including material handling and storage requirements, mixing and proportioning requirements (as applicable), maximum pot life, film/coating thickness, curing, testing and certification requirements of all rehabilitation materials. Product Material Safety Data Sheets.
 - 3. Detailed instructions and methodology for finishing all pipe and manhole connections to rehabilitated manholes to prevent infiltration and exfiltration.
 - 4. Wastewater Flow Control/Bypassing Plan.
 - 5. Confined Space Entry Plan/Permit.
 - 6. Plan for capturing extraneous debris during rehabilitation processes and debris disposal.

1.04 MATERIALS

- A. Refer to the latest Manatee County Public Works Utility Standards Section 12 Precast Concrete Manholes and Wetwells for material requirements and details.

1.04.1 CEMENTITIOUS MORTOR

- A. Mortar shall be made of one part Portland cement and two parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C 150. Sand shall meet the requirements of ASTM C 144.

1.04.2 PATCHING MATERIAL

- A. A quick setting fiber reinforced cementitious material shall be used as a patching material and is to be mixed and applied according to manufacturer's recommendations.

1.04.3 HYDRAULIC CEMENT

- A. A rapid setting, high-early-strength, cementitious product specifically formulated for leak control shall be used to stop water infiltration. The material shall be mixed and applied according to the manufacturer's recommendations.

1.04.4 CHEMICAL GROUT

- A. A chemical grout shall be used for stopping very active infiltration and filling voids.

1.04.5 LINER MATERIAL

A. CEMENTITIOUS MATERIAL

- 1. Cementitious liner products shall be used to form a structural monolithic liner covering all interior manhole surfaces and shall have the following minimum requirements:
 - a. Compressive Strength (ASTM C109): 7,000 psi, 28 days
 - b. Tensile Strength (ASTM C496): 700 psi, 28 days
 - c. Flexural Strength (ASTM C293): 1,300 psi, 28 days
 - d. Shrinkage (ASTM C596): 0.02% at 28 days
 - e. Minimum Bond (ASTM C952): 200 psi, 28 days
- 2. Refer to Section 09920 Sewpercoat Surface System of the specifications.

When used as the final rehabilitation liner material (no epoxy liner), product shall be made with calcium aluminate cement. Calcium aluminate is not required when the cementitious liner is used as the underlayment for a protective coating liner application.

B. PROTECTIVE COATING LINER MATERIAL

- 1. The protective coating liner is to be applied where corrosion is anticipated. The protective coating liner material shall be applied over the completed cementitious liner material (without the calcium aluminate). The liner shall be spray applied or spin cast. The manufacturer of the selected protective coating liner material shall approve in writing that their protective coating liner is compatible with cementitious repair and liner material.
- 2. The protective coating liner material shall conform to Section 09970 Surface Protection Spray Systems of the specifications.

C. WATER

- 1. Water shall be clean and potable.

1.04.6 INTERNAL MANHOLE CHIMNEY SEAL MATERIAL

- A. An aromatic urethane rubber material or flexible epoxy mastic used to prevent leakage of water into the manhole through the frame joint area and the area above the manhole cone and shall have the following minimum requirements:
1. Elongation (ASTM D412): 600%
 2. Tensile Strength (ASTM D412): 1,150 psi
 3. Adhesive Strength (ASTM D903): 175 lb. l/in.
 4. Tear Resistance (ASTM D1004): 155 lb. l/in.

The seal shall extend from the inside of the manhole frame down to the cone or corbel of the manhole.

1.04.7 EXTERNAL MANHOLE SEAL WRAP

- A. External Manhole Seal Wrap: When work consists of adjusting manholes or cone replacements, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. The external seal wrap shall conform with Manatee County Public Works Department Utility Standards Section 12 and be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

1.05 PREPARATION

- A. Perform traffic control in accordance with the approved traffic control submittal.
- B. Store materials in accordance with manufacturer's recommendations.
- C. Schedule and perform the work in a manner that does not cause or contribute to overflows or spills of sewage from the sewer system.
- D. Install devices to prevent extraneous material from entering the sewer system and to prevent upstream line from flooding the manhole. If extraneous material or debris falls into a "live" manhole during adjustment operations, the Contractor shall remove debris at no cost to the Owner.
- E. Dispose of wastes in accordance with applicable regulations.
- F. Schedule and perform any bypass pumping that will be necessary to properly rehabilitate the manhole.
- G. If present in the manhole, Contractor shall remove all access steps. Removal shall consist of neatly cutting steps flush with the wall prior to any lining installation. Contractor shall be responsible for proper disposal of steps.
- H. For manholes that are located within pavement areas and require resetting or replacement of concrete riser rings, cones, and /or frames, the Contractor shall sawcut, remove, and replace a 6 ft. x 6 ft. square or round section of pavement and base for rehabilitation operations. Costs for removal and replacement of pavement and base beyond these limits shall be borne by the Contractor.

1.06 INSTALLATION

- A. Prior to any lining all other miscellaneous work must be complete.
- B. Prior to man entry into any structure to be rehabilitated, proper ventilation and strict confined space OSHA regulations shall be followed. Failure to do so shall be grounds for removal from the project.

1.06.1 CONE REPLACEMENT

- A. The Contractor shall replace existing deteriorated manhole cone section with new precast concrete cone section. A preformed rubber gasket shall be placed in all keyways between existing manhole riser section and cone joints. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Manatee County Public Works Department Utility Standards. If the existing manhole is of brick construction, the cone shall be set in a full bed of mortar on the top course of bricks.

1.06.2 RISER RINGS

- A. The Contractor shall replace existing, deteriorated riser rings with new precast concrete riser rings. All manholes designated to receive casting adjustment and/or alignment shall be adjusted to meet existing finished grade unless an alternative elevation is specified. A cementitious mortar shall be placed in between individual precast concrete riser rings, and precast concrete riser ring and cone joints. The mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Manatee County Public Works Department Utility Standards.

1.06.3 MANHOLE FRAME AND COVER

- A. Existing frames and covers which must be removed to facilitate manhole rehabilitation, riser reconstruction, and/or casting alignment or grade adjustments shall be salvaged, cleaned and given two coats of an approved bituminous coating by the Contractor for replacement unless determined to be defective by Engineer. If manhole frame and/or cover are determined to be defective, Contractor shall replace with new frame and/or cover. Replacement frames and/or covers shall be furnished and installed in accordance with the Contract Documents. Frames shall be set in full mortar bed. The mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils.

1.06.4 CEMENTITIOUS LINER

- A. Active leaks shall be stopped using hydraulic cement or chemical grout as necessary. Installation shall be in accordance with the manufacturer's recommendations.

- B. All manholes to be lined shall be cleaned and scarified with a minimum of 5,000 psi water jet at a minimum water temperature of 180 degrees F. The water jet shall hit the manhole wall surface at as near perpendicular angle as possible. Cleaning the manhole walls from the ground surface without the appropriate angled nozzles will not be accepted. Manhole surface build-up of debris and loose manhole construction materials shall be removed during the cleaning process.
- C. The intent of the surface preparation and cleaning work is to remove debris, films (oil, greases, etc or unsound, deteriorated concrete and to provide a structurally sound, clean surface that will enable lining materials to bond to the original substrate at adhesion strengths of that specified herein, a substrate pH of 8.3 is the minimum pH that will be considered acceptable to demonstrate that the surface preparation and cleaning have been properly performed.
- D. Additional aggressive surface preparation and cleaning methods may be necessary to remove carbonated cementitious lining concrete or contaminants that remain after the cleaning performed as described above. The Contractor shall test the pH of the cleaned manhole interior surface at various locations of the manhole and when the results indicate a pH less than 8.3 then additional surface preparations and cleaning will be required. As a minimum level of effort the Contractor shall either dry sand blasting or pneumatic jackhammering with a bushing bit followed by a minimum 5,000 psi water blast.
- E. Any bench, invert or service line repairs shall be made at this time using quick setting grout or repair mortar per the manufacturer's recommendations.
- F. Invert repair shall be performed on all inverts with visible damage or where infiltration is present. After blocking flow through the manhole and thoroughly cleaning the invert, quick setting patch material shall be applied to the invert in an expeditious manner. The finished invert surfaces shall have a smooth surface and form a continuous monolithic conduit with the sewer pipe entering and leaving the manhole. The bench and invert shall form a watertight seal with the manhole walls, base and pipe seal.
- G. Wastewater flow shall be controlled by methods which prevent contact with the new bench and invert for 6-8 hours after mortar placement. If 6-8 hours set time is not possible, a fast setting, high early strength mortar shall be used with provisions for flow control until concrete has set.
- H. Fill all cracks, holes and joints that have voids using non-shrink grouts in accordance with the manufacturer's recommendations.
- I. Apply Cementitious Liner Material per the Manufacturer's recommendations. Apply Cementitious Liner material so that the final thickness is 0.5-inch minimum or per the thickness required by the manufacturer's minimum specification, whichever is greater. The material shall start at the bottom of the manhole frame and extend to the water level of the invert.

- J. Finishing: Trowel the surface of the liner to create a uniform smooth finish. Caution shall be taken to prevent over working the material. Once the initial cure has taken place, the exposed surface area should be given a broom finish. Thickness may be verified at any point with a wet gage.
- K. If the cementitious lining material is not immediately coated with a protective coating liner, apply a seal coat compatible with the repair material to aid in curing and minimize recontamination of the substrate prior to application of the protective coating liner material.

1.06.5 PROTECTIVE COATING LINER

- A. Prior to any protective coating lining perform all work shown in Section 1.06.4 above.
- B. Remove any curing compounds, sealers or contaminates prior to protective coating lining.
- C. Apply protective coating lining material in accordance with the manufacturer's recommendations over the waterproofing/structural repair material shown in Section 1.06.4.
- D. Apply protective coating lining material in accordance to Section 09970 Surface Protection Spray System of the specifications.

1.06.6 INTERNAL MANHOLE CHIMNEY SEALANT

- A. Perform all work shown in Sections 1.06.4 and 1.06.5 (if 1.06.5 is required) prior to any Internal Manhole Chimney Sealant.
- B. Clean all contaminates from manhole frame by sandblasting or mechanical methods as recommended by the chimney sealant manufacturer.
- C. Install Internal Manhole Chimney Sealant in accordance with the manufacturer's recommendations. The Contractor shall contact the manufacture for thickness recommendations however; the final liner material shall be made no less than 170 mils.

1.06.7 EXTERNAL MANHOLE SEAL WRAP

- A. When Work consists of adjusting sewer manholes or cone replacement, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. Frame and cover shall be completely coated prior to installation of the external seal wrap. The external seal wrap shall be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

1.06.8 MANHOLE INSERT

- A. If existing manhole is not equipped with a watertight manhole insert, Contractor shall furnish and install a new manhole insert per Manatee County Public Works Utility Standards Section 12 and in accordance with the manufacturer's recommendations.
- B. If existing manhole is equipped with a watertight manhole insert to prevent intrusion of storm water, the insert shall be cleaned and reinstalled by the Contractor, unless determined to be defective by the County. If insert is determined to be defective, Contractor shall furnish a new watertight manhole insert and install in accordance with manufacturer's recommendations at the completion of manhole rehabilitation operations.

1.07 TESTING

- A. After completion of any rehabilitation operation and prior to backfilling (if required), the Contractor shall conduct the following tests on the manholes:
 - 1. Visual Inspection: The County and Contractor shall make a final visual inspection. Any deficiencies in the finished system shall be marked and repaired.
- B. If a protective coating liner is applied, the following additional tests will be required:
 - 1. Wet Film Thickness Gage: During application a wet film thickness gage, meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to ensure a monolithic coating and uniform thickness during application.

1.08 WARRANTY

- A. The Contractor shall guaranteed the work to be free of defects in materials and workmanship for five-year period, unless otherwise stated, after completion and acceptance of the work. The Contractor shall repair defects in materials or workmanship, which may develop during the warranty period; and any damage to other work caused by such defects or discovered within the same period at no additional cost to the County.

1.08.1**WARRANTY INSPECTIONS**

- A. Conduct visual inspection prior to expiration of warranty to determine integrity of rehabilitation materials and water-tightness.
 - 1. Complete post inspection during first high groundwater period (spring or fall) following acceptance of work.
 - 2. Contractor should accompany County on inspections.
 - 3. Inspect a minimum of 25 percent of the manholes rehabilitated at locations selected by County.
 - a. Infiltration and Inflow: None
 - b. Structural Repair: Sound
 - c. If more than one manhole fails warranty inspection, inspect all manholes with similar characteristics.
 - d. Repair defects in accordance with Warranty.

END OF SECTION

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SECTION 02640
VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.
- B. All of the types of valves and appurtenances shall be products of well-established reputable firms who are fully experienced and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these standards as applicable. Valves used in waterworks applications shall comply with Section 8 of NSF Standard 61 for mechanical devices.
- C. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of potable water, reclaimed water, wastewater, etc., depending on the applications.
- D. All valves and appurtenances shall be of the size shown on the drawings and, to the extent possible, all equipment of the same type on the project shall be from a single manufacturer.
- E. All valves and appurtenances shall have the name of the manufacturer, year of the valve and the working pressure for which they are designed cast in raised letters upon some visible part of the body.
- F. Special tools, if required for the normal operation or maintenance, shall be supplied with the equipment.
- G. All hand actuated buried valves shall have three-piece adjustable valve boxes and 2-inch square AWWA operating nuts. Provide stainless steel extension stems and alignment rings where needed to bring the operating nut to within 4 feet below the box lid.
- H. Water and reclaimed water system isolation valves shall be gate valves for sizes 2-inch through 12-inch and shall be butterfly valves for sizes 16-inch and larger.
- I. Isolation valves for sewer force main pipelines shall be gate valves, unless otherwise noted on the plans. Tapping valves shall be used for tapping force mains. Plug valves shall be full port, have a 100% circular cross section, and must have prior written authorization from the County for use.

- J. Valves shall open when turning the operating nut or wheel counterclockwise and shall close when turning clockwise.
- K. All bonnet bolts, gland bolts, flange connection bolts, nuts, washers, and other trim hardware exposed to the outside environment shall be stainless steel. Thrust collar tie-rod bolts shall be stainless steel. All MJ-type underground bolts, nuts, and washers shall be stainless steel.
- L. All valves shall have a factory applied, holiday free, fusion bonded epoxy coating on the interior and exterior unless otherwise noted in the plans or the following specification. All other painted items exposed to sunlight, including field painted box lids, etc., shall be painted the appropriate color with an epoxy type paint.
- M. No valves with a break-way stem shall be allowed.
- N. The equipment shall include, but not be limited to, the following:
 - 1. Gate valves (Sec. 2.01)
 - 2. Combination Pressure Reducing and Pressure Sustaining with Check Valves Option (Sec. 2.02)
 - 3. Ball Valves (Sec. 2.03)
 - 4. Butterfly Valves (Sec. 2.04)
 - 5. Plug Valves (Sec. 2.05)
 - 6. Valve Actuators (Sec. 2.06)
 - 7. Air Release Valves (Sec. 2.07)
 - 8. Valves Boxes (Sec. 2.08)
 - 9. Corporation Stops and Saddles (Sec. 2.09)
 - 10. Flange Adapters and Plain End Couplings (Sec. 2.10)
 - 11. Hose Bibs (Sec. 2.11)
 - 12. Swing Check Valves (Sec. 2.12)
 - 13. Hydrants (Sec. 2.13)
 - 14. Restrained Joints (Sec. 2.14)
 - 15. Tapping Sleeves and Tapping Valves (Sec. 2.15)
 - 16. Tracer Wire Boxes (Sec. 2.16)

1.02 SUBMITTALS

- A. Submit to the County within 30 days after execution of the contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.
- B. Complete shop drawings of all valves and appurtenances shall be submitted to the County for approval in accordance with the Specifications.

1.03 TOOLS

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

PART 2 PRODUCTS

2.01 GATE VALVES

- A. Where indicated on the drawings or necessary due to locations, size, or inaccessibility, chain wheel operators shall be furnished with the valves. Such operators shall be designed with adequate strength for the valves with which they are supplied and provide for easy operation of the valve. Chains for valve operators shall be galvanized.
- B. Gate valves installed underground shall be provided with a box cast in a concrete pad and a box cover. Stainless steel or equivalent valve extension stems shall be provided to place the valve operating nut no more than 4 feet deep. One valve wrench, 6 feet in length, shall be provided for every 15 valves installed.
- C. Gate valves 2 inches to 14 inches in diameter shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 or AWWA C515 and shall be UL listed and FM approved where applicable. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.
- D. The valves shall have a non-rising stainless steel stem to eliminate lead content. All bolts, nuts and washers shall be stainless steel to eliminate exterior corrosion and maintain fastener strength. Manufacturer shall use Never-Seez or equivalent during assembly of bolt and nut sets to prevent galling of similar metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the thrust collar. Valves that are located above grade and located in valve vaults shall be OS&Y with flanged joints.
- E. The wedge shall be ductile iron fully encapsulated with an EPDM rubber. The Elastomer type shall be permanently indicated on the disc or body of the valve. The resilient sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.
- F. The valve body, bonnet, and bonnet cover shall meet or exceed all the requirements of AWWA C515.
- G. Valves meeting AWWA C515 requirements shall be rated for an operating pressure of 250 psi and shall be tested in accordance with AWWA C515.
- H. The valves are to have 2-inch cast or ductile iron AWWA operating nuts and shall open left or counterclockwise.
- I. The valves shall be covered by a Manufacturer's 10-year warranty on manufacturer's defects and reasonable labor costs for replacement. Warranty shall become effective from the date of purchase by the end user and delivered within 30 days from the receipt of the purchase order. For publicly owned and maintained utilities, the end user is Manatee County Government.

- J. Gate valves shall be assembled and tested in a certified ISO 9001:2000 manufacturing facility within the United States and provide their certification of meeting internationally recognized quality control procedures.

2.02 COMBINATION PRESSURE REDUCING & PRESSURE SUSTAINING WITH CHECK VALVE OPTION

- A. Pressure sustaining and check valve shall be pilot operated diaphragm actuated valve with cast iron body, bronze trim, and 125-pound flanged ends. The valve shall be hydraulically operated, diaphragm type globe valve. The main valve shall have a single removable seat and a resilient disc, of rectangular cross section, surrounded on three and a half sides. No external packing glands are permitted and there shall be no pistons operating the main valve or any controls. The valve shall be equipped with isolation valves to service the pilot system while permitting flow if necessary. Main valve and all pilot controls shall be manufactured in the United States of America. Valve shall be single chamber type, with stainless steel stem.
- B. Valve shall automatically reduce pressure for the downstream distribution network and sustain a minimum pressure in the high pressure main regardless of distribution demand, and as an option, shall also close when a pressure reversal occurs for check valve operations. The pilot system shall consist of two direct acting, adjustable, spring loaded diaphragm valves.
- C. Valve shall be cast iron or ductile iron with main valve trim of brass and bronze. The pilot control valves shall be cast brass with 303 stainless steel trim. Valve shall be similar in all respects to Cla-Val Company, Model 92-01 or a similar control valve such as Bermad Model 723, GA Industries Model 4700 or an approved equal.

2.03 BALL VALVES

- A. Ball valves for water and reclaimed water, in sizes 3/4-inch through 2-inch, shall be brass body, stem and ball per ASTM B 62, alloy 85-5-5-5, full port, full flow, 1/4-turn check, ball curb valves, rated for 300 psi, Mueller 300 (as specified in the table below), Ford B-Series, or approved equal, with compression, pack joint, flare, threaded or flanged ends as required. Ball valves for wastewater, 2-inch through 3-inch, shall be 316 stainless steel body, cap, stem and ball per ASTM A351, full port, full flow, 1/4-turn check, ball valves, steam rated for 150 psi, pressure rating 1,000 psi CWT, Apollo 76F or approved equal, with threaded or flanged ends as required.

Curb Stops for Water and Reclaimed Water

Pipe Material	Type of Connection	Model
HDPE	Compression x FIP	B-25170 *
HDPE	Pack Joint x FIP	P-25170 *
Copper	Compression x FIP	B-25170
Copper	Flare x FIP	B-25166
Stainless Steel	FIP x FIP Thread	B-20200
* Insert required, part number per manufacturer product information		

- B. All valves shall be mounted in such a position that valve position indicators are plainly visible. Above grade ball valves shall have a vinyl coated lever handle. Lever handle, handle nut, and lever packing gland shall be 304 or 316 stainless steel.
- C. Potable plastic service pipe material and compression and pack joint connectors shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.

2.04 BUTTERFLY VALVES

- A. Butterfly valves shall conform to AWWA C504, Class 250 B, Mueller Lineseal XP11, DeZurik AWWA, Pratt HP-250II, or an approved equal.
- B. Valve seats shall be an EPDM elastomer. Valve seats 24 inches and larger shall be field adjustable and replaceable without dismounting operator disc or shaft and without removing the valve from the line. Valves 20 inches and smaller shall have bonded or mechanically restrained seats as outlined in AWWA C504.
- C. All valves shall be subject to hydrostatic and leakage tests at the point of manufacture. The hydrostatic test for Class 250 valves shall be performed with an internal hydrostatic pressure equal to 500 psi applied to the inside of the valve body of each valve. During the hydrostatic test, there shall be no leakage through the metal, the end joints or the valve shaft seal. The leakage test for the Class 250 valves shall be performed at a differential pressure of 250 psi and against both sides of the valve. No adjustment of the valve disc shall be necessary after pressure test for normal operation of valve. All valves shall be leaktight in both directions.
- D. Butterfly valve actuators shall conform to AWWA C504. Gearing for the actuators shall be totally enclosed in a gear case. Actuators shall be capable of seating and unseating the disc against the full design pressure and shall transmit a minimum torque to the valve. Actuators shall be rigidly attached to the valve body.

- E. The valve shaft shall be constructed of 18-8, ASTM A-276, Type 304 stainless steel and designed for both torsional and shearing stresses when the valve is operated under its greatest dynamic or seating torque. Shaft shall be of either a one piece unit extending full size through the valve disc and valve bearing or it may be of a stub shaft design. Shaft bearings shall be teflon or nylon, self-lubricated type.
- F. Gearing for the operators shall be totally enclosed in a gear case in accordance with paragraph 3.8.3 of the above mentioned AWWA Standard Specification.
- G. Operators shall be capable of seating and unseating the disc against the full design pressure of velocity, as specified for each class, into a dry system downstream and shall transmit a minimum torque to the valve. Operators shall be rigidly attached to the valve body.
- H. The manufacturer shall certify that the required tests on the various materials and on the completed valves have been satisfactory and that the valves conform with all requirements of this Specification and the AWWA standard.
- I. Where indicated on the Drawings, extension stems, floor stands, couplings, stem guides, and floor boxes as required shall be furnished and installed.

2.05 PLUG VALVES

- A. Plug valves shall be eccentric, non-lubricating type with integral plug and shafts and shall be furnished with end connections and with actuating mechanisms as called for on the construction plans or as otherwise required. Valves shall seal bubble-tight or water drop-tight in both directions when tested according to the Leakage Test method of AWWA C504 with a hydrostatic pressure of 150 psi.
- B. Plug valves shall also be subjected to the internal, full body Hydrostatic Test of AWWA C504 at a pressure two times the rated pressure or a minimum pressure of 300 psi, whichever is greater. During the test, there shall be no leakage through the metal, or through the end joints or shaft seal, nor shall any part of the valve be deformed.
- C. Flanged valve ends shall be faced and drilled according to ANSI B 16.1, Class 125. Mechanical joint valve ends shall conform to AWWA C111. Threaded ends shall conform to the NPT requirements of ANSI B1.20.1.
- D. The plug valve body, bonnet and gland shall be ductile iron per ASTM A 126, Class B. The integral plug and shafts shall be cast iron ASTM A 126, Class B, or 316 stainless steel. The entire plug, except for the shafts, shall be covered with nitrile (Buna N) rubber. The rubber compound shall have been vulcanized to the metal plug and shall have a peel strength of not less than 75 pounds per inch when tested according to ASTM D 429, method B. The valve seat shall be at least 90 percent pure nickel, welded-in overlay into the cast iron body. The top and bottom bearings shall be 316 stainless steel.
- E. Plug valves shall have a full port area of 100 percent of the nominal pipe size area.

- F. Valves shall have worm gear type actuators with 2-inch square operating nuts.
- G. Plug valves shall be installed side-ways with plug shaft horizontal so that the plug rotates upward when it opens, with the flow entering the seat end of the valve.
- H. Plug valves shall be coated inside with Protecto 401 or amine-cured novolac ceramic epoxy or another two-part epoxy suitable for sanitary sewer service which has been approved by Manatee County.

2.06 VALVE ACTUATORS

- A. Butterfly valve and plug valve actuators.

Butterfly valve and plug valve actuators shall conform to the requirements for actuators presented in AWWA C 504 and shall be either manual or motor operated. Actuators shall be capable of seating and unseating the disc against the full design pressure and velocity, as specified for each class, into a dry system downstream, and shall transmit a minimum torque to the valve. Actuators shall be rigidly attached to the valve body.

- B. Manual Actuators.

Manual actuators shall have permanently lubricated, totally enclosed gearing with handwheel and gear ratio sized on the basis of actual line pressure and velocities. Actuators shall be equipped with handwheel, position indicator, and mechanical stop-limiting locking devices to prevent over travel of the disc in the open and closed positions. They shall turn counter-clockwise to open valves. Manual actuators shall be of the traveling nut, self-locking type or of the worm gear type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Valves located above grade shall have handwheel and position indicator, and valves located below grade shall be equipped with a 2-inch square AWWA operating nut located at ground level and cast iron extension type valve box.

- C. Motor Actuators (Modulating)

- (1) The motor actuated valve controller shall include the motor, actuator unit gearing, limit switch gearing, limit switches, position transmitter which shall transmit a 4-20 mA DC signal, control power transformer, electronic controller which will position the valve based on a remote 4-20 milliamp signal, torque switches, bored and key-wayed drive sleeve for non-rising stem valves, declutch lever and auxiliary handwheel as a self-contained unit.

- (2) The motor shall be specifically designed for valve actuator service using 480 volt, 60 Hertz, three phase power as shown, on the electrical drawings. The motor shall be sized to provide an output torque and shall be the totally enclosed, non-ventilated type. The power gearing shall consist of helical gears fabricated from heat treated alloy steel forming the first stage of reduction. The second reduction stage shall be a single stage worm gear. The worm shall be of alloy steel with carburized threads hardened and ground for high efficiency. The worm gear shall be of high tensile strength bronze with hobbled teeth. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout. Preference will be given to units having a minimum number of gears and moving parts. Spur gear reduction shall be provided as required.
- (3) Limit switches and gearing shall be an integral part of the valve control. The limit switch gearing shall be made of bronze and shall be grease lubricated, intermittent type and totally enclosed to prevent dirt and foreign matter from entering the gear train. Limit switches shall be of the adjustable type capable of being adjusted to trip at any point between fully opened valve and fully closed valve.
- (4) The speed of the actuator shall be the responsibility of the system supplier with regard to hydraulic requirements and response compatibility with other components within the control loop. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing. The rotor type gear limit switch shall have two normally open and two normally closed contacts per rotor. Gear limit switches must be geared to the driving mechanism and in step at all times whether in motor or manual operation. Provision shall be made for two additional rotors as described above, each to have two normally open and two normally closed contacts. Each valve controller shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve, should excessive load be met by obstructions in either direction of travel. The torque switch shall be provided with double-pole contacts.
- (5) A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operations, but must be responsive to manual operation at all times except when being electrically operated. The motor shall not rotate during hand operation nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve operator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. This movement from motor operation to handwheel operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running. The gear limit switches and torque switches shall be housed in a single easily accessible compartment integral with the power compartment

of the valve control. All wiring shall be accessible through this compartment. Stepping motor drives will not be acceptable.

- (6) The motor with its control module must be capable of continuously modulating over its entire range without interruption by heat protection devices. The system, including the operator and control module must be able to function, without override protection of any kind, down to zero dead zone.
- (7) All units shall have strip heaters in both the motor and limit switch compartments.
- (8) The actuator shall be equipped with open-stop-close push buttons, an auto-manual selector switch, and indicating lights, all mounted on the actuator or on a separate locally mounted power control station.
- (9) The electronics for the electric operator shall be protected against temporary submergence.
- (10) Actuators shall be Limitorque L120 with Modutronic Control System containing a position transmitter with a 4-20MA output signal or equal.

D. Motor Actuators (Open-Close)

- (1) The electronic motor-driven valve actuator shall include the motor, actuator gearing, limit switch gearing, limit switches, torque switches, fully machined drive sleeve, declutch lever, and auxiliary handwheel as a self-contained unit.
- (2) The motor shall be specifically designed for valve actuator service and shall be of high torque totally enclosed, nonventilated construction, with motor leads brought into the limit switch compartment without having external piping or conduit box.
- (3) The motor shall be of sufficient size to open or close the valve against maximum differential pressure when voltage to motor terminals is 10% above or below nominal voltage.
- (4) The motor shall be prelubricated and all bearings shall be of the anti-friction type.
- (5) The power gearing shall consist of helical gears fabricated from heat treated steel and worm gearing. The worm shall be carburized and hardened alloy steel with the threads ground after heat treating. The worm gear shall be of alloy bronze accurately cut with a hobbing machine. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout.
- (6) Limit switches and gearing shall be an integral part of the valve actuator. The switches shall be of the adjustable rotor type capable of being adjusted to trip at any point between fully opened valve and fully closed valve. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing (influent valves require additional contacts to allow stopping at an intermediate position). The rotor

type gear limit switch shall have two normally open and two normally closed contacts per rotor. Additional switches shall be provided if shown on the control and/or instrumentation diagrams. Limit switches shall be geared to the driving mechanism and in step at all times whether in motor or manual operation. Each valve actuator shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve should excessive load be met by obstructions in either direction of travel. Travel and thrusts shall be independent of wear in valve disc or seat rings.

- (7) A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operation except when being electrically operated. The motor shall not rotate during hand operation, nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve actuator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. Movement from motor operation to handwheel operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running.
- (8) Valve actuators shall be equipped with an integral reversing controller and three phase overload relays, Open-Stop-Close push buttons, local-remote-manual selector switch, control circuit transformer, three-phase thermal overload relays and two pilot lights in a NEMA 4X enclosure. In addition to the above, a close coupled air circuit breaker or disconnect switch shall be mounted and wired to the valve input power terminals for the purpose of disconnecting all underground phase conductors.
- (9) The valve actuator shall be capable of being controlled locally or remotely via a selector switch integral with the actuator. In addition, an auxiliary dry contact shall be provided for remote position feedback.
- (10) Valve A.C. motors shall be designed for operation on a 480 volt, 3-phase service. Valve control circuit shall operate from a fuse protected 120-volt power supply.
- (11) Motor operators shall be as manufactured by Limitorque Corporation, Type L120 or approved equal.

2.07

AIR RELEASE VALVES

- A. Air release valves shall be automatic float operated, GA Industries fig-929 for sewer applications, Fig-920 for water and reclaimed water application, or an approved equal, with inlet size and working pressure ratings as required and NPT connections.

- B. Valve bodies shall be ductile iron per ASTM A 126, Class B. The orifice, float and linkage shall be stainless steel. The seat shall be (Buna N) nitrile elastomer.

2.08 VALVE BOXES

- A. Buried valves shall have adjustable cast iron or HDPE valve boxes. Lids shall be cast iron drop type, and shall have "WATER", "SEWER", or "RECLAIM", as applicable, cast into the top. Lids will be painted "safety" blue for potable, purple for reclaimed, and green for sanitary sewer.
- B. Cast iron boxes shall be two-piece, or three-piece, as required, screw type, Tyler Pipe, 6850 Series, Box 461-S through 668-S, with extensions, as required to make the desired box length, or an approved equal. Bottom barrel shall be 5-1/4 inches inside diameter, with a flanged bottom with sufficient bearing area to prevent settling.
- C. HDPE boxes shall be two-piece, adjustable, 1/4-inch thick minimum heavy wall, high density polyethylene, with cast iron top and stainless steel adjustable stem, Trench Adapter, as manufactured by American Flow Control, or an approved equal. Bottom barrel shall have flanged bottom to prevent settling. All bolts, screws and pins shall be stainless steel.
- D. Reclaimed Valve Boxes shall be square 9-inch x 9-inch load bearing marked "Reclaimed Water" and painted Pantone 522C purple.
- E. All valves shall either have operating nuts within 4 feet below the top of the lid or shall have extension stems with centering guides to provide an extended operating nut within 4 feet below the lid. Extension stems shall be fixed to the valve operating nut with a stainless steel fastener.
- F. All potable water, sewer, and reclaimed water grade-adjustment risers shall be cast iron material just like the valve box. No plastic or steel risers shall be allowed.
- G. A centering device BoxLok or equal shall be installed in the valve box.
- H. Stand pipe shall match color code of the system being installed, (blue for potable, Pantone purple 522 C for reclaimed, and green for sanitary sewer).

2.09 CORPORATION STOPS AND SADDLES

- A. Corporation stops for connections to ductile iron and PVC water and reclaimed water mains shall be all red brass, alloy 85-5-5-5, per ASTM B 62, and shall conform to AWWA C800. 1-inch through 2-inch corporation stops shall be ball type, 300 psi working pressure rated, with AWWA MIP threaded inlets and compression, pack joint, flare, or FIP threaded joint outlets, Mueller as shown in the table below, or an approved equal. All joints made to CTS size HDPE tubing shall use stainless steel insert stiffeners.

Corporation Stops

Pipe Material	Type of Connection	Mueller 300 Model
HDPE	Compression x AWWA IP Thread	B-25028 (Saddle) *
HDPE	Compression x AWWA Taper Thread	B-25008 (Direct Tap) *
HDPE	Pack Joint x AWWA IP Thread	P-25028 (Saddle) *
HDPE	Pack Joint x AWWA Taper Thread	P-25008 (Direct Tap) *
Copper	Compression x AWWA IP Thread	B-25028 (Saddle)
Copper	Pack Joint x AWWA Taper Thread	B-25008 (Direct Tap)
Copper	Pack Joint x AWWA IP Thread	P-25028 (Saddle)
Copper	Pack Joint x AWWA Taper Thread	P-25008 (Direct Tap)
Copper	Flare x AWWA IP Thread	B-25028 (Saddle)
Copper	Flare x AWWA Taper Thread	B-25008 (Direct Tap)
Stainless Steel	FIP Thread x AWWA IP Thread	B-20046 (Saddle)
Stainless Steel	FIP Thread x AWWA Taper Thread	B-20045 (Direct Tap)
* Insert required, part number per manufacturer product information		

- B. Potable plastic service pipe material and compression and pack joint connectors shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.
- C. Water and reclaimed water service connections to PVC and DIP mains shall be made using red brass saddles, alloy 85-5-5-5, per ASTM B 62. Straps, washers and nuts shall be brass or stainless steel. No ductile iron, cast iron or steel saddles will be allowed. Saddles shall be Smith Blair 325 Bronze saddles with Stainless Steel or brass extra wide strap or equivalent.
- D. Connections to PVC and DIP sanitary force mains for services up to 12 inches shall be made using Romac Style 306 double bolt stainless steel service saddles. For connections larger than 12 includes connections shall be made using Romac Style 305 double bolt stainless steel service saddles.
- E. Service and air release valve (ARV) connections to HDPE water, reclaimed water and sewer mains may be made using Romac Style 306H saddle or approved equal. All saddles shall be properly sized per the manufacturer product information and be installed according to the manufacturer's written instructions. Connections to HDPE mains shall not be made using narrower saddles similar to the Smith-Blair 325.

2.10

FLANGED ADAPTERS AND PLAIN END COUPLINGS

Plain end couplings and adapters shall be fusion-bonded epoxy coated carbon steel with Ethylene Propylene Diene Monomer (EPDM) rubber gaskets and stainless steel nuts, bolts and spacers. Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non- chlorinated organic solvents or non-aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used for potable water mains if the soil is contaminated with aromatic

hydrocarbons or chlorinated hydrocarbons, and is also contaminated with low molecular-weight petroleum products or organic solvents. Couplings shall be Dresser Style 38, or another approved equal. Flange adapters shall have a plain end compression seal similar to the style 38, with an ANSI 125 Class flange on the opposite end, and shall be Dresser Style 128W or an approved equal. Stainless steel backup rings shall be used for force mains that are located in corrosive environments including wetwells and valve vaults.

2.11 HOSE BIBS

Hose bibs shall be 3/4" or 1" brass, polished chromium plated brass, with vacuum breaker as noted on the drawings.

2.12 SWING CHECK VALVES

- A. Check valves shall be swing type, weighted lever, conforming to AWWA C508. Valves shall be iron-body, bronze-mounted, single disk, 175 psi working pressure for 2- through 12-inch, 150 psi for 14- through 30-inch, with ANSI B16.1 Class 125 flanged ends, by Mueller; No. A-2600-6-01 (sewer), No. A-2602-6-01 (water), or AVK Series 41, or an approved equal.
- B. When there is no flow through the line, the disc shall hang lightly against its seat in practically a vertical position. When open, the disc shall swing clear of the waterway.
- C. Check valves shall have bronze seat and body rings, extended bronze or stainless steel hinge pins and stainless steel nuts and bolts on bolted covers.
- D. Valves shall be so constructed that disc and body seat may easily be removed and replaced without removing the valve from the line. Valves shall be fitted with an extended hinge arm with outside lever and weight.

2.13 HYDRANTS

Hydrants shall be dry barrel, nostalgic style, and shall be AVK Series 2780, American Darling B-84-B, Mueller Super Centurian 250, or approved equal and shall conform to AWWA C502 and UL/FM certified, and shall in addition meet the specific requirements and exceptions which follow:

- A. Hydrants shall be according to manufacturer's standard pattern or nostalgic style and of standard size, and shall have one 5-inch Storz connection or equivalent with two 2½- inch hose nozzles.
- B. Hydrant inlet connections shall have mechanical joints for 6-inch pipe.
- C. Hydrant valve opening shall have an area at least equal to that area of a 5 1/4-inch minimum diameter circle and be obstructed only by the valve rod. Each hydrant shall be able to deliver 500 gpm minimum through its two 2 1/2 -inch hose nozzles when opened together with a loss of not more than 2 psi in the hydrant per AWWA C502.

- D. The upper and lower stem rod shall be stainless steel and shall have a breakable stem-rod coupling of stainless steel, or cast iron or ductile iron with a fusion bonded epoxy coating, with stainless steel pins and clips.
- E. Hydrants shall be hydrostatically tested as specified in AWWA C502 and shall be rated at 250 psi minimum.
- F. The operating nut shall be 1½ -inch pentagon shaped with a protective weather cover, and open counter clockwise.
- G. All nozzle threads shall be American National Standard.
- H. Each nozzle cap shall be provided with a Buna N rubber washer.
- I. All hydrants shall be traffic break away type and allow for 360-degree rotation to position the Storz connection/nozzle in the desired direction after installation.
- J. Hydrants must be capable of being extended without removing any operating parts.
- K. Hydrant extensions shall be fusion bonded epoxy coated inside and outside with a stainless-steel stem. The breakaway coupling can be fusion bonded epoxy coated or stainless steel. Only one hydrant extension is allowed per hydrant.
- L. Weepholes shall be excluded from fire hydrants.
- M. Hydrant main valve closure shall be of the compression type opening against the pressure and closing with the pressure. The main valve shall be faced or covered with EPDM elastomer, which shall seat on a bronze ring.
- N. Hydrant bonnets, weather cover, nozzle section, caps and shoe shall be cast iron or ductile iron, and shall be holiday free fusion-bonded epoxy coated at the factory, per AWWA C550, inside and outside. Lower barrel shall be fusion bonded epoxy coated inside and outside. Aboveground parts shall also have a top coat of Sherwin-Williams Acrolon 218 HS acrylic polyurethane or approved equal; color Safety Yellow for fire hydrants that are connected to the potable water system or Pantone 522C purple for fire hydrants that are connected to the reclaimed water system.
- O. Exterior nuts, bolts and washers shall be stainless steel. Bronze nuts may be used below grade.
- P. All internal operating parts shall be removable without requiring excavation.

2.14

RESTRAINED JOINTS

- A. Pipe joints shall be restrained by poured-in-place concrete thrust blocks or by other mechanical methods, including tie rods, Stargrip and Allgrip, as

manufactured by Star Pipe Products or Megaflange and 2000 PV, as manufactured by EBAA Iron Sales. Flanged joints may be used above ground.

- B. All T-bolts, bolts, nuts, washers, and all thread rods shall be stainless steel. The use of rebar with welded thread is prohibited. Cor-Ten hardware shall be accepted only when approved by Owner/Engineer prior to bidding.

A certification from the supplier shall be provided to the County during the shop drawing review process ensuring all T-bolts, bolts, nuts, washers, and all thread rods meet the A-588 requirements and shall state the project name and contractor in the certification letter. If stainless steel is to be used, no certification letter is required.

- C. Restrained joints may also be Lok-Ring, as manufactured by American Cast Iron Pipe Company, or an approved equal.
- D. Restrained joint designs, which require wedges and/or shims to be driven into the joints in order to disassemble the pipe shall not be allowed.

2.15

TAPPING SLEEVES AND VALVES

- A. Tapping valves shall meet the requirements of AWWA C509/C515 with ductile iron body and shall be rated for a pressure of 250 psi. The valves shall be flanged with alignment ring by mechanical joint with a nonrising stainless steel stem. All bolts, nuts and washers shall be stainless steel. Manufacturer shall use Never-Seez or equivalent during assembly of bolt and nut sets to prevent galling of similar metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the valve's thrust collar. Valve shall be designed for vertical burial and shall open counterclockwise. Operating nut shall be AWWA standard 2-inch square for valves 2 inches and up. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve to accommodate full size shell cutter. Gaskets shall cover the entire area of the flange surface and be 1/8-inch minimal thickness of red rubber. The wedge shall be ductile iron fully encapsulated with EPDM rubber. All bolts, nuts and washers between the sleeve and valve shall be stainless steel.
- B. Tapping sleeves and saddles shall seal to the pipe by the use of a confined "O" ring gasket, and shall be able to withstand a pressure test of 180 psi for water lines or 150 psi for sewer force mains for one hour with no leakage in accordance with AWWA C110. A stainless steel 3/4-inch NPT test plug shall be provided for pressure testing. All bolts joining the two halves shall be stainless steel and shall be included with the sleeve or saddle. Sleeves and saddles shall be fusion applied epoxy coated (potable water only) or be made of 18-8 Type 304 stainless steel. Saddle straps shall be 18-8 Type 304 stainless steel.

2.16

TRACER WIRE TEST STATION BOXES

Tracer wire test station boxes shall be provided at plug valves, butterfly valves, blowoff valves, gate valves, fire hydrants and backflow preventers as indicated in these Standards. Tracer wire test station boxes for yard service shall be 2 ½ inch diameter, 15-inch length, ABS plastic with a cast iron rim and lid, P200NFGT as manufactured by Bingham & Taylor, or equal approved by Manatee County. Where test boxes will be in streets or subject to vehicular traffic, use B&T Model P525RD, 5 ¼ -inch diameter or equal, centered in a separate concrete pad similar to a valve box pad.

PART 3

EXECUTION

3.01

INSTALLATION

- A. All valves and appurtenances shall be installed in the location shown, true to alignment and rigidly supported. Any damage occurring to the above items before they are installed shall be repaired to the satisfaction of the County.
- B. After installation, all valves and appurtenances shall be tested at least two hours at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the County.
- C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.
- D. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections.
- E. Flanged joints and mechanical joints shall be made with 316 stainless steel bolts, nuts and washers. High strength, low alloy Cor-Ten will be accepted only when approved by the Owner/Engineer prior to bidding.
- F. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- G. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8". Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance

of about 6" from the end.

- H. Valve boxes with concrete bases shall be installed as shown on the Drawings. Mechanical joints shall be made in the standard manner. Valve stems shall be vertical in all cases. Place cast iron box over each stem with base bearing on compacted fill and the top flush with final grade. Boxes shall have sufficient bracing to maintain alignment during backfilling. Knobs on cover shall be parallel to pipe. Remove any sand or undesirable fill from valve box.

3.02 HYDRANTS

- A. Hydrants shall be set at the locations designated by the County and/or as shown on the Drawings and shall be bedded on a firm foundation. A drainage pit on crushed stone as shown on the Drawings shall be filled with gravel or crushed stone and satisfactorily compacted. During backfilling, additional gravel or crushed stone shall be brought up around and 6" over the drain port. Each hydrant shall be set in true vertical alignment and shall be properly braced. Concrete thrust blocks shall be placed between the back of the hydrant inlet and undisturbed soil at the end of the trench. Minimum bearing area shall be as shown on the plans. Felt paper shall be placed around the hydrant elbow prior to placing concrete. CARE MUST BE TAKEN TO ENSURE THAT CONCRETE DOES NOT PLUG THE DRAIN PORTS. Concrete used for backing shall be as specified herein.
- B. When installations are made under pressure, the flow of water through the existing main shall be maintained at all times. The diameter of the tap shall be a minimum of 2" less than the inside diameter of the branch line.
- C. The entire operation shall be conducted by workmen thoroughly experienced in the installation of tapping sleeves and valves, and under the supervision of qualified personnel furnished by the manufacturer. The tapping machine shall be furnished by the Contractor if tap is larger than 12" in diameter.
- D. The Contractor shall determine the locations of the existing main to be tapped to confirm the fact that the proposed position for the tapping sleeve will be satisfactory and no interference will be encountered such as the occurrence of existing utilities or of a joint or fitting at the location proposed for the connection. No tap will be made closer than 30" from a pipe joint.
- E. Tapping valves shall be set in vertical position and be supplied with a 2" square operating nut for valves 2" and larger. The valve shall be provided with an oversized seat to permit the use of full sized cutters.
- F. Tapping sleeves and valves with boxes shall be set vertically or horizontally as indicated on the Drawings and shall be squarely centered on the main to be tapped. Adequate support shall be provided under the sleeve and valve during the tapping operation. Sleeves shall be no closer than 30" from water main joints. Thrust blocks shall be provided behind all tapping sleeves. Proper tamping of supporting earth around and under the valve and sleeve is mandatory. After completing the tap, the valve shall be flushed to ensure that the valve seat is clean.

3.03 SHOP PAINTING

Ferrous surfaces of valves and appurtenances shall receive a coating of rust-inhibitive primer. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

3.04 FIELD PAINTING

All metal valves and appurtenances specified herein and exposed to view shall be painted safety blue.

3.05 INSPECTION AND TESTING

All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak testing. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.7. Prior to testing, the pipe lines shall be supported in a manner approved by the County to prevent movement during tests.

All leaks shall be repaired and lines retested as approved by the County.

END OF SECTION

SECTION 02720

SANITARY SEWER BYPASS PUMPING

PART 1 GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment and incidentals required to maintain existing and anticipated flows within the affected portion of the collection system throughout the construction period.

1.02 PUBLIC IMPACTS

The contractor shall not create a public nuisance due to excessive noise or dust, nor impact the public with flooding of adjacent lands, discharge of raw sewage, or release of other potential hazards, nor shall he encroach on or limit access to adjacent lands. No extra charge may be made for increased costs to the contractor due to any of the above.

1.03 SUBMITTALS

- A. The Contractor shall, within 30 days of the date of the Notice to Proceed, submit to the Project Manager a detailed Pumping Plan for each site by-pass pumping will be needed. The Pumping Plan shall address all measures and systems to prevent a sanitary sewer overflow (SSO) as defined by the EPA. The Plan shall include as a minimum:
1. Working drawings and sketches showing work location, pump location, piping layout & routing. Show all proposed encroachment and access impacts on adjacent properties or facilities.
 2. Pump, control, alarm and pipe specifications or catalog cuts. Detailed sketch of controls and alarm system.
 3. Power requirements and details on methods to provide by-pass power or fueling.
 4. Calculation and determination of response times to prevent an SSO after a high-water alarm. If anticipated peak flows are 750 G.P.M. or greater, an operator is required on site at all times pump is in service. If the anticipated peak flows are less than 750 G.P.M. an operator may not be required to be on site at all times; show operator on-site schedule.
 5. Procedures to be taken in case of power, pump, or piping failures; including contact names and numbers for emergency notifications.
 6. Frequency and specific responsibility for monitoring pump operation, fuel levels, pump maintenance and entire length of piping.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Pumps:

1. By-pass pumping system shall consist of at least a primary pump and a backup pump. Each pump shall have a minimum pumping capacity of 150% of the anticipated peak flows. When bypassing a pump station, 150% of the lift station capacity (G.P.M. & T.D.H) shall be provided.
2. Pumps shall be low noise or sound attenuated. The noise level at any operating condition, in any direction, shall not exceed 70dBA at a distance of twenty-three (23) feet (7 meters) from the pump and/or power source.

B. Controls:

The by-pass pump system shall be equipped with automatic controls and an alarm system. The automatic controls will automatically start the backup pump in the event of a high-water condition or failure of the primary pump. The alarm system will immediately notify the Contractor of a pump failure or high water condition.

C. Pipe:

Pipe shall be of adequate size and capacity to match the pumps. Pipe type and materials will depend on the particulars of the site conditions, and shall be detailed in the Pumping Plan. Contractor will provide all connections.

PART 3 EXECUTION

3.01 SITE CONDITIONS

Site conditions will vary by site. Contractor is responsible to determine and address requirements such as traffic control, excavation, connections & fittings, impacts on access to adjacent properties, routing and support of by-pass piping, etc., in the Pumping Plan.

3.02 ON-SITE MONITORING

- A. All by-pass operations where the anticipated flow rates are 750 G.P.M or greater shall require an employee on-site at all times (full-time on-site monitoring attended by personnel experienced with the pumps and controls, with demonstrated ability to monitor, turn on & off, and switch between pumps while the by-pass pump system is in service.
- B. By-pass operations where the anticipated flow rates are less than 750 G.P.M may not require an employee on-site at all times while the by-pass pump system is in operation. The Contractor shall have personnel experienced with the pumps and controls on site within the calculated response time to prevent an SSO after a high-water alarm.

- C. During by-pass operations, the Contractor shall have posted on site with the permit, a copy of the approved Plan and the name and 24-hour contact number of the primary response person, the job site superintendent, and the construction company owner.

3.03 OPERATIONS

- A. The Contractor is responsible for securing and providing power, fuel, site security, traffic control and all other supplies, materials and permits required for the by-pass pumping.
- B. Contractor shall demonstrate automatic pump switching and alarm system to the satisfaction of: the County inspector, Project Manager, or Lift Stations Superintendent prior to beginning by-pass pumping. Satisfactory demonstration shall be documented by the inspector's, PM's or Lift Station Superintendent's dated signature on the posted copy of the approved Pumping Plan.

3.04 DAMAGE RESTORATION & REMEDIATION

- A. The Contractor shall be responsible for any pre-pump notifications, all restoration of pre-pump conditions and any damage caused by by-pass operations.
- B. Should there be an SSO caused by or as a direct result of the by-pass pumping, the contractor is responsible for all immediate & long term response, notifications, clean up, mitigation, etc. Copies of all written response plans, notifications, documentation, mitigation plans, etc., shall be submitted to the County Project Manager.

END OF SECTION

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SECTION 02999

MISCELLANEOUS WORK AND CLEANUP

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section includes items and operations which are not specified in detail as separate items, but may be sufficiently described as to the kind and extent of work involved. The Contractor shall furnish all labor, materials, equipment and incidentals necessary to complete all work under this Section.
- B. The work of this Section may include, but is not limited to the following:
 - 1. Restoration of roads, sidewalks, driveways, curbing and gutters, fences, guardrails, lawns, shrubbery and any other existing items damaged or destroyed.
 - 2. Crossing utilities.
 - 3. Relocation of existing water, reclaim water, or sewer lines less than four inches diameter, water and sanitary sewer services, low pressure gas lines, telephone lines, electric lines, cable TV lines as shown on the Contract Drawings.
 - 4. Restoring easements (servitudes) and rights-of-way.
 - 5. Clean up.
 - 6. Incidental work (project photographs, testing, shop drawings, traffic control, record drawings, etc.).
 - 7. Excavation and Embankment - As defined in the Florida Department of Transportation Standard Specifications for Road and Bridge Construction (1991 Edition or latest revision).
 - 8. Stormwater and erosion control devices.

1.02 SUBMITTAL OF LUMP SUM BREAKDOWN

Contractor shall submit to the County, a breakdown of the lump sum bid for Miscellaneous Work and Cleanup Item in the Proposal within 10 days after date of Notice to Proceed.

1.03 WORK SPECIFIED UNDER OTHER SECTIONS

All work shall be completed in a workmanlike manner by competent workmen in full compliance with all applicable sections of the Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS

Materials required for this Section shall equal or exceed materials that are to be restored. The Contractor may remove and replace or reuse existing materials with the exception of paving.

PART 3 EXECUTION

3.01 RESTORING OF SIDEWALKS, ROADS, CURBING, FENCES AND GUARDRAILS

- A. The Contractor shall protect existing sidewalks & curbing. If necessary, sidewalks & curbing shall be removed from joint to joint and replaced after backfilling. Curbing damaged during construction because of the Contractor's negligence or convenience, shall be replaced with sidewalks & curbing of equal quality and dimension at no cost to the County.
- B. At the locations necessary for the Contractor to remove, store and replace existing fences and guardrails during construction, the sections removed shall be only at the direction of the County. If any section of fence is damaged due to the Contractor's negligence, it shall be replaced at no cost to the County with fencing equal to or better than that damaged and the work shall be satisfactory to the County.
- C. Guardrails in the vicinity of the work shall be protected from damage by the Contractor. Damaged guardrails shall be replaced in a condition equal to those existing
- D. Road crossings shall be restored in accordance with the Contract Documents and current FDOT Standards. Compensation for road restoration shall be included under the Road Restoration Bid Item if specified or under Miscellaneous Cleanup if it is not specified.

3.02 CROSSING UTILITIES

This item shall include any extra work required in crossing culverts, water courses, drains, water mains and other utilities, including all sheeting and bracing, extra excavation and backfill, or any other work required or implied for the proposed crossing, whether or not shown on the Drawings.

3.03 RELOCATIONS OF EXISTING GAS LINES, TELEPHONE LINES, ELECTRIC LINES AND CABLE TV LINES

The Contractor shall notify the proper utility involved when relocation of these utility lines is required. The Contractor shall coordinate all relocation work by the utility so that construction shall not be hindered.

3.04 RESTORING THE EASEMENTS AND RIGHTS-OF-WAY

The Contractor shall be responsible for all damage to private property due to his operations. He shall protect from injury all walls, fences, cultivated shrubbery, pavement, underground facilities, including water, sewer and reclaimed water lines and services, or other utilities which may be encountered along the easement. If removal and replacement is required, it shall be done in a workmanlike manner, at his expense, so that the replacement are equivalent to that which existed prior to construction.

3.05**STORMWATER AND EROSION CONTROL DEVICES**

The Contractor shall be responsible for, provide, and install all stormwater and erosion control devices necessary to insure satisfactory compliance with the Florida Department of Environmental Protection Stormwater, Erosion, and Sedimentation Control Inspector's Manual.

END OF SECTION

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED

Poured-in-place concrete slabs, thrust blocks, pile caps and pipe support cradles.

1.02 QUALITY ASSURANCE

Perform cast-in-place concrete work in accordance with ACI 318, unless specified otherwise in this Section.

1.03 TESTING LABORATORY SERVICES

- A. Inspection and testing will be performed by the testing laboratory currently under contract to Manatee County in accordance with the Contract Documents.
- B. Provide free access to work and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of work.
- D. Tests of cement and aggregates may be performed to ensure conformance with requirements stated herein.
- E. Three concrete test cylinders will be taken for every 100 cu. yds. or part thereof of each class of concrete placed each day. Smaller pours shall have cylinders taken as directed by the County.
- F. One slump test will be taken for each set of test cylinders taken.

1.04 REFERENCES

- A. ASTM C33 - Concrete Aggregates
- B. ASTM C150 - Portland Cement
- C. ACI 318 - Building Code Requirements for Reinforced Concrete
- D. ASTM C260 - Air Entraining Admixtures for Concrete
- E. ASTM C94 - Ready-Mixed Concrete
- F. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete

- G. ACI 305 - Recommended Practice for Hot Weather Concreting

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: Moderate-Type II, High early strength-Type III, Portland type, ASTM C150.
- B. Fine and Coarse Aggregates: ASTM C33.
- C. Water: Clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious material.

2.02 ADMIXTURES

- A. Air Entrainment: ASTM C260.
- B. Chemical: ASTM C494 Type A - water reducing admixture.

2.03 ACCEPTABLE MANUFACTURERS

Acceptable Products:

1. Pozzolith
2. WRDA

2.04 ACCESSORIES

Non-shrink grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2400 psi in 2 days and 7000 psi in 28 days.

2.05 CONCRETE MIXES

- A. Mix concrete in accordance with ASTM C94.
- B. Provide concrete of following strength:
 1. Required concrete strengths as determined by 28 day cylinders shall be as shown on the Drawings, but shall not be less than 3000 psi.
 2. Select proportions for normal weight concrete in accordance with ACI 301 3.8 Method 1, Method 2, or Method 3. Add air entraining agent to concrete to entrain air as indicated in ACI 301 Table 3.4.1.
 3. All mixes shall be in accordance with FDOT Specifications.
- C. Use set-retarding admixtures during hot weather only when accepted by County.
- D. Add air entraining agent to concrete mix for concrete work exposed to exterior.

2.06

FORMS

- A. Forms shall be used for all concrete masonry, including footings. Form shall be so constructed and placed that the resulting concrete will be of the shape, lines, dimensions, appearance and to the elevations indicated on the Drawings.
- B. Forms shall be made of wood, metal, or other approved material. Wood forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots; where used for expose surfaces, boards shall be dressed and matched. Plywood shall be sanded smooth and fitted with tight joints between panels. Metal forms shall be of an approved type for the class of work involved and of the thickness and design required for rigid construction.
- C. Edges of all form panels in contact with concrete shall be flush within 1/32-inch and forms for plane surfaces shall be such that the concrete will be plane within 1/16-inch in four feet. Forms shall be tight to prevent the passage of mortar and water and grout.
- D. Forms for walls shall have removable panels at the bottom for cleaning, inspection and scrubbing-in of bonding paste. Forms for walls of considerable height shall be arranged with tremies and hoppers for placing concrete in a manner that will prevent segregation and accumulation of hardened concrete on the forms or reinforcement above the fresh concrete.
- E. Molding or bevels shall be placed to produce a 3/4-inch chamfer on all exposed projecting corners, unless otherwise shown on the Drawings. Similar chamfer strips shall be provided at horizontal and vertical extremities of all wall placements to produce "clean" separation between successive placements as called for on the Plans.
- F. Forms shall be sufficiently rigid to withstand vibration, to prevent displacement or sagging between supports and constructed so the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy.
- G. Forms, including new pre-oiled forms, shall be oiled before reinforcement is placed, with an approved nonstaining oil or liquid form coating having a non-paraffin base.
- H. Before form material is re-used, all surfaces in contact with concrete shall be thoroughly cleaned, all damaged places repaired, all projecting nails withdrawn, all protrusions smoothed and in the case of wood forms pre-oiled.
- I. Form ties encased in concrete shall be designed so that after removal of the projecting part, no metal shall be within 1-inch of the face of the concrete. That part of the tie to be removed shall be at least 1/2-inch diameter or be provided with a wood or metal cone at least 1/2-inch in diameter and 1-inch long. Form ties in concrete exposed to view shall be the cone-washer type equal to the Richmond "Tyscru". Throughbolts or common wire shall not be used for form ties.

PART 3 EXECUTION

3.01 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304.
- B. Notify County minimum 24 hours prior to commencement of concreting operations.
- C. Verify anchors, seats, plates and other items to be cast into concrete are placed, held securely and will not cause hardship in placing concrete. Rectify same and proceed with work.
- D. Maintain records of poured concrete items. Record date, location of pour, quantity, air temperature and test samples taken.
- E. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- F. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's recommendations.
- G. Pour concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur.
- H. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solidly with non-shrink grout.
- I. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify County upon discovery.
- J. Conform to ACI 305 when concreting during hot weather.

3.02 SCREEDING

Screed surfaces level, maintaining flatness within a maximum deviation of 1/8" in 10 feet.

3.03 PATCHING

Allow County to inspect concrete surfaces immediately upon removal of forms. Patch imperfections as directed. All patching procedures shall be submitted to and approved by the County prior to use.

3.04 DEFECTIVE CONCRETE

- A. Modify or replace concrete not conforming to required lines, details and elevations.
- B. Repair or replace concrete not properly placed resulting in excessive honeycomb and other defects. Do not patch, fill, touch-up, repair, or replace exposed architectural concrete except upon express direction of County for each individual area.

3.05 CONCRETE FINISHING

Provide concrete surfaces to be left exposed, columns, beams and joists with smooth rubbed finish.

3.06 CURING AND PROTECTION

Beginning immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury. Maintain concrete with minimal moisture loss at relatively constant temperature for a period of 7 days or until concrete strengths reaches 75% of the 28 day design strength.

Protection against moisture loss may be obtained with spray on curing compounds or plastic sheets. Protection against heat or cold may be obtained with insulated curing blankets or forms.

3.07 CONCRETE DRIVEWAY RESTORATION

Concrete driveways shall be restored with 6 inches of 3,000 psi concrete with W2.5 X W2.5, 6X6 wire mesh. Place ½ inch expansion joint between back of curb and new concrete. Area beneath restoration shall be mechanically tamped prior to placing concrete.

3.08 CONCRETE SIDEWALK RESTORATION

Concrete sidewalks across driveways shall be restored with 6 inches of 3,000 psi concrete with W2.5 X W2.5, 6X6 wire mesh. Place ½ inch expansion joint between back of curb and new concrete. Area beneath restoration shall be mechanically tamped prior to placing concrete.

Concrete sidewalks outside of driveways shall be restored with 4 inches of 3,000 psi concrete per FDOT Design Standards, Sections 522 & 310

END OF SECTION

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SECTION 05550 AIR RELEASE ENCLOSURE

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to install the above ground air release enclosure as listed in the specifications and as shown on the Drawings.

1.02 RELATED WORK

The contractor shall be responsible for any related work necessary for the proper installation of enclosure. This shall include, but is not limited to, any required bypass pumping, any required earthwork and any required concrete work.

1.03 SUBMITTALS

- A. Submit to the County shop drawings and schedules of all enclosure systems and appurtenances required. Submit design data and specification data sheets listing all parameters used in the enclosure system design.
- B. Submit to the County the name of the enclosure supplier and a list of materials to be furnished.

1.04 REFERENCE STANDARDS

- A. American Water Works Association (AWWA).
- B. American Society for Testing and Materials (ASTM).
- C. Where reference is made to the above standard, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

The enclosure manufacturer shall be a company specializing in the manufacture of such enclosures with at least five (5) years of successful field experience and being lab certified as meeting A.S.S.E 1060 requirements.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in shipping, handling and placing to avoid damaging. Any material damaged in shipment shall be replaced as directed by the County.

- B. Any material showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

PART 2 PRODUCTS

2.01 GENERAL

All enclosures shall comply with the standard detail for shape and size and shall include a 22" square by 24" tall enclosure with a hasp for a padlock. The enclosure shall be securely attached to a concrete base with anchor brackets installed on the interior of the enclosure, through the flange base of the enclosure itself or through a stainless steel anchor hinge.

2.02 ALUMINUM ENCLOSURE

- A. The roof, walls and access panels shall be constructed of mill finish aluminum, ASTM B209, solid sheet construction, with a wall thickness of one eighth inch.
- B. All structural members shall be aluminum. No wood or "particle board" shall be allowed in assembly.
- C. Multi-sectional enclosures shall fit together with overlapping "tongue and groove" joints and be secured internally with mechanical fasteners.
- D. All assembly fasteners shall be stainless steel or aluminum.

2.03 STAINLESS STEEL ENCLOSURE

- A. The roof, walls and access panels shall be constructed stainless steel, type 316, solid sheet construction, with a wall thickness of one eighth inch.
- B. All structural members shall be stainless steel. No wood or "particle board" shall be allowed in assembly.
- C. Multi-sectional enclosures shall fit together with overlapping "tongue and groove" joints and be secured internally with mechanical fasteners.
- C. All assembly fasteners shall be stainless steel.

2.04 FIBERGLASS ENCLOSURE

- A. Enclosure shall be a one-piece molded fiberglass/resin enclosure with polyester coating; a base flange for mounting to the concrete slab and a full recessed door opening with a lip. Enclosure shall be by Allied Molded Products, or equivalent. Color shall be as directed by the County.
- B. Full length piano style hinge, door latch, padlock hasp and all bolts and other hardware shall be of stainless steel.

PART 3 EXECUTION

3.01 INSTALLATION

Enclosure shall be assembled and mounted plumb, level and square on the concrete pad according to the manufacturer's instructions and the contract drawings.

END OF SECTION

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SECTION 09865

SURFACE PREPARATION AND SHOP PRIME PAINTING

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required for the surface preparation and application of shop primers on ferrous metals, excluding stainless steels, as specified herein.

1.02 SUBMITTALS

- A. Submit to the County for approval, as provided in the Contract Drawings for shop drawings, manufacturer's specifications and data on the proposed primers and detailed surface preparation, application procedures and dry mil thickness.
- B. Submit representative physical samples of the proposed primers, if required by the County.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Submerged Services: Shop primer for ferrous metals which will be subject to splash action or which are specified to be considered submerged service shall be sprayed with one coat of Koppers 654 epoxy Primer or Koppers Inertol Primer 621-FDA, dry film thickness 3.5 to 4.5 mils by Koppers Co., Inc., or equal.
- B. Nonsubmerged Services: Shop primer for ferrous metals other than those covered by paragraph 2.01 A shall be sprayed with one coat of Koppers Pug Primer, dry film thickness 3.0 to 4.0 mils by Koppers Co., Inc. or equal.
- C. Nonprimed Surfaces: Gears, bearing surfaces, and other similar surfaces obviously not to be painted shall be given a heavy shop coat of grease or other suitable rust-resistant coating. This coating shall be maintained as necessary to prevent corrosion during all periods of storage and erection and shall be satisfactory to the County up to the time of the final acceptance.
- D. Compatibility of Coating Systems: Shop priming shall be done with primers that are guaranteed by the manufacturer to be compatible with their corresponding primers and finish coats specified in the Contract Documents for use in the field and which are recommended for use together.

PART 3 EXECUTION

3.01 APPLICATION

A. Surface Preparation and Priming:

1. Non submerged components scheduled for priming, as defined above, shall be sandblasted clean in accordance with SSPC-SP-6, Commercial Grade, immediately prior to priming. Submerged components scheduled for priming, as defined above, shall be sandblasted clean in accordance with SSPC-SP-10. Near White, immediately prior to priming.
2. Surfaces shall be dry and free of dust, oil, grease, dirt, rust, loose mill scale and other foreign material before priming.
3. Shop prime in accordance with approved paint manufacturer's recommendations.
4. Priming shall follow sandblasting before any evidence of corrosion has occurred and within 24 hours.

END OF SECTION

SECTION 09900

PAINTING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, tools, materials, equipment, scaffolding or other structures and incidentals necessary to complete this Contract in its entirety.
- B. The work includes painting and finishing of all new interior and exterior exposed items above and below grade and surfaces, such as structural steel, miscellaneous metals, ceilings, walls, floors, doors, frames, transoms, roof fans, construction signs, guardrails, posts, fittings, valves, tanks, equipment and all other work obviously required to be painted unless otherwise specified herein or on the Drawings. The omission of minor items in the Schedule of Work shall not relieve the Contractor of his obligation to include such items where they come within the general intent of the Specification as stated herein.
- C. The following items shall not be painted:
 - 1. Any code-requiring labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.
 - 2. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts, unless otherwise indicated.
 - 3. Aluminum handrails (except where in contact with concrete) walkways, windows, louvers and grating unless otherwise specified herein.
 - 4. Signs and nameplates.
 - 5. Finish hardware.
 - 6. Chain link fence.
 - 7. Piping buried in the ground or embedded in concrete.
 - 8. Concealed surfaces of pipe or crawl space.
 - 9. Nonferrous metals, unless specifically noted otherwise.
 - 10. Electrical switchgear and motor control centers.
 - 11. Stainless steel angles, tubes, pipe, etc.
 - 12. Products with polished chrome, aluminum, nickel or stainless steel finish.
 - 13. Plastic switch plates and receptacle plates.
 - 14. Flexible couplings, lubricated bearing surfaces, insulation and metal and plastic pipe interior.
 - 15. Sprinkler heads.
 - 16. Lifting chain on cranes and hoists
 - 17. Electrical cable, festooned conductor system, cables, collector pole brackets, etc.
- D. All work shall be done in strict accordance with this Specification, the Design Drawings and the painting package, including manufacturer's printed instructions.

- E. The Contractor will obtain, at its own expense, all permits, licenses and inspections and shall comply with all laws, codes, ordinances, rules and regulations promulgated by authorities having jurisdiction which may bear on the Work. This compliance will include Federal Public Law 91-596 more commonly known as the "Occupational Safety and Health Act of 1970".

1.02 DEFINITIONS

- A. Field Painting is the painting of new or rebuilt items at the job site. Field painting shall be the responsibility of the Contractor.
- B. Shop Painting is the painting of new or rebuilt items in the shop prior to delivery to the jobsite.
- C. Abbreviations The abbreviations and definitions listed below, when used in this specification, shall have the following meanings:
 - 1. SSPC - Steel Structures Painting Council
 - 2. Exterior - Outside, exposed to weather
 - 3. Interior Dry - Inside, concealed or protected from weather
 - 4. Interior Wet - Inside, subject to immersion services
 - 5. ASTM - American Society of Test Materials
 - 6. NACE - National Association of Corrosion Engineers
 - 7. NSF - National Sanitation Foundation
 - 8. AWWA - American Water Works Association
- D. Dry Film Thickness shall be in Mils.

1.03 RESOLUTION OF CONFLICTS

- A. It shall be the responsibility of the Contractor to arrange a meeting prior to the start of painting, or flooring installation between the Contractor, the Paint Manufacturer, whose products are to be used, and the County. All aspects of surface preparation, application and coating systems as covered by this Specification will be reviewed at this meeting.
- B. Clarification shall be requested promptly from the County when instructions are lacking, conflicts occur in the Specifications, or the procedure seems improper or inappropriate for any reason.
- C. Copies of all manufacturer's instructions and recommendations shall be furnished to the County by the Painting Contractor.
- D. It shall be the responsibility of the Coating Manufacturer to have their factory representative meet in person with the Contractor and County a minimum of three times during the job as a consultant on surface preparation, mil thickness of coating and proper application of coating unless meeting is determined to be unnecessary by the County.

1.04 SUBMITTALS

- A. Contractor shall submit catalog data and cut sheets for the painting system being used if not the TNEMEC materials specified.
- B. Samples as detailed in 3.01 B shall be submitted regardless of system being used, showing each color to be used.
- C. Hazardous Material Disposal documentation shall be submitted if applicable.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Effective oil and water separators shall be used in all compressed air lines serving spray painting and sandblasting operations to remove oil or moisture from the air before it is used. Separators shall be placed as far as practicable from the compressor.
- B. All equipment for application of the paint and the completion of the work shall be furnished by the Contractor in first-class condition and shall comply with recommendations of the paint manufacturer.
- C. Contractor will provide free of charge to the County a "Nordson-Mikrotest" or "Positest" dry film thickness gauge for ferrous metal and an OG232 "Tooke" gauge or equal for non-ferrous and cementitious surface, to be used to inspect coatings by the County and Contractor. The gauges may be used by the Contractor and returned each day to the County. County will return gauges to Contractor at completion of job.

2.02 MATERIALS

- A. All materials specified herein are manufactured by the TNEMEC Company, Inc., North Kansas City, Missouri. These products are specified to establish standards of quality and are approved for use on this Project.
- B. Equivalent materials of other manufacturers may be substituted on approval of the County. Requests for substitution shall include manufacturer's literature for each product giving the name, generic type, descriptive information and evidence of satisfactory past performance and an independent laboratory certification that their product meets the performance criteria of the specified materials.
- C. Abrasion - Fed. Test Method Std. No. 141, Method 6192, CS-17 Wheel, 1,000 grams load.
- D. Adhesion - Elcometer Adhesion Tester.
- E. Exterior Exposure - Exposed at 45 degrees facing the ocean (South Florida Marine Exposure)
- F. Hardness - ASTM D3363-74

- G. Humidity - ASTM D2247-68
- H. Salt Spray (Fog) - ASTM B117-73
- I. Substitutions which decrease the total film thickness, change the generic type of coating, or fail to meet the performance criteria of the specified materials shall not be approved. Prime and finish coats of all surfaces shall be furnished by the same manufacturer.
- J. All coatings to be shop applied must meet the requirements for volatile organic compounds (VOC) of not more than 3.5 lbs/gallon after thinning.
- K. Colors, where not specified, shall be as selected by the County or their Representative.
- L. All coatings in contact with potable water need to be NSF Certified in accordance with ANSI/NSF Standard 61.
- M. All above ground potable water mains and appurtenances shall be painted safety blue.

PART 3 EXECUTION

3.01 INSPECTION OF SURFACES

- A. Before application of the prime coat and each succeeding coat, all surfaces to be coated shall be subject to inspection by the County. Any defects or deficiencies shall be corrected by the Contractor before application of any subsequent coating.
- B. Samples of surface preparation and of painting systems shall be furnished by the Contractor to be used as a standard throughout the job, unless omitted by the County.
- C. When any appreciable time has elapsed between coatings, previously coated areas shall be carefully inspected by the County, and where, in his opinion, surfaces are damaged or contaminated, they shall be cleaned and recoated at the Contractor's expense. Recoating times of manufacturer's printed instructions shall be adhered to.
- D. Coating thickness shall be determined by the use of a properly calibrated "Nordson-Mikrotest" "Positest" Coating Thickness Gauge (or equal) for ferrous metal or an OG232 "Tooke" Paint Inspection gauge (or equal) for non-ferrous and cementitious surfaces. Please note that use of the "Tooke" gauge is classified as a destructive test.

3.02 SURFACE PREPARATION

The surface shall be cleaned as specified for the paint system being used. All cleaning shall be as outlined in the Steel Structures Painting Council's Surface Preparation Specification, unless otherwise noted. If surfaces are subject to contamination, other than mill scale or normal atmospheric rusting, the surfaces shall be pressure washed, and acid or caustic pH residues neutralized, in addition to the specified surface preparation.

3.03

STANDARDS FOR SURFACE PREPARATION

- A. Chemical and/or Solvent Cleaning: Remove all grease, oil, salt, acid, alkali, dirt, dust, wax, fat, foreign matter and contaminants, etc. by one of the following methods: steam cleaning, alkaline cleaning, or volatile solvent cleaning.
- B. Hand Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by hand chipping, scraping, sanding and wire brushing.
- C. Power Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by power tool chipping, descaling, sanding, wire brushing and grinding.
- D. Flame Cleaning: Dehydrating and removal of rust, loose mill scale and some light mill scale by use of flame, followed by wire brushing.
- E. White Metal Blast Cleaning: Complete removal of all mill scale, rust, rust scale, previous coating, etc., leaving the surface a uniform gray-white color.
- F. Commercial Grade Blast Cleaning: Complete removal of all dirt, rust scale, mill scale, foreign matter and previous coating, etc., leaving only shadows and/or streaks caused by rust stain and mill scale oxides. At least 66% of each square inch of surface area is to be free of all visible residues, except slight discoloration.
- G. Brush-Off Blast Cleaning: Removal of rust scale, loose mill scale, loose rust and loose coatings, leaving tightly-bonded mill scale, rust and previous coatings. On concrete surfaces, brush-off blast cleaning shall remove all laitance, form oils and solid contaminants. Blasting should be performed sufficiently close to the surface so as to open up surface voids, bugholes, air pockets and other subsurface irregularities, but so as not to expose underlying aggregate.
- H. Pickling: Complete removal of rust and mill scale by acid pickling, duplex pickling or electrolytic pickling (may reduce the resistance of the surface to corrosion, if not to be primed immediately).
- I. Near-White Blast Cleaning: Removal of all rust scale, mill scale, previous coating, etc., leaving only light stains from rust, mill scale and small specks of previous coating. At least 95% of each square inch of surface area is to be free of all visible residues and the remainder shall be limited to slight discoloration.
- J. Power Tool Cleaning to Bare Metal: Complete removal of rust, rust scale, mill scale, foreign matter and previous coatings, etc., to a standard as specified on a Commercial Grade Blast Cleaning (SSPC-SP-6, NACE-3) by means of power tools that will provide the proper degree of cleaning and surface profile.
- K. Visual standards "Pictorial Surface Preparation Standards for Painting Steel Surfaces", and the National Association of Corrosion Engineer, "Blasting Cleaning Visual Standards" TM-01-70 and TM-01-75 shall be considered as standards for proper surface preparation.

- L. Oil, grease, soil, dust, etc., deposited on the surface preparation that has been completed shall be removed prior to painting according to Solvent Cleaning under this Specification.
- M. Weld flux, weld spatter and excessive rust scale shall be removed by Power Tool Cleaning as per these Specifications.
- N. All weld seams, sharp protrusions and edges shall be ground smooth prior to surface preparation or application of any coatings.
- O. All areas requiring field welding shall be masked off prior to shop coating, unless waived by the County.
- P. All areas which require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be cleaned by thorough Power Tool as specified in these Specifications.
- Q. Touch-up systems will be same as original specification except that approved manufacturer's organic zinc-rich shall be used in lieu of inorganic zinc where this system was originally used. Also strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the County's attention; otherwise, Contractor assumes full responsibility.

3.03 PRETREATMENTS

When specified, the surface shall be pretreated in accordance with the specified pretreatment prior to application of the prime coat of paint.

3.04 STORAGE

Materials shall be delivered to the job site in the original packages with seals unbroken and with legible unmutated labels attached. Packages shall not be opened until they are inspected by the County and required for use. All painting materials shall be stored in a clean, dry, well-ventilated place, protected from sparks, flame, direct rays of the sun or from excessive heat. Paint susceptible to damage from low temperatures shall be kept in a heated storage space when necessary. The Contractor shall be solely responsible for the protection of the materials stored by himself at the job site. Empty coating cans shall be required to be neatly stacked in an area designated by the County and removed from the job site on a schedule determined by the County. County may request a notarized statement from Contractor detailing all materials used on the Project.

3.05 PREPARATION OF MATERIALS

- A. Mechanical mixers, capable of thoroughly mixing the pigment and vehicle together, shall mix the paint prior to use where required by manufacturer's instructions; thorough hand mixing will be allowed for small amounts up to one gallon. Pressure pots shall be equipped with mechanical mixers to keep the pigment in suspension, when required by manufacturer's instructions. Otherwise, intermittent hand mixing shall be done to assure that no separation occurs. All mixing shall be done in accordance with SSPC Vol. 1, Chapter 4, "Practical Aspects, Use and Application of Paints" and/or with manufacturer's recommendations.
- B. Catalysts or thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction.

3.06 APPLICATION

- A. Paint shall be applied only on thoroughly dry surfaces and during periods of favorable weather, unless otherwise allowed by the paint manufacturer. Except as provided below, painting shall not be permitted when the atmospheric temperature is below 50 deg F, or when freshly painted surfaces may be damaged by rain, fog, dust, or condensation, and/or when it can be anticipated that these conditions will prevail during the drying period.
- B. No coatings shall be applied unless surface temperature is a minimum of 5deg above dew point; temperature must be maintained during curing.
- C. See coating schedule for actual coating systems to be used on this project.

3.07**DEW POINT CALCULATION CHART****DEW POINT CALCULATION CHART**

Ambient Air Temperature - Fahrenheit

Relative Humidity	20	30	40	50	60	70	80	90	100	110	120
90%	18	28	37	47	57	67	77	87	97	107	117
85%	17	26	36	45	55	65	76	84	95	104	113
80%	16	25	34	44	54	63	73	82	93	102	110
75%	15	24	33	42	52	62	71	80	91	100	108
70%	13	22	31	40	50	60	68	78	88	96	105
65%	12	20	29	38	47	57	66	76	85	93	103
60%	11	20	27	36	45	55	64	73	83	92	101
55%	9	17	25	34	43	53	61	70	80	89	98
50%	6	15	23	31	40	50	59	67	77	86	94
45%	4	13	21	29	37	47	56	64	73	82	91
40%	1	11	18	26	35	43	52	61	69	78	87
35%	-2	8	16	23	31	40	48	57	65	74	83

SURFACE TEMPERATURE AT WHICH CONDENSATION OCCURSDew Point

Temperature at which moisture will condense on surface. No coatings should be applied unless surface temperature is a minimum of 5deg above this point. Temperature must be maintained during curing.

Example

If air temperature is 70 deg F and relative humidity is 65%, the dew point is 57 deg F. No coating should be applied unless surface temperature is 62 deg F minimum.

- A. No coating shall be applied unless the relative humidity is below 85%.
- B. Suitable enclosures to permit painting during inclement weather may be used if provisions are made to control atmospheric conditions artificially inside the enclosure, within limits suitable for painting throughout the painting operations.
- C. Field painting in the immediate vicinity of, or on, energized electrical and rotating equipment, and equipment and/or pipes in service shall not be performed without the approval of the County.
- D. Extreme care shall be exercised in the painting of all operable equipment, such as valves, electric motors, etc., so that the proper functioning of the equipment will not be affected.

- E. The Contractor's scaffolding shall be erected, maintained and dismantled without damage to structures, machinery, equipment or pipe. Drop cloths shall be used where required to protect buildings and equipment. All surfaces required to be clear for visual observation shall be cleaned immediately after paint application.
- F. Painting shall not be performed on insulated pipe within three (3) feet of insulation operations or on insulation whose covering and surface coat have not had time to set and dry. Painting shall not be performed on uninsulated pipe within one (1) foot of any type of connection until the connection has been made, except as directed by the County.
- G. The prime coat shall be applied immediately following surface preparation and in no case later than the same working day. All paint shall be applied by brushing, paint mitt and roller, conventional spraying, or airless spraying, using equipment approved by the paint manufacturer.
- H. Each coat of paint shall be recoated as per manufacturer's instructions. Paint shall be considered recoatable when an additional coat can be applied without any detrimental film irregularities such as lifting or loss of adhesion.
- I. Surfaces that will be inaccessible after assembly shall receive either the full specified paint system or three shop coats of the specified primer before assembly.
- J. Finish colors shall be in accordance with the COLOR SCHEDULE and shall be factory mixed (i.e., there shall be no tinting by the Contractor, unless authorized by the County).
- K. All edges and weld seams in immersion service shall receive a "stripe coat" (applied by brush) of the 2nd coat prior to application of the full 2nd coat.
- L. All open seams in the roof area of tanks shall be filled after application of the topcoat with a flexible caulking such as Sika Flex 1A.

3.08 WORKMANSHIP

- A. The Contractor must show proof that all employees associated with this Project shall have been employed by the Contractor for a period not less than six (6) months.
- B. Painting shall be performed by experienced painters in accordance with the recommendations of the paint manufacturer. All paint shall be uniformly applied without sags, runs, spots, or other blemishes. Work which shows carelessness, lack of skill, or is defective in the opinion of the County, shall be corrected at the expense of the Contractor.
- C. The Contractor shall provide the names of at least three other projects of similar size and scope that they have successfully completed under their current company name.

3.09 APPLICATION OF PAINT

A. By Brush and/or Rollers

1. Top quality, properly styled brushes and rollers shall be used. Rollers with a baked phenol core shall be utilized.
2. The brushing or rolling shall be done so that a smooth coat as nearly uniform in thickness as possible is obtained. Brush or roller strokes shall be made to smooth the film without leaving deep or detrimental marks.
3. Surfaces not accessible to brushes or rollers may be painted by spray, by dauber or sheepskins, and paint mitt.
4. It may require two coats to achieve the specified dry film thickness if application is by brush and roller.

B. Air, Airless or Hot Spray

1. The equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the paint to be applied and shall be equipped with suitable pressure regulators and gauges.
2. Paint shall be applied in a uniform layer, with a 50% overlap pattern. All runs and sags should be brushed out immediately or the paint shall be removed and the surface resprayed.
3. High build coatings should be applied by a cross-hatch method of spray application to ensure proper film thickness of the coating.
4. Areas inaccessible to spray shall be brushed; if also inaccessible to brush, daubs or sheepskins shall be used, as authorized by the manufacturer.
5. Special care shall be taken with thinners and paint temperatures so that paint of the correct formula reaches the receiving surface.
6. Nozzles, tips, etc., shall be of sizes and designs as recommended by the manufacturer of the paint being sprayed.
7. The first coat on concrete surfaces in immersion service should be sprayed and back rolled.

3.10 PROTECTION AND CLEANUP

- A. It shall be the responsibility of the Contractor to protect at all times, in areas where painting is being done, floors, materials of other crafts, equipment, vehicles, fixtures, and finished surfaces adjacent to paint work. Cover all electric plates, surface hardware, nameplates, gauge glasses, etc., before start of painting work.
- B. At the option of the County during the course of this project, the Contractor will contain all spent abrasives, old paint chips, paint overspray and debris by means suitable to the County, including, but not limited to, full shrouding of the area.
- C. If shrouding is required, the Contractor must provide a complete design of the intended shroud or cover. Care must be taken not to modify or damage the structure during the use of the shroud. If damage should occur, the Contractor is held responsible for all repairs.

- D. At completion of the work, remove all paint where spilled, splashed, spattered, sprayed or smeared on all surfaces, including glass, light fixtures, hardware, equipment, painted and unpainted surfaces.
- E. After completion of all painting, the Contractor shall remove from job site all painting equipment, surplus materials and debris resulting from this work.
- F. The Contractor is responsible for the removal and proper disposal of all hazardous materials from the job site in accordance with Local, State and Federal requirements as outlined by the Environmental Protection Agency.
- G. A notarized statement shall be presented to the County that all hazardous materials have been disposed of properly including, but not limited to: name of disposal company, disposal site, listing of hazardous materials, weights of all materials, cost per pound and EPA registration number.

3.11 TOUCH-UP MATERIALS

The Contractor shall provide at the end of the Project at least one (1) gallon of each generic topcoat in each color as specified by the County for future touch-up. Two gallons may be required for (2) component materials.

3.12 ON-SITE INSPECTION

During the course of this Project, the County will reserve the option of incorporating the services of a qualified inspection service. The inspection service will be responsible for assuring the proper execution of this Specification by the successful Contractor.

3.13 STEEL - STRUCTURAL, TANKS, PIPES AND EQUIPMENT

A. EXTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 73-1: Epoxy/High Build Urethane

This system is highly resistant to abrasion, wet conditions, corrosive fumes and chemical contact. Provides 3-4 times the color and gloss retention of conventional paints. Second coat to be same color or close to finish color. Specify Series 74 Endura-Shield for gloss finish.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 66-1211 Epoxoline Primer	3.0 - 4.0
2nd Coat: 66-Color Hi-Build Epoxoline	2.0 - 3.0
3rd Coat: 73-Endura-Shield III	<u>2.0 - 3.0</u>
Dry Film Thickness	7.0 - 10.0
Minimum	8.0 Mils

2. System No. 73-2: High Build Urethane for Marginally Cleaned Surfaces or Topcoating Existing System

This system can be used over factory finish paint or cover non-sandblasted steel and offer the high performance of a urethane coating. Specify Series 74 Endura-Shield for gloss finish.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning or SSPC-SP3 Power Tool Cleaning

Shop Coat: Manufacturer Standard Primer (or existing coating)	1.5 - 2.0
2nd Coat: 135 Chembuild	3.0 - 5.0
3rd Coat: 73-Color Endura-Shield	<u>2.0 - 3.0</u>
Dry Film Thickness	6.5 - 10.0
Minimum	7.5 Mils

3. System No. 82-1: Silicone Alkyd Enamel - Gloss

Coating system for outstanding color and gloss retention and weatherability. This system will provide better performance than alkyd enamel, but not as good as a urethane. Series 82 includes a minimum of 30% silicone resin and conforms to SSPC-Paint 21-78, Type 1.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 37H-77 Chem Prime	2.0 - 3.5
2nd Coat: 23-Color Enduratone	2.0 - 3.0
3rd Coat: 82-Color Silicone Alkyd Enamel	1.0 - <u>2.0</u>
Dry Film Thickness	5.0 - 8.5
Minimum	6.0 Mils

4. System 90-97: Zinc/Epoxy/Urethane

This system offers the added corrosion protection of a zinc rich primer. Series 90-97 Tneme-Zinc is an organic zinc-rich primer that can be used for field touch up of a zinc primer or for touch up of galvanized surfaces that are damaged.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 90-97 Tneme-Zinc	2.5 - 3.5
2nd Coat: 66-Color Hi-Build Epoxoline	2.0 - 3.0
3rd Coat: 73 Endurashield III	<u>2.0 - 3.0</u>
Dry Film Thickness	6.5 - 9.5
Minimum	8.0 Mils

B. INTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 69.1: High Solids Epoxy

This coating will provide maximum protection. It offers chemical and corrosion resistance for long-term protection against salt spray, moisture, corrosive fumes, and chemical attack. Series 69 is a polyamidoamine cured epoxy. Primer coat must be touched-up before second coat is applied.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 69-1211 Epoxoline Primer II	3.0 - 5.0
2nd Coat: 69-Color Hi-Build Expoxoline II	<u>4.0 - 6.0</u>
Dry Film Thickness	7.0 - 11.0
Minimum	9.0 Mils

2. System No.66-2: High Build Epoxy

This system will provide chemical and corrosion resistance against abrasion, moisture, corrosion fumes, chemical contact and immersion in non-potable water. Primer coat must be touched-up before second coat is applied. Substitute Series 161 for low temperature cure or quick recoats.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 69-1211 Epoxoline Primer	3.0 - 5.0
2nd Coat: 69-Color Hi-Build Expoxoline	<u>4.0 - 6.0</u>
Dry Film Thickness	7.0 - 11.0
Minimum	9.0 Mils

3. System No. 66-6: High Build Epoxy (Over OEM Finishes)

This system is to be used over standard manufacturer's primer to offer a high performance epoxy finish. Excellent for areas of rust not able to be completely cleaned.

Surface Preparation: Spot SSPC-SP6 Commercial Blast Cleaning or SSPC- SP11 Power Tool Cleaning to Bare Metal

Shop Coat: Manufacturer's Standard (or existing coating)	1.0 - 2.0
2nd Coat: 50-330 Poly-Ura-Prime	2.0 - 3.0
3rd Coat: 66-Color Hi-Build Expoxoline	<u>2.0 - 4.0</u>
Dry Film Thickness	5.0 - 9.0
Minimum	7.0 Mils

C. IMMERSION

1. System No. 69-2: High Solids Epoxy (Non-Potable Water)

This system provides maximum protection in immersion service. Scarify the surface before topcoating if the Series 69 has been exterior-exposed for 90 days or longer. If primer coat is damaged, it must be touched-up before second coat is applied.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

Shop Coat:

69-1211 Hi-Build Epoxoline II	3.0 - 5.0
2nd Coat: 69-Color Hi-Build Epoxoline II	<u>6.0 - 8.0</u>
Dry Film Thickness	9.0 - 13.0
Minimum	11.0 Mils

2. System No. 66-2: High Solids Epoxy (Non-Potable Water)

This system will provide chemical and corrosion resistance for protection against abrasion, moisture, corrosive fumes, chemical contact and immersion. Primer coat must be touched-up before second coat is applied. Scarify the surface before topcoating if the Series 66 has been exterior-exposed for 60 days or longer. Substitute Series 161 for low temperature cure or quick recoats.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

Shop Coat: 66-1211 Epoxoline Primer	3.0 - 5.0
2nd Coat: 66-Color Hi-Build Epoxoline	3.0 - 5.0
3rd Coat: 66-Color Hi-Build Epoxoline	<u>3.0 - 5.0</u>
Dry Film Thickness	9.0 - 15.0
Minimum	11.0 Mils

3. System No. 20-1: Epoxy-Polyamide (Potable Water)

This system meets American Water Works Association AWWA D 102 Inside Paint System Number 1. Series 20 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Substitute Series FC20 for low temperature cure or quick recoats.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

Shop Coat:

20-WH02 Pota-Pox (Tank White)	3.0 - 5.0
2nd Coat: 20-1255 Pota-Pox (Beige)	4.0 - 6.0
3rd Coat: 20-WH02 Pota-Pox (Tank White)	<u>4.0 - 6.0</u>
Dry Film Thickness	11.0 - 17.0
Minimum	12.0 Mils

4. System No. 140: High Solids Epoxy (Potable Water)

Series 140 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

Shop Coat: 140-1255 Pota-Pox II (Beige)	6.0 - 8.0
2nd Coat: 140-WH02 Pota-Pox II (Tank White)	<u>6.0 - 8.0</u>
Dry Film Thickness	12.0 - 16.0
Minimum	14.0 Mils

5. System No. 46-30: Coal Tar-Epoxy (Non-Potable Water Only)

May be applied in a two-coat application. Review critical recoat time if utilized.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning*

One Coat: 46H-413 Hi-Build Tneme Tar
Minimum Dry Film Thickness 14.0 - 20.0

*SSPC-SP-6 Commercial Blast Cleaning may be used for non-immersion service.

6. System No. 46-26: Coal Tar Epoxy (Non-Potable Water Only)

Must be recoated within four days at 75deg F. Higher temperature will shorten recoat time.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning*

1st Coat: 46-413 Tneme Tar	<u>8.0 - 10.0</u>
2nd Coat: 46-413 Tneme Tar	<u>8.0 - 10.0</u>
Dry Film Thickness	16.0 - 20.0
Minimum	16.0 Mils

*SSPC-6 Commercial Blast Cleaning may be used for non-immersion service.

3.14 OVERHEAD METAL DECKING, JOIST

A. INTERIOR EXPOSURE

System No. 15-1: Uni-Bond

This system should be used on ceiling areas where a one-coat system is desired. Can be applied over steel, galvanized and aluminum decking, joist, beams, conduits and concrete.

Surface Preparation: Surfaces must be dry, clean and free of oil, grease and other contaminates. Allow concrete to cure 28 days.

Coating: 15-Color Uni-Bond
Dry Film Thickness 2.5 - 3.5

B. EXTERIOR EXPOSURE

System No. 135-1: Chembuild

This system can be applied over a wide variety of coatings and factory finishes. It can also be applied direct to galvanized aluminum decking, joists, conduits and tight rust.

Surface Preparation: Pressure clean to remove all dirt, oil, grease, chemicals and foreign contaminates. Remove loose paint and all rust by hand and power tool cleaning (SSPC-SP 2 & 3)

Coating: 135-Color Chembuild
Dry Film Thickness 3.0 - 5.0

3.15 MILL COATED STEEL PIPE

A. EXTERIOR/INTERIOR EXPOSURE (NON-IMMERSION)

System No. 66-3: Epoxy-Polyamide

This system can be applied directly to mill coated steel pipe without sandblasting for use in non-immersion. There may be some bleed through with the 1st coat. Do not apply over glossy varnish type mill coatings.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 66-1211 Epoxoline Primer	3.0 - 4.0
2nd Coat: 66-Color Hi-Build Epoxoline	4.0 - 6.0
3rd Coat: (If required)	(4.0 - 6.0)
Dry Film Thickness	11.0 - 16.0
Minimum	11.0 Mils

3.16 GALVANIZED STEEL - PIPE AND MISCELLANEOUS FABRICATIONS

A. EXTERIOR / (NON-IMMERSION)

System No. 73-1: Epoxy/High Build Urethane

Series 66 has excellent adhesion to galvanized steel. This system is highly resistant to abrasion, wet conditions, corrosive fumes and chemical contact. Provides 3-4 times the color and gloss retention of conventional paints. First coat to be same color as or close to the finish color. Specify Series 74 Endura-Shield for gloss finish.

Surface Preparation: SSPC-SP1 Solvent Cleaning

1st Coat: 66-Color Hi-Build Epoxoline	2.0 - 4.0
2nd Coat: 73-Color Endura-Shield	<u>2.0 - 4.0</u>
Dry Film Thickness	4.0 - 8.0
Minimum	5.0 Mils

B. INTERIOR EXPOSURE (NON IMMERSION) AND ALUMINUM IN CONTACT WITH CONCRETE

System No. 66-6: Polyamide Epoxy

Surface Preparation: SSPC-SP1 Solvent Cleaning

1st Coat: 66-Color Hi-Build Epoxoline	2.0 - 4.0
2nd Coat: 66-Color Hi-Build Epoxoline	<u>2.0 - 4.0</u>
Dry Film Thickness	4.0 - 8.0
Minimum	5.0 Mils

C. IMMERSION (POTABLE WATER)

System No. 20-1: Epoxy-Polyamide (Potable Water)

Series 20 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Substitute Series FC20 for low temperature cure or quick recoat.

Surface Preparation: SSPC-SP 7 Brush Off Blast Cleaning

1st Coat: 20-1255 Pota-Pox Primer	3.0 - 5.0
2nd Coat: 20-WH02 Pota-Pox Finish	<u>4.0 - 6.0</u>
Dry Film Thickness	7.0 - 11.0
Minimum	9.0 Mils

3.17 CHAIN-LINK FENCES

A. GALVANIZED STEEL & NON-FERROUS METAL

System No. 22-1: Oil-Cementitious

Surface Preparation: Surface shall be clean and dry

One Coat: 22-Color Galv-Gard
Dry Film Thickness 3.0 - 4.0

3.18 CONCRETE

A. EXTERIOR - ABOVE GRADE

1. System No. 52-1 Modified Epoxy - Sand Texture

Series 52 is a high build, decorative sand texture finish that hides minor surface irregularities and gives long-term protection against weather, driving rain, ultraviolet exposure, alternate freezing and thawing. Series 52 will actually become part of the concrete. Available in Series 55, Tneme-Crete smooth finish. For porous substrates, a second coat of Series 52 is required. Substitute Series 180 or 181 W.B. Tneme-Crete when specified over existing acrylic or latex coatings.

Surface Preparation: Surface shall be clean and dry.

One Coat: 52-Color Tneme-Crete
Dry Film Thickness 8.0 - 10.0

2. System No. 6-1: Acrylic Emulsion Low Sheen

If semi-gloss finish is desired, use Series 7 Tneme-Cryl SG as the second coat.

Surface Preparation: Surface must be clean and dry.

1st Coat: 6-Color Tneme-Cryl	2.0 - 3.0
2nd Coat: 6-Color Tneme-Cryl	<u>2.0 - 3.0</u>
Dry Film Thickness	4.0 - 6.0
Minimum	5.0 Mils

3. System No. 156-1: Modified Acrylic Elastomer

If texture is needed, use 157 Enviro-Crete TX (medium texture) or 159 Enviro-Crete XTX (coarse texture). For application over previously applied coatings, use TNEMEC Series 151 Elasto-Grip at 1.0 - 2.5 mils DFT prior to the application of Series 156 Enviro-Crete.

Surface Preparation: Surface must be clean and dry.

1st Coat: 156-Color Enviro-Crete	4.0 - 8.0
2nd Coat: 156-Color Enviro-Crete	<u>4.0 - 8.0</u>
Dry Film Thickness	8.0 - 16.0
Minimum	10.0 Mils

B. EXTERIOR - BELOW GRADE

1. System No. 46-61: Coal Tar Pitch Solution

Surface Preparation: Surface must be clean and dry, Level all protrusions.

1st Coat: 46-465 H.B. Tnemecol	<u>8.0 - 12.0</u>
2nd Coat: 46-465 H.B. Tnemecol	<u>8.0 - 12.0</u>
Dry Film Thickness	16.0 - 24.0
Minimum	16.0 Mils

2. System No. 46-31: Coal Tar-Epoxy

Surface Preparation: Surface shall be clean and dry.

One Coat:	46H-413 Hi-Build Tneme-Tar
Dry Film Thickness	14.0 - 20.0

3. System No. 100-1: Crystalline Waterproofing

This system can be applied to concrete that is still wet or has not developed final cure. It can be used where wet surface conditions exist or where there is the potential for water intrusion due to hydrostatic pressure. Application shall be per Xypex specification manual.

Surface Preparation: Surface to be clean and roughened by Brush Blasting or Acid Etching.

1st Coat: XYPEX Concentrate at 1.5 lbs/SY
2nd Coat: XYPEX Modified at 1.5 lbs/SY

C. EXTERIOR/INTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 6-1: Acrylic Emulsion, Low Sheen (Interior/Exterior)

This system will provide a decorative coating with good exterior durability, color retention, and a high vapor transmission rate. For Semi-Gloss finish, use 7-Color Tneme-Cryl S/G.

Surface Preparation: Surface shall be clean and dry. Allow concrete to cure for 28 days.

1st Coat: 6-Color Tneme-Cryl	2.0 - 3.0
2nd Coat: 6-Color Tneme-Cryl	2.0 - 3.0
Dry Film Thickness	4.0 - 6.0
Minimum	5.0 Mils

2. System No. 66-4: Epoxy-Polyamide (Interior/Exterior)

Series 66 provides excellent protection from abrasion, moisture, corrosive fumes and chemical contact. For exterior exposures, topcoat with Series 73, or 74 Endura-Tone for gloss and color retention.

Surface Preparation: Surfaces shall be clean and dry. Allow concrete to cure for 28 days. SSPC-SP-7 Brush-Off Blast Clean.

1st Coat: 66-Color Hi-Build Epoxoline	3.0 - 5.0
2nd Coat: 66-Color Hi-Build Epoxoline	4.0 - 6.0
Dry Film Thickness	7.0 - 11.0
Minimum	9.0 Mils

3. System No. 83-1: High Solids Catalyzed Epoxy (Interior)

Surface Preparation: Surface shall be clean and dry. Allow concrete to cure for 28 days. SSPC-SP-7 Brush Off Blast Clean. Concrete block surfaces: Allow to cure 28 days. Level fins, protrusions and mortar splatter.

1st Coat: 83-Color Ceramlon II	6.0 - 10.0
2nd Coat: 83-Color Ceramlon II	6.0 - 10.0
Dry Film Thickness	12.0 - 20.0
Minimum	14.0 Mils

D. IMMERSION - POTABLE & NON-POTABLE WATER

1. System No. 66-4: Epoxy Polyamide (Non-Potable Water)

Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer.

Surface Preparation: SSPC-SP-7 Brush-Off Blast Cleaning

1st Coat: 66-Color Hi-Build Epoxoline	4.0 - 6.0
2nd Coat: 66-Color Hi-Build Epoxoline	<u>4.0 - 6.0</u>
Dry Film Thickness	8.0 - 12.0
Minimum	10.0 Mils

2. System No. 104-5: High Solids Epoxy (Non-Potable Water)

Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer.

Surface Preparation: SSPC-SP-7 Brush-Off Blast Cleaning

1st Coat: 104-1255 H.S. Epoxy Primer	<u>6.0 - 10.0</u>
2nd Coat: 104 Color H.S. Epoxy	<u>6.0 - 10.0</u>
Dry Film Thickness	12.0 - 20.0
Minimum	14.0 Mils

3. System No. 46-31: Coal Tar-Epoxy (Non-Potable Water)

May be applied in a two-coat application. Review critical recoat time is utilized. Surface irregularities and bugholes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer.

Surface Preparation: Brush-Off Blast Cleaning

One Coat:	46H-413 Hi-Build Tneme-Tar
Dry Film Thickness	14.0-20.0

4. System No. 45-27: Coal Tar Epoxy (Non-Potable Only)

Must be recoated within four days at 75deg F. Higher temperature will shorten recoat time.

Surface Preparation: Brush-Off Blast Cleaning

1st Coat: 46-413 Tneme Tar	<u>8.0 - 10.0</u>
2nd Coat: 46-413 Tneme Tar	<u>8.0 - 10.0</u>
Dry Film Thickness	16.0 - 20.0
Minimum	16.0 Mils

5. System No. 20-2 Epoxy-Polyamide (Potable Water)

This system meets American Water Works Association AWWA D 102 Inside System No. 1. Series 20 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer. (NSF Standard 61 approved). Substitute Series FC20 for low temperature cure or quick recoats.

Surface Preparation: SSPC-SP10 Near White Blast Cleaning

1st Coat: 20-1255 Pota-Pox	4.0 - 6.0
2nd Coat: 20-WH02 Pota-Pox Finish	<u>4.0 - 6.0</u>
Dry Film Thickness	8.0 - 12.0
Minimum	10.0 Mils

6. System No. 139-2: Epoxy-Polyamine (Potable Water)

Series 139 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer. (NSF Standard 61 approved.)

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

1st Coat: 139-1255 Pota-Pox II	6.0 - 8.0
2nd Coat: 139-WH02 Pota-Pox II	<u>6.0 - 8.0</u>
Dry Film Thickness	12.0 - 16.0
Minimum	14.0 Mils

E. INTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 104-3: High Solids Epoxy

This system will produce a slick, tile-like finish that has excellent chemical and water resistance. Surface will be easy to clean.

Surface Preparation: Surface to be clean and dry.

1st Coat: 104-Color H.S. Epoxy	6.0 - 8.0
2nd Coat: 104-Color H.S. Epoxy	<u>6.0 - 8.0</u>
Dry Film Thickness	12.0 - 16.0
Minimum	14.0 Mils

2. System No. 113-1: Acrylic-Epoxy Semi-Gloss

This system will provide high performance and can be applied directly over existing coatings without lifting. Can be used when low odor is required during application. Specify Series 114 Tneme-Tuffcoat for Gloss Finish.

Surface Preparation: Surface must be clean and dry.

One Coat: 113-Color Tneme-Tuffcoat
Dry Film Thickness 4.0 - 6.0

3.19 CONCRETE FLOORS

A. EPOXY FLOOR COATINGS

1. System No. 67-1: Epoxy-Polyamide

This system will provide a durable, long-wearing coating that bonds tightly to concrete and stands up under heavy foot traffic, frequent cleaning and spillage of water, oil, grease, or chemical.

Surface Preparation: Acid Etch or Brush-Off Blast Cleaning

1st Coat: 67-Color Tnema-Tread	2.0 - 3.0
2nd Coat: 67-Color Tnema-Tread	<u>2.0 - 3.0</u>
Dry Film Thickness	4.0 - 6.0
Minimum	5.0 Mils

2. System No. S67-1: Epoxy-Polyamide (Non-Skid)

This system will provide the same protection and durability as System 67-1 with the addition of a non-skid finish.

Surface Preparation: Acid Etch or Brush-Off Blast Cleaning

1st Coat: S67-Color Tneme-Tread	2.0 - 3.0
2nd Coat: 67-Color Tneme-Tread	<u>2.0 - 3.0</u>
Dry Film Thickness	4.0 - 6.0
Minimum	5.0 Mils

3. System No. 73-12: Epoxy/Urethane

This system will provide maximum protection against chemical splash and spillage, wet conditions and abrasion. Specify Series 70 Endura-Shield for Gloss finish. First coat must be thinned 20% prior to application. For non-skid finish, specify Series S67 Tneme-Tread for the first and second coat.

Surface Preparation: Acid Etch or Brush-Off Blast Cleaning

1st Coat: 67-Color Tneme-Tread	2.0 - 3.0
2nd Coat: 67-Color Tneme-Tread	2.0 - 3.0
3rd Coat: 71-Color Endura-Shield	<u>1.5 - 2.5</u>
Dry Film Thickness	5.5 - 8.5
Minimum	6.5 Mils

4. System No. 281-1: High Build Polyamine-Epoxy Floor

Please refer to manufacturer's Installation Guide and Technical Data for proper installation.

Surface Preparation: Abrasive blast cleaning (refer to Installation Guide of manufacturer.

1st Coat: 201 Epoxoprime	6.0 - 8.0
2nd Coat: 281 Tneme-Glaze	<u>6.0 - 8.0</u>
Dry Film Thickness	12.0 - 16.0
Minimum	14.0 Mils

5. System No. 221/281: Functional Flooring (Non-Slip)

Please refer to manufacturer's Installation Guide and Technical Data for proper installation.

Surface Preparation: Abrasive blast cleaning (refer to Installation Guide of manufacturer.

1st Coat: 201 Epoxoprime	6.0 - 8.0
2nd Coat: 221 Lami-Tread	1/8" (2 cts. @ 1/16" ea.)
3rd Coat: 281 Tneme-Glaze	<u>8.0 - 12.0</u>
Minimum Dry Film Thickness	1/4"+

3.20

POROUS MASONRY

A. EXTERIOR/INTERIOR EXPOSURE

1. System No. 52-2: Modified Epoxy - Sand Texture

First coat of Tneme-Crete will act as a filler coat while the second coat will completely seal and finish. Long-term life and high performance. Available in Series 55 Tneme-Crete smooth finish.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 52-Color Tneme-Crete 60 - 80 SF
2nd Coat: 52-Color Tneme-Crete Per Gal/Per Coat

2. System No. 6-2: Acrylic Emulsion, Low Sheen

This system will fill the block and provide a sealed surface. For Semi-Gloss Finish, use 7-Color Tneme-Cryl S/G.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 54-562 Modified Epoxy Masonry Filler	80 SF Gal	
2nd Coat: 6-Color Tneme-Cryl	<u>2.0 - 3.0</u>	
3rd Coat: 6-Color Tneme-Cryl	<u>2.0 - 3.0</u>	*4.0 - 6.0

*Total Dry Film Thickness of Topcoats Only.

3. System No. 66-15: Epoxy-Polyamide (Interior)

Block Filler is a modified epoxy designed for high moisture.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 54-660 Epoxy Masonry Filler	100 SF/Gal
2nd Coat: 66-Color Hi-Build Epoxoline	4.0 - 6.0
3rd Coat: 66-Color Hi-Build Epoxoline	<u>4.0 - 6.0</u>
	*8.0 - 12.0

*Total Dry Film Thickness of Topcoats Only.

4. System No. 104-6: High Solids Epoxy (Interior Only)

This system will produce a film thickness of 16 mils. The surface will be tile-like for easy cleaning and will provide protection against chemical attack, corrosive fumes, high humidity and wash down. Backfold first coat to fill porosity.

Surface Preparation: Surface to be clean and dry.

1st Coat: 104-Color H.S. Epoxy	<u>6.0 - 10.0</u>
2nd Coat: 104-Color H.S. Epoxy	<u>6.0 - 10.0</u>
Dry Film Thickness	12.0 - 20.0
Minimum	14.0 Mils

5. System No. 113-1: Acrylic-Epoxy Semi-Gloss (Interior Only)

Series 113 Tneme-Tufcoat has very low odor and can be used when painting in occupied areas. Specify Series 114 Tneme-Tufcoat for a gloss finish.

Surface Preparation: Surface must be clean and dry.

1st Coat: 130 Envirofill	100 SF/Gal
2nd Coat: 113-Color Tnema-Tufcoat*	<u>4.0 - 6.0</u>
	**4.0 - 6.0

* Two coats may be required if applied by roller

** Total Dry Film Thickness of Topcoats Only

6. System No. 156-1: Modified Acrylic Elastomer

If texture is needed, use 157 Enviro-Crete TX (medium texture of 159 Enviro-Crete XTX - coarse texture). For application over previously applied coatings, use TNEMEC 151 Elasto-Grip at 1.0 - 2.5 mils DFT.

Surface Preparation: Surfaces must be clean and dry.

1st Coat: 130 Envirofil	100 SF/Gal
2nd Coat: 156-Color Enviro-Crete	4.0 - 8.0
3rd Coat: 156-Color Enviro-Crete	<u>4.0 - 8.0</u>
Dry Film Thickness	8.0 - 16.0
Minimum	10.0 Mils
(For 2nd & 3rd Coats)	

3.21 GYPSUM WALLBOARD

A. INTERIOR EXPOSURE

1. System No. 111-5: Acrylic-Epoxy

Surface Preparation: Surface must be clean and dry.

1st Coat: 51-792 PVA Sealer	1.0 - 2.0
2nd Coat: 113 H.B. Tnemefcoat*	<u>4.0 - 5.0</u>
Dry Film Thickness	5.0 - 7.0
Minimum	6.0 Mils

*Two coats may be required if application is by brush and roller.

2. System No. 66-22: Hi-Build Epoxoline

Surface Preparation: Surface must be clean and dry.

1st Coat: 51-792 PVA Sealer	1.0 - 2.0
2nd Coat: 66-Color Hi-Build Epoxoline*	<u>4.0 - 6.0</u>
Dry Film Thickness	5.0 - 8.0
Minimum	5.0 Mils

*Two coats may be required if applied by roller

3. System No. 6-1: Acrylic Emulsion, Low Sheen
(Interior/Exterior Exposure)

This system is designed for mild use areas like office walls, laboratory ceilings, stairwells, etc. For Semi-Gloss finish, use 7-color Tneme-Cryl S/G.

Surface Preparation: Surface must be dry and clean.

1st Coat: 6-Color Tneme-Cryl	2.0 - 3.0
2nd Coat: 6-Color Tneme-Cryl	<u>2.0 - 3.0</u>
Dry Film Thickness	4.0 - 6.0
Minimum	5.0 Mils

3.22 WOOD

A. EXTERIOR/INTERIOR EXPOSURE

1. System No. 23-4: Alkyd Semi-Gloss

Specify Series 2H Hi-Build Tneme-Gloss for High Gloss finish.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 36-603 Undercoater	—————	2.5 - 3.5
2nd Coat: 23 Enduratone	—————	1.5 - 3.5
3rd Coat: 23 Enduratone	—————	<u>1.5 - 3.5</u>
Dry Film Thickness		5.5 - 10.5
Minimum		6.0 Mils

2. System No. 6-5: Acrylic Latex

Substitute Series 7 if semi gloss finish is desired.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 36-603 Undercoater	—————	2.0 - 3.5
2nd Coat: 6-Color Tneme-Cryl	—————	2.0 - 3.0
3rd Coat: 6-Color Tneme-Cryl	—————	<u>2.0 - 3.0</u>
Dry Film Thickness		6.0 - 9.5
Minimum		7.5 Mils

3.23 PVC PIPE

A. EXTERIOR OR INTERIOR

System No. 66-23: Epoxy-Polyamide

Optional topcoat of Series 73/74 Endura-Shield would give long-term color and gloss retention for exterior exposure.

Surface Preparation: Surface shall be clean and dry.

One Coat:	66-Color Hi-Build Epoxoline
	Dry Film Thickness 4.0 - 6.0

3.24 INSULATED PIPE

A. INTERIOR EXPOSURE

System No. 6-1: Acrylic Emulsion, Low Sheen

For semi-gloss finish, use 7-Color Tneme-Cryl S/G.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 6-Color Tneme-Cryl	2.0 - 3.0
2nd Coat: 6-Color Tneme-Cryl	<u>2.0 - 3.0</u>
Dry Film Thickness	4.0 - 6.0
Minimum	5.0 Mils

3.25 HIGH HEAT COATING

A. EXTERIOR/INTERIOR EXPOSURE

1. System No. 39-2: Silicone Aluminum (1200deg F Maximum)

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning - 1.0 Mil Surface Profile

1st Coat: 39-1261 Silicone Aluminum	1.0 - 1.5
2nd Coat: 39-1261 Silicone Aluminum	<u>1.0 - 1.5</u>
Dry Film Thickness	2.0 - 3.0
Minimum	2.0 Mils

2. System No. 39-4: Silicone Aluminum (600deg F Maximum)

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning - 1.0 Mil Surface Profile

1st Coat: 39-661 Silicone Aluminum	1.0 - 1.5
2nd Coat: 39-661 Silicone Aluminum	<u>1.0 - 1.5</u>
Dry Film Thickness	2.0 - 3.0
Minimum	2.0 Mils

3.26 SURFACES EXPOSED TO H₂S/H₂SO₄ (SEVERE EXPOSURE/IMMERSION)

A. CEMENTITIOUS SURFACES

System No. 120-1: Vinester

Surface Preparation: Abrasive blast clean to remove all laitance, fines and contamination.

1st Coat: 120-5002 Vinester	6.0 - 10.0*
2nd Coat: 120-5003 Vinester F&S	As Required**
3rd Coat: 120-5002 Vinester	12.0 - 18.0
4th Coat: 120-5001 Vinester	12.0 - 18.0
Dry Film Thickness	30.0 - 46.0
Minimum	36.0 Mils+

*First coat is to be applied by roller application or spray applied followed by backrolling.

**All surface voids, cracks, pinholes and other defects must be filled flush with the adjacent surfaces by putty knife, trowel, float, squeegee, or other suitable method.

B. FERROUS METAL SURFACES

System No. 120-2: Vinyl Ester

Surface Preparation: SSPC-SP-5 White Metal Blast Cleaning (3.0 Mil Profile)

1st Coat: 120-5002 Vinester	12.0 - 18.0
2nd Coat: 120-5001 Vinester	12.0 - 18.0
Dry Film Thickness	24.0 - 36.0
Minimum	30.0 Mils

3.27 EXTERIOR OF PRESTRESSED CONCRETE TANKS

A. System No. 156-1: New Tanks

Surface Preparation: Surface to be clean and dry.

1st Coat: 156-Color Envirocrete	4.0 - 6.0
2nd Coat: 156-Color Envirocrete	4.0 - 6.0
Dry Film Thickness	8.0 - 12.0
Minimum	10.0 Mils

B. System No. 156-2: Existing Tanks (Previously Painted)

Major cracks (wider than 1/64") can be repaired with TNEMEC Series 152 Tneme-Tape per instructions.

Surface Preparation: Remove all dirt, oil, grease, chalk, and loose paint per high pressure water blast (min. 3500 psi).

1st Coat: 151 Elasto-Grip	1.0 - 2.5
Stripe Coat: Stripe all hairline cracks	3.0 - 5.0
with a brushed coat of Series 156 Envirocrete	
Topcoat: 156-Envirocrete	4.0 - 6.0
Dry Film Thickness (Cracks)	8.0 - 13.5
Dry Film Thickness (Other)	5.0 - 8.5

3.28 SECONDARY CONTAINMENT AREAS

A. System No. 66-4: Epoxy Polyamide

This system will provide excellent resistance to most chemicals including petrochemicals.

Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive Blast Clean per SSPC-SP7 (Brush Off Blast)

Primer: 66-Color Hi-Build Epoxoline	4.0 - 6.0
Topcoat: 66-Color Hi-Build Epoxoline	4.0 - 6.0
Dry Film Thickness	8.0 - 12.0
Minimum	10.0 Mils

B. System No. 61-1: Amine Epoxy

This system offers superior chemical resistance to a wide range of chemicals. Use TNEMEC Series 63-1500 between coats as a filler and surfacer wherever it is required.

Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive Blast Clean per SSPC-SP7 (Brush Off Blast).

Primer: 61-5002 Tneme-Liner (Beige)	8.0 - 12.0
Topcoat: 61-5001 Tneme-Liner (Gray)	8.0 - 12.0
Dry Film Thickness	16.0 - 24.0

C. System 262-1: Flexible Polyurethane

Multiple passes may be required to achieve recommended film thickness. See Elasto-Shield application guide for additional instructions. This product is only available in black.

Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive Blast Clean per SSPC-SP7 (Brush Off Blast)

Coating: 262 Elasto Shield (Black)

Minimum Dry Film Thickness 50.0

3.29 CLEAR WATER REPELLENT FOR CONCRETE, MASONRY AND BRICK

A. Silane Sealer (Min. 20% Solids)

Surface Preparation: Allow new concrete to cure 28 days. Clean surfaces to be sealed by abrasive blasting or waterblasting.

COATING: BRICK, CONCRETE
HULS Chem-Trete BSM 20....75-200 SF/GAL

SPLIT FACED OR POROUS MASONRY
HULS Chemtrete PB.....35-100 SF/GAL

3.30 MANHOLES, WET WELLS AND LIFT STATIONS

A. System No. 120-1: Vinester

Surface Preparation: Abrasive blast clean to remove all laitance, fines and contamination.

1st Coat: 120-5002 Vinester	_____	6.0 - 10.0*
2nd Coat: 120-5003 Vinester F&S	_____	As Required**
3rd Coat: 120-5002 Vinester	_____	12.0 - 18.0
4th Coat: 120-5001 Vinester	_____	12.0 - 18.0
Dry Film Thickness		30.0 - 46.0
Minimum		36.0 Mils+

*First coat to be applied by roller application or spray applied followed by backrolling.

**All surface voids, cracks, pinholes and other defects must be filled flush with the adjacent surfaces by putty knife, trowel, float, squeegee, or other suitable method.

B. System No. 100-1: Crystalline Waterproofing

This system can be applied to concrete that is still wet or has not developed final cure. It can be used where wet surface conditions exist or where there is the potential for water intrusion due to hydrostatic pressure.

Surface Preparation: Surface to be clean and roughened by Brush Blasting or Acid Etching.

1st Coat: XYPEX Concentrate @ 1.5 lbs./SY

2nd Coat: XYPEX Modified @ 1.5 lbs./SY

3.31 CANAL PIPE CROSSINGS

A. System 90-97: Zinc/Epoxy/Urethane for New Pipe or Pipe Requiring Removal of Existing Coatings

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Primer: 90-97 Tneme-Zinc	2.5 - 3.5
2nd Coat: 66-Color Hi-Build Epoxoline	2.0 - 3.0
3rd Coat: 74-Color Endurashield	<u>2.0 - 3.0</u>
Dry Film Thickness	6.5 - 9.5
Minimum	8.0 Mils

B. System No. 135-2: High Build, High Gloss Urethane for Marginally Cleaned Surfaces or Topcoating Over Existing Systems

Surface Preparation: High Pressure Water Blast (min. 3500 psi) or Solvent Clean (SSPC-SP1) and Spot Hand and Power Tool Clean (SSPC-SP 2 & 3) or Brush Blast (SSPC-SP7). Existing coatings must be clean, dry and tightly adhering prior to application of coatings.

1st Coat: 135-Color Chembuild	3.0 - 4.0
2nd Coat: 74-Color Endurashield	<u>2.0 - 3.0</u>
Minimum Dry Film Thickness	5.0

C. Ductile Iron Pipe (Above grade)

A test patch is always recommended to insure proper adhesion to existing coatings without lifting of existing coatings.

Surface Preparation: Clean and dry. (Do not solvent clean.)

1st Coat: TNEMEC Series 66*	3.0 - 5.0
2nd Coat: TNEMEC Series 66	<u>3.0 - 5.0</u>
Minimum Dry Film Thickness 6.0 - 10.0	

*Allow the black asphaltic coating to "bleed" through the first coat. After the first coat is cured, apply second coat.

3.32 PROJECT DESIGNER SYSTEMS REFERENCE GUIDE

A. STEEL

EXTERIOR (NON-IMMERSION)

- A.1 System No. 73-1: Epoxy/High Build Urethane
- A.2 System No. 73-2: High Build Urethane
- A.3 System No. 2H-3: Alkyd Gloss
- A.4 System 90-97: Zinc/Epoxy/Urethane

INTERIOR EXPOSURE (NON-IMMERSION)

- B.1 System No. 69-1: High Solids Epoxy
- B.2 System No. 66-2: High Build Epoxy
- B.3 System No. 66-6: High Build Epoxy

IMMERSION

- C.1 System No. 69-2: High Solids Epoxy (Non-Potable)
- C.2 System No. 66-2: High Build Epoxy (Non-Potable)
- C.3 System No. 20-1: Epoxy-Polyamide (Potable)
- C.4 System No. 140: High Solids Epoxy (Potable Water)
- C.5 System No. 46-30: High Build Coat Tar Epoxy (Non-Potable Only)
- C.6 System No. 46-26: Coal Tar Epoxy (Non Potable Water Only)

B. OVERHEAD METAL DECKING, JOIST (INTERIOR EXPOSURE)

System No. 15-1: Uni-Bond

C. OVERHEAD METAL DECKING, JOINT (EXTERIOR EXPOSURE)

System No. 135-1: Chembuild

D. MILL COATED STEEL PIPE

System No. 66-3: Epoxy Polyamide

E. GALVANIZED STEEL-PIPE AND MISCELLANEOUS FABRICATORS

System No. 73-1: Epoxy/High Build Urethane

F. GALVANIZED STEEL-INTERIOR EXPOSURE (NON-IMMERSION) AND ALUMINUM IN CONTACT WITH CONCRETE

System No. 66-6: Polyamide Epoxy

G. GALVANIZED STEEL - IMMERSION (POTABLE WATER)

System No. 20-1: Epoxy Polyamide (Potable Water)

H. CHAIN LINK FENCES

System No. 22-1: Oil-Cementitious

I. CONCRETE

EXTERIOR-ABOVE GRADE

A.1 System No. 52-1: Modified Epoxy-Sand Texture

A.2 System No. 6-1: Acrylic Emulsion Low Sheen

A.3 System No. 156-1: Modified Acrylic Elastomer

EXTERIOR-BELOW GRADE

B.1 System No. 46-61: Coal Tar Pitch Solution

B.2 System No. 46-31: Coal Tar Epoxy

B.3 System No. 100-1: Crystalline Waterproofing

EXTERIOR/INTERIOR EXPOSURE (NON-IMMERSION)

C.1 System No. 6-1: Acrylic Emulsion Low Sheen

C.2 System No. 66-4: Epoxy-Polyamide

C.3 System No. 83-1: High Solids Catalyzed Epoxy

IMMERSION (POTABLE & NON-POTABLE)

D.1 System No. 66-4: Epoxy-Polyamide (Non-Potable)

D.2 System No. 104-5: High Solids Epoxy (Non-Potable)

D.3 System No. 46-31: High Build Coal Tar Epoxy (Non-Potable Only)

D.4 System No. 46-27: Coal Tar Epoxy (Non Potable Only)

D.5 System No. 20-2: Epoxy Polyamide (Potable)

D.6 System No. 139-2: Epoxy Polyamide (Potable)

INTERIOR EXPOSURE (NON-IMMERSION)

- E.1 System No. 104-3: High Solids Epoxy
- E.2 System No. 113-1: Acrylic Epoxy Semi-Gloss

J. CONCRETE FLOORS

- A.1 System No. 67-1: Epoxy-Polyamide
- A.2 System No. S67-1: Epoxy-Polyamide (Non-Skid)
- A.3 System No. 73-12: Epoxy/Urethane
- A.4 System No. 281-1: High Build Polyamide-Epoxy Flooring
- A.5 System No. 221/281: Functional Flooring (Non-Slip)

K. POROUS MASONRY - EXTERIOR/INTERIOR EXPOSURE

- A.1 System No. 52-2: Modified Epoxy-Sand Texture
- A.2 System No. 6-2: Acrylic Emulsion, Low Sheen
- A.3 System No. 66-15: Epoxy-Polyamide (Interior)
- A.4 System No. 104-6: High Solids Epoxy (Interior Only)
- A.5 System No. 113-1: Acrylic Epoxy Semi-Gloss (Interior Only)
- A.6 System No. 156-1: Modified Acrylic Elastomer

L. GYPSUM WALLBOARD

- A.1 System No. 111-5: Acrylic Epoxy
- A.2 System No. 66-22: Hi-Build Epoxoline
- A.3 System No. 6-1: Acrylic Emulsion, Low Sheen

M. WOOD EXTERIOR/INTERIOR EXPOSURE

- A.1 System No. 23-4: Alkyd Semi-Gloss
- A.2 System No. 6-5: Acrylic Latex

N. PVC PIPE EXTERIOR/INTERIOR EXPOSURE

- A.1 System No. 66-23: Epoxy-Polyamide

O. INSULATED PIPE-INTERIOR EXPOSURE

- A.1 System No. 6-1: Acrylic Emulsion, Low Sheen

P. HIGH HEAT SURFACES-FERROUS METAL

- A.1 System No. 39-2: Silicone Aluminum (1200deg F Maximum)
- A.2 System No. 39-4: Silicone Aluminum (600deg F Maximum)

Q. SURFACES EXPOSED TO H₂S/H₂SO₄ (SEVERE EXPOSURE/IMMERSION)

- A.1 System No. 120-1: Vinester

- R. EXTERIOR OF PRESTRESSED CONCRETE TANKS
 - A. System 156-1: New Tanks
 - B. System 156-2: System 156-2 Existing Tanks (Previously Painted)
- S. SECONDARY CONTAINMENT AREAS
 - A. System No. 64-4: Epoxy Polyamide
 - B. System No. 61-1: Amine Epoxy
 - C. System No. 262-1: Flexible Polyurethane
- T. CLEAR WATER REPELLENT FOR CONCRETE, MASONRY AND BRICK
 - A. Silane Sealer (Min. 20% Solids)
- U. MANHOLES, WET WELLS & LIFT STATIONS
 - A. System No. 120-1: Vinester
 - B. System No. 100-1: Crystalline Waterproofing
- V. CANAL PIPE CROSSINGS
 - A. System No. 90-97: Zinc/Epoxy/Urethane
 - B. System No. 135-2: High Build/High Gloss Urethane
 - C. Ductile Iron Pipe Above Grade: Series 66 High Build Epoxy

3.33 COATING SCHEDULE - TO BE DEVELOPED BY PROJECT AS NEEDED

END OF SECTION

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APPENDIX A - PERMITS

UTILITY PERMIT

PERMIT NO: 2018-H-194-229

STATE ROAD INFORMATION

County: Manatee	Section: 13080000	State Road No: SR 789	Beginning Mile Post: 6.251	Ending Mile Post: 6.295
---------------------------	-----------------------------	---------------------------------	--------------------------------------	-----------------------------------

APPLICANT INFORMATION

<p>The Utility Agency Owner (UAO) shall be identified in this Applicant Information Box. When the UAO is a City or County and desires to have the Utility Builder make a joint permit applicant, as prescribed in Section 2.1(4) of the 2017 Utility Accommodation Manual (UAM), the Utility Builder shall also be identified in this Applicant Information Box. A Utility Builder alone cannot apply for a utility permit without the City or County adding them as a joint applicant.</p>	
Utility Agency/Owner (UAO)	Utility Builder (only applicable when the UAO is a City or County)
Name: <u>Manatee County</u>	Name: _____
Contact Person: <u>Manatee County</u>	Contact Person: _____
Address: <u>1022 26th Avenue East</u>	Address: _____
City: <u>Bradenton</u>	City: _____
State: <u>Florida</u>	State: _____
Zip: <u>342083926</u>	Zip: _____
Telephone: <u>94170874877487</u>	Telephone: _____
Email: <u>sia.mollanazar@mymanatee.org</u>	Email: _____

WORK DESCRIPTION

<p>The Applicant(s) requests permission from the Florida Department of Transportation (FDOT) to construct, operate, and maintain the utilities as described below and as depicted in the incorporated documentation.</p> <p>The purpose of this project involves the replacement of an existing 6" force main and 10" gravity sewer. Approximately 2,855 linear feet of force main will connect Manatee County lift station 1 to Manatee County's 6" force main. The connection to existing force main occurs underneath the Cortez Bridge (SR-684). Additionally, approximately 720 linear feet of gravity main will be connected to the Manatee County sewer system. Approximately 240 linear feet of force main and 23 ... (see work description cont. page)</p> <p>Utility Work No: _____</p> <p>Additional sheets are attached and are incorporated into this permit Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>For FDEP certification, the FDOT agency report is attached in accordance with UAM Section 2.4.1 (13) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>
--

TRAFFIC CONTROL (TCP)

<p><input checked="" type="checkbox"/> The TCP will comply with the following 600 series index(es) <u>600, 603, 605, 660, 604</u></p> <p><input type="checkbox"/> A TCP has been attached and incorporated into this permit application in compliance with UAM Section 2.4.2.</p>
<p>MOT Technician's contact information (may be supplied at the two (2) business day notification to FDOT):</p> <p>Name: _____ Telephone: _____ Email: _____</p>

COMMENCEMENT OF WORK

<p>The UAO and/or Utility Builder shall commence actual construction in good faith within sixty (60) calendar days after approval of the permit application. If the beginning date is more than sixty (60) calendar days from the date of approval, the UAO and/or Utility Builder must review the permit with the FDOT Approving Engineer listed to make sure no changes have occurred to the transportation facility that would affect the permit's continued approval. The UAO and/or Utility Builder shall make good faith efforts to expedite the work and complete the work within the calendar days indicated.</p> <p>Anticipated Start Date: <u>1/16/2019</u></p> <p>Calendar days needed to completed: <u>413</u></p>
--

Approved
2018-H-194-229
Leon Herndon
9/18/2018

UTILITY PERMIT**PERMIT NO:** 2018-H-194-229**APPLICANT SIGNATURE**

By the below signature(s) the UAO and/or Utility Builder agree(s) to construct, operate, and maintain the work as noted in the above Work Description, shown in plans and incorporated documents, in compliance with the UAM, all instructions noted in the FDOT Special Instructions Box, and special instructions incorporated into this permit. The UAO and/or Utility Builder declares, the location of all existing utilities that it owns or has an interest in, both aerial and underground, are accurately shown on the plans of the work areas. In accordance with UAM Section 2.8, the UAO and/or Utility Builder further declares that a letter of notification was delivered to the owners of other facilities within the work areas and that those listed below are the only facility owners known to be involved or potentially impacted by the proposed work.

Date Notified:

10/10/2017

Name of other facility owners (attach additional sheets if necessary).

Frontier2/8/2017Manatee County10/10/2017TECO peoples gas

Utility Agency/Owner

Utility Builder (when applicable)

Signature: SIA MOLLANAZAR (digital signature) Date: 8/6/2018Name (printed): SIA MOLLANAZAR

Title: _____

Signature: _____ Date: _____

Name (printed): _____

Title: _____

FDOT PROJECT INFORMATION

Pursuant to UAM Section 2.1(10), the utility work is within FDOT projects listed below and must have a Utility Work Schedule for each project approved prior to commencement of work within the FDOT project limits:

There are NO FDOT constructions (proposed or underway).

This work is NOT related to an approved utility work Schedule.

FDOT SPECIAL INSTRUCTIONS

In accordance with UAM Section 2.7, FDOT incorporates the below and attached special instructions into this permit.

1. OPERATIONS OFFICE IS NOTIFIED 48 HOURS IN ADVANCE OF STARTING WORK. PERMIT VOID UNLESS DOT MANATEE PHONE: (941) 708-4400

2. IF A LANE CLOSURE IS WITHIN THE PROJECT LIMITS, THE PERMITTEE MUST SUBMIT THROUGH THE LANE CLOSURE INFORMATION SYSTEM AT [HTTP://LCIS.DOT.STATE.FL.US/](http://LCIS.DOT.STATE.FL.US/) TWO WEEKS PRIOR FOR A REQUESTED LANE CLOSURE TO INFORM THE MOTORING PUBLIC. FAILURE TO COMPLY MAY RESULT IN A DELAY TO BEGIN WORK.

Additional FDOT Special Instructions are attached and incorporated into this permit. Yes ☐ No ☒

PERMIT APPROVAL

By signature below, FDOT gives permission to the UAO and/or Utility Builder to construct, operate, and maintain the utilities indicated in this Utility Permit in compliance with the UAM, all incorporated documents, and special instructions. Any changes to the approved work must be approved by the FDOT's Approving Engineer and attached and incorporated into this permit in accordance with UAM Section 2.11.

Approving Engineer: Leon Herndon (digital signature) Date: 9/18/2018Name: Leon HerndonTitle: MAINTENANCE MANAGER/PERMITSNotification of Utility Work to be provided to: Telephone (941) 708-4400 ext. 4436 or Email: leon.herndon@dot.state.fl.us

An FDOT Representative is required to be present on the worksite prior to commencement of work. Yes ☐ No ☒

Rep. Name: _____ Telephone _____ Email: _____

Approved
2018-H-194-229
Leon Herndon
9/18/2018

Florida Department of Transportation
UTILITY PERMIT

December 14, 2016

PERMIT NO: 2018-H-194-229

CERTIFICATION

I, the undersigned UAO and/or Utility Builder, hereby CERTIFY that the utilities were constructed and inspected in compliance with the UAM all incorporated documents, and special instructions. Pursuant to UAM Section 2.11, all changes have been approved by the FDOT's Approving Engineer and incorporated into this permit along with all other material certifications, test results, bore logs, approved plans changes, as-built plans or other required documentation.

I also CERTIFY that work began on _____ and was completed on _____ and that the area was left in as good or better condition than when the work began.

Utility Agency/Owner

Utility Builder (when applicable)

Signature: _____ Date _____

Signature: _____ Date _____

Name (printed): _____

Name (printed): _____

Title: _____

Title: _____

FINAL INSPECTION OF WORK

☐ The work was inspected and found to be in non-compliance as noted below:

☐ All issues of non-compliance listed above have been brought into compliance and/or FDOT has no outstanding issues that need to be addressed by the UAO and/or Utility Builder. However, this final inspection does not release the UAO and/or Utility Builder of their continuing responsibilities pursuant to Rule 14-46.001, the UAM, all incorporated documents, and special instructions.

FDOT Inspector: _____ Date: _____

Name: _____

Title: _____

Approved
2018-H-194-229
Leon Herndon
9/18/2018

PERMIT NO.: 2018-H-194-229

The complete Work Description could not fit in the space allotted on Page 1 of the Utility Permit so it is displayed below.

Work Description

The purpose of this project involves the replacement of an existing 6" force main and 10" gravity sewer. Approximately 2,855 linear feet of force main will connect Manatee County lift station 1 to Manatee County's 6" force main. The connection to existing force main occurs underneath the Cortez Bridge (SR-684). Additionally, approximately 720 linear feet of gravity main will be connected to the Manatee County sewer system. Approximately 240 linear feet of force main and 235 linear feet of gravity main will be constructed via open cut along SR-789 (Gulf Drive). Sewer manholes will be constructed at the intersection of 6th Street and Gulf Drive as well as 5th Street and Gulf Drive.

Approved
2018-H-194-229
Leon Herndon
9/18/2018

PERMIT NO.: 2018-H-194-229

STATE ROAD INFORMATION:

Manatee SR 789, Begin MP: 6.251, End MP: 6.295, Manatee SR 684, Begin MP: 0.113, End MP: 0.113

NAME OF OTHER FACILITY OWNERS / DATE NOTIFIED:

FDOT PROJECT INFORMATION:

There are NO FDOT constructions (proposed or underway).
This work is NOT related to an approved Utility Work Schedule.

THE WORK WAS INSPECTED AND FOUND TO BE IN NON-COMPLIANCE AS NOTED BELOW:

Approved
2018-H-194-229
Leon Herndon
9/18/2018

FTR

VERIZON FLORIDA, INC.

☐ INVOLVED - WE HAVE FACILITIES IN THIS AREA
☒ NOT INVOLVED

BY Path Rend DATE 9/19/06
FOR ADDITIONAL INFORMATION PLEASE CONTACT
AT 6711
PLEASE CONTACT - LOCATES
800-432-4770

NOTE:

ALL FACILITIES ARE BASED UPON
EXISTING VERIZON MAPS AND ARE TO BE
CONSIDERED APPROXIMATE LOCATIONS.
DEVELOPER MUST CALL
AT 1-800-432-4770 FOR EXACT LOCATION OF
FACILITIES AT LEAST 2 BUSINESS DAYS
BEFORE DIGGING.



(1) Buried
copper cable
along the
East end of
Church

Crossings
is conduits
cable

(1) Buried
copper cable
along the
West side
of Church

Approved
2018-H-194-229
Leon Herndon
9/18/2018

(1) Direct Buried Copper
cable



(1) Direct Buried
Copper cable

(1) Direct Buried
Copper cable

(1) Direct Buried
Copper cable

(1) 2way
Duct system
w/ fiber
(1) 4" Conduit
w copper
(1) Direct Buried
Copper cable

Bohmann, Lindsey

From: Wood, Wade
Sent: Tuesday, October 10, 2017 8:44 AM
To: Patti.Reid@ftr.com
Cc: Tondreault, Jamison; Bohmann, Lindsey
Subject: Manatee County EOSL Project
Attachments: Attachments.html

Patti-

I know we coordinated early on this the process, but we have finalized our plans, please see attached. We wanted to pass the final plans along to see if you have any comments or concerns. If so, please feel free to reach out.

Thanks,

ShareFile Attachments

Expires April 8, 2018

EOSL Package A - 100% Plans.pdf	19.4 MB
EOSL Package B - 100% Plans.pdf	23.4 MB

Download Attachments

Wade Wood uses ShareFile to share documents securely. [Learn More.](#)

W. Wade Wood III, P.E.

Kimley-Horn | 655 North Franklin Street, Suite 150, Tampa, FL 33602

Direct: 813-635-5583 | Mobile: 321-299-2395

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Approved
2018-H-194-229
Leon Herndon
9/18/2018

Bohmann, Lindsey

From: Reid, Patti <patti.reid@ftr.com>
Sent: Monday, March 20, 2017 8:19 AM
To: Bohmann, Lindsey
Subject: RE: FM-1 MARK UP COMPELTE.
Attachments: 20170320081358381.pdf

Patti Reid
Engr SPEC-NTWK ENG&OPS
Frontier Communications
1701 Ringling Blvd
Sarasota FL 34236
Ofc 941-906-6711
PATTI.REID@FTR.COM

WWW.FRONTIER.COM

Be strong enough to stand alone, smart enough to know when you need help, and brave enough to ask for it.



From: Lindsey.Bohmann@kimley-horn.com [mailto:Lindsey.Bohmann@kimley-horn.com]
Sent: Monday, March 20, 2017 7:43 AM
To: Reid, Patti
Subject: RE: FORCE MAIN 28A MARK UP COMPLETE.

Good morning Patti,

Approved
2018-H-194-229
Leon Herndon
9/18/2018

I have reattached it, let me know if there are still issues.

Thanks,
Lindsey

From: Reid, Patti [<mailto:patti.reid@ftr.com>]
Sent: Monday, March 20, 2017 7:20 AM
To: Bohmann, Lindsey <Lindsey.Bohmann@kimley-horn.com>
Subject: RE: FORCE MAIN 28A MARK UP COMPLETE.

Lindsey

There is an error on this page when I try to open it.

Patti Reid
Engr SPEC-NTWK ENG&OPS
Frontier Communications
1701 Ringling Blvd
Sarasota FL 34236
Ofc 941-906-6711
PATTI.REID@FTR.COM

WWW.FRONTIER.COM

Be strong enough to stand alone, smart enough to know when you need help, and brave enough to ask for it.



From: Lindsey.Bohmann@kimley-horn.com [<mailto:Lindsey.Bohmann@kimley-horn.com>]
Sent: Friday, March 17, 2017 2:20 PM
To: Reid, Patti <patti.reid@ftr.com>
Subject: RE: FORCE MAIN 28A MARK UP COMPLETE.

Thank you. I don't show that I received FM 1 yet. I have attached the Exhibit for FM 1.

Thanks,
Lindsey

From: Reid, Patti [<mailto:patti.reid@ftr.com>]
Sent: Friday, March 17, 2017 2:13 PM
To: Bohmann, Lindsey <Lindsey.Bohmann@kimley-horn.com>
Subject: FORCE MAIN 28A MARK UP COMPLETE.

Mark-up complete. This should be the last of them.

Patti Reid
Engr SPEC-NTWK ENG&OPS
Frontier Communications
1701 Ringling Blvd
Sarasota FL 34236
Ofc 941-906-6711
PATTI.REID@FTR.COM

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Be strong enough to stand alone, smart enough to know when you need help, and brave enough to ask for it.



This communication is confidential. Frontier only sends and receives email on the basis of the terms set out at http://www.frontier.com/email_disclaimer.

Bohmann, Lindsey

From: Bohmann, Lindsey
Sent: Tuesday, February 14, 2017 12:26 PM
To: patti.reid@ftr.com
Subject: Utility Notification Progress
Attachments: Attachments.html

ShareFile Attachments	
Title	Size
Force Main 15A Utilities.pdf	6.1 MB
Force Main 1C Utilities.pdf	8.8 MB
Force Main 28A Utilities.pdf	7.1 MB
Force Main 8 Utilities.pdf	6 MB
Orlando Ave Utilities.pdf	6.5 MB
Port Manatee FM.pdf	6 MB
<div>Download Attachments</div> Lindsey Bohmann uses ShareFile to share documents securely. Learn More.	

Good Afternoon Patti,

Last week I sent you an email requesting that you specify the approximate location of any utilities owned or operated by your organization in the areas specified on the attached aerials. If possible, I would like to have the location of your utilities by the end of this week. Please get this information to me at your earliest convenience and let me know if you do not think that you could have this to me by the end of the week.

Thanks for your help, and if you have any additional questions, please do not hesitate to contact us.

Lindsey

Lindsey Bohmann | Analyst
Kimley-Horn | 655 N Franklin Street, Suite 150, Tampa, FL 33602
Direct: 813 635 5550 | Mobile: 772 713 9740 | www.kimley-horn.com

Approved
2018-H-194-229
Leon Herndon
9/18/2018

Bohmann, Lindsey

From: Bohmann, Lindsey
Sent: Wednesday, February 8, 2017 5:16 PM
To: patti.reid@ftr.com
Subject: Request for Utility Locations in Manatee County
Attachments: Attachments.html

ShareFile Attachments	
Title	Size
Force Main 15A Utilities.pdf	6.1 MB
Force Main 1C Utilities.pdf	8.8 MB
Force Main 28A Utilities.pdf	7.1 MB
Force Main 8 Utilities.pdf	6 MB
Orlando Ave Utilities.pdf	6.5 MB
Port Manatee FM.pdf	6 MB
<div>Download Attachments</div> Lindsey Bohmann uses ShareFile to share documents securely. Learn More.	

Hi Patti,

Kimley-Horn and Associates, Inc. has been authorized by Manatee County to design several force main replacements. The new pipe diameter and location is described below and the proposed location can be seen in the attached aerials.

The general location for each force main:

1. Force main 1C- Approximately 2,500 feet of 6 inch force main from Lift Station 054 to a point of connection to the existing Force Main 5.
2. Force main 8- Approximately 1,400 feet of 6 inch force main from Lift Station 063 to a manhole at the intersection of Marina Drive and Clark Drive.
3. Force main 15A- Approximately 1,700 feet of 6 inch force main from Lift Station 067 to a manhole along North Bay Blvd.
4. Force main 28A- Approximately 1,500 feet of 4 inch force main from the Lift Station 130 to a manhole north of the intersection of 57th Avenue West and 24th Street West. Additionally, approximately 275 feet of 4 inch force main from US Post Office Lift Station to a manhole south of 57th Avenue West along 20th Street West.
5. Orlando Avenue- Approximately 2,300 feet of 10 inch force main from Lift Station 26A to a manhole at the intersection of Orlando Avenue and US 41. Additionally, 215 feet of 3 inch force main from the Cortez Plaza Lift Station to a manhole off of 5th Street West.

6. Port Manatee- Approximately 2,000 feet of 4 inch force main from Lift Station 512 to a manhole near North Dock Street and Eastern Avenue. Kimley-Horn is requesting that you specify the approximate location of any utilities owned or operated by your organization in these areas. Please mark the approximate locations on the attached sheets and/or include as-builts and record drawings along with any service request forms or guidelines regarding resolution procedures in the event of a conflict.

Thanks for your help, and if you have any additional questions, please do not hesitate to contact us.

Lindsey

Lindsey Bohmann | Analyst

Kimley-Horn | 655 N Franklin Street, Suite 150, Tampa, FL 33602

Direct: 813 635 5550 | Mobile: 772 713 9740 | www.kimley-horn.com

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FOR
END OF SERVICE LIFE FORCE MAIN REPLACEMENT
PACKAGE B: FM 8/ FM 15/ FM 1

MANATEE COUNTY, FLORIDA

JULY 2018

MANATEE COUNTY PROJECTS #6089580, #6089680, #6089480



PROJECT TEAM:

OWNER:
MANATEE COUNTY
1022 26TH AVE. E.
BRADENTON, FL 34208
CONTACT: MICHAEL STURM, P.E.
941-708-7450 ext. 7332

ENGINEER:
KIMLEY-HORN AND ASSOCIATES, INC.
655 NORTH FRANKLIN STREET, SUITE 150
TAMPA, FL 33602
CONTACT: W. WADE WOOD, P.E.
813-635-5583

SURVEYOR:
HYATT SURVEY SERVICES INC.,
11007 8TH AVENUE EAST
BRADENTON, FLORIDA 34212
CONTACT: JOHN MATTHEWS
941-748-4693

GEO TECH:
ARDAMAN & ASSOCIATES, INC.
78 SARASOTA CENTER BOULEVARD
SARASOTA, FLORIDA 34240
CONTACT: JERRY H. KUEHN, P.E.
941-922-3526

UTILITY CONTACTS:

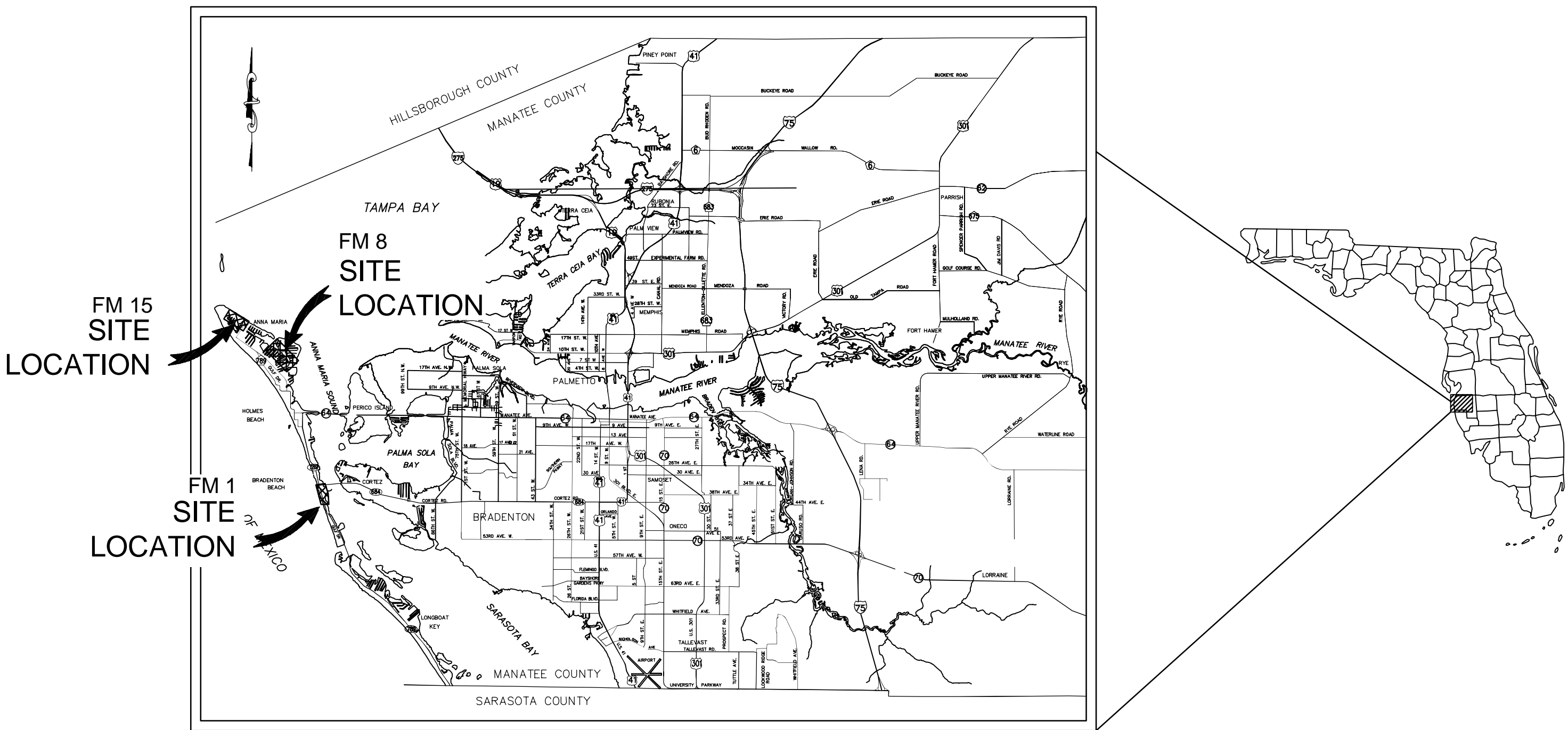
FLORIDA POWER & LIGHT
GREG COKER
1253 12TH AVE. EAST
PALMETTO, FL 34221
941-723-4430

FRONTIER COMMUNICATIONS
PATTI REID
1701 RINGLING BLVD.
SARASOTA, FL 34236
941-906-6711

CHARTER COMMUNICATIONS
JIM CRUZAN
5413 S.R. 64 EAST,
BRADENTON, FL 34208
727-329-2846

MANATEE COUNTY UTILITY RECORDS
KATHY MCMAHON
4520- 66TH STREET W
BRADENTON, FL 34210
941-792-8811 EXT. 5002

TECO PEOPLES GAS
DANNY SHANAHAN
8261 VICO CT.
SARASOTA, FL 34240
941-342-4006



PROJECT VICINITY MAP
N.T.S.

FDOT PERMITTING SET

PREPARED BY
Kimley»Horn

2018 KIMLEY-HORN AND ASSOCIATES, INC.
655 NORTH FRANKLIN STREET, SUITE 150,
TAMPA, FL 33602
PHONE (813) 620-1460
WWW.KIMLEY-HORN.COM CA 00000696

SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
1	COVER SHEET
2	GENERAL NOTES
3	SURVEY AND SUE NOTES
4	FORCE MAIN 8 KEY SHEET
5-7	PLAN AND PROFILE MARINA DRIVE
8	FORCE MAIN 15 KEY SHEET
9-12	PLAN AND PROFILE NORTH BAY BLVD.
13	FORCE MAIN 1 KEY SHEET
14	PLAN AND PROFILE 6TH STREET
15	PLAN AND PROFILE GULF DRIVE
16	PLAN AND PROFILE 5TH STREET
17-18	PLAN AND PROFILE BAY DRIVE
19	PLAN AND PROFILE CHURCH AVENUE
20	PLAN AND PROFILE CHURCH AVENUE
21-24	CONSTRUCTION DETAILS
25	CROSS SECTIONS (GULF DRIVE)

THE SITE CONSTRUCTION STAKEOUT SHALL BE PERFORMED UNDER THE DIRECTION OF A FLORIDA REGISTERED SURVEYOR. AUTOCAD FILES WILL BE FURNISHED TO AID IN THE SITE CONSTRUCTION STAKEOUT. ANY DISCREPANCIES FOUND BETWEEN AUTOCAD FILES AND SITE CONSTRUCTION PLANS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION FOR CLARIFICATION PRIOR TO THAT STAKEOUT.

THIS DOCUMENT IS PROTECTED BY SECTION 106 OF THE "UNITED STATES COPYRIGHT" ACT. REPRODUCTION OR ALTERATION OF THIS DOCUMENT OR THE INFORMATION CONTAINED HEREON BY ANY MEANS WHATSOEVER IS STRICTLY PROHIBITED WITHOUT THE PRIOR WRITTEN CONSENT OF KIMLEY-HORN AND ASSOCIATES, INC. CONSENT IS HEREBY GRANTED SPECIFICALLY TO GOVERNMENTAL AGENCIES TO REPRODUCE THIS DOCUMENT IN COMPLIANCE WITH F.S. CHAPTER 119.	WADE W. WOOD, P.E. FLORIDA LICENSE NUMBER 69051	DATE July, 2018
		KHA PROJECT NO. 148400016
		SHEET NUMBER 1

No.	REVISIONS	DATE	BY

Approved
Leon Herndon
9/18/2018

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GENERAL

- ALL CONSTRUCTION ACTIVITIES SHALL BE COORDINATED WITH THE PROJECT MANAGEMENT DIVISION. THE PROJECT MANAGER IS: MICHAEL STURM, P.E. AND CAN BE REACHED AT (941) 708-7450 X7332
- IF THE CONTRACTOR WANTS A SITE VISIT PRIOR TO BIDDING, THESE SHALL BE ARRANGED THROUGH THE COUNTY'S PURCHASING DIVISION.
- ALL CONSTRUCTION ON THIS PROJECT SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF MANATEE COUNTY UTILITY AND TRANSPORTATION STANDARDS AND/OR FDOT "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" UNLESS OTHERWISE INDICATED ON THE PLANS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL CONDITIONS AND REQUIREMENTS OF ALL PERMITS AND ALL GOVERNMENTAL, STATE AND FEDERAL, AND LOCAL AGENCIES. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS THAT ARE NOT PROVIDED IN THE BID DOCUMENTS, AT NO ADDITIONAL COST TO THE OWNER.
- THE INFORMATION PROVIDED IN THESE PLANS IS SOLELY TO ASSIST THE CONTRACTOR IN ASSESSING THE NATURE AND EXTENT OF THE CONDITIONS WHICH MAY BE ENCOUNTERED DURING THE COURSE OF WORK. ALL CONTRACTORS ARE DIRECTED, PRIOR TO BIDDING, TO CONDUCT WHATEVER INVESTIGATION THEY MAY DEEM NECESSARY TO ARRIVE AT THEIR OWN CONCLUSIONS REGARDING THE ACTUAL CONDITIONS THAT WILL BE ENCOUNTERED, AND UPON WHICH THEIR BIDS WILL BE BASED.
- THE CONTRACTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS ON THE PLANS AND REVIEW ALL FIELD CONDITIONS THAT MAY AFFECT CONSTRUCTION. SHOULD DISCREPANCIES OCCUR, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO OBTAIN THE ENGINEER'S CLARIFICATION BEFORE COMMENCING WITH CONSTRUCTION.
- THE CONTRACTOR SHALL NOTIFY SUNSHINE 811 (1-800-432-4770) AT LEAST 2 FULL BUSINESS DAYS PRIOR TO CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL UTILITIES FOR THE POSSIBLE RELOCATION OR THE TEMPORARY MOVEMENT OF ANY EXISTING UTILITIES WITHIN THE RIGHTS-OF-WAY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT EXISTING UTILITIES FROM DAMAGE. EXPLORATORY EXCAVATION MAY BE REQUIRED PRIOR TO CONNECTION TO EXISTING UTILITIES.
- NO WORK, EXCEPT FOR EMERGENCY TYPE, SHALL BE PERFORMED AFTER 7:00 PM AND BEFORE 7:00 AM. FOR ADDITIONAL PROJECT RESTRAINTS, REFER TO SECTION 01310 OF THE SPECIFICATIONS.
- THE CONTRACTOR SHALL PROVIDE CERTIFIED RECORD DRAWINGS AS OUTLINED IN THE SPECIFICATIONS. RED-LINE DRAWINGS SHALL BE CURRENT WITH EACH PAY APPLICATION SUBMITTED AND WILL BE CHECKED AS PART OF THE PAY APPLICATION REVIEW PROCESS. PAYMENT WILL NOT BE MADE TO CONTRACTOR WITHOUT APPROVED RED-LINE DRAWINGS. THE MOST CURRENT SET OF RED-LINE DRAWINGS SHALL ALSO BE BROUGHT TO EACH MONTHLY PROGRESS MEETING.
- THE CONTRACTOR SHALL INCLUDE IN HIS BID: BY-PASS PUMPING FACILITIES, PUMPS, FITTINGS, LABOR, ETC. AS NECESSARY, BASED ON METHOD AND SEQUENCE OF CONSTRUCTION TO COMPLETE ALL WORK WHILE MAINTAINING SEWER SERVICE OPERATIONS AT ALL TIMES.
- THE CONTRACTOR SHALL PROVIDE THE OWNER AND ENGINEER WITH A DETAILED CONSTRUCTION PHASING PLAN BASED ON THE CONNECTION SEQUENCING BELOW. EXISTING FORCE MAIN 8, FORCE MAIN 15, AND FORCE MAIN 1 SHALL REMAIN IN SERVICE UNTIL ALL CONNECTIONS TO THE PROPOSED FORCE MAIN ARE CONSTRUCTED.
- ALL PROPOSED WORK SHALL BE COORDINATED WITH MANATEE COUNTY UTILITIES DEPARTMENT AT LEAST TWO WEEKS IN ADVANCE OF PROPOSED CONSTRUCTION.
- THE CONTRACTOR SHALL FURNISH SHOP DRAWINGS TO THE ENGINEER FOR REVIEW OF ALL PIPE CONNECTIONS, TRANSITIONS, AND SPECIAL APPURTENANCES PRIOR TO FABRICATION OR DELIVERY TO THE JOB SITE.
- UNLESS OTHERWISE INDICATED OR APPROVED, ALL BELOW GROUND DUCTILE IRON PIPE SHALL HAVE PUSH-ON OR MECHANICAL JOINTS, AND ALL ABOVE GROUND DUCTILE IRON PIPE SHALL HAVE FLANGED JOINTS. ALL JOINTS SHALL BE FULLY RESTRAINED PER THE DETAILS IN THESE PLANS.
- SANITARY SEWERS AND FORCEMAINS CROSSING OVER OR UNDER WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18" BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SUCH THAT THE SEWER OR FORCE MAIN PIPE JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN 10" BETWEEN ANY TWO JOINTS. AS AN ALTERNATIVE, THE SEWER OR FORCE MAIN MAY BE PLACED IN A WATERTIGHT CASING PIPE, CONSISTENT WITH F.A.C. RULE 62-555.314.
- ALL BELOW-GRADE FITTINGS 4-INCHES AND GREATER IN DIAMETER SHALL BE MECHANICAL JOINT DUCTILE IRON WITH PROTECTO 401 LINING FOR THEIR INTERIOR SURFACES AND COAL TAR ENAMEL COATING ON EXTERIOR SURFACES, AS NOTED IN SECTION 02615 OF SPECIFICATIONS.
- IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO SECURE PROPERTY FOR STAGING MATERIALS AND EQUIPMENT.
- IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO ACQUIRE, OR ENTER INTO AGREEMENTS, FOR LANDS FOR LAY DOWN AREAS AND STAGING. THE COUNTY WILL COORDINATE AND ADVISE, TO HELP IDENTIFY POSSIBLE PARCELS. IT IS FINALLY THE CONTRACTOR'S RESPONSIBILITY TO SECURE THE NEEDED AREAS, AND THE COUNTY TAKE NO RESPONSIBILITY FOR DELAYS IN THIS REGARD.
- COORDINATION AND PUBLIC INFORMATION FOR AND WITH AREA RESIDENTS ARE OF THE UTMOST IMPORTANCE. CONTRACTOR WILL INSURE ADHERENCE TO THE COUNTY'S NOISE ORDINANCE, HAZARD AND SAFETY, AND NUISANCE ABATEMENT DIRECTIONS, PLANS, OBJECTIONS AND ORDINANCES. THE ENGINEER WILL HAVE THE FINAL DISCRETION IN THIS REGARD, AS REPRESENTED ONSITE BY THE COUNTY INSPECTOR AND ENGINEER'S STAFF.

SAFETY

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE FLORIDA TRAFFIC SAFETY ACT, 90-96, LAWS OF FLORIDA EFFECTIVE OCTOBER 1, 1990 AND THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION EXCAVATION SAFETY STANDARDS, 29 CFR 1926.650, SUBPART P, AS AMENDED. THE CONTRACTOR SHALL INCLUDE IN THE TOTAL BID PRICE ALL COSTS FOR COMPLIANCE WITH THESE REGULATIONS.
- THE CONTRACTOR SHALL USE SHEET PILING, SHEETING, BRACING, ETC., AS REQUIRED IN ALL EXCAVATION AREAS AND CONFORM TO ALL OSHA REQUIREMENTS.
- THE CONTRACTOR SHALL USE ALL NECESSARY SAFETY PRECAUTIONS TO AVOID CONTACT WITH OVERHEAD AND UNDERGROUND UTILITIES, POWER LINES, ETC.
- THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. THIS EXCLUSION DOES NOT ALLEVIATE THE CONTRACTOR FOR PROVIDING A CONTINUOUS SAFE WORKSPACE.

ENVIRONMENTAL

- WHEN A BENTONITE SPILL OR FRACK-OUT OCCURS OR THERE IS A LOSS OF RETURN INDICATING EXCESSIVE SEEPAGE OR LOSS OF DRILLING FLUID, DRILLING MUST BE STOPPED UNTIL THE LOCATION OF THE SPILL IS IDENTIFIED. UNDER NO CIRCUMSTANCES WILL DRILLING CONTINUE WHEN A SPILL IS APPARENT.
- ONCE LOCATED, THE BENTONITE SPILL MUST BE ISOLATED AND SEEPAGE INTO ANY NEARBY WATER BODIES WILL BE BLOCKED DEPENDING ON THE DEGREE OF THE SPILL. THE ISOLATED BENTONITE MUST BE REMOVED MANUALLY OR MECHANICALLY AND DISPOSED OF BY APPROPRIATE MEANS OR REUSED.
- THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY STORM WATER, EROSION, AND SEDIMENTATION CONTROL MEASURES. ACCORDING WITH THE FDOT "FLORIDA STORM WATER, EROSION AND SEDIMENTATION CONTROL INSPECTOR'S MANUAL", IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTROL AND PREVENT EROSION AND TRANSPORT OF SEDIMENT TO SURFACE DRAINS AND TO DITCHES DURING CONSTRUCTION.
- STOCKPILES SHALL BE PROTECTED AT ALL TIMES BY ON-SITE DRAINAGE CONTROLS WHICH PREVENT EROSION OF THE STOCKPILED MATERIAL. CONTROL OF DUST FROM SUCH STOCKPILES IS REQUIRED, DEPENDING UPON THEIR LOCATION AND THE EXPECTED LENGTH OF TIME THE STOCKPILES WILL BE PRESENT. IN NO CASE SHALL ANY STOCKPILED MATERIAL REMAIN AFTER THIRTY (30) CALENDAR DAYS.
- STORM WATER INLETS IN THE VICINITY OF THE PROJECT SHALL BE PROTECTED BY SEDIMENT TRAPS SUCH AS SECURED HAY BALES, SOD, STONE, ETC., WHICH SHALL BE MAINTAINED AND MODIFIED AS REQUIRED BY CONSTRUCTION PROGRESS, AND WHICH MUST BE APPROVED BY THE ENGINEER BEFORE INSTALLATION. THIS WILL BE MAINTAINED TO PREVENT DEGRADATION OF THE WATERS OF THE COUNTY AND STATE.
- SEDIMENT BASINS AND TRAPS, PERIMETER BERMS, SEDIMENT BARRIERS, VEGETATIVE BUFFERS, AND OTHER MEASURES INTENDED TO TRAP SEDIMENT AND/OR PREVENT THE TRANSPORT OF SEDIMENT ONTO ADJACENT PROPERTIES, OR INTO EXISTING BODIES OF WATER, MUST BE INSTALLED, CONSTRUCTED, OR IN THE CASE OF VEGETATIVE BUFFERS, PROTECTED FROM DISTURBANCE, AS A FIRST STEP IN THE LAND ALTERATION PROCESS. SUCH SYSTEMS SHALL BE FULLY OPERATIVE BEFORE ANY OTHER DISTURBANCE OF THE SITE BEGINS. EARTHEN STRUCTURES INCLUDING BUT NOT LIMITED TO BERMS, EARTH FILTERS, DAMS OR DIKES SHALL BE STABILIZED AND PROTECTED FROM DRAINAGE DAMAGE OR EROSION WITHIN ONE (1) WEEK OF INSTALLATION.
- ALL SWALES, DITCHES, AND CHANNELS LEADING FROM THE SITE SHALL BE PROTECTED FROM SILTATION AND EROSION DURING CONSTRUCTION AND BE SODDED WITHIN THREE (3) DAYS OF EXCAVATION.
- ALL EROSION AND POLLUTION CONTROL DEVICES SHALL BE CHECKED REGULARLY, ESPECIALLY AFTER EACH RAINFALL AND SHALL BE CLEANED OUT AND/OR REPAIRED AS REQUIRED.

- SOIL DISPLACED BY CONSTRUCTION WILL BE REMOVED. EROSION CONTROL SHALL BE IMPLEMENTED IN AREAS WHICH ARE CONSIDERED ENVIRONMENTALLY SENSITIVE. EROSION CONTROL SYSTEMS SHALL BE REQUIRED FOR ALL WORK WITHIN JURISDICTION AREAS. THESE SYSTEMS MAY INCLUDE STAKED HAY BALES, SILT SCREENS, FILTER FABRIC, AND TURBIDITY SCREENS.
- THE CONTRACTOR SHALL NOT ENTER UPON OR IN ANY WAY ALTER WETLAND AREAS THAT MAY BE ON OR NEAR THE CONSTRUCTION SITE. ALL WORK IN THE VICINITY OF OPEN WATER AND/OR WETLANDS IS TO BE PERFORMED IN COMPLIANCE WITH THE ENVIRONMENTAL REGULATIONS AND/OR PERMITS FOR THE SITE. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY FINES RESULTING FROM HIS VIOLATION OF ANY REGULATIONS OR PERMIT CONDITIONS.
- CONTRACTOR SHALL PROVIDE PROTECTIVE MATTING, FUEL CONTAINMENT AND ALL OTHER MATERIALS, EQUIPMENT AND LABOR TO PROTECT THE STAGING AREA DURING CONSTRUCTION.
- CONTRACTOR SHALL, PRIOR TO BEGINNING CONSTRUCTION, SUBMIT A "FUELING SPILL PREVENTION PLAN" THAT SHALL CLEARLY INDICATE HOW FUEL SPILLS WILL BE PREVENTED WHEN FUELING BOTH WITHIN AND OUTSIDE OF THE STAGING AREA.
- RIGHT-OF-WAY
- ALL CONSTRUCTION ACTIVITIES SHALL BE LIMITED TO WITHIN THE MANATEE COUNTY RIGHT-OF-WAY, OTHER PUBLIC RIGHT-OF-WAYS OR EASEMENTS SHOWN ON THE DRAWINGS.
- THE CONTRACTOR SHALL EMPLOY A LAND SURVEYOR REGISTERED IN THE STATE OF FLORIDA TO REFERENCE AND RESTORE PROPERTY CORNER MONUMENTS, PINS, AND LANDMARKS THAT MAY BE DISTURBED BY CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR, PRIOR TO CONSTRUCTION AND RESTRICTING ANY TRAFFIC, MUST OBTAIN ANY REQUIRED RIGHTS-OF-WAY USE PERMITS AND A TRAFFIC CONTROL PLAN. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS FROM OTHER GOVERNMENTAL AGENCIES HAVING RELATANT JURISDICTION. ALL MAINTENANCE AND PROTECTION OF TRAFFIC SHALL BE IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF THE CURRENT FLORIDA DEPARTMENT OF TRANSPORTATION "MANUAL OF TRAFFIC CONTROL AND SAFE PRACTICES". A TRAFFIC CONTROL PLAN SHALL BE SUPPLIED BY THE CONTRACTOR AT THE PRE-CONSTRUCTION MEETING, PER SPECIFICATIONS 01570.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ALL DAMAGED STORM WATER STRUCTURES, PIPING, ENTRANCE PIPE AND HEADWALLS WHETHER SHOWN ON THE PLANS OR NOT. THE HEADWALLS SHALL BE REPLACED IN ACCORDANCE WITH F.D.O.T. STANDARDS, OR THE APPLICABLE JURISDICTION.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH IN THE FIELD THE RIGHT-OF-WAY LINES, BASE LINES, BENCH MARKS (ELEV.), CENTER LINES, AND STATIONING AS REQUIRED TO CONSTRUCT THIS PROJECT.
- THE CONTRACTOR SHALL COORDINATE THE CUTTING OF DRIVEWAYS WITH THE PROPERTY OWNER PRIOR. ALL DRIVEWAYS MUST BE IN PASSABLE CONDITION AT THE END OF THE WORK DAY AND FULLY RESTORED.
- A RIGHT OF ENTRY AGREEMENT SHALL BE OBTAINED BY THE CONSTRUCTION MANAGER FROM THE PROPERTY OWNER BEFORE ANY DRIVEWAY CONSTRUCTION WORK IS DONE OUTSIDE OF THE RIGHT-OF-WAY OR EASEMENT.

UTILITIES

- LOCATIONS, ELEVATIONS AND DIMENSIONS OF EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES ARE SHOWN TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS BUT DO NOT PURPORT TO BE ABSOLUTELY CORRECT. THERE MAY BE OTHER IMPROVEMENTS, UTILITIES, ETC. WHICH ARE WITHIN THE PROJECT AREA AND WHICH HAVE NOT BEEN LOCATED OR IDENTIFIED, MAY NOT BE IN THE EXACT LOCATION SHOWN OR RELOCATED SINCE THE PREPARATION OF THESE PLANS. THE CONTRACTOR SHALL VERIFY, PRIOR TO CONSTRUCTION, THE LOCATIONS, ELEVATIONS AND DIMENSIONS OF ALL EXISTING UTILITIES STRUCTURES AND OTHER FEATURES (WHETHER OR NOT SHOWN ON THE PLANS) THAT MAY EFFECT HIS WORK. ALL EXISTING UTILITIES TO BE EXTENDED, CROSSED OR CONNECTION POINTS SHALL BE EXPOSED PRIOR TO CONSTRUCTION TO VERIFY LOCATION AND ELEVATION. ANY DISCREPANCIES OR CONFLICTS FOUND SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION FOR RESOLUTION.
- THE CONTRACTOR SHALL PROTECT ALL EXISTING STRUCTURES, WATER AND SEWER LINES, STORM DRAINS, UTILITIES, DRIVEWAYS, SIDEWALKS, SIGNS, MAIL BOXES, FENCES, TREES, LANDSCAPING, AND ANY OTHER IMPROVEMENT OR FACILITY IN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL REPAIR AND/OR REPLACE ANY DAMAGED ITEM DUE TO HIS CONSTRUCTION ACTIVITIES TO EQUAL OR BETTER THAN PRE-CONSTRUCTION CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL USE APPROPRIATE TECHNIQUES, AS APPROVED, RECOMMENDED OR OFFERED BY FLORIDA POWER AND LIGHT TO PREVENT UNDERMINING OF POWER POLES DURING CONSTRUCTION. IF HOLDING OF POWER POLES IS RECOMMENDED OR REQUIRED BY THE UTILITY, THE CONTRACTOR SHALL COORDINATE THIS ACTIVITY WITH THE UTILITY AND BEAR ALL RELATED COSTS.
- ANY TEMPORARY SHUTDOWNS FOR MODIFICATIONS OF EXISTING UTILITY SYSTEMS THAT MUST REMAIN IN SERVICE DURING CONSTRUCTIONS SHALL BE KEPT TO A MINIMUM AND SHALL BE COORDINATED WITH AND APPROVED BY THE MANATEE COUNTY UTILITY OPERATIONS DEPARTMENT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. IT IS NOTED THAT TEMPORARY SHUTDOWNS MAY BE RESTRICTED TO CERTAIN HOURS AT ANY TIME OF THE DAY OR NIGHT AND WILL BE COMPLETED AT NO ADDITIONAL COST TO THE OWNER.
- FOR WORK BEING DONE ON EXISTING SANITARY SEWER LINES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE FLOW OF ALL SEWAGE DURING CONSTRUCTION, WHICH MAY REQUIRE BY-PASS PUMPING AND/OR PUMPER TRUCKS. THE CONTRACTOR SHALL SUBMIT A DETAILED BY-PASS PUMPING PLAN PER SECTION 02720.
- THE ELEVATIONS OF THE UTILITY SERVICES AND LATERALS HAVE BEEN ASSUMED ON THE BASIS OF TYPICAL ANTICIPATED SOIL COVERAGE. CONTRACTOR SHALL NOT RELY ON THIS INFORMATION FOR CONSTRUCTION, BUT SHALL BE RESPONSIBLE FOR FIELD LOCATIONS (HORIZONTAL AND VERTICAL) OF ALL UTILITIES CROSSING THE PROPOSED FORCE MAIN. THE CONTRACTOR SHALL INCLUDE IN THE UNIT COST OF THE SUBJECT FORCE MAIN CONSTRUCTION, THE COST OF UTILITY ADJUSTMENTS NECESSARY TO ATTAIN DESIGN MINIMUM SEPARATION FOR UTILITIES COMPROFSED WITH THE CONSTRUCTION OF THE PROPOSED FORCE MAIN. INTERRUPTIONS OF ANY EXISTING UTILITY SERVICES SHALL BE NOTICED TO EFFECTED CUSTOMERS A MINIMUM OF 48 HOURS IN ADVANCE AND SHALL NOT EXCEED 4 HOURS IN DURATION.

RESTORATION

- ALL RESTORATION WORK PERFORMED THROUGHOUT THE PROJECT SHALL CONFORM TO EXISTING LINES AND GRADES UNLESS SHOWN OTHERWISE.
- ALL DISTURBED GRASSED AREAS SHALL BE SODDED UNLESS OTHERWISE INDICATED. THE TYPE OF SOD USED TO REPLACE OWNER MAINTAINED AREAS IN RIGHT-OF-WAY SHALL BE COORDINATED WITH THE PROPERTY OWNER.
- ALL CONCRETE THRUST BLOCKS INSTALLED FOR TESTING PURPOSES AND NOT REQUIRED FOR THE OPERATION OF THE PIPELINE SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR, PRIOR TO FINAL ACCEPTANCE, AT NO ADDITIONAL COST TO THE OWNER.
- ASPHALT DRIVES THAT ARE CUT SHALL BE RESTORED PER SECTION 02513.
- CONCRETE DRIVEWAYS OR SIDEWALKS THAT ARE CUT SHALL BE RESTORED TO MATCH EXISTING ACCORDING TO THE CURRENT EDITIONS OF THE F.D.O.T. SPECIFICATIONS FOR ROAD AND BRIDGE DESIGN, SECTION 522, AND SECTION 310 OF THE F.D.O.T. DESIGN STANDARDS.
- WHENEVER A PERMANENT ROADWAY SURFACE IS NOT REPLACED IMMEDIATELY AFTER BACKFILLING AND COMPACTION OF THE NEWLY INSTALLED PIPE LINE IN AREAS WHERE TRAFFIC MUST PASS, THE CONTRACTOR SHALL INSTALL A TEMPORARY SURFACE CONSISTING OF NINE INCHES OF COMPACTED LIME ROCK BASE AND A COAT OF ASPHALT EMULSION. PERMANENT ROADWAY REPAIR SHALL BE PERFORMED A MAXIMUM OF TWENTY-ONE CALENDAR DAYS AFTER THE INITIAL OPEN CUTTING.
- RESTORATION OF CURBS, DRIVEWAYS, SIDEWALKS, AND PLACEMENT OF SOD SHALL BE COMPLETED WITHIN FORTY-FIVE CALENDAR DAYS OF INITIAL DISTURBANCE, OR TWENTY-ONE CALENDAR DAYS OF SUBSTANTIAL COMPLETION, WHICHEVER OCCURS FIRST.
- ALL EXISTING FENCES DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED AND REINSTALLED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER UNLESS SHOWN TO BE REMOVED ON CONSTRUCTION PLANS.
- WHERE CONCRETE REPAIRS ARE NECESSARY AND EXPANSION OR CONTRACTION JOINTS ARE PRESENT, CONTRACTOR SHALL REMOVE AND REPLACE CONCRETE UP TO THE NEXT EXPANSION OR CONTRACTION JOINT.

CONSTRUCTION

- THE EXHAUST SYSTEM OF ALL GASOLINE AND DIESEL ENGINES SHALL BE EQUIPPED WITH MUFFLERS THAT MEET THE EQUIPMENT MANUFACTURER'S REQUIREMENTS FOR NOISE SUPPRESSION. THE CONTRACTOR SHALL INSTALL NOISE ABATEMENT BAFFLES POSITIONED TO BREAK LINE-OF-SITE FROM THE NOISE SOURCE TO AFFECTED RESIDENCES, AS APPROVED BY THE ENGINEER.
- NO MATERIAL SHALL BE STOCKPILED IN ROADWAYS. ALL DIRT AND DEBRIS SHALL BE REMOVED FROM THE JOB SITE DAILY. ROADS SHALL BE SWEEP DAILY AS PART OF DAILY CLEAN UP.
- THE CONTRACTOR IS TO CONTROL ALL FUGITIVE DUST ORIGINATING ON THIS PROJECT BY WATERING OR OTHER METHODS AS REQUIRED.

- INGRESS AND EGRESS TO ALL THE PROPERTIES IN THE CONSTRUCTION AREA SHALL BE MAINTAINED AT ALL TIMES.
- PRIOR APPROVAL WILL BE REQUIRED FOR REMOVAL OR TRIMMING OF ANY TREE WITHIN THE CONSTRUCTION AREA.
- THE CONTRACTOR SHALL PROVIDE ALL DEWATERING EQUIPMENT NECESSARY TO KEEP ALL EXCAVATIONS DRY. DEWATERING IS REQUIRED TO 18" BELOW TRENCH BOTTOM.
- ALL PIPING AND FITTINGS USED ON THIS PROJECT SHALL BE AS NOTED ON THE PLANS AND IN THE CONTRACT DOCUMENT AND SHALL BE INSTALLED TO THE LINES AND GRADES SHOWN ON THE PLANS AND PROFILES.
- ALL PIPE SHALL BE COLOR CODED TO CONFORM TO MANATEE COUNTY STANDARDS.
- ALL FITTINGS FOR PRESSURE CLASS-RATED PIPE SHALL BE RESTRAINED DUCTILE IRON. RESTRAINED LENGTHS OF PIPE SHALL ADHERE TO THE REQUIREMENTS AS SHOWN ON THE DETAIL SHEETS.
- WHERE IT IS NECESSARY TO DEFLECT PIPE EITHER HORIZONTALLY OR VERTICALLY, PIPE DEFLECTION SHALL NOT EXCEED 75% OF THE MANUFACTURER'S MAXIMUM ALLOWABLE RECOMMENDED DEFLECTION.
- ALL ROCKS OR STONES LARGER THAN SIX INCH DIAMETER SHALL BE REMOVED FROM THE BACKFILL MATERIAL. BACKFILL MATERIAL PLACED WITHIN ONE FOOT OF PIPING AND APPURTENANCES SHALL NOT CONTAIN ANY STONES LARGER THAN TWO INCH DIAMETER.
- ONLY MANATEE COUNTY UTILITY OPERATIONS STAFF ARE AUTHORIZED TO OPERATE VALVES AND PUMP STATIONS ON COUNTY OWNED AND MAINTAINED UTILITY SYSTEMS.
- THE CONTRACTOR, PRIOR TO ANY TEMPORARY WATER SHUT-OFFS DURING WATER MAIN TIE-IN, ETC., SHALL NOTIFY THE AFFECTED RESIDENTS BY POSTING INFORMATIONAL SIGNS IN THE NEIGHBORHOOD AT LEAST TWO DAYS (48 HRS) PRIOR TO THE WATER SHUT-OFF. REFERENCE SECTION 01580, PARAGRAPH 1.03 OF THE SPECIFICATIONS. WHEN FEASIBLE, "DOOR HANGERS" SHALL BE DELIVERED TO AFFECTED RESIDENCES AT LEAST TWO DAYS (48 HRS) PRIOR TO WATER SHUT-OFF. FOR LARGE PROJECTS WITH HUNDREDS OF HOMES AFFECTED, THE CONTRACTOR SHALL ALSO MAKE EXTENSIVE USE OF THE MEDIA AND SHALL HAVE PRIOR CONTACT WITH HOMEOWNERS' ASSOCIATIONS AND THE RESPECTIVE CITIES. WRITTEN NOTIFICATIONS SHALL ALSO BE FAXED TO THE TAMPA TRIBUNE, BRADENTON HERALD, AMI SUN, ISLANDER, SARASOTA HERALD TRIBUNE, WRBO RADIO, EMERGENCY COMMUNITY CENTERS, INSPECTIONS, WATER TREATMENT PLANT, WATER MANAGER, HELPLINE, CUSTOMER SERVICE, AND THE MANATEE COUNTY UTILITY OPERATIONS DEPARTMENT.
- ALL TEST POINT PIPING SHALL BE CUT LOOSE FROM THE CORPORATION STOP AND COMPLETELY REMOVED AND DISPOSED OF BY THE CONTRACTOR PRIOR TO FINAL ACCEPTANCE. A CORPORATION STOP PLUG SHALL BE INSTALLED AND THE CORPORATION STOP SHALL REMAIN IN PLACE.
- ALL EXISTING MAINS THAT ARE BEING REPLACED SHALL BE ABANDONED IN PLACE UPON ACCEPTANCE AND SHALL BE REPLACED FROM THE VALVE TO THE OTHER POINT OF CONNECTION OUTSIDE OF THE ROADWAY PER MANATEE SPECIFICATIONS FOR CUT AND CAPPING ABANDONED PIPE.
- FIELD CONDITIONS MAY NECESSITATE MINOR ALIGNMENT AND GRADE DEVIATION OF THE PROPOSED UTILITIES TO AVOID OBSTACLES, AS ORDERED BY THE ENGINEER.
- THE CONTRACTOR SHALL OBTAIN AUTHORIZATION FROM THE MANATEE COUNTY UTILITIES DEPARTMENT (MCD) OFFICE OF INDUSTRIAL COMPLIANCE PRIOR TO DEWATERING. COMPLETION OF CONSTRUCTION DEWATERING AUTHORIZATION TO DISCHARGE APPLICATION IS REQUIRED. FILL OUT FORM AS COMPLETELY AS POSSIBLE AS MISSING INFORMATION DELAYS THE APPROVAL PROCESS.
- THE MCD OFFICE OF INDUSTRIAL COMPLIANCE WILL DETERMINE WHETHER A LETTER OF APPROVAL, A DISCHARGE AUTHORIZATION, OR A DISCHARGE PERMIT IS REQUIRED.
- FOR SITES SUSPECTED OF CONTAMINATED GROUNDWATER MANATEE COUNTY WILL REQUIRE AN APPLICANT TO DEMONSTRATE THAT THE DISCHARGE MEETS THE MANATEE COUNTY SEWER USE ORDINANCE.
- IF ANY RECLAIMED OR WATER MAINS INCLUDING SERVICE LINES ARE DAMAGED DURING CONSTRUCTION, THEY SHALL BE REPLACED FROM THE VALVE TO THE OTHER POINT OF CONNECTION OUTSIDE OF THE ROADWAY PER MANATEE COUNTY'S STANDARDS. SERVICES SHALL BE REPLACED FROM THE COLD STOP TO THE METER.

TRAFFIC CONTROL NOTES

- TRAFFIC SHALL BE MAINTAINED IN ACCORDANCE WITH F.D.O.T. DESIGN STANDARDS INDICES NO. 600, 603, 605, 611, 612, 613, 616, AND 660 DEPENDING ON THE OPERATION BEING PERFORMED.
FOR ALL TWO-LANE WORK, TWO-WAY, WORK WITHIN TRAVEL LANE UTILIZE INDEX 603.
FOR ALL TWO-LANE WORK, TWO-WAY, WORK NEAR INTERSECTION UTILIZE INDEX 605.
FOR ALL MULTILANE WORK OUTSIDE SHOULDER UTILIZE INDEX NO. 611.
FOR ALL MULTILANE WORK ON SHOULDER UTILIZE INDEX NO. 612.
FOR ALL MULTILANE WORK WITHIN TRAVEL WAY MEDIAN OR OUTSIDE LANE UTILIZE INDEX NO. 613.
FOR ALL MULTILANE WORK NEAR INTERSECTION MEDIAN OR OUTSIDE LANE UTILIZE INDEX NO. 616.
FOR PEDESTRIAN CONTROL FOR CLOSURE OF SIDEWALK, UTILIZE FDOT INDEX NO. 660.
- CONTRACTOR TO COORDINATE WITH ED HERNDON (941) 708-4436 AT FDOT FOR ALL WORK DONE ON A STATE FACILITY.
- TO AVOID DISRUPTION DUE TO INCLEMENT WEATHER, THE CONTRACTOR SHOULD PERFORM ANY MILLING AND PAVING OPERATIONS DURING THE SAME WORK PERIOD.
- ALL EXISTING PAVEMENT MARKINGS OUTSIDE THE CONSTRUCTION LIMITS THAT HAVE BEEN ALTERED BECAUSE OF CONSTRUCTION OPERATIONS SHALL BE REPLACED UPON THE COMPLETION OF THE PROJECT AT THE CONTRACTORS EXPENSE.
- LANE CLOSURES SHALL OCCUR BETWEEN 9:00 P.M. AND 5:00 A.M., UNLESS LANE CLOSURE CALCULATIONS ARE PROVIDED AND APPROVED OR APPROVAL IS GRANTED BY THE DISTRICT PERMIT ENGINEER.

THE CONTRACTOR SHALL SCHEDULE WORK OPERATIONS SO THAT ALL LANES CAN BE RE-OPENED TO TRAFFIC WITHIN A PERIOD OF 24 HOURS IN CASE OF AN EMERGENCY.
- PEDESTRIANS, BICYCLES, AND WHEELCHAIRS:
AT THE END OF EACH WORKDAY OR WHENEVER THE WORK ZONE BECOMES INACTIVE, ANY DROP-OFF ADJACENT TO A SIDEWALK SHALL BE BACKFILLED AT A SLOPE NOT TO EXCEED 1:4, OR SHALL BE PROTECTED IN ACCORDANCE WITH STANDARD INDEX 600.
- PEDESTRIAN AND WHEELCHAIR TRAFFIC SHALL BE ACCOMMODATED UTILIZING STANDARD INDEX 660.
- ONE PORTABLE VARIABLE MESSAGE SIGN SHALL BE USED IN ADVANCE OF EACH LANE CLOSURE. THE FOLLOWING ARE SUGGESTED MESSAGES TO USE IN THE APPROPRIATE SITUATIONS:

MESSAGE 1
"RIGHT" OR "CENTER" OR "LEFT"
"LANE" "LANE" "LANE"
"CLOSED" "CLOSED" "CLOSED"
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMMEDIATE REMOVAL OF STORMWATER FROM ROADWAYS UTILIZED FOR TRAFFIC CONTROL IN A MANNER APPROVED BY THE ENGINEER.
- AT THE END OF EACH WORKING DAY'S ACTIVITY, TEMPORARY PAVEMENT MARKINGS AND TEMPORARY RPM'S SHALL BE INSTALLED PRIOR TO OPENING THE LANES UP FOR TRAFFIC.
- ALL PAVEMENT MARKINGS, SIGNS, MARKERS, CHANNELIZATION REQUIRED TO PHASE WORK OR SHIFT TRAFFIC, SHALL UTILIZE INDICES FOR PLACEMENT.
- THE CONTRACTOR SHALL RESTRICT THE OPERATIONS SO THAT THE FIRST LIFT OF ASPHALT IS PLACED ON THE SAME DAY THAT THE LANES ARE MILLED, BEFORE OPENING THE LANES TO TRAFFIC. INSTALL TEMPORARY PAVEMENT MARKINGS AFTER THE FIRST LIFT AND PRIOR TO OPENING.
- MILLING AND RESURFACING SHALL BE ACCOMPLISHED DURING THE OFF-PEAK HOURS.
- THE CONTRACTOR IS RESPONSIBLE TO RETIME THE TRAFFIC SIGNALS WITHIN THE PROJECT LIMITS (INCLUDING LIMITS OF WORK ZONE, TRAFFIC CONTROL) THAT ARE POTENTIALLY AFFECTED DURING VARIOUS PHASES OF CONSTRUCTION. COORDINATE ALL SIGNAL RETIME EFFORTS WUKUNDA GOPALAKRISHNA, P.E., PTCE, COUNTY TRAFFIC ENGINEER, AT 941-749-3500, EXT. 7813.

- CONTRACTOR TO MAINTAIN VEHICLE DETECTION IN OPERATION FOR LANES THAT WILL REMAIN OPEN. CONTRACTOR TO COORDINATE ALL VEHICLE DETECTION ISSUES WITH CLARKE DAVIS OF MANATEE COUNTY AT 941-708-7450, EXT. 7272 OR CLARKE.DAVIS@MANATEE.ORG
- MAINTENANCE OF TRAFFIC AND ANY SIGNAL RETIMING WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- ANY SIGNAL RETIMING REQUIRED FOR THE INTERSECTIONS IMPACTED BY THE PROJECT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. SIGNAL TIMING MODIFICATIONS TO BE SUBMITTED TO MANATEE COUNTY TRAFFIC DESIGN, ATTENTION MR. MUKUNDA GOPALAKRISHNA FOR REVIEW AND APPROVAL AT LEAST 15 WORKING DAYS BEFORE PROPOSED CHANGES. THIS DOES NOT GOVERN EMERGENCY SITUATIONS, PENDING THE APPROVAL OF THE ENGINEER.
- A DETAILED MAINTENANCE OF TRAFFIC PLANS ARE TO BE SUBMITTED TO MANATEE COUNTY AND THE ENGINEER, BY THE CONTRACTOR, FOR REVIEW AND APPROVAL A MINIMUM OF 21 WORKING DAYS PRIOR TO PROPOSED IMPLEMENTATION.

FDOT NOTES

ALL WORK PERFORMED WITHIN THE FDOT R/W SHALL CONFORM TO:

- FDOT STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION (2016) (A.K.A. STANDARD SPECS).
- FDOT DESIGN STANDARDS FOR DESIGN, CONSTRUCTION, MAINTENANCE AND OPERATIONS ON THE STATE HIGHWAY SYSTEM, 2016, (A.K.A. STANDARD INDEX). COMPLIANCE WITH ALL APPLICABLE INDICES IS REQUIRED.
- FLORIDA DEPARTMENT OF TRANSPORTATION ROADWAY PLANS PREPARATION MANUAL, VOLUME 1, CHAPTERS 2 AND 25. (REVISED 2013).
- FLORIDA DEPARTMENT OF TRANSPORTATION FLEXIBLE PAVEMENT DESIGN MANUAL FOR NEW CONSTRUCTION AND PAVEMENT REHABILITATION, JANUARY 2015.
- ALL TRAFFIC STRIPES AND MARKINGS ARE TO BE LEAD FREE, NON-SOLVENT BASED THERMOPLASTIC. THE PERMITTEE SHALL FURNISH THE DEPARTMENT WITH THE MANUFACTURER'S CERTIFICATION THAT THE THERMOPLASTIC IS 'LEAD FREE'.
- LANE CLOSURE MAY NEED TO BE ALTERED DEPENDING ON THE AREA THE WORK IS TAKING PLACE.

ABBREVIATIONS

RJ	-	RESTRAINED JOINT	BT	-	BURIED TELEPHONE
R/W	-	RIGHT-OF-WAY	UC	-	UNDERGROUND CONDUIT
HDD	-	HORIZONTAL DIRECTIONAL DRILL	DBC	-	DIRECT BURIED CABLE
FOC	-	FIBER OPTIC CABLE	SS	-	SANITARY SEWER
FM	-	FORCE MAIN	EC	-	ELLIPTICAL CONCRETE PIPE
WM	-	WATER MAIN	A	-	ASPHALT
FW	-	RECLAIM WATER MAIN	NG	-	NATURAL GROUND
PVC	-	POLYVINYL CHLORIDE	G	-	GRAVEL
ST	-	STORM DRAIN	S	-	SHELL
EX	-	EXISTING	C	-	CONCRETE

KIMLEY HORN LEGEND

PROPOSED FORCEMAIN/
WATERMAIN



ABANDONED WATERMAIN



EX. SANITARY SEWER



EX. STORM



EX. BURIED TELEPHONE



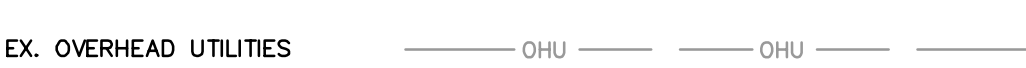
EX. FIBER OPTIC CABLE



EX. DIRECT BURIED CABLE



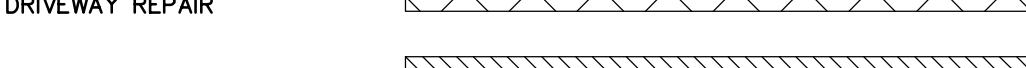
EX. UNDERGROUND CONDUIT



EX. OIL



EX. BURIED ELECTRIC



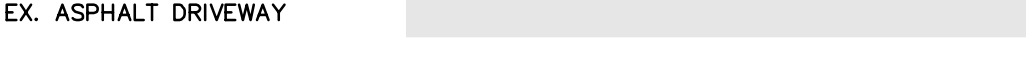
EX. GAS



EX. OVERHEAD UTILITIES



PROPOSED FULL
ROADWAY RESTORATION



PROPOSED SIDEWALK/
DRIVEWAY REPAIR



PROPOSED CURB REPAIR



PROPOSED MILLING AND
RESURFACING



EX. CONCRETE DRIVEWAY



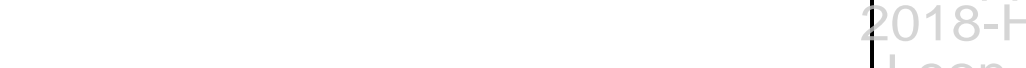
EX. ASPHALT DRIVEWAY



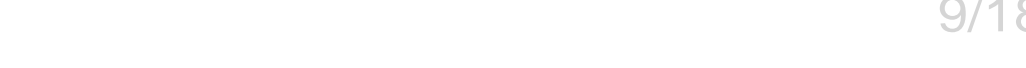
EX. BRICK DRIVEWAY



EX. SHELL DRIVEWAY



EX. INFILTRATION TRENCH



EX. GRAVEL/STONE



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END OF SERVICE LIFE
PACKAGE B: FM 8/ FM 15/ FM1

MANATEE COUNTY

LICENSED PROFESSIONAL

W. WADE WOOD, P.E.

FL LICENSE NUMBER
69051

FL

DATE:

SHEET NUMBER

2

Approved
2018-H-194-229
Leon Herndon
9/18/2018

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FM 8 TEST HOLE DATA (ECHEZABAL & ASSOCIATES INC.)			
TEST HOLE	UTILITY	SURFACE TYPE	DEPTH TO TOP OF PIPE (FEET)
TH-20	1.25" DBC BY FRONTIER	NG	1.48
TH-21	2" DBC BY FRONTIER	NG	2.91

NOTE: SUBSURFACE UTILITY ENGINEERING DATA PROVIDED BY ECHEZABAL & ASSOCIATES, INC.
DATED DECEMBER 14, 2017.

FM 1 TEST HOLE DATA (ECHEZABAL & ASSOCIATES INC.)			
TEST HOLE	UTILITY	SURFACE TYPE	DEPTH TO TOP OF PIPE (FEET)
TH-01	16" DIP WM COBB	A	2.80
TH-02	16" DIP WM COBB	A	3.63
TH-03	4" PVC BT FRONTIER	NG	2.25
TH-04	2" STL WM COBB	A	2.96
TH-05	4" POLY GAS TECO	NG	4.74
TH-06	6" DIP WM COBB	A	3.37
TH-07	4" POLY GAS TECO PEOPLES GAS	G	3.75
TH-08	4" POLY GAS TECO PEOPLES GAS	A	3.53
TH-09	6" DIP SAN FM MANATEE CO.	A	2.98
TH-10	4" POLY GAS TECO PEOPLES GAS	A	6.44
TH-11	6" DIP SAN FM MANATEE CO.	A	4.68
TH-12	5/8" DBC TELECOM FRONTIER	NG	2.76
TH-13	5/8" DBC TELECOM FRONTIER	NG	2.24
TH-14	5/8" DBC TELECOM FRONTIER	S	2.09
TH-15	5/8" DBC TELECOM FRONTIER	S	1.87
TH-16	6" WM PLASTIC FG MANATEE	A	2.81
TH-17	6" DIP WM MANATEE CO.	G	2.69
TH-18	1.5" POLY GAS TECO PEOPLES GAS	A	2.42
TH-19	6" AC WM MANATEE CO.	A	3.04
TH-22	8" PVC WM MANATEE CO.	NG	3.87
TH-23	(2) 1.5" POLY BT FRONTIER	C/NG	2.82
TH-24	6" DIP SAN FM MANATEE CO.	A	3.13
TH-25	6" PLASTIC WM MANATEE CO.	A	2.45
TH-26	6" AC WM MANATEE CO..	A	2.80

NOTE: SUBSURFACE UTILITY ENGINEERING DATA PROVIDED BY ECHEZABAL & ASSOCIATES, INC.
DATED DECEMBER 20, 2017.

SURVEY NOTES

FM 8 SITE CONTROL				
DESIGNATION	NORTHING	EASTING	ELEVATION (FEET)	DESCRIPTION
BM-5	1158412.28	422205.42	2.29	IRS (LB 7203)
BM-6	1157884.45	423039.92	2.02	ND (LB 6690)
BM-5491	1158013.94	422875.43	2.21	IRS (LB 7203)

THE FOLLOWING NGS VERTICAL CONTROL MONUMENT WAS RECOVERED AND UTILIZED FOR THE ELEVATIONS INDICATED HEREIN: "GIS 100" PID AG9205 NAVD 1988 ELEVATION 2.56'

FM 15 SITE CONTROL				
DESIGNATION	NORTHING	EASTING	ELEVATION (FEET)	DESCRIPTION
BM-3	1163831.60	418465.69	2.85	IRC (LB 7203)
BM-4	1164339.33	417562.66	2.50	IRC (LB 7203)

THE FOLLOWING NGS VERTICAL CONTROL MONUMENT WAS RECOVERED AND UTILIZED FOR THE ELEVATIONS INDICATED HEREIN: "S 254" PID AG5205 NAVD 1988 ELEVATION 11.10'

FM 1 SITE CONTROL				
DESIGNATION	NORTHING	EASTING	ELEVATION (FEET)	DESCRIPTION
BM-25	1140044.78	429897.37	13.10	ND (LB 7203)
BM-26	1139417.03	430101.25	2.98	ND (LB 7203)
BM-28	1139020.71	430301.98	4.16	IRC (LB 7203)
BM-29	1138735.27	430265.02	2.65	IRC (LB 7203)
BM-30	1138260.89	430188.95	2.63	IRC (LB 7203)
BM-31	1138171.81	429824.07	4.99	ND (LB 7203)
BM-32	1137959.74	429955.51	5.01	IRC (LB 7203)

THE FOLLOWING NGS VERTICAL CONTROL MONUMENT WAS RECOVERED AND UTILIZED FOR THE ELEVATIONS INDICATED HEREIN: "GIS 100" PID AG9205 NAVD 1988 ELEVATION 2.56'

LEGEND	
● SITE CONTROL POINT	R/W RIGHT-OF WAY
○ IRON PIPE FOUND	ND NAIL W/ DISC
● IRON ROD FOUND	IRC IRON ROD W/ CAP
■ CONCRETE MONUMENT FOUND	
PP SIGN	✱ PINE
◇ WOOD UTILITY POLE	✳ PALM
▬ CONCRETE UTILITY POLE	
— GUY WIRE	☼ TREE
□ WATER METER	
— WATER VALVE	
⊗ SANITARY MANHOLE	
⊕ FIRE HYDRANT	
~ BACKFLOW PREVENTER	● TH-1 TEST HOLE
▤ UTILITY BOX	
▤ UTILITY RISER	● B-1 BORE HOLE
⊞ ELECTRIC SERVICE BOX	
⊞ TELEPHONE SERVICE BOX	

No.	REVISIONS	DATE	BY



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KHA PROJECT 148400016
DATE 6/4/2018
SCALE AS SHOWN
DESIGNED BY WWW
DRAWN BY LMB
CHECKED BY WEW



END OF SERVICE LIFE
PACKAGE B: FM 8/ FM 15/ FM1

MANATEE COUNTY

LICENSED PROFESSIONAL

W. WADE WOOD, P.E.

FL LICENSE NUMBER
69051

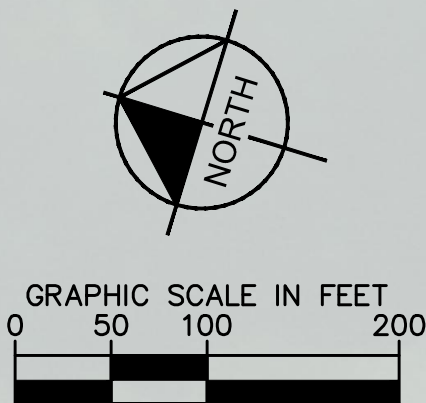
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SURVEY AND SUE NOTES

3
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LEGEND	
FM OPEN CUT	——
FM HDD	- - -
10" SS	—SS—




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END OF SERVICE LIFE
PACKAGE B: FM 8/ FM 15/ FM1

MANATEE COUNTY

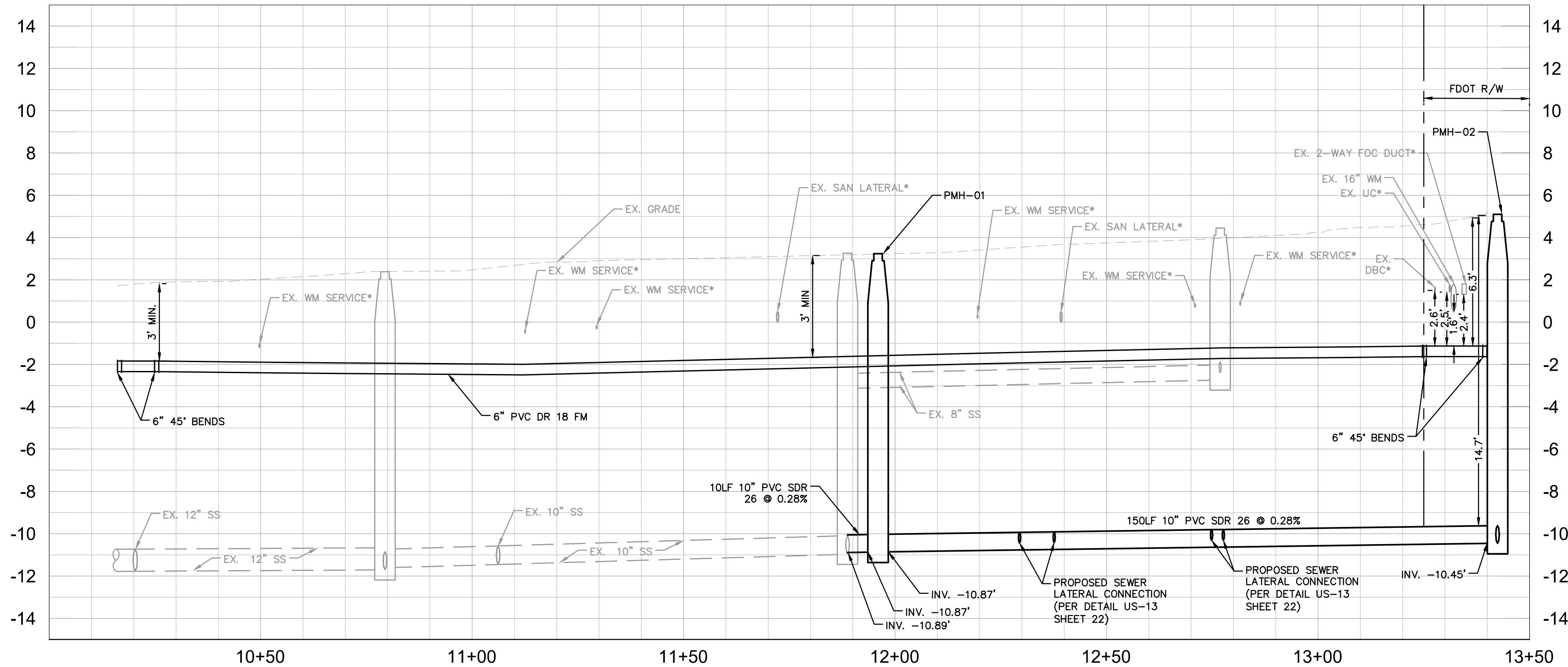
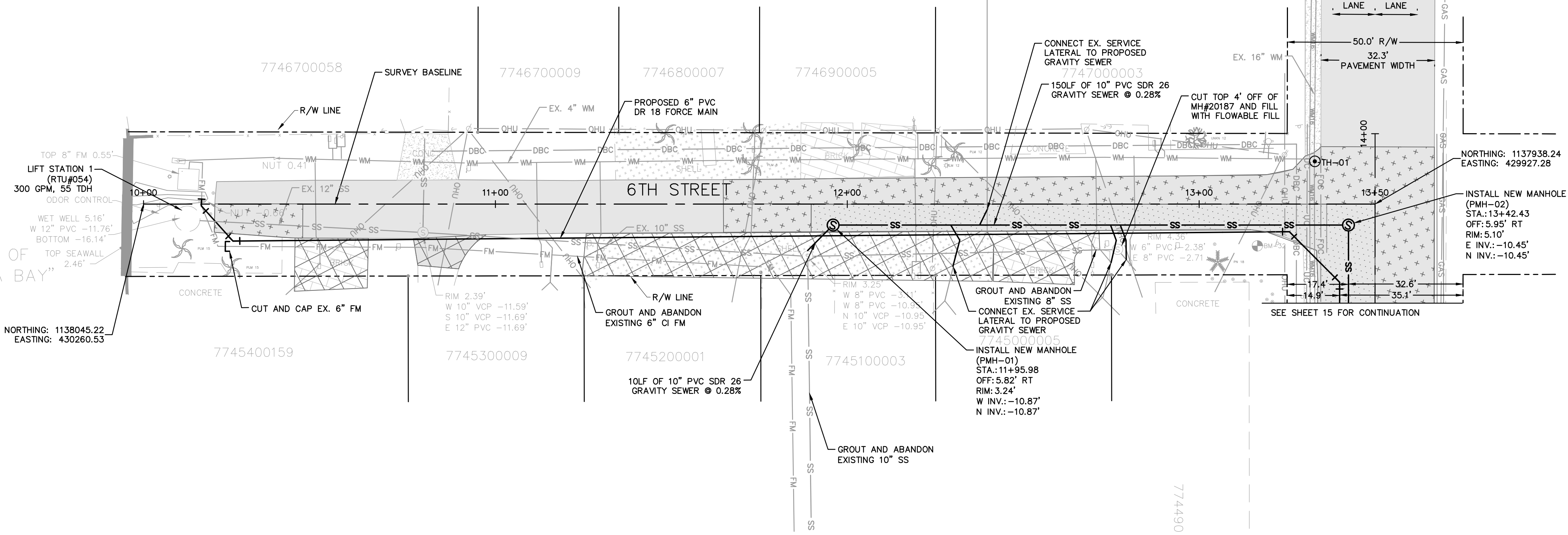
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FORCE MAIN 1
KEY SHEET

SHEET NUMBER
13
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WATERS OF
"SARASOTA BAY"



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WHERE CONCRETE REPAIRS ARE NECESSARY AND EXPANSION JOINTS ARE PRESENT, CONTRACTOR TO REMOVE AND REPLACE CONCRETE UP TO THE NEXT EXPANSION JOINT. OTHERWISE, REPLACE CONCRETE AS NECESSARY.

GROUNDWATER / DEWATERING NOTE:
THE PRESENCE OF GROUNDWATER SHOULD BE ANTICIPATED ON THIS PROJECT. CONTRACTOR'S BID SHALL INCLUDE CONSIDERATION FOR THIS ISSUE. WHEN PERFORMING GRADING OPERATIONS DURING PERIODS OF WET WEATHER, PROVIDE ADEQUATE DEWATERING, DRAINAGE AND GROUND WATER MANAGEMENT TO CONTROL MOISTURE OF SOILS.




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KHA PROJECT
148400016
DATE
7/12/2018
SCALE AS SHOWN
DESIGNED BY WWW
DRAWN BY LMB
CHECKED BY WEW



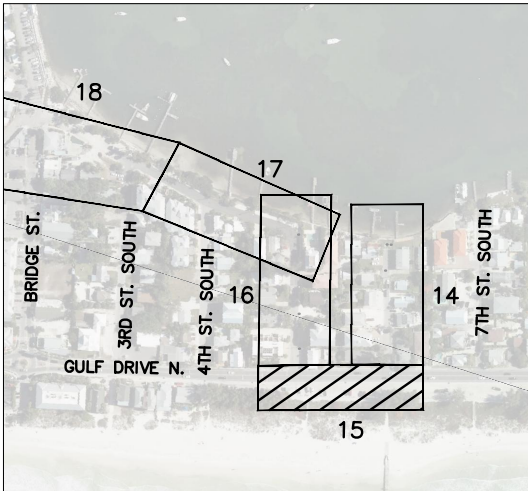
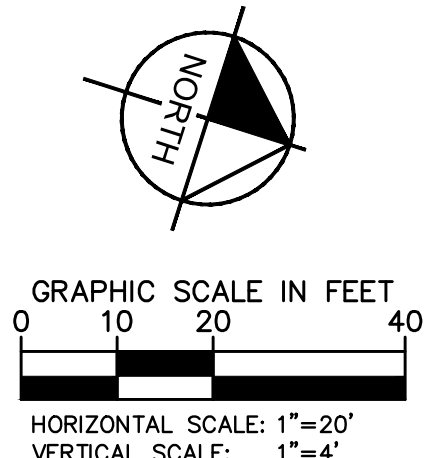
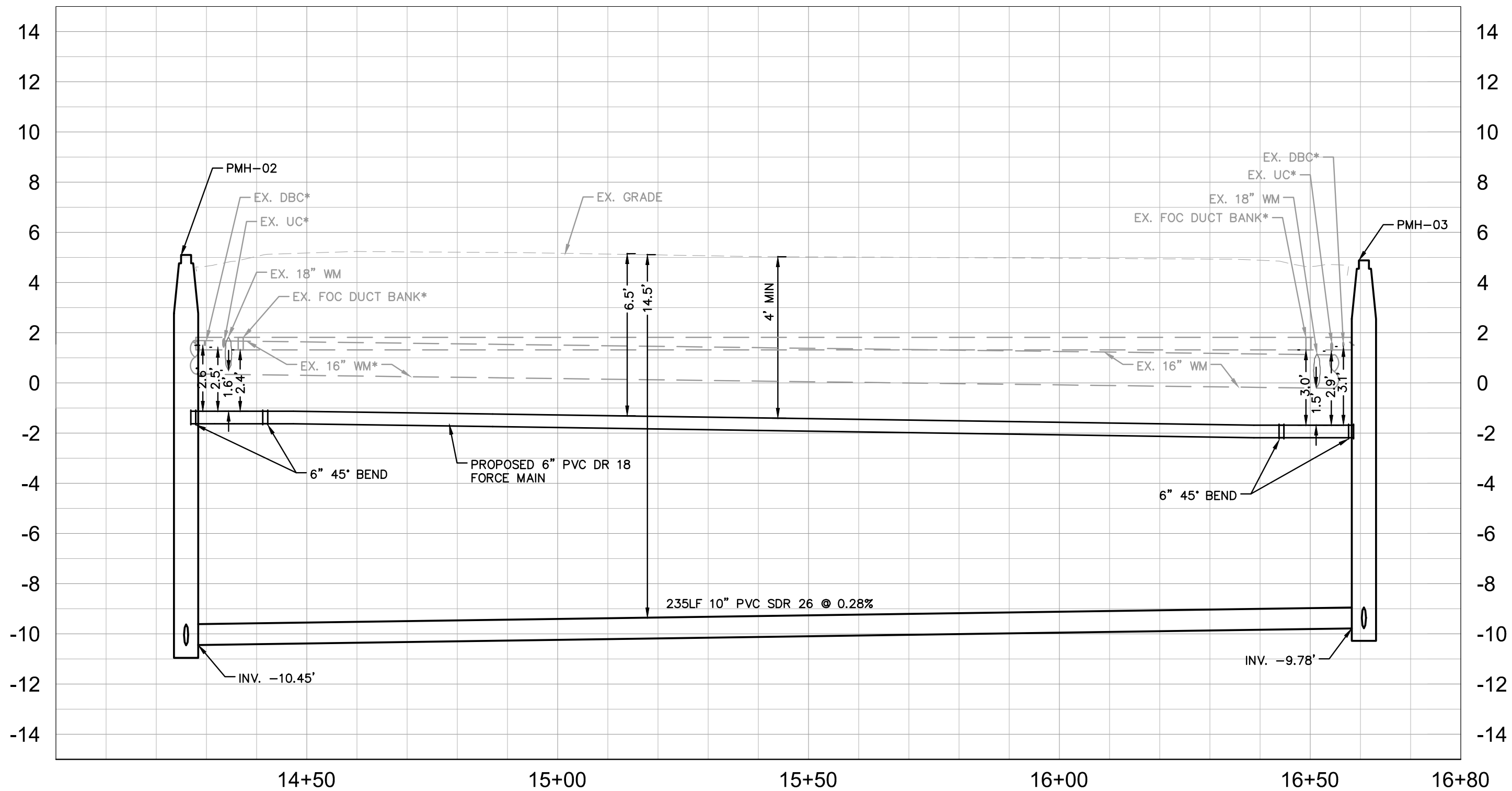
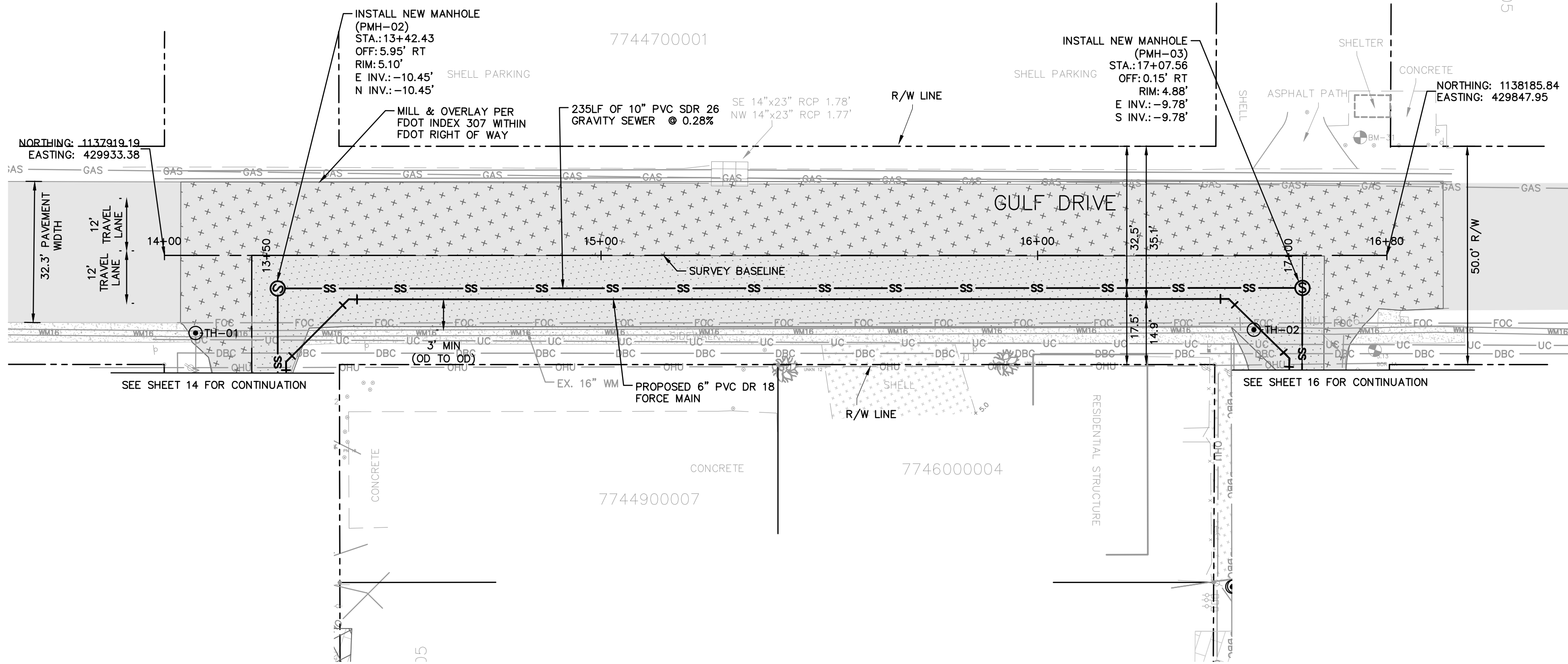
END OF SERVICE LIFE
PACKAGE B: FM 8/ FM 15/ FM1
MANATEE COUNTY

LICENSED PROFESSIONAL
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FL LICENSE NUMBER
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PLAN AND PROFILE
6TH STREET

SHEET NUMBER
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- LEGEND**
- SIDEWALK/DRIVEWAY RESTORATION
 - FULL ROADWAY RESTORATION
 - MILLING AND RESURFACING
 - REMOVE & REPLACE CURB

- NOTES:**
- CONTRACTOR TO FOLLOW RESTRAINED LENGTHS SET IN RESTRAIN LENGTH DETAILS ON SHEET 22 & 23.
 - CONSTRUCTION DEWATERING SHALL BE CONDUCTED IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS INCLUDING BUT NOT LIMITED TO CHAPTERS 62-621.300 AND 62-620 OF THE FLORIDA ADMINISTRATIVE CODE (FAC).
 - REFER TO DETAIL UC-12 SHEET 21 FOR COUNTY ROADWAY REPAIR REQUIREMENTS
 - EXISTING FORCE MAIN SHALL BE FLUSHED PRIOR TO GROUTING AFTER THE PROPOSED FORCE MAIN HAS BEEN PLACED INTO SERVICE.

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KHA PROJECT
148400016
DATE
7/12/2018
SCALE AS SHOWN
DESIGNED BY WWW
DRAWN BY LMB
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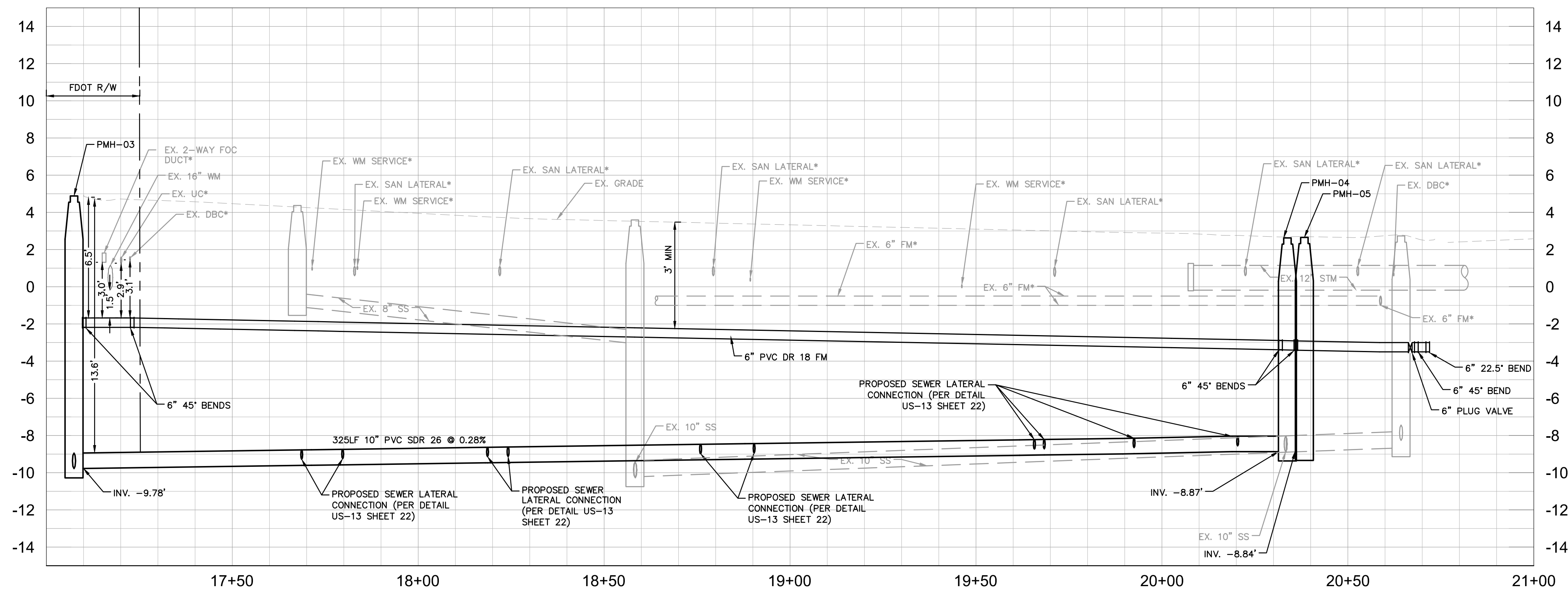
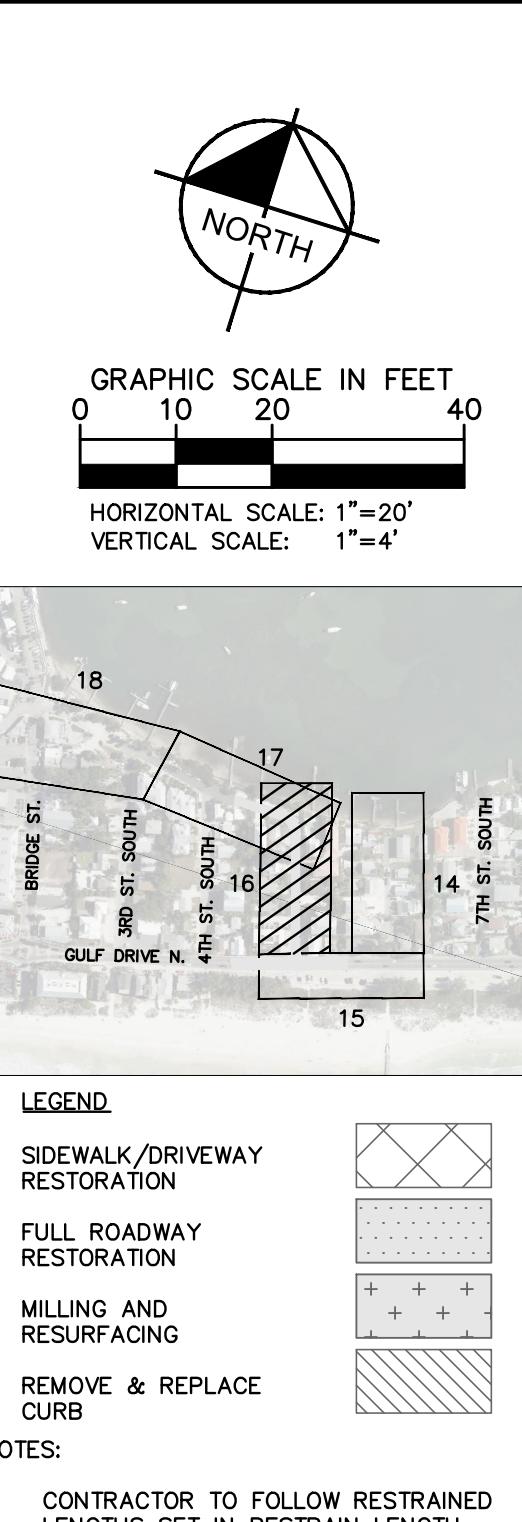
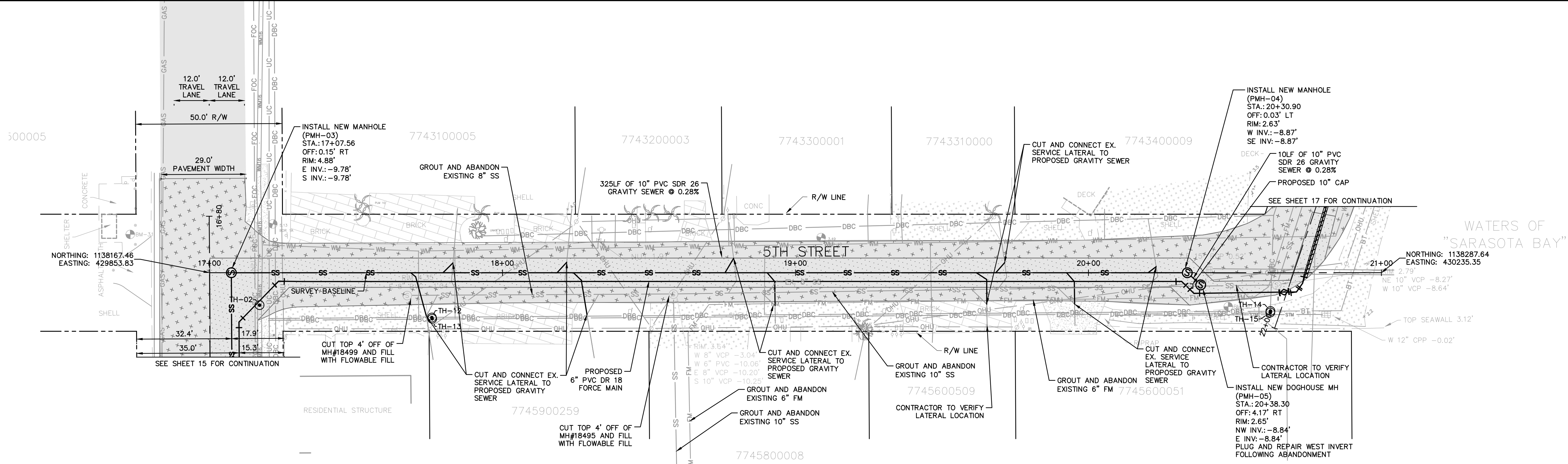
END OF SERVICE LIFE
PACKAGE B: FM 8/ FM 15/ FM1
MANATEE COUNTY

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FL LICENSE NUMBER
69051
FL DATE:

PLAN AND PROFILE
GULF DRIVE

SHEET NUMBER
15
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Kimley»Horn

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KHA PROJECT 148400016
DATE 7/12/2018
SCALE AS SHOWN
DESIGNED BY WWW
DRAWN BY LMB
CHECKED BY WEW

Manatee County

END OF SERVICE LIFE
PACKAGE B: FM 8/ FM 15/ FM1

MANATEE COUNTY

LICENSED PROFESSIONAL

W. WADE WOOD, P.E.

FL LICENSE NUMBER 69051

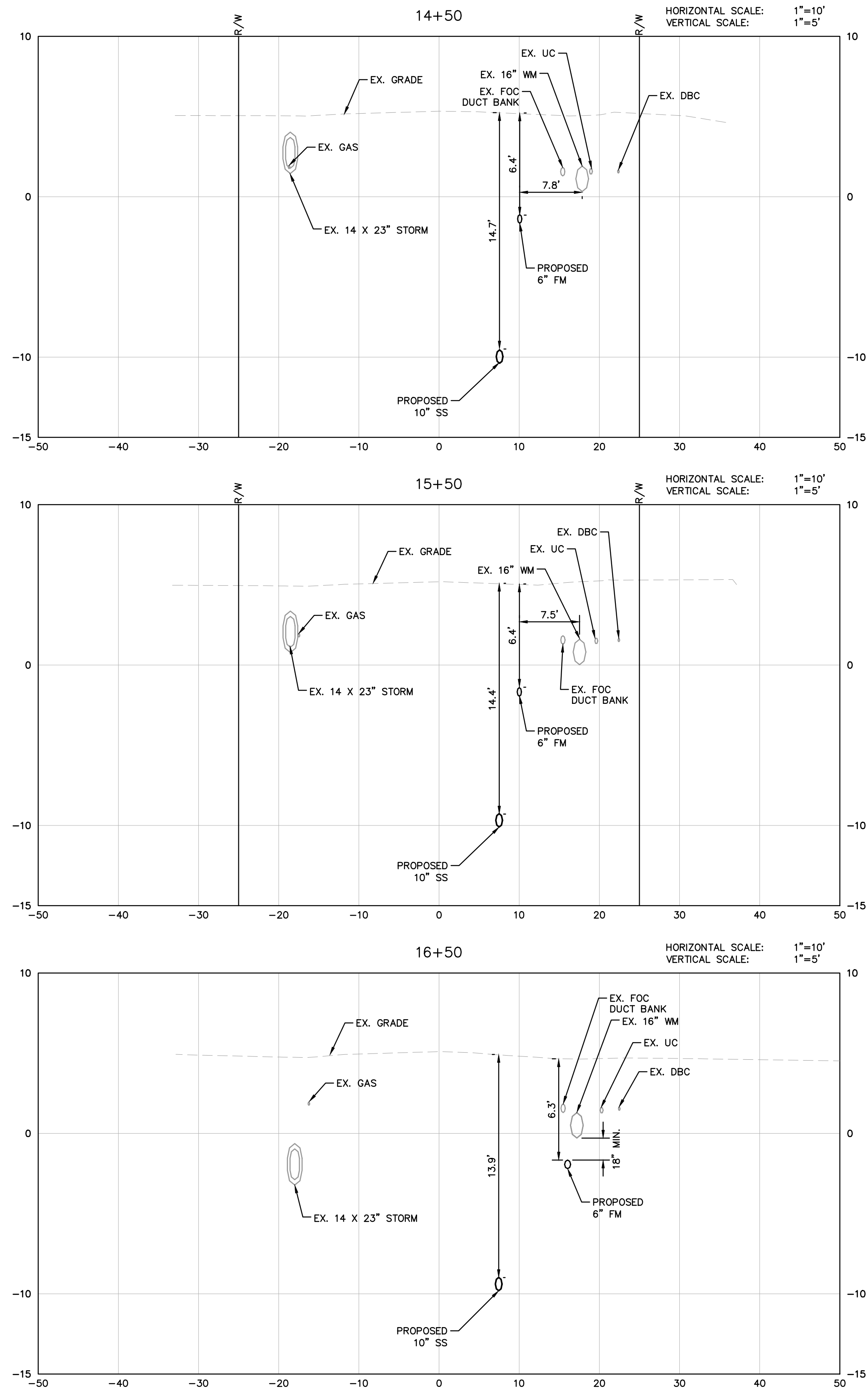
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PLAN AND PROFILE
5TH STREET

SHEET NUMBER 16

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KHA PROJECT
148400016


DATE
7/12/2018

SCALE AS SHOWN

DESIGNED BY WWW

DRAWN BY LMB

CHECKED BY WEW



END OF SERVICE LIFE
PACKAGE B: FM 8/ FM 15/ FM1

MANATEE COUNTY

LICENSED PROFESSIONAL

W. WADE WOOD, P.E.

FL LICENSE NUMBER
69051

CROSS SECTIONS
(GULF DRIVE)

SHEET NUMBER

25

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2018-H-194-229
Leon Herndon
9/18/2018

Force Main 1C

Legend

Ties into Force Main 5

Bradenton Beach

3rd St N

Highland Ave

Cortez Rd W

EXISTING 4" P.E.

1st St N

Bay Dr N

Laverne Dr

Widge Dr

Bridge St

3rd St S

4th St S

7th St S

Force Main 1C Route

Lift Station 1C

Approved
2018-H-194-229
Leon Herndon
9/18/2018

1000 ft

Bohmann, Lindsey

From: Wood, Wade
Sent: Tuesday, October 10, 2017 9:33 AM
To: cerrato.eng@verizon.net
Cc: Tondreault, Jamison; Bohmann, Lindsey
Subject: Manatee County EOSL Project
Attachments: Attachments.html

John-

I know some of our group has been in contact with you previously. We have finished our design on the aforementioned project and wanted to give you an opportunity to review and see if you have any concerns. Please feel free to reach out to us if you have any concerns.

Thanks,

ShareFile Attachments

Expires April 8, 2018

EOSL Package A - 100% Plans.pdf	19.4 MB
EOSL Package B - 100% Plans.pdf	23.4 MB

Download Attachments

Wade Wood uses ShareFile to share documents securely. [Learn More.](#)

W. Wade Wood III, P.E.

Kimley-Horn | 655 North Franklin Street, Suite 150, Tampa, FL 33602

Direct: 813-635-5583 | Mobile: 321-299-2395

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Approved
2018-H-194-229
Leon Herndon
9/18/2018

Lindsey Bohmann

Kimley-Horn | 655 N Franklin Street, Suite 150, Tampa, FL 33602

Direct: 813 635 5550 | www.kimley-horn.com

Celebrating ten years as one of FORTUNE's 100 Best Companies to Work For

From: Richard Dorio [<mailto:rvdoriorjr@verizon.net>]
Sent: Friday, February 24, 2017 12:15 PM
To: Bohmann, Lindsey <Lindsey.Bohmann@kimley-horn.com>
Cc: 'Cerrato Engineering' <cerrato.eng@verizon.net>
Subject: RE: Manatee County Force Main Location

Mrs. Bohmann,

Attached are TECO PGS's markups for the force main Locations

Richard Dorio Jr
Cerrato Engineering
1312 Apollo Beach Blvd.
Apollo Beach, FL 33572
(813) 645-2700

From: Cerrato Engineering [<mailto:cerrato.eng@verizon.net>]
Sent: Friday, February 24, 2017 9:00 AM
To: 'Richard Dorio'
Subject: FW: Manatee County Force Main Location

John D. Cerrato P.E
Cerrato Engineering
1312 Apollo Beach Blvd. Suite H
Apollo Beach, FL. 33572
Office (813)645-2700
Cell (813)714-9856

Approved
2018-H-194-229
Leon Herndon
9/18/2018

From: Lindsey.Bohmann@kimley-horn.com [<mailto:Lindsey.Bohmann@kimley-horn.com>]
Sent: Thursday, February 23, 2017 7:36 AM
To: cerrato.eng@verizon.net
Subject: RE: Manatee County Force Main Location

Good Morning John,

Any progress with those force main files?

Thank you for all of your help,

Lindsey

Lindsey Bohmann | Analyst

Kimley-Horn | 655 N Franklin Street, Suite 150, Tampa, FL 33602

Direct: 813 635 5550 | www.kimley-horn.com

Celebrating nine years as one of FORTUNE's 100 Best Companies to Work For

From: Cerrato Engineering [<mailto:cerrato.eng@verizon.net>]
Sent: Monday, February 20, 2017 2:06 PM
To: Bohmann, Lindsey <Lindsey.Bohmann@kimley-horn.com>
Cc: 'Shanahan, Daniel J.' <djshanahan@tecoenergy.com>
Subject: RE: Manatee County Force Main Location

Thanks

Expect to forward PGS disposition by tomorrow.

John D. Cerrato P.E
Cerrato Engineering
1312 Apollo Beach Blvd. Suite H
Apollo Beach, FL. 33572
Office (813)645-2700
Cell (813)714-9856

From: Lindsey.Bohmann@kimley-horn.com [<mailto:Lindsey.Bohmann@kimley-horn.com>]
Sent: Monday, February 20, 2017 1:14 PM
To: cerrato.eng@verizon.net
Subject: Manatee County Force Main Location

Hey John,

As mentioned here are some nearby addresses for the Manatee County force mains:

FM 15A
601 N Bay Blvd
Bradenton Beach, FL 34216

FM 8
402B Clark Dr
Holmes Beach, FL 34217

FM 28A
2311 57th Ave W
Bradenton, FL 34207

FM Orlando Ave
4573 14th St W
Bradenton, FL 34207

Thank you again and if you have any questions please give me a call.

Lindsey

Lindsey Bohmann | Analyst

Kimley-Horn | 655 N Franklin Street, Suite 150, Tampa, FL 33602

Direct: 813 635 5550 | www.kimley-horn.com

Celebrating nine years as one of FORTUNE's 100 Best Companies to Work For

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Leon Herndon
9/18/2018



ECHEZABAL & ASSOCIATES, INC.
25400 US 19 NORTH, SUITE 137
CLEARWATER, FL 33763
PHONE (727 796-8740)

Subsurface Utility Investigation Test Hole Field Data

Project Name: FORCE MAIN END OF LIFE
 Project Limits:
 City / County: BRADENTON BEACH / Manatee
 Financial Project No.:
 EAI Project No.: 2017031.00

Date: 8/4/2017 Revised Date:

Vac Unit: UNIT 1

SUE Crew: EM, DH, ZW

Prepared By: R. Bouffard

Checked By: N. STAUB

Units: U.S. Survey Foot

Datum(s) Horizontal: Vertical:

Utility Type:		Utility Material:					Station and Offset Measured From:							
BE - Buried Electric	BT - Buried Telephone	AC - (Transite)	CMP - Corrugated Metal Pipe				EP - Edge of Pavement	X - "X" Cut in Pavement	SBL - Survey Base Line					
CATV - Cable Television	CW - Chilled Water	CI - Cast Iron	CPP - Corrugated Plastic Pipe				BOC - Back of Curb	BW - Back of Walk	CLC - Center Line of Construction					
FL - Fuel Line	FM - Force Main	Conc. - Concrete	DBC - Direct Buried Cable				Surface Type							
FOC - Fiber Optic Cable	GM - Gas Main	Fg - Fiberglass	DIP - Ductile Iron Pipe											
HW - Hot Water	IRR - Irrigation	Galv. - Galvanized	HDPE - High Density PE				A - Asphalt	B - Brick	Conc. - Concrete	G - Gravel	NG - Natural Ground			
RAW - Raw Water	RCW - Reclaimed Water	STL - Steel	PE - Polyethylene Pipe				P - Pavers	R - Rock	S - Shell					
SAN - Sanitary	SL - Street Light	UNK - Unknown	PVC - Polyvinyl Chloride Pipe				Test Hole Identified By:							
STM - Storm	TS - Traffic Signal		RCP - Reinforced Concrete Pipe											
WM - Water Main	EXP - Exploratory		VCP - Vitrified Clay Pipe				N - Nail	N&D - Nail & Disk		X - "X" Cut in Pavement		H&L - Hub & Lath		
UNK - Unknown							IR - Iron Rod	IRC - Iron Rod & Cap						
Test Hole Date	Test Hole Number	Utility Size, Material,Type & Owner (Nominal size measured in inches)	NORTHING	EASTING	Ground Elevation	Depth to Top	Utility Elevation (Top)	Offset From	Cross Sectional View	Utility Direction	I.D.'d By	Surface Type	Pavement Thickness (Inches)	
5/30/2017	1	16" DIP WM COBB	N/A	N/A	N/A	2.80	N/A	N/A	○	↕	N	A	N/A	
5/31/2017	2	16" DIP WM COBB	N/A	N/A	N/A	3.63	N/A	N/A	○	↕	N	A	N/A	
5/31/2017	3	4" PVC BT FRONTIER	N/A	N/A	N/A	2.25	N/A	N/A	○	↔	N	NG	N/A	
5/31/2017	4	2" STL WM COBB	N/A	N/A	N/A	2.96	N/A	N/A	○	↔	N	A	N/A	
6/1/2017	5	4" POLY GAS TECO	N/A	N/A	N/A	4.74	N/A	N/A	○	↔	IR	NG	N/A	
6/1/2017	6	6" DIP WM COBB	N/A	N/A	N/A	3.37	N/A	N/A	○	↔	N	A	N/A	
6/5/2017	7	4" POLY GAS TECO PEOPLES GAS	N/A	N/A	N/A	3.75	N/A	N/A	○	↗	IR	G	N/A	
6/5/2017	8	4" POLY GAS TECO PEOPLES GAS	N/A	N/A	N/A	3.53	N/A	N/A	○	↕	N	A	N/A	
6/6/2017	9	6" DIP SAN FM MANATEE CO.	N/A	N/A	N/A	2.98	N/A	N/A	○	↕	N	A	N/A	
6/6/2017	10	4" POLY GAS TECO PEOPLES GAS	N/A	N/A	N/A	6.44	N/A	N/A	○	↕	N	A	N/A	
6/6/2017	11	6" DIP SAN FM MANATEE CO.	N/A	N/A	N/A	4.68	N/A	N/A	○	↕	N	A	N/A	

Notes: COBB = City of Bradenton Beach

Approved
 2018-H-194-229
 Leon Herndon
 8/18/2018



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE

EAI JOB No.: 2017031.00

DATE: 5-31-17

NUMBER

Z

LOCATE BY: EM, ZH, DH

SURVEY BY:

CHECKED BY: WCS 6/14/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER

SIZE / TYPE EXPECTED:

SIZE FOUND: 17.4 I.D. O.D. NOMINAL SIZE: 16"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER: City of Bradenton Beach

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER Mag nail

MEASURED DEPTH: 3.63 ft. 1.108 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 16" BLACK DIP WL.

GULF DR. S & 5TH. ST. S

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



GULF DR. S

(1) 16" BLACK
DIP WL

TH # 2

2 WV

5TH. ST. S

EP/
FSW

CONC.
5.00

BSW

N.W. Cor
CONC. LP/PP
#50477715904

SURVEY DATA:

SURVEY PT. #

STATION

ROADWAY

OFFSET

ft.

LT.

RT.

BASELINE: SURVEY CONSTR. OTHER

SURVEY PT. ELEV.

SURVEYED

PLAN

SCALED

Approved

2018-11-19 14:29

Leon Herron

9/18/2018



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE
NUMBER 1

EAI JOB No.: 2017031.00

DATE: 5-30-17

LOCATE BY: EM, ZH, DH

SURVEY BY: _____

CHECKED BY: WCS 6/14/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 17.4 I.D. O.D. NOMINAL SIZE: 16

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: City of Bradenton Beach

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: CEAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER _____

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER Mag nail

MEASURED DEPTH: 2.8 ft. 0.85 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 16" Black DIP WL.
Test holed WL @ Tee to 6" Service unintentionally. Had thrust block around most of pipe. 16" Size From Plans. MD to Top thrust block = 2.05. MD to top of pipe is approx.

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

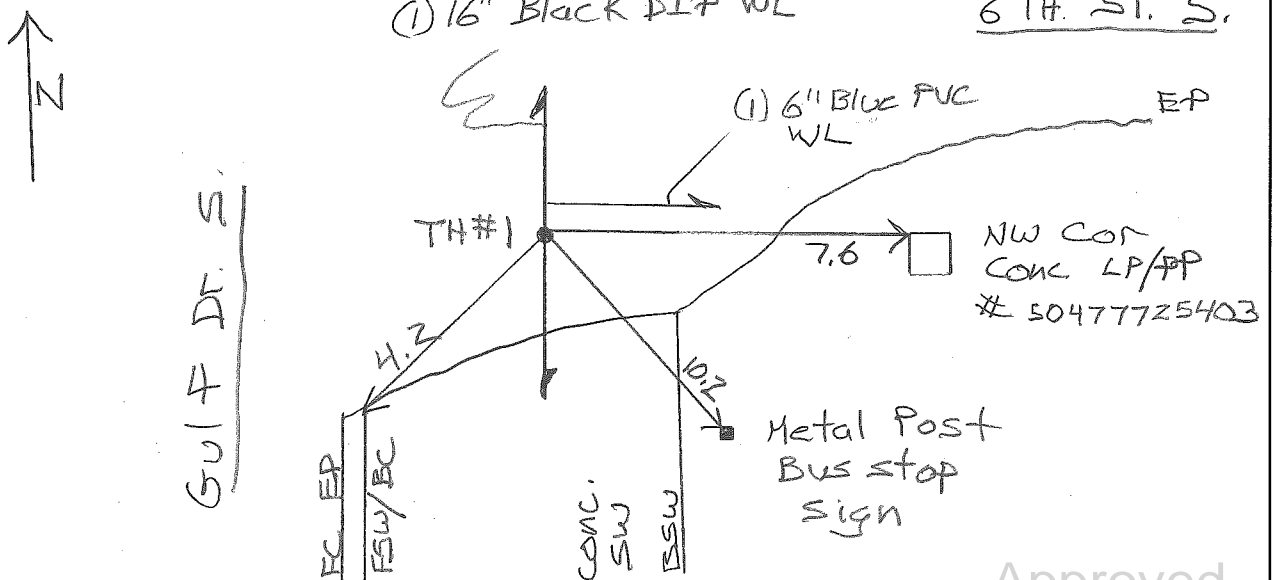
DIRECTION FACING

N

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA: SURVEY PT. # _____ STATION _____
ROADWAY _____ OFFSET _____ ft. LT. RT. _____
BASELINE: SURVEY CONSTR. OTHER _____ SURVEY PT. ELEV. _____

Approved
2018-11-19
Leon Herndon
9/18/2018

Bohmann, Lindsey

From: Kathy McMahon <kathy.mcmahon@mymanatee.org>
Sent: Tuesday, February 14, 2017 11:15 AM
To: Aaron Burkett; Bill Kersey; Chris Mowbray; Dave Branning; David Schofield; Ed Ference; Frank Conetta; Gerardo Traverso; Jim Stockwell; John Pari; Keith McMahan; Kenneth Kohn; Kenneth LaBarr; Michael Sturm; Mukunda Gopalakrishna; Peggy Hines; Robert Shankle; Ryan Beggy; Sage Kamiya; Scott May; Shea Shoun; Tom Gerstenberger; Vishal Kakkad
Cc: Bohmann, Lindsey; Peggy Hines; Keith McMahan
Subject: FW: Request for Utility Locations in Manatee County
Attachments: Attachments.html

The following correspondence has been emailed to me. I am forwarding it on to your offices for review and/or comment. Please respond to **Ms. Bohmann** directly. I have uploaded a general map of our underground facilities and the corresponding record drawings/as-builts we have filed in our database to our FTP Site (<https://www.mymanatee.org/uploader/>). You will receive a separate email from "noreply" with instructions on how to retrieve them. If you do not receive it by the end of day, check your spam or junk mail folder in case it gets caught there. Should you have any questions or need further assistance, please contact me. Thank you.

<https://www.mymanatee.org/uploader/?ShareToken=B4BF53833C037710C666FBF4DC9BC27254D1418D>

Kathy McMahon
Manatee County Utility Records
4520 – 66th Street West
Bradenton, FL 34210
941-792-8811 #5002

Please be advised that Manatee County is not to be held liable for any inaccuracies in record drawings. Additionally any maps or map data (like shape files) produced by this division are only a visual representation of known potable, reclaimed, waste water, traffic and fiber optic utilities in the area. Manatee County does not warrant the accuracy, reliability, or timeliness of any information contained herein and shall not be held liable for any costs or losses of any kind caused by reliance on such information.

<http://www.mymanatee.org/home/government/departments/utilities/infrastructure-mapping-and-damage-prevention/mapping-request-form.html>

Approved
2018-H-194-229
Leon Herndon
9/18/2018



From: Lindsey.Bohmann@kimley-horn.com [mailto:Lindsey.Bohmann@kimley-horn.com]
Sent: Wednesday, February 08, 2017 5:19 PM
To: Kathy McMahon
Subject: FW: Request for Utility Locations in Manatee County

ShareFile Attachments	
Title	Size
Force Main 15A Utilities.pdf	6.1 MB
Force Main 1C Utilities.pdf	8.8 MB
Force Main 28A Utilities.pdf	7.1 MB
Force Main 8 Utilities.pdf	6 MB
Orlando Ave Utilities.pdf	6.5 MB
Port Manatee FM.pdf	6 MB
Lindsey Bohmann uses ShareFile to share documents securely. Learn More.	

Hi Kathy,

Kimley-Horn and Associates, Inc. has been authorized by Manatee County to design several force main replacements. The new pipe diameter and location is described below and the proposed location can be seen in the attached aerials.

The general location for each force main:

1. Force main 1C- Approximately 2,500 feet of 6 inch force main from Lift Station 054 to a point of connection to the existing Force Main 5.
2. Force main 8- Approximately 1,400 feet of 6 inch force main from Lift Station 063 to a manhole at the intersection of Marina Drive and Clark Drive.
3. Force main 15A- Approximately 1,700 feet of 6 inch force main from Lift Station 067 to a manhole along North Bay Blvd.

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2018-H-194-229
Leon Herndon
9/18/2018

4. Force main 28A- Approximately 1,500 feet of 4 inch force main from the Lift Station 130 to a manhole north of the intersection of 57th Avenue West and 24th Street West. Additionally, approximately 275 feet of 4 inch force main from US Post Office Lift Station to a manhole south of 57th Avenue West along 20th Street West.
5. Orlando Avenue- Approximately 2,300 feet of 10 inch force main from Lift Station 26A to a manhole at the intersection of Orlando Avenue and US 41. Additionally, 215 feet of 3 inch force main from the Cortez Plaza Lift Station to a manhole off of 5th Street West.
6. Port Manatee- Approximately 2,000 feet of 4 inch force main from Lift Station 512 to a manhole near North Dock Street and Eastern Avenue.

Kimley-Horn is requesting that you specify the approximate location of any utilities owned or operated by your organization in these areas. Please mark the approximate locations on the attached sheets and/or include as-builts and record drawings along with any service request forms or guidelines regarding resolution procedures in the event of a conflict.

Thanks for your help, and if you have any additional questions, please do not hesitate to contact us.

Lindsey

Lindsey Bohmann | Analyst
Kimley-Horn | 655 N Franklin Street, Suite 150, Tampa, FL 33602
Direct: 813 635 5550 | Mobile: 772 713 9740 | www.kimley-horn.com

Celebrating nine years as one of FORTUNE's 100 Best Companies to Work For



Florida Department of Environmental Protection

Southwest District Office
13051 North Telecom Parkway, Suite 101
Temple Terrace, Florida 33637-0926

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

July 27, 2017

PERMITTEE:

Sia Mollanazar, P.E., Deputy Director
Manatee County Public Works Department
1022 26th Ave. East
Bradenton, FL 34208
Sia.Mollanazar@mymanatee.org

PERMIT NUMBER:	CS41-0182063-188-DWC/CG
ISSUE DATE:	July 27, 2017
EXPIRATION DATE:	July 26, 2022
COUNTY:	Manatee
PROJECT NAME:	Force Main 8 Replacement
WWTF NAME:	Manatee County Southwest Regional WRF
FACILITY ID:	FLA012619

NOTIFICATION OF ACCEPTANCE OF USE OF A GENERAL PERMIT

Dear Mr. Mollanazar,

This letter acknowledges receipt of your Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System for the subject project. Our Office received the Notice on July 25, 2017.

This is to advise you that the Department does not object to your use of this general permit for the following: six-inch diameter force mains along Marina Drive.

Please note the attached requirements apply to your use of this general permit for constructing the proposed domestic wastewater collection/transmission system.

You are further advised that the construction activity must conform to the description contained in your Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System and that any deviation may subject the permittee to enforcement action and possible penalties.

Mr. Mollanazar, P.E., Deputy Director

Page 2

July 27, 2017

If you have any questions, please contact Adib Alam at (813) 470-5947 or via email at Adib.Alam@dep.state.fl.us.

Sincerely,



For Pamala Vazquez
Program Administrator
Permitting & Waste Cleanup Program
Southwest District

Copies furnished to:

W. Wade Wood, P.E., Kimley-Horn & Associates, Inc., Wade.Wood@kimley-horn.com

Adib Alam, SWD FDEP, Adib.Alam@dep.state.fl.us

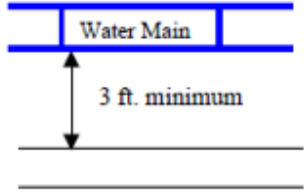
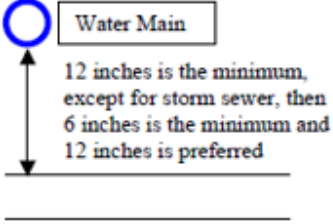
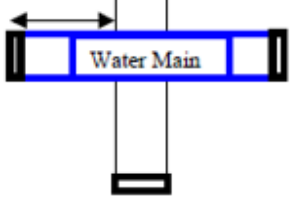
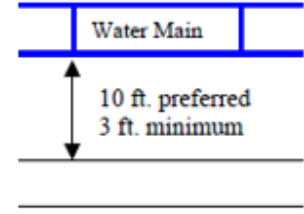
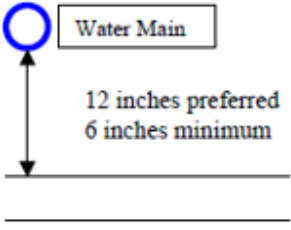
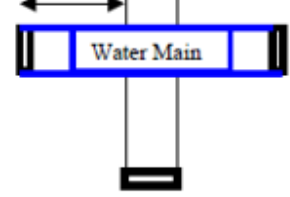
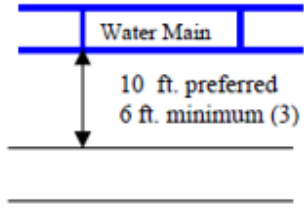
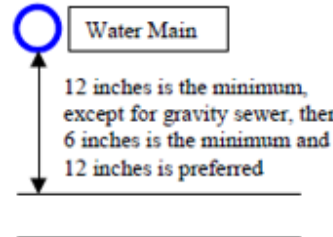
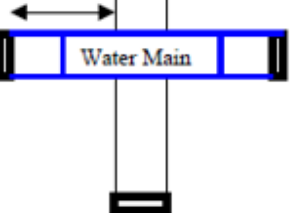
Kenneth Labarr, Manatee County Public Works Dept., Kenneth.Labarr@mymanatee.org

Jim Stockwell, P.E., Manatee County Public Works Dept., Jim.Stockwell@mymanatee.org

REQUIREMENTS FOR USE OF THE GENERAL PERMIT FOR DOMESTIC WASTEWATER COLLECTION/TRANSMISSION SYSTEMS:

1. This general permit is subject to the general permit conditions of Rule 62-4.540, F.A.C., as applicable. This rule is available at the Department's Internet site at: <http://www.dep.state.fl.us/water/rulesprog.htm#ww> [62-4.540]
2. This general permit does not relieve the permittee of the responsibility for obtaining a dredge and fill permit where it is required. [62-604.600(6)(b)1]
3. This general permit cannot be revised, except to transfer the permit. [62-604.600(6)(b)2]
4. This general permit will expire five years from the date of issuance. If the project has been started and not completed by that time, a new permit must be obtained before the expiration date in order to continue work on the project. [62-4.030]
5. Upon completion of construction of the collection/transmission system project, and before placing the facilities into operation for any purpose other than testing for leaks or testing equipment operation, the permittee shall submit to the Department's Southwest District Office Form 62-604.300(8)(b), Request for Approval to Place a Domestic Wastewater Collection/Transmission System into Operation. This form is available at the Department's Internet site at: <http://www.dep.state.fl.us/water/wastewater/forms.htm> [62-604.700(2)]
6. The new or modified collection/transmission facilities shall not be placed into service until the Department clears the project for use. [62-604.700(3)]
7. Abnormal events shall be reported to the Department's Southwest District Office in accordance with Rule 62-604.550, F.A.C. For unauthorized spills of wastewater in excess of 1000 gallons per incident, or where information indicates that public health or the environment may be endangered, oral reports shall be provided to the STATE WATCH OFFICE TOLL FREE NUMBER (800) 320-0519 as soon as practical, but no later than 24 hours from the time the permittee or other designee becomes aware of the circumstances. Unauthorized releases or spills less than 1000 gallons per incident are to be reported orally to the Department's Southwest District Office within 24 hours from the time the permittee, or other designee becomes aware of the circumstances. [62-604.550]

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH F.A.C. RULE 62-555.314

Other Pipe	Horizontal Separation	Crossings (1)	Joint Spacing @ Crossings (Full Joint Centered)
Storm Sewer, Stormwater Force Main, Reclaimed Water (2)	 3 ft. minimum	 12 inches is the minimum, except for storm sewer, then 6 inches is the minimum and 12 inches is preferred	 Alternate 3 ft. minimum
Vacuum Sanitary Sewer	 10 ft. preferred 3 ft. minimum	 12 inches preferred 6 inches minimum	 Alternate 3 ft. minimum
Gravity or Pressure Sanitary Sewer, Sanitary Sewer Force Main, Reclaimed Water (4)	 10 ft. preferred 6 ft. minimum (3)	 12 inches is the minimum, except for gravity sewer, then 6 inches is the minimum and 12 inches is preferred	 Alternate 6 ft. minimum
On-Site Sewage Treatment & Disposal System	10 ft. minimum	---	---

(1) Water main should cross above other pipe. When water main must be below other pipe, the minimum separation is 12 inches.

(2) Reclaimed water regulated under Part III of Chapter 62-610, F.A.C.

(3) 3 ft. for gravity sanitary sewer where the bottom of the water main is laid at least 6 inches above the top of the gravity sanitary sewer.

(4) Reclaimed water not regulated under Part III of Chapter 62-610, F.A.C.

Disclaimer – This document is provided for your convenience only. Please refer to F.A.C. Rule 62-555.314 for additional construction requirements.



Florida Department of Environmental Protection

Southwest District Office
13051 North Telecom Parkway, Suite 101
Temple Terrace, Florida 33637-0926

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

July 27, 2017

PERMITTEE:

Mr. Mollanazar, Deputy Director – Engineering Services
Manatee County Public Works Department
1022 26th Ave. East
Bradenton, FL 34208
Sia.Mollanazar@mymanatee.org

PERMIT NUMBER: CS41-0182063-187-DWC/CG
ISSUE DATE: July 27, 2017
EXPIRATION DATE: July 26, 2022
COUNTY: Manatee
PROJECT NAME: Force Main 15 Replacement
WWTF NAME: Manatee county Southwest WRF
FACILITY ID: FLA012619

NOTIFICATION OF ACCEPTANCE OF USE OF A GENERAL PERMIT

Dear Mr. Mollanazar,

This letter acknowledges receipt of your Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System for the subject project. Our Office received the Notice on August 24, 2016.

This is to advise you that the Department does not object to your use of this general permit for the following: six-inch diameter force main and one manhole along North Bay Blvd.

Please note the attached requirements apply to your use of this general permit for constructing the proposed domestic wastewater collection/transmission system.

You are further advised that the construction activity must conform to the description contained in your Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System and that any deviation may subject the permittee to enforcement action and possible penalties.

Mr. Mollanazar, Deputy Director – Engineering Services

Page 2

July 27, 2017

If you have any questions, please contact Larisa Orekhova at 813-470-5929 or via email at Larisa.Orekhova@dep.state.fl.us.

Sincerely,



For Pamala Vazquez
Program Administrator
Permitting & Waste Cleanup Program
Southwest District

Copies furnished to:

W. Wade Wood, P.E., Kimley-Horn & Associates, Inc., Wade.Wood@kimley-horn.com

Kenneth Labarr, Manatee County Public Works Dept., Kenneth.Labarr@mymanatee.org

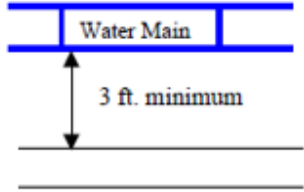
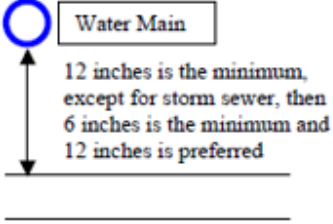
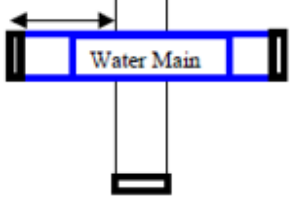
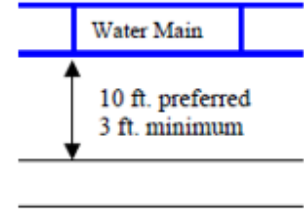
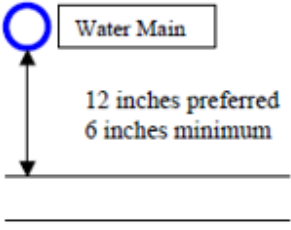
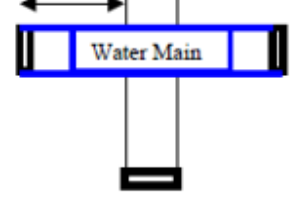
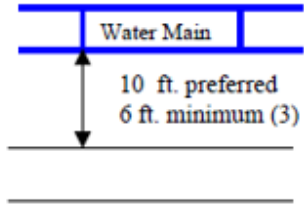
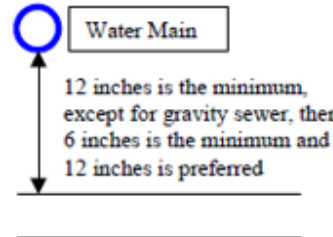
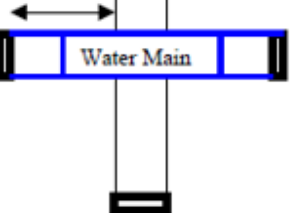
Jim Stockwell, P.E., Manatee County Public Works Dept., Jim.Stockwell@mymanatee.org

Larisa Orekhova, FDEP SWD, Larisa.Orekhova@dep.state.fl.us

REQUIREMENTS FOR USE OF THE GENERAL PERMIT FOR DOMESTIC WASTEWATER COLLECTION/TRANSMISSION SYSTEMS:

1. This general permit is subject to the general permit conditions of Rule 62-4.540, F.A.C., as applicable. This rule is available at the Department's Internet site at: <http://www.dep.state.fl.us/water/rulesprog.htm#ww> [62-4.540]
2. This general permit does not relieve the permittee of the responsibility for obtaining a dredge and fill permit where it is required. [62-604.600(6)(b)1]
3. This general permit cannot be revised, except to transfer the permit. [62-604.600(6)(b)2]
4. This general permit will expire five years from the date of issuance. If the project has been started and not completed by that time, a new permit must be obtained before the expiration date in order to continue work on the project. [62-4.030]
5. Upon completion of construction of the collection/transmission system project, and before placing the facilities into operation for any purpose other than testing for leaks or testing equipment operation, the permittee shall submit to the Department's Southwest District Office Form 62-604.300(8)(b), Request for Approval to Place a Domestic Wastewater Collection/Transmission System into Operation. This form is available at the Department's Internet site at: <http://www.dep.state.fl.us/water/wastewater/forms.htm> [62-604.700(2)]
6. The new or modified collection/transmission facilities shall not be placed into service until the Department clears the project for use. [62-604.700(3)]
7. Abnormal events shall be reported to the Department's Southwest District Office in accordance with Rule 62-604.550, F.A.C. For unauthorized spills of wastewater in excess of 1000 gallons per incident, or where information indicates that public health or the environment may be endangered, oral reports shall be provided to the STATE WATCH OFFICE TOLL FREE NUMBER (800) 320-0519 as soon as practical, but no later than 24 hours from the time the permittee or other designee becomes aware of the circumstances. Unauthorized releases or spills less than 1000 gallons per incident are to be reported orally to the Department's Southwest District Office within 24 hours from the time the permittee, or other designee becomes aware of the circumstances. [62-604.550]

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH F.A.C. RULE 62-555.314

Other Pipe	Horizontal Separation	Crossings (1)	Joint Spacing @ Crossings (Full Joint Centered)
Storm Sewer, Stormwater Force Main, Reclaimed Water (2)	 3 ft. minimum	 12 inches is the minimum, except for storm sewer, then 6 inches is the minimum and 12 inches is preferred	 Alternate 3 ft. minimum
Vacuum Sanitary Sewer	 10 ft. preferred 3 ft. minimum	 12 inches preferred 6 inches minimum	 Alternate 3 ft. minimum
Gravity or Pressure Sanitary Sewer, Sanitary Sewer Force Main, Reclaimed Water (4)	 10 ft. preferred 6 ft. minimum (3)	 12 inches is the minimum, except for gravity sewer, then 6 inches is the minimum and 12 inches is preferred	 Alternate 6 ft. minimum
On-Site Sewage Treatment & Disposal System	10 ft. minimum	---	---

(1) Water main should cross above other pipe. When water main must be below other pipe, the minimum separation is 12 inches.

(2) Reclaimed water regulated under Part III of Chapter 62-610, F.A.C.

(3) 3 ft. for gravity sanitary sewer where the bottom of the water main is laid at least 6 inches above the top of the gravity sanitary sewer.

(4) Reclaimed water not regulated under Part III of Chapter 62-610, F.A.C.

Disclaimer – This document is provided for your convenience only. Please refer to F.A.C. Rule 62-555.314 for additional construction requirements.



Florida Department of Environmental Protection

Southwest District Office
13051 North Telecom Parkway, Suite 101
Temple Terrace, FL 33637-0926

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

August 3, 2017

Manatee County
c/o Sia Mollanazar, Deputy Director – Engineering Services
1022 26th Avenue East
Bradenton, FL 34208
sia.mollanazar@mymanatee.org

File No.: 41-0355575-001-EG, Manatee County

Dear Sia Mollanazar:

On July 5, 2017, we received your notice of intent to use a General Permit (GP), pursuant to Rule 62-330.453, Florida Administrative Code (F.A.C.) to install approximately 485-linear-feet of 6-inch force main within Lake Lavista Inlet, a Class III Florida Waterbody. The project is located adjacent to North Bay Boulevard between Lakeview Drive and Pine Avenue, Section 18, Township 34 South, Range 16 East, Manatee County.

Your intent to use a general permit has been reviewed by Department staff for three types of authorizations: (1) regulatory authorization, (2) proprietary authorization (related to state-owned submerged lands), and (3) federal authorization. The authority for review and the outcomes of the reviews are listed below. Please read each section carefully.

Your project qualifies for all three. However, this letter does not relieve you from the responsibility of obtaining other federal, state, or local authorizations that may be required for the activity.

If you change the project from what you submitted, the authorization(s) granted may no longer be valid at the time of commencement of the project. Please contact us prior to beginning your project if you wish to make any changes.

If you have any questions regarding this matter, please contact Brandon Miller via email at Michael.B.Miller@dep.state.fl.us or by phone at 813-470-5742.

1. Regulatory Review –Verified

Based on the forms, drawings, and documents submitted with your notice, it appears that the project meets the requirements for the General Permit under Rule 62-330.453, F.A.C. Any activities performed under a general permit are subject to general conditions required in Rule 62-330.405, F.A.C. (attached), and the specific conditions of Rule 62-330.453, F.A.C. (attached). Any deviations from these conditions may subject the permittee to enforcement action and possible penalties.

Please be advised that the construction phase of the GP must be completed within five years from the date the notice to use the GP was received by the Department. If you wish to continue this GP beyond the expiration date, you must notify the Department at least 30 days before its expiration.

Authority for review- Part IV of Chapter 373, F.S., Title 62, F.A.C. and in accordance with the operating agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, F.A.C.

2. Proprietary Review - Approved

The Department acts as staff to the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees) and issues certain authorizations for the use of sovereign submerged lands. The Department has the authority to review activities on sovereign submerged lands under Chapter 253 of the Florida Statutes (F.S.) and 258, F.S. if located within an aquatic preserve, and Chapters 18-20 and 18-21 of the Florida Administrative Code.

The activity appears to be located on sovereign submerged lands owned by the Board of Trustees. As staff to the Board of Trustees, the Department has reviewed the activity described above, and has determined that the activity qualifies for an exception under Rule 18-21.005(1)(a)(1), Florida Administrative Code and Section 253.77 of the Florida Statutes to construct and use the activity on the specified sovereign submerged lands, as long as the work performed is located within the boundaries as described herein and is consistent with the terms and conditions herein.

Please be advised that any use of sovereign submerged lands without specific prior authorization from the Board of Trustees will be considered a violation of Chapter 253, Florida Statutes and may subject the affected upland riparian property owners to legal action as well as potential fines for the prior unauthorized use of sovereign land.

Authority for review - Chapter 253 F.S., Chapter 18-21, F.A.C., and Section 62-330.075, F.A.C. as required.

3. Federal Review - SPGP Approved

Your proposed activity as outlined in your application and attached drawings qualifies for Federal authorization pursuant to the State Programmatic General Permit V, and a **SEPARATE permit** or authorization **will not be required** from the Corps. Please note that the Federal authorization expires on July 26, 2021. However, your authorization may remain in effect for up to 1 additional year, if provisions of Special Condition B.27 of the SPGP V permit instrument are met. You, as permittee, are required to adhere to all General Conditions and Special Conditions that may apply to your project." Special conditions required for your project are attached. A copy of the SPGP V with all terms and conditions and the General Conditions may be found at <http://www.saj.usace.army.mil/Divisions/Regulatory/sourcebook.htm>."

Authority for review - an agreement with the USACOE entitled "Coordination Agreement Between the U. S. Army Corps of Engineers (Jacksonville District) and the Florida Department of Environmental Protection, or Duly Authorized Designee, State Programmatic General Permit", Section 10 of the Rivers and Harbor Act of 1899, and Section 404 of the Clean Water Act.

Additional Information

Please retain this letter. The activities may be inspected by authorized state personnel in the future to ensure compliance with appropriate statutes and administrative codes. If the activities are not in compliance, you may be subject to penalties under Chapter 373, F.S., and Chapter 18-14, F.A.C.

Notice of Rights

This action is final and effective on the date filed with the Clerk of the Department unless a petition for an administrative hearing is timely filed under Sections 120.569 and 120.57, F.S., before the deadline for filing a petition. On the filing of a timely and sufficient petition, this action will not be final and effective until further order of the Department. Because the administrative hearing process is designed to formulate final agency

action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice.

Petition for Administrative Hearing

A person whose substantial interests are affected by the Department's action may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. Pursuant to Rule 28-106.201, F.A.C., a petition for an administrative hearing must contain the following information:

- (a) The name and address of each agency affected and each agency's file or identification number, if known;
- (b) The name, address, any email address, any facsimile number, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests are or will be affected by the agency determination;
- (c) A statement of when and how the petitioner received notice of the agency decision;
- (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;
- (e) A concise statement of the ultimate facts alleged, including the specific facts that the petitioner contends warrant reversal or modification of the agency's proposed action;
- (f) A statement of the specific rules or statutes that the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and
- (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wishes the agency to take with respect to the agency's proposed action.

The petition must be filed (received by the Clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000. Also, a copy of the petition shall be mailed to the applicant at the address indicated above at the time of filing.

Time Period for Filing a Petition

In accordance with Rule 62-110.106(3), F.A.C., petitions for an administrative hearing by the applicant must be filed within 21 days of receipt of this written notice. Petitions filed by any persons other than the applicant, and other than those entitled to written notice under Section 120.60(3), F.S. must be filed within 21 days of publication of the notice or within 21 days of receipt of the written notice, whichever occurs first. Under Section 120.60(3), F.S., however, any person who has asked the Department for notice of agency action may file a petition within 21 days of receipt of such notice, regardless of the date of publication. The failure to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

Extension of Time

Under Rule 62-110.106(4), F.A.C., a person whose substantial interests are affected by the Department's action may also request an extension of time to file a petition for an administrative hearing. The Department may, for good cause shown, grant the request for an extension of time. Requests for extension of time must be filed with the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, before the applicable deadline for filing a petition for an administrative hearing. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

Mediation

Mediation is not available in this proceeding.

FLAWAC Review

The applicant, or any party within the meaning of Section 373.114(1)(a) or 373.4275, F.S., may also seek appellate review of this order before the Land and Water Adjudicatory Commission under Section 373.114(1) or 373.4275, F.S. Requests for review before the Land and Water Adjudicatory Commission must be filed with the Secretary of the Commission and served on the Department within 20 days from the date when the order is filed with the Clerk of the Department.

Judicial Review

Any party to this action has the right to seek judicial review pursuant to Section 120.68, F.S., by filing a Notice of Appeal pursuant to Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, M.S. 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this action is filed with the Clerk of the Department.

Executed in Hillsborough County, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Sincerely,



Anthony Pidala
Environmental Consultant
Permitting and Waste Cleanup Program
Southwest District

Enclosures:

Ch. 62-330.453, F.A.C.
General Conditions for All General Permits, Ch. 62-330.405, F.A.C.
Special Consent Conditions
General Conditions for Authorizations for Activities on State-Owned Submerged Lands
Special Conditions Related to All Review and Authorizations
General Conditions for Federal Authorization for SPGP V
Department of the Army Permit Transfer for SPGP V

Attachments:

Project Drawings

cc:

Brandon Miller, DEP Southwest District, Michael.B.Miller@dep.state.fl.us
DEP Southwest, SW_ERP@dep.state.fl.us
DEP Southwest, SWD_Clerical@dep.state.fl.us
Lee Cook, Quest Ecology, lee@questecology.com

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this determination, including all copies, was mailed before the close of business on August 3, 2017, to the above listed persons.

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to 120.52(7),
Florida Statutes, with the designated Department Clerk,
receipt of which is hereby acknowledged.

Clerk Stacy Gardiner Date August 3, 2017,

62-330.453 General Permit for Installation, Maintenance, Repair, and Removal of Utility Lines.

(1) A general permit is granted for the installation, maintenance, repair, and removal of underground utility lines, cable, conduit, or pipeline transmitting electricity, communication signals, potable water, raw water, reclaimed water, domestic wastewater, propane gas or natural gas.

(2) For the purposes of this general permit:

(a) "Directional drilling" means the linear or curvilinear, excavation of a tunnel or conduit, in any direction, through the use of drilling equipment that can change direction during excavation; this also includes borehole reaming and pulling following primary drilling.

(b) "Jack-and-bore" means the linear, primarily lateral excavation of a tunnel, typically between excavated subgrade pits, through use of drilling equipment and encasement which is advanced under mechanical force, and includes similar methods commonly termed as "microtunneling."

(c) "Frac-out" means any release of drilling fluid or slurry which results in above-grade discharge of drilling fluid or slurry or significant loss of such fluid or slurry into the surrounding parent material.

(3) This general permit is limited as follows:

(a) No work occurs within Outstanding Florida Waters, Aquatic Preserves, or Class I waters;

(b) The installation of conduit or pipeline to drain wetlands or other surface waters is not authorized;

(c) Prior to work, existing pipelines shall be evacuated of substances which, if released, could result in a violation of state water quality standards;

(d) The maximum width of the disturbed corridor in wetlands shall not exceed 30 feet.

(e) The total area of forested wetland disturbance shall not exceed 0.5 acre per ten miles of cable, conduit, or pipeline;

(f) Minor above-grade improvements may be constructed in uplands under this general permit, but shall be limited to vents, valves, meter assemblies, relays, junction boxes, pads or similar structures that are directly connected to the utility line, do not create discharges, and which cumulatively comprise no more than 100 square feet of impervious surfaces per mile of utility line.

(g) Installation, maintenance, repair, and removal activities performed via trenching or methods other than directional drilling or jack-and-bore, are subject to the following special conditions:

1. The maximum width of the excavated trench shall not exceed eight feet, with temporary spoil storage banks not to exceed ten feet in width;

2. For a trench with a top width greater than three feet in herbaceous wetlands, the upper layer of the soil horizon shall initially be scraped and segregated into a spoil bank that is separated from the spoil bank resulting from the excavation of the trench for the utility line. The upper layer of the soil horizon shall be replaced as the last step of restored grades to facilitate natural revegetation;

3. Trenching in surface waters shall be limited to wetlands, artificial waters, and residential canal systems;

4. Temporary spoil banks shall contain breaches that prevent impoundment or restriction of surface water flows;

(h) Installation, maintenance, repair, and removal conducted using directional drilling or jack-and-bore methods are subject to the following special conditions:

1. The maximum outside diameter of the cable, conduit or pipeline, including encasement, shall not exceed 24 inches;

2. A minimum of depth of cover, equal to the greater of either five feet, or five times the maximum encased diameter of the utility line to be installed, shall be maintained between the top of the utility line and casing and the soil surface or submerged bottom of any wetland or waterbody being crossed.

3. All work areas associated with directional drilling or jack-and-bore activities, including entrance and exit pits, drill rigs, tanks, pumps, drilling fluid mixing and settling pits, dewatering systems and staging areas for pipe, cables, and drill string, shall be located within uplands.

4. The use of drilling fluids shall not cause or contribute to a violation of state ground water quality criteria or standards, as defined in Chapter 62-520, F.A.C.

5. The permittee shall, at least 48 hours prior to commencement of any directional drilling or jack-and-bore activities, submit to the agency the name, as registered with the Florida Department of State, and

all-hours telephone contact information of all contractors responsible for drilling and for containment and cleanup in the event of a drilling fluid frac-out or spill;

6. Contractor shall, at all times during directional drilling activities, maintain appropriate equipment and materials in a readily-accessible location and condition, to effectively contain and clean up a drilling fluid frac-out or spill;

7. The permittee or the permittee's contractor shall, at all times during directional drilling activities, ensure that appropriately-trained personnel monitor downhole equipment position, drilling fluid circulation and pressures, and actively monitor the entire utility line route for surface frac-out of drilling fluids;

8. Drilling activities shall be discontinued and the drilling fluid or slurry shall be contained using appropriate methods as soon as possible, in the event of a drilling fluid frac-out or spill. Removal of drilling fluid or slurry from wetlands and other surface waters shall be initiated and completed in the most expeditious manner practicable. Removed drilling fluid shall be contained or disposed of in an appropriate upland location. Any frac-out or spill of drilling fluid into wetlands or other surface waters shall be reported to Agency staff within 24 hours following detection of the spill or frac-out.

Rulemaking Authority 373.026(7), 373.043, 373.118(1), 373.406(5), 373.4131, 373.414(9), 373.418, 403.805(1) FS. Law Implemented 373.118(1), 373.406(5), 373.413, 373.4131, 373.414(9), 373.416, 373.418, 403.814(1) FS. History—New 10-3-95, Formerly 62-341.453, Amended 10-1-13.

62-330.405 General Conditions for All General Permits

The following general permit conditions are binding upon the permittee and are enforceable under Chapter 373, F.S. These conditions do not apply to the general permit in Section 403.814(12), F.S.

(1) The general permit is valid only for the specific activity indicated. Any deviation from the specified activity and the conditions for undertaking that activity shall constitute a violation of the permit and may subject the permittee to enforcement action and revocation of the permit under Chapter 373, F.S.

(2) This general permit does not eliminate the necessity to obtain any required federal, state, local and special district authorizations prior to the start of any construction, alteration, operation, maintenance, removal or abandonment authorized by this permit.

(3) This general permit does not convey to the permittee or create in the permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the permittee, or convey any rights or privileges other than those specified in the general permit.

(4) The general permit does not relieve the permittee from liability and penalties when the permitted activity causes harm or injury to: human health or welfare; animal, plant or aquatic life; or property. It does not allow the permittee to cause pollution that violates state water quality standards.

(5) Section 253.77, F.S., provides that a person may not commence any excavation, construction, or other activity involving the use of state-owned or other lands of the state, the title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund without obtaining the required consent, lease, easement, or other form of authorization authorizing the proposed use. Therefore, the permittee is responsible for obtaining any necessary authorizations from the Board of Trustees prior to commencing activity on state-owned lands.

(6) The authorization to conduct activities under a general permit may be modified, suspended or revoked in accordance with Chapter 120, F.S., and Section 373.429, F.S.

(7) This permit shall not be transferred to a third party except pursuant to Rule 62-330.340, F.A.C. The permittee transferring the general permit shall remain liable for any corrective actions that may be required as a result of any permit violations prior to sale, conveyance, or other transfer of ownership or control of the permitted project, activity, or the real property at which the permitted project or activity is located.

(8) Upon reasonable notice to the permittee, Agency staff with proper identification shall have permission to enter, inspect, sample and test the permitted system to ensure conformity with the plans and specifications approved by the permit.

(9) The permittee shall maintain any permitted project or activity in accordance with the plans

submitted to the Agency and authorized in this general permit.

(10) A permittee's right to conduct a specific activity under this general permit is authorized for a duration of five years.

(11) Activities shall be conducted in a manner that does not cause or contribute to violations of state water quality standards. Performance-based erosion and sediment control best management practices shall be implemented and maintained immediately prior to, during, and after construction as needed to stabilize all disturbed areas, including other measures specified in the permit to prevent adverse impacts to the water resources and adjacent lands. Erosion and sediment control measures shall be installed and maintained in accordance with the *State of Florida Erosion and Sediment Control Designer and Reviewer Manual (Florida Department of Environmental Protection and Florida Department of Transportation June 2007)*, available at

www.dep.state.fl.us/water/wetlands/docs/erp/FLerosionSedimentManual_6_07.pdf, and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual (Florida Department of Environmental Protection, Nonpoint Source Management Section, Tallahassee, Florida, July 2008)*, available at www.dep.state.fl.us/water/nonpoint/docs/erosion/erosion-inspectors-manual.pdf.

(12) Unless otherwise specified in the general permit, temporary vehicular access within wetlands during construction shall be performed using vehicles generating minimum ground pressure to minimize rutting and other environmental impacts. Within forested wetlands, the permittee shall choose alignments that minimize the destruction of mature wetland trees to the greatest extent practicable. When needed to prevent rutting or soil compaction, access vehicles shall be operated on wooden, composite, metal, or other non-earthen construction mats. In all cases, access in wetlands shall comply with the following:

(a) Access within forested wetlands shall not include the cutting or clearing of any native wetland tree having a diameter 4 inches or greater at breast height;

(b) The maximum width of the construction access area shall be limited to 15 feet;

(c) All mats shall be removed within 72 hours after the work commences; and

(d) Areas disturbed for access shall be restored to natural grades immediately after the maintenance or repair is completed.

(13) Barges or other work vessels used to conduct in-water activities shall be operated in a manner that prevents unauthorized dredging, water quality violations, and damage to submerged aquatic communities.

(14) The construction, alteration, or use of the authorized project shall not adversely impede navigation or create a navigational hazard in the water body.

(15) Except where specifically authorized in a general permit, activities must not:

(a) Impound or obstruct existing water flow, cause adverse impacts to existing surface water storage and conveyance capabilities, or otherwise cause adverse water quantity or flooding impacts to receiving water and adjacent lands;

(b) Cause an adverse impact to the maintenance of surface or ground water levels or surface water flows established pursuant to Section 373.042, F.S., or a Works of the District established pursuant to Section 373.086, F.S.; or

(16) If any prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, dugout canoes, or any other physical remains that could be associated with Native American cultures, or early colonial or American settlement are encountered at any time within the project site area, work involving subsurface disturbance in the immediate vicinity of such discoveries shall cease. The permittee or other designee shall contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section, at (850) 245-6333 or (800) 847-7278, as well as the appropriate permitting agency office. Such subsurface work shall not resume without verbal or written authorization from the Division of Historical Resources. If unmarked human remains are encountered, all work shall stop immediately and notification shall be provided in accordance with Section 872.05, F.S.

(17) The activity must be capable, based on generally accepted engineering and scientific principles, of being performed and of functioning as proposed, and must comply with any applicable District special basin and geographic area criteria.

(18) The permittee shall comply with the following when performing work within waters accessible to federally- or state-listed aquatic species, such as manatees, marine turtles, smalltooth sawfish, and Gulf sturgeon:

(a) All vessels associated with the project shall operate at "Idle Speed/No Wake" at all times while in the work area and where the draft of the vessels provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

(b) All deployed siltation or turbidity barriers shall be properly secured, monitored, and maintained to prevent entanglement or entrapment of listed species.

(c) All in-water activities, including vessel operation, must be shutdown if a listed species comes within 50 feet of the work area. Activities shall not resume until the animal(s) has moved beyond a 50-foot radius of the in-water work, or until 30 minutes elapses since the last sighting within 50 feet. Animals must not be herded away or harassed into leaving. All on-site project personnel are responsible for observing water-related activities for the presence of listed species.

(d) Any listed species that is killed or injured by work associated with activities performed shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1(888)404-3922 and ImperiledSpecies@myFWC.com.

(e) Whenever there is a spill or frac-out of drilling fluid into waters accessible to the above species during a directional drilling operation, the FWC shall be notified at imperiledspecies@myfwc.com with details of the event within 24 hours following detection of the spill or frac-out.

(19) The permittee shall hold and save the Agency harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any activity authorized by the general permit.

(20) The permittee shall immediately notify the Agency in writing of any submitted information that is discovered to be inaccurate.

Rulemaking Authority 373.026(7), 373.043, 373.118(1), 373.406(5), 373.4131, 373.414(9), 373.4145, 373.418, 403.805(1) FS. Law Implemented 373.044, 373.118(1), 373.129, 373.136, 373.406(5), 373.413, 373.4131, 373.414(9), 373.4145, 373.416, 373.422, 373.423, 373.429, 403.814(1) FS. History—New 10-3-95, Amended 10-1-07, Formerly 62-341.215, Amended 10-1-13.

Special Consent Conditions

1. The applicant agrees to indemnify, defend and hold harmless the Board of Trustees and the State of Florida from all claims, actions, lawsuits and demands in any form arising out of the authorization to use sovereignty submerged lands or the applicant's use and construction of structures on sovereignty submerged lands. This duty to indemnify and hold harmless will include any and all liabilities that are associated with the structure or activity including special assessments or taxes that are now or in the future assessed against the structure or activity during the period of the authorization.
2. Failure by the Board of Trustees to enforce any violation of a provision of the authorization or waiver by the Board of Trustees of any provision of the authorization will not invalidate the provision not enforced or waived, nor will the failure to enforce or a waiver prevent the Board of Trustees from enforcing the unenforced or waived provision in the event of a violation of that provision.
3. Applicant binds itself and its successors and assigns to abide by the provisions and conditions set forth in the authorization. If the applicant or its successors or assigns fails or refuses to comply with the provisions and conditions of the authorization, the authorization may be terminated by the Board of Trustees after written notice to the applicant or its successors or assigns. Upon receipt of such notice, the applicant or its successors or assigns will have thirty (30) days in which to correct the violations. Failure to correct the violations within this period will result in the automatic revocation of this authorization.

4. All costs incurred by the Board of Trustees in enforcing the terms and conditions of the authorization will be paid by the applicant. Any notice required by law will be made by certified mail at the address shown on page one of the authorization. The applicant will notify the Board of Trustees in writing of any change of address at least ten days before the change becomes effective.
5. This authorization does not allow any activity prohibited in a conservation easement or restrictive covenant that prohibits the activity.

General Conditions for Authorizations for Activities on State-Owned Submerged Land

All authorizations granted by rule or in writing under Rule 18-21.005, F.A.C., except those for geophysical testing, shall be subject to the general conditions as set forth in paragraphs (a) through (i) below. The general conditions shall be part of all authorizations under this chapter, shall be binding upon the grantee, and shall be enforceable under Chapter 253 or 258, Part II, F.S.

(a) Authorizations are valid only for the specified activity or use. Any unauthorized deviation from the specified activity or use and the conditions for undertaking that activity or use shall constitute a violation. Violation of the authorization shall result in suspension or revocation of the grantee's use of the sovereignty submerged land unless cured to the satisfaction of the Board.

(b) Authorizations convey no title to sovereignty submerged land or water column, nor do they constitute recognition or acknowledgment of any other person's title to such land or water.

(c) Authorizations may be modified, suspended or revoked in accordance with their terms or the remedies provided in Sections 253.04 and 258.46, F.S., or Chapter 18-14, F.A.C.

(d) Structures or activities shall be constructed and used to avoid or minimize adverse impacts to sovereignty submerged lands and resources.

(e) Construction, use, or operation of the structure or activity shall not adversely affect any species which is endangered, threatened or of special concern, as listed in Rules 68A-27.003, 68A-27.004, and 68A-27.005, F.A.C.

(f) Structures or activities shall not unreasonably interfere with riparian rights. When a court of competent jurisdiction determines that riparian rights have been unlawfully affected, the structure or activity shall be modified in accordance with the court's decision.

(g) Structures or activities shall not create a navigational hazard.

(h) Structures shall be maintained in a functional condition and shall be repaired or removed if they become dilapidated to such an extent that they are no longer functional. This shall not be construed to prohibit the repair or replacement subject to the provisions of Rule 18-21.005, F.A.C., within one year, of a structure damaged in a discrete event such as a storm, flood, accident, or fire.

(i) Structures or activities shall be constructed, operated, and maintained solely for water dependent purposes, or for non-water dependent activities authorized under Paragraph 18-21.004(1)(f), F.A.C., or any other applicable law.

Special Conditions Related to All Review and Authorizations

In addition to the conditions specified above, the following Special Conditions apply to all projects reviewed and/or authorized under the SPGP V.

1. The District Engineer reserves the right to require that any request for authorization under this SPGP V be evaluated as an Individual Permit. Conformance with the terms and conditions of the SPGP V does not automatically guarantee Federal authorization.

2. On a case-by-case basis the Corps may impose additional Special Conditions which are deemed necessary to minimize adverse environmental impacts.

3. Failure to comply with all conditions of the Federal authorizations under the SPGP V would constitute a violation of the Federal authorization.

4. No structure or work shall adversely affect or disturb properties listed in the National Register of Historic Places or those eligible for inclusion in the National Register. Prior to the start of work, the Applicant/Permittee or other party on the Applicant's/Permittee's behalf, shall conduct a search of known historical properties by contracting a professional archaeologist, and contacting the Florida Master Site File at 850-245-6440 or SiteFile@dos.state.fl.us. The Applicant/Permittee can also research sites in the National Register Information System (NRIS). Information can be found at <http://www.cr.nps.gov/nr/research>.

a. If, during the initial ground disturbing activities and construction work, there are archaeological/cultural materials unearthed (which shall include, but not be limited to: pottery, modified shell, flora, fauna, human remains, ceramics, stone tools or metal implements, dugout canoes or any other physical remains that could be associated with Native American cultures or early colonial or American settlement), the Permittee shall immediately stop all work in the vicinity and notify the Compliance and Review staff of the State Historic Preservation Office at 850-245-6333 and the Corps Regulatory Project Manager to assess the significance of the discovery and devise appropriate actions, including salvage operations. Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7.

b. In the unlikely event that human remains are identified, they will be treated in accordance with Section 872.05, Florida Statutes; all work in the vicinity shall immediately cease and the local law authority, the State Archaeologist (850-245-6444), and the Corps Regulatory Project Manager shall immediately be notified. Such activity shall not resume unless specifically authorized by the State Archaeologist and the Corps.

5. No work shall be authorized under the SPGP V which proposes the use of prefabricated modules for habitat creation, restoration, or enhancement except as allowed in Special Condition 15 for *Living Shorelines* of the *Shoreline Stabilization* category.

6. The Design and construction of a Project must comply with the following.

a. Where aquatic vegetation is present, adverse impacts to aquatic vegetation from construction of piling-supported structures may be avoided/minimized by adherence to, or employing alternative construction techniques that provide a higher level of protection than, the protective criteria in the joint U.S. Army Corps of Engineers'/National Marine Fisheries Service's "*Construction Guidelines in Florida for Minor Piling-Supported Structures Constructed in or over Submerged Aquatic Vegetation (SAV), Marsh or Mangrove Habitat*" U.S. Army Corps of Engineers/National Marine Fisheries Service August 2001 (updated June 2008). Unless otherwise specifically approved by the National Marine Fisheries Service, where aquatic vegetation is present, piling-supported structures authorized under the SPGP V must comply with, or provide a higher level of protection than, the criteria contained in the referenced construction guidelines. Mangrove impacts are limited to the removal of mangroves along 4 linear feet of

shoreline to accommodate a 4-ft-wide access walkway associated with a dock that meets the above guidelines.

b. Additionally, because of concerns about adverse impacts to the endangered Johnson's seagrass (*Halophila johnsonii*) in the lagoon and canal systems on Florida's east coast from Sebastian Inlet (Brevard County) south to and including central Biscayne Bay (Miami-Dade County), the following requirements must be met:

(1) Piling-supported structures must comply with, or provide a higher level of protection than, the criteria contained in the construction guidelines titled "*Key for Construction Conditions for Docks or Other Minor Structures Constructed in or Over Johnson's seagrass (Halophila johnsonii)*" National Marine Fisheries Service/U.S. Army Corps of Engineers - February 2002 (updated October 2002)."

(2) Removal of derelict vessels must comply with the practices of Special Condition 18.

(3) All other activities will have no effect on Johnson's seagrass, i.e., no seagrass is present.

c. The presence of seagrass will be determined utilizing the attached "*Submerged Aquatic Vegetation Survey Guidelines*".

7. For projects in waters accessible to sea turtles, Smalltooth sawfish, Gulf sturgeon, or Shortnose sturgeon, the Permittee will utilize the "*Sea Turtle and Smalltooth Sawfish Construction Conditions*" and the following additions:

a. Any collision(s) with and/or injuries to any whale, or sturgeon occurring during the construction of a project, shall be reported immediately to NMFS's Protected Resources Division (PRD) at (727-824-5312).

b. Reports to NMFS's Protected Resources Division (PRD) may be made by email to takereport.nmfs@noaa.gov.

c. Sea turtle and marine mammal stranding/rescue organizations' contact information is available by region at <http://www.nmfs.noaa.gov/pr/health/networks.htm>.

d. Smalltooth sawfish encounters shall be reported to <http://www.flmnh.ufl.edu/fish/sharks/sawfish/sawfishencounters.html>.

e. All work must occur during daylight hours.

8. The Permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The Permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

9. The Permittee is responsible for compliance with 50 CFR 224.103(c) prohibiting approach within 500 yards of a right whale, with limited exceptions.

10. Turbidity control measures shall be used throughout construction to control erosion and siltation to ensure there are no violations of state or federal water quality standards. Turbidity control measures shall be: (1) for the smallest practicable area; (2) monitored daily to ensure listed species are not entangled or trapped in the project area; (3) shall be removed promptly upon project completion and the return of water quality conditions; (4) and shall not block entry to or exit from designated critical habitat. Siltation

barriers shall be made of material in which listed species cannot become entangled (i.e., reinforced impermeable polycarbonate vinyl fabric [PVC]).

a. Turbidity curtains are not required where not practical in dynamic systems such as surf zones and could actually do more harm than good if the curtains become detached (e.g., they could entrap pelagic organisms and become entangled around benthic organisms, such as coral).

b. Turbidity barriers are not required if installation of single piling in deep water since is unlikely to adversely affect water quality.

11. In-water rope or chain must meet the following requirements: Industrial grade metal

chains or heavy cables that do not readily loop and tangle; All in-water lines (rope and cable) must be thick and taut and cannot have excess line in the water; Lines can be enclosed in a plastic or rubber sleeve/tube to add rigidity.

12. No work shall occur where hard bottom or any hard or coral including ESA-listed coral species are present within the footprint of the project.

13. No work shall occur that results in removal of mangroves (including prop roots), except:

a. as provided by Special Condition 6.a.; or,

b. for removal of mangroves growing at the foot or from an existing seawall whose removal needed to repair the seawall.

14. No work shall occur that results in impacts to seagrass except as provided by Special Condition 6.

15. (For *Docks, Piers, Associated Facilities, and Other Minor Piling-Supported Structures and Boat Ramps and Boat Launch Areas and Structures Associated with Such Ramps or Launch Areas.*)

a. Aids to Navigation and Private Aids to Navigation (e.g. attached to the structures authorized by the SPGP) must be approved by and installed in accordance with U.S. Coast Guard requirements.

b. Temporary structures associated with marine events will be removed and the site restored upon completion of the event.

c. (For multi-family residential docks (e.g., condos, trailer parks, apartment complexes) designated for fishing or vessel storage, for temporary marine event pile-supported structures involving high speed vessel traffic or fishing, and for commercial or public boat ramps.) Install educational signs as follows in a visible location to alert boaters of listed species in the area susceptible to vessel strikes or hook-and-line captures. NMFS website (http://sero.nmfs.noaa.gov/protected_resources/section_7/protected_species_educational_signs/index.html) provides sign installation guidance and most current version of the signs.

(1) All commercial and public boat ramps shall install the Save Sea Turtle, Sawfish, and Dolphin sign.

(2) If the Project occurs within the range of Gulf, Atlantic, or Shortnose sturgeon, the Permittee will install and maintain the *Report Sturgeon* sign.

(3) If the Project occurs within 14 miles of North Atlantic Right Whale critical habitat, the Permittee will install and maintain the *Help Protect North Atlantic Right Whales* sign.

d. Project construction will take place from uplands or from floating equipment (e.g., barge); prop or wheel-washing is prohibited.

16. (For *Transient activities*.)

a. Temporary structures shall not block access of species to an area such as preventing movement in or out of a river or channel.

b. (For *scientific sampling, measurement, and monitoring devices*.) No later than 24 months from initial installation, or upon completion of data acquisition, whichever comes first, the measuring device and any other structure or fills associated with that device (e.g., anchors, buoys, lines) must be removed and the site must be restored to pre-construction elevations.

17. (For *Living Shorelines* of the *Shoreline Stabilization* category.)

a. Only native plant species will be planted.

b. Not more than 500 linear feet in length, not more than 35 ft waterward of the high tide line. (note that FAC 62-330 limits to 10 feet of the mean high water line) or result in more than 0.5 ac area between the natural shoreline and the structure.

c. No discharge of earthen fill material, other than earthen material associated with vegetative planting, is not authorized.

d. Construction, maintenance and removal of approved permanent, shore-parallel wave attenuation structures are authorized. Approved permanent wave attenuation materials include oyster breakwaters (described above), clean limestone boulders, and prefabricated structures made of concrete and rebar that are designed in a manner that cannot trap sea turtles, Smalltooth sawfish, or sturgeon. Reef balls that are not open on the bottom, triangle structures with a top opening of at least 3 feet between structures, and reef discs stacked on a pile may be used.

e. (For oyster breakwaters).

(1) Reef materials shall be placed in a manner to ensure that materials (e.g., bagged oyster shell, oyster mats, loose cultch surrounded and contained by a stabilizing feature, reef balls, and reef cradles) will remain stable and prevent movement of materials to surrounding areas.

(2) Materials must be placed in designated locations (i.e., shall not be indiscriminately/randomly dumped) and shall not be placed outside of the total project limits.

18. (For *Subaqueous Utility Lines* of the *Transient Activities* category.)

a. A Frac-out Contingency Plan similar to the attached plan will be developed, submitted with the application and then followed.

b. All subaqueous transmission lines crossing over, under, or in flood control channels/canals in Federal projects (either federally or locally maintained) which are installed with horizontal direction drilling (HDD) shall ensure the top of the HDD boring is a minimum of 10 feet beneath the bottom of the channel plus a minimum 25 feet outside the channel edges and the estimated total drilling fluid pressure is less than 10 psi. Projects not in compliance with these criteria shall not be eligible for authorization under SPGP V.

c. The Permittee shall, upon completion of work, provide an as-built survey showing the horizontal and vertical location (X-Y-Z coordinates in NAD 83 and NAVD 88) of the object below the

channel as it enters and exits the design edges of the authorized width of the channel, plus a minimum of 25 feet outside the channel edges.

19. (For *Removal of Derelict Vessels* of the *Transient Activities* category.)

a. Removal of marine debris shall require visual confirmation (e.g., divers, swimmers, camera) that the item can be removed without causing further damage to aquatic resources.

b. If an item cannot be removed without causing harm to surrounding coral, the item will be disassembled as much as practicable so that it no longer can accidentally harm or trap species.

c. Monofilament debris will be carefully cut loose from coral so as not to cause further harm. Under no circumstance will line be pulled through coral since this could cause breakage of coral.

d. Marine debris shall be lifted straight up and not be dragged through seagrass beds, coral, or hard bottom habitats. Debris shall be properly disposed of in appropriate facilities in accordance with applicable federal and state requirements.

20. For concrete piles installed by impact hammer:

a. The piles will be less than or equal to 24 inches in diameter; and

b. Not more than 10 piles will be installed per day if in open water; or,

c. Not more than 5 piles will be installed per day in a *confined space*. A *confined space* is defined as any area that has a solid object (e.g., shoreline, seawall, jetty) or structure within 150 feet of the pile installation site that would effectively serve as a barrier or otherwise prevent animals from moving past it to exit the area. This does not include objects such as docks or other pile-supported structures that would not stop animal movement or significantly reflect noise.

21. Metal piles will NOT be installed by impact hammer.

22. Projects within the boundary of the NOAA Florida Keys National Marine Sanctuary require prior approval from the Sanctuary.

23. The Permittee shall use only clean fill material. The fill material shall be upland sources and be free of items such as trash, debris, automotive parts, asphalt, construction materials, concrete block with exposed reinforcement bars, and soils contaminated with any toxic substance, in toxic amounts in accordance with Section 307 of the Clean Water Act.

24. No blasting is authorized.

25. For Projects authorized under this SPGP V in navigable waters of the U.S., the Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structures or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

26. The SPGP V will be valid for five (5) years from the date of issuance unless suspended or revoked by issuance of a public notice by the District Engineer. The Corps, in conjunction with the Federal resource agencies, will conduct periodic reviews to ensure that continuation of the permit during the five-year

authorization period is not contrary to the public interest. If revocation occurs, all future applications for activities covered by the SPGP V will be evaluated by the Corps.

27. If the SPGP V expires or is revoked prior to completion of the authorized work, authorization of activities which have commenced or are under contract to commence in reliance upon the SPGP V will remain in effect provided the activity is completed within twelve (12) months of the date the SPGP V expired or was revoked.

28. The General Conditions attached hereto are made a part of this SPGP V and must be attached to all authorizations processed under this SPGP V.

General Conditions for Federal Authorization for SPGP V

1. The time limit for completing the work authorized ends on July 26, 2021.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner on the enclosed form and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Further Information:

1. Limits of this authorization.
 - a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal projects.
2. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

- d. Design or Construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
3. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
4. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
- a. You fail to comply with the terms and conditions of this permit.
 - b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 3 above).
 - c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.
5. Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CER 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.
6. When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date the enclosed form.
7. The Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structures or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the U.S. Army Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal, relocation or alteration.

Department of the Army Permit Transfer for SPGP V

PERMITEE: _____

PERMIT NUMBER: _____ DATE: _____

ADDRESS/LOCATION OF PROJECT:

(Subdivision)

(Lot)

(Block)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. Although the construction period for works authorized by Department of the Army permits is finite, the permit itself, with its limitations, does not expire.

To validate the transfer of this permit and the associated responsibilities associated with compliance with its terms and conditions, have the transferee sign and date below and mail to the U.S. Army Corps of Engineers, Enforcement Branch, Post Office Box 4970, Jacksonville, FL 32232-0019.

(Transferee Signature)

(Date)

(Name Printed)

(Street address)

(Mailing address)

(City, State, Zip Code)

STANDARD MANATEE CONDITIONS FOR IN-WATER WORK
2011

The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

- a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.
- b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.
- c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.
- d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.
- e. Any collision with or injury to a manatee shall be reported immediately to the FWC Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or Vero Beach (1-772-562-3909) for south Florida, and to FWC at ImperiledSpecies@myFWC.com
- f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the Florida Fish and Wildlife Conservation Commission (FWC) must be used (see MyFWC.com/manatee). One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8 1/2" by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. Questions concerning these signs can be sent to the email address listed above.

CAUTION: MANATEE HABITAT

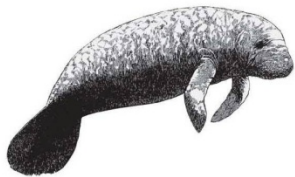
All project vessels

IDLE SPEED / NO WAKE

When a manatee is within 50 feet of work
all in-water activities must

SHUT DOWN

Report any collision with or injury to a manatee:



Wildlife Alert:

1-888-404-FWCC(3922)

cell *FWC or #FWC



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

- a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.
- b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.
- c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.
- d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.
- e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.
- f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.
- g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006

O:\forms\Sea Turtle and Smalltooth Sawfish Construction Conditions.doc

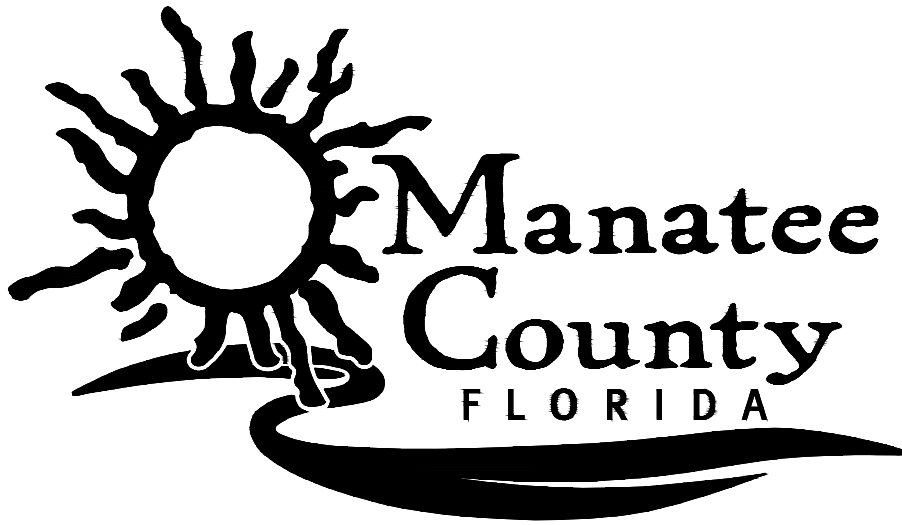


CONSTRUCTION PLANS
FOR
FORCE MAIN 15 REPLACEMENT

MANATEE COUNTY, FLORIDA

APRIL 2017

MANATEE COUNTY PROJECT #6089680



PROJECT TEAM:

OWNER:
MANATEE COUNTY
1022 26TH AVE. E.
BRADENTON, FL 34208
CONTACT: MICHAEL STURM, P.E.
941-708-7450 ext. 7332

ENGINEER:
KIMLEY-HORN AND ASSOCIATES, INC.
655 NORTH FRANKLIN STREET, SUITE 150
TAMPA, FL 33602
CONTACT: W. WADE WOOD, P.E.
813-635-5583

SURVEYOR:
HYATT SURVEY SERVICES INC.,
11007 8TH AVENUE EAST
BRADENTON, FLORIDA 34212
CONTACT: JOHN MATTHEWS
941-748-4693

GEOTECH:
ARDAMAN & ASSOCIATES, INC.
78 SARASOTA CENTER BOULEVARD
SARASOTA, FLORIDA 34240
CONTACT: JERRY H. KUEHN, P.E.
941-922-3526

UTILITY CONTACTS:

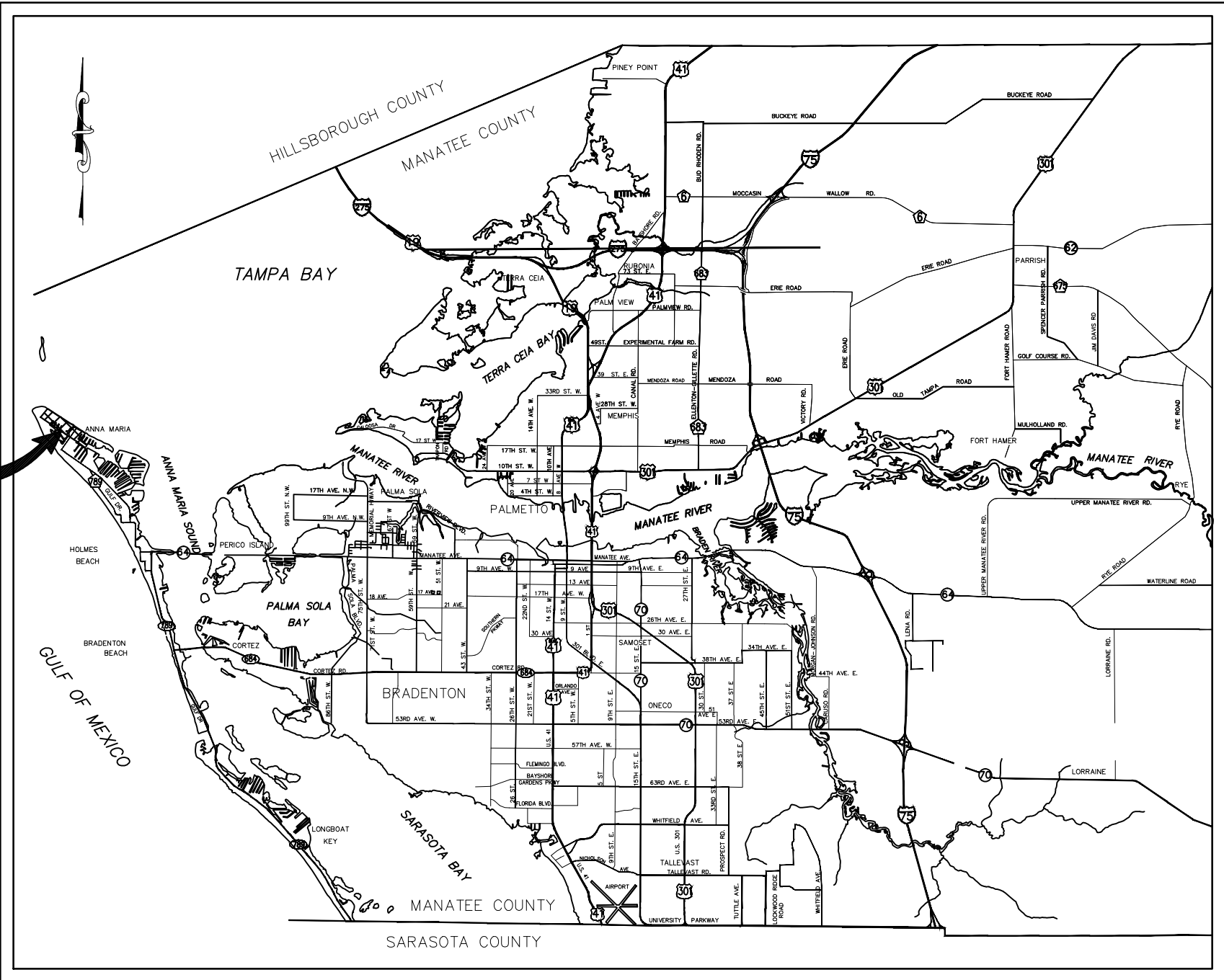
FLORIDA POWER & LIGHT
GREG COKER
1253 12TH AVE. EAST
PALMETTO, FL 34221
941-723-4430

MANATEE COUNTY
KATHY MCMAHON
4520- 66TH STREET W
BRADENTON, FL 34210
941-792-8811 EXT. 5002

FRONTIER COMMUNICATIONS
PATTI REID
1701 RINGLING BLVD.
SARASOTA, FL 34236
941-906-6711

CHARTER COMMUNICATIONS
JIM CRUZAN
5413 S.R. 64 EAST,
BRADENTON, FL 34208
727-329-2846

SITE
LOCATION



PROJECT VICINITY MAP
N.T.S.

60% SUBMITTAL
NOT FOR CONSTRUCTION

PREPARED BY
Kimley»Horn

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TAMPA, FL 33602
PHONE (813) 620-1460
WWW.KIMLEY-HORN.COM CA 00000696

No.	REVISIONS	DATE	BY		

SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
1	COVER SHEET
2	GENERAL NOTES
1 OF 3	TOPOGRAPHIC SURVEY COVER
2 OF 3	TOPOGRAPHIC SURVEY PLAN SHEET
3 OF 3	TOPOGRAPHIC SURVEY PLAN SHEET
3	KEY SHEET
4	PLAN AND PROFILE SHEET
5	PLAN AND PROFILE SHEET
6	PLAN AND PROFILE SHEET
7	PLAN AND PROFILE SHEET
8	CONSTRUCTION DETAILS
9	CONSTRUCTION DETAILS
10	CONSTRUCTION DETAILS

THE SITE CONSTRUCTION STAKEOUT SHALL BE PERFORMED UNDER THE DIRECTION OF A FLORIDA REGISTERED SURVEYOR. AUTOCAD FILES WILL BE FURNISHED TO AID IN THE SITE CONSTRUCTION STAKEOUT. ANY DISCREPANCIES FOUND BETWEEN AUTOCAD FILES AND SITE CONSTRUCTION PLANS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION FOR CLARIFICATION PRIOR TO THAT STAKEOUT.

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WADE W. WOOD, P.E.
FLORIDA LICENSE NUMBER:
69051
DATE:

DATE
FEB, 2017
KHA PROJECT NO.
148400016
SHEET NUMBER
1

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KHA PROJECT	148400016
DATE	4/20/2017
SCALE	AS SHOWN
DESIGNED BY	WWW
DRAWN BY	SNH
CHECKED BY	WEW

FORCE MAIN 15 REPLACEMENT

FL

LICENSED PROFESSIONAL

W. WADE WOOD, P.E.

FL LICENSE NUMBER 69051

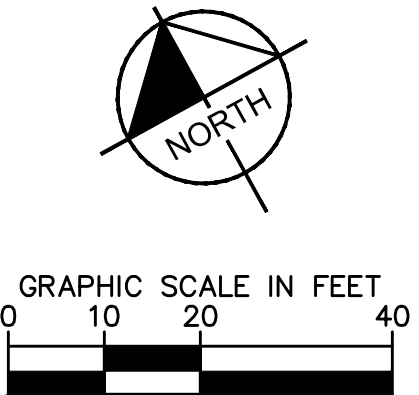
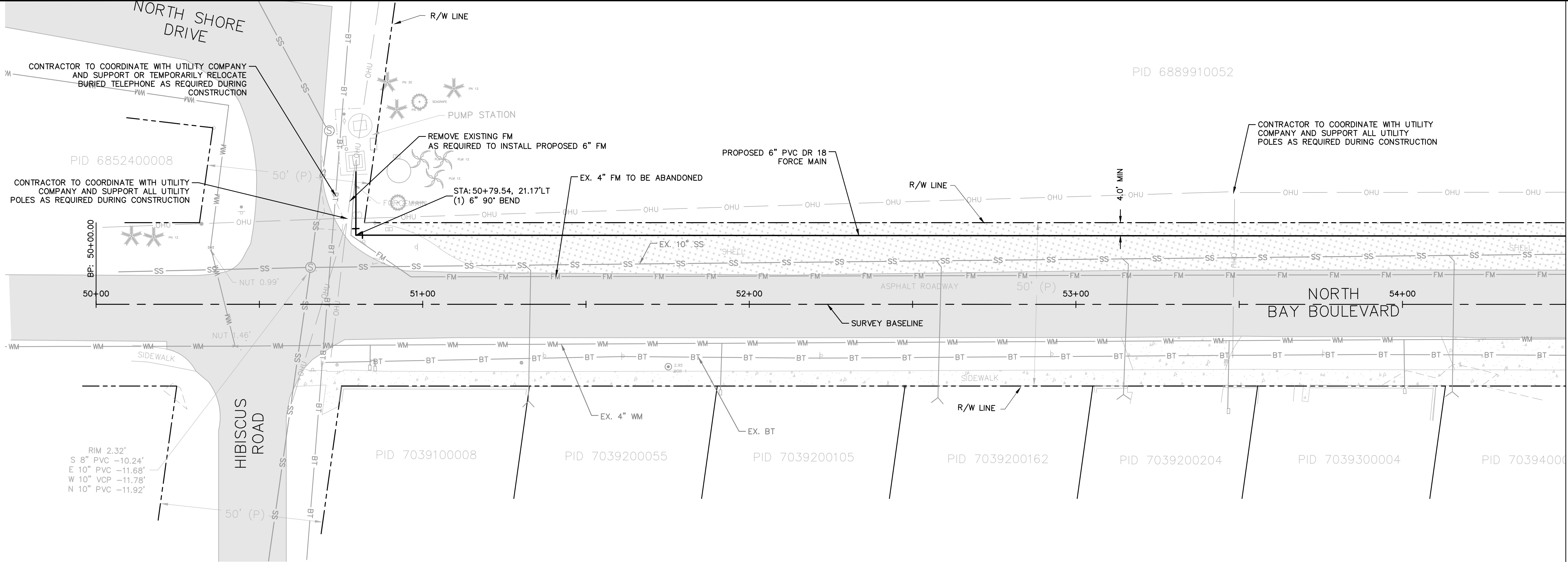
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KEY SHEET

SHEET NUMBER

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MATCH LINE STA 54+50
SEE SHEET 5 FOR CONTINUATION

NOTES:

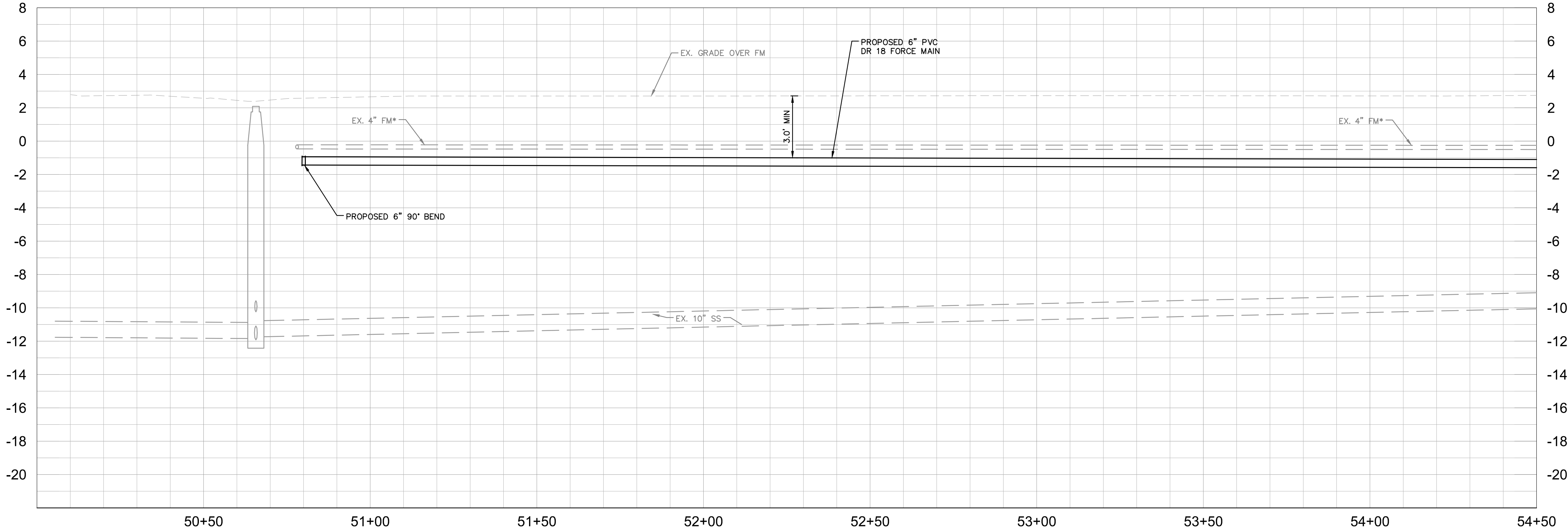
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KHA PROJECT
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**FORCE MAIN 15
REPLACEMENT**

MANATEE COUNTY

LICENSED PROFESSIONAL

W. WADE WOOD, P.E.

FL LICENSE NUMBER
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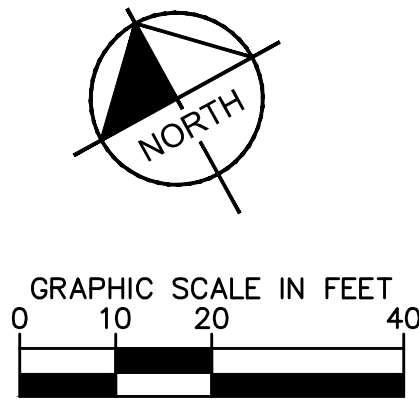
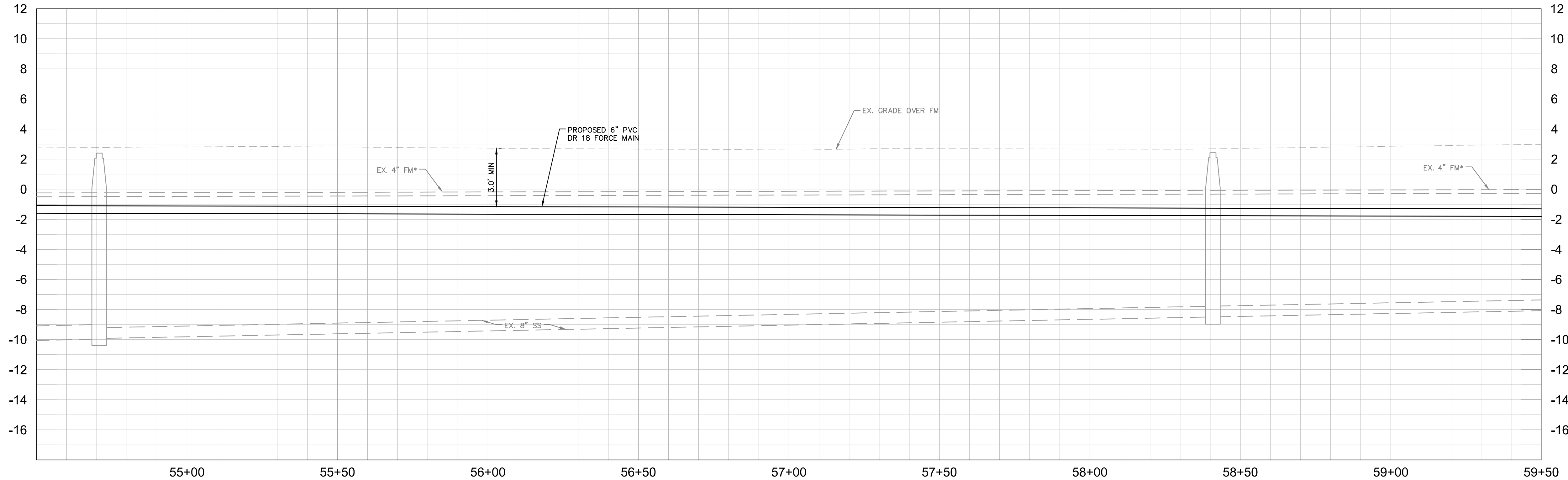
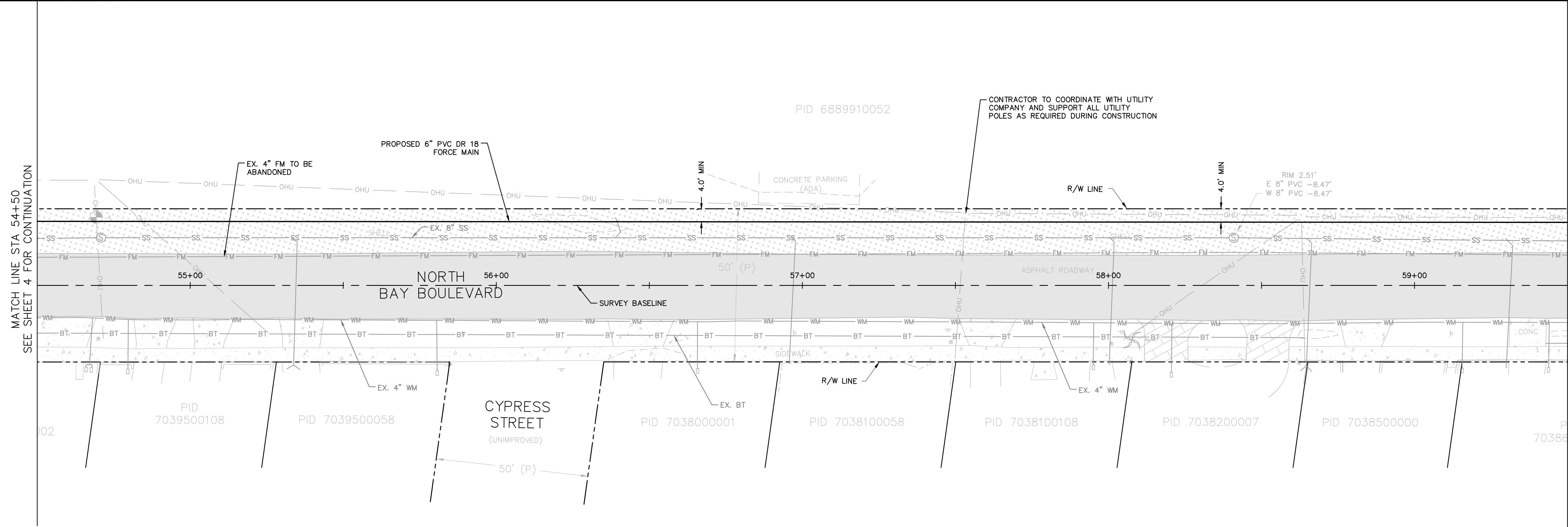
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DATE
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SCALE AS SHOWN

DESIGNED BY WWW

DRAWN BY SNH

CHECKED BY WEW

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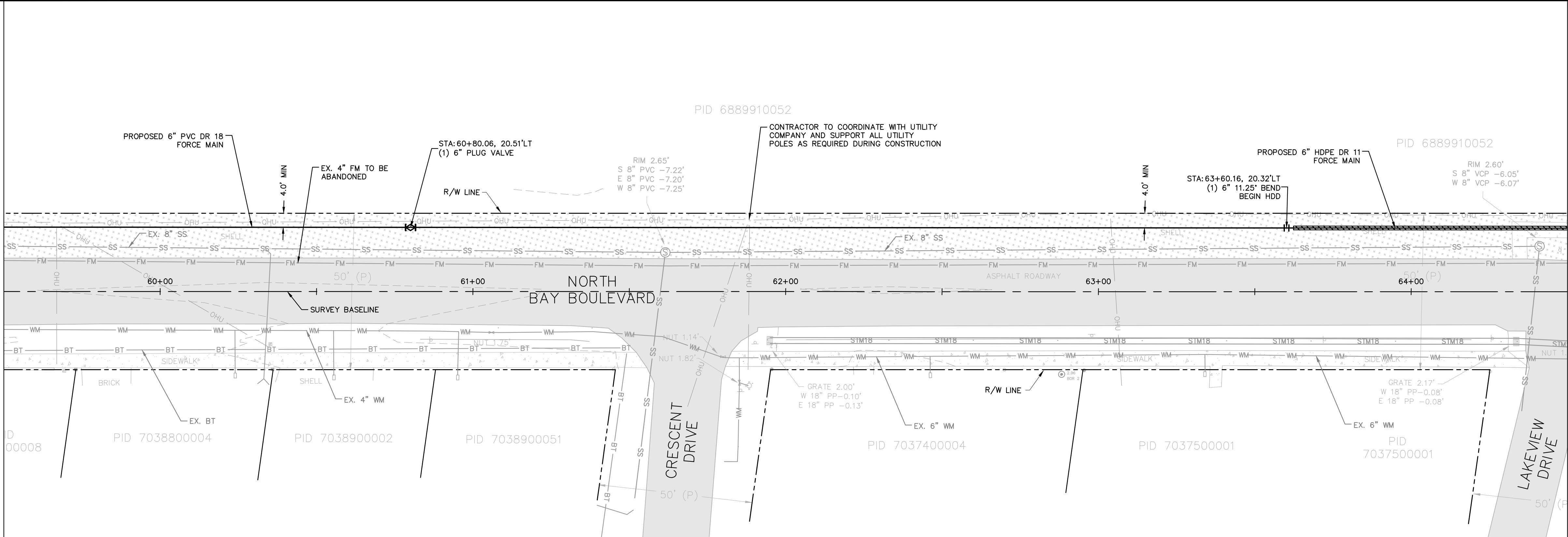
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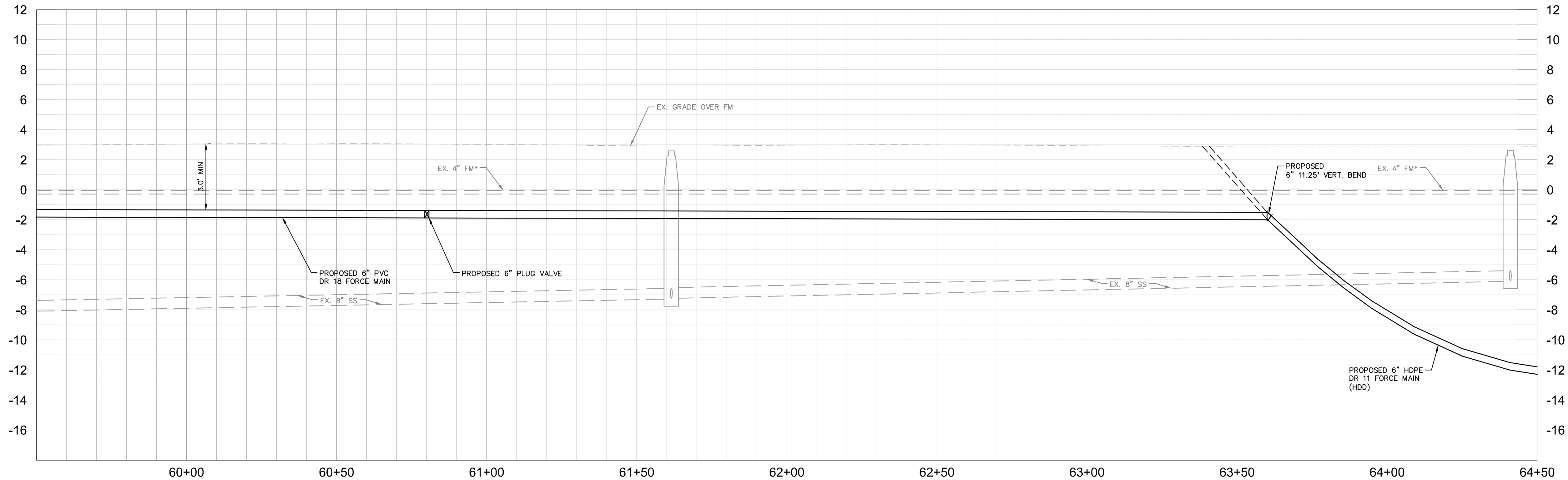
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MATCH LINE STA 59+50
SEE SHEET 5 FOR CONTINUATION



MATCH LINE STA 64+50
SEE SHEET 7 FOR CONTINUATION



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KHA PROJECT 148400016
DATE 4/20/2017
SCALE AS SHOWN
DESIGNED BY WWW
DRAWN BY SNH
CHECKED BY WEW



FORCE MAIN 15 REPLACEMENT

MANATEE COUNTY

LICENSED PROFESSIONAL

W. WADE WOOD, P.E.

FL LICENSE NUMBER
69051

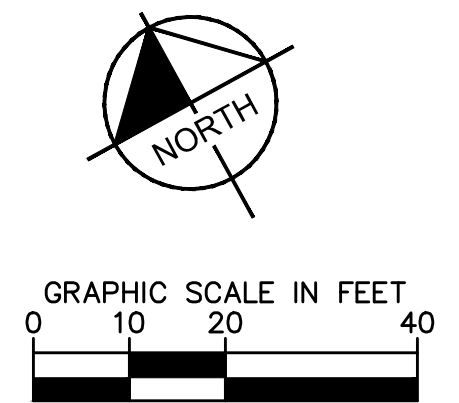
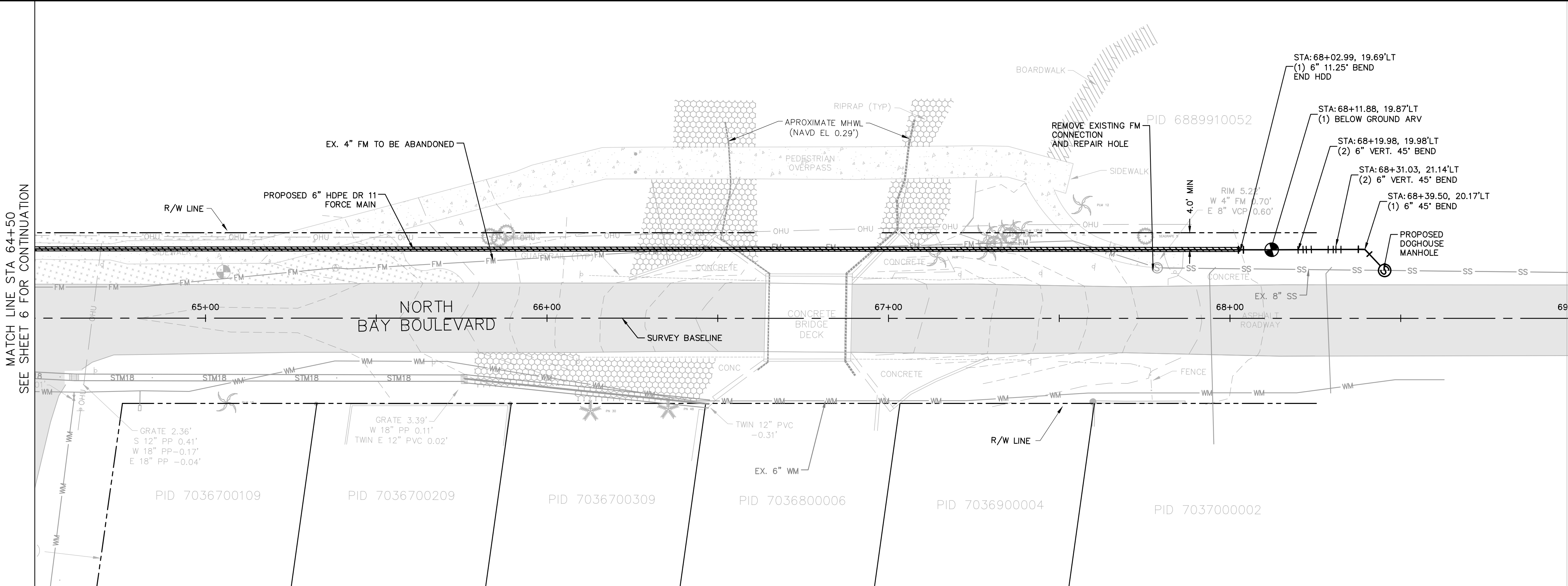
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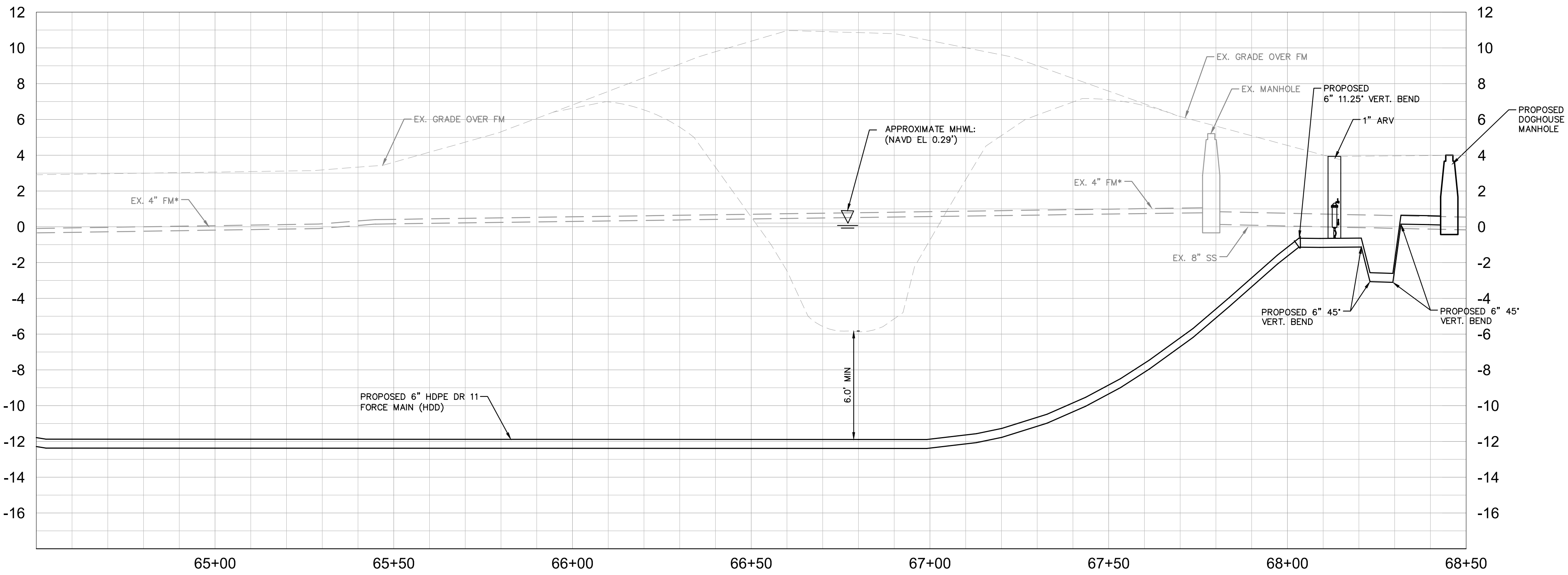
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148400016


DATE
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SCALE AS SHOWN

DESIGNED BY WWW

DRAWN BY SNH

CHECKED BY WEW



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FL DATE:

LICENSED PROFESSIONAL

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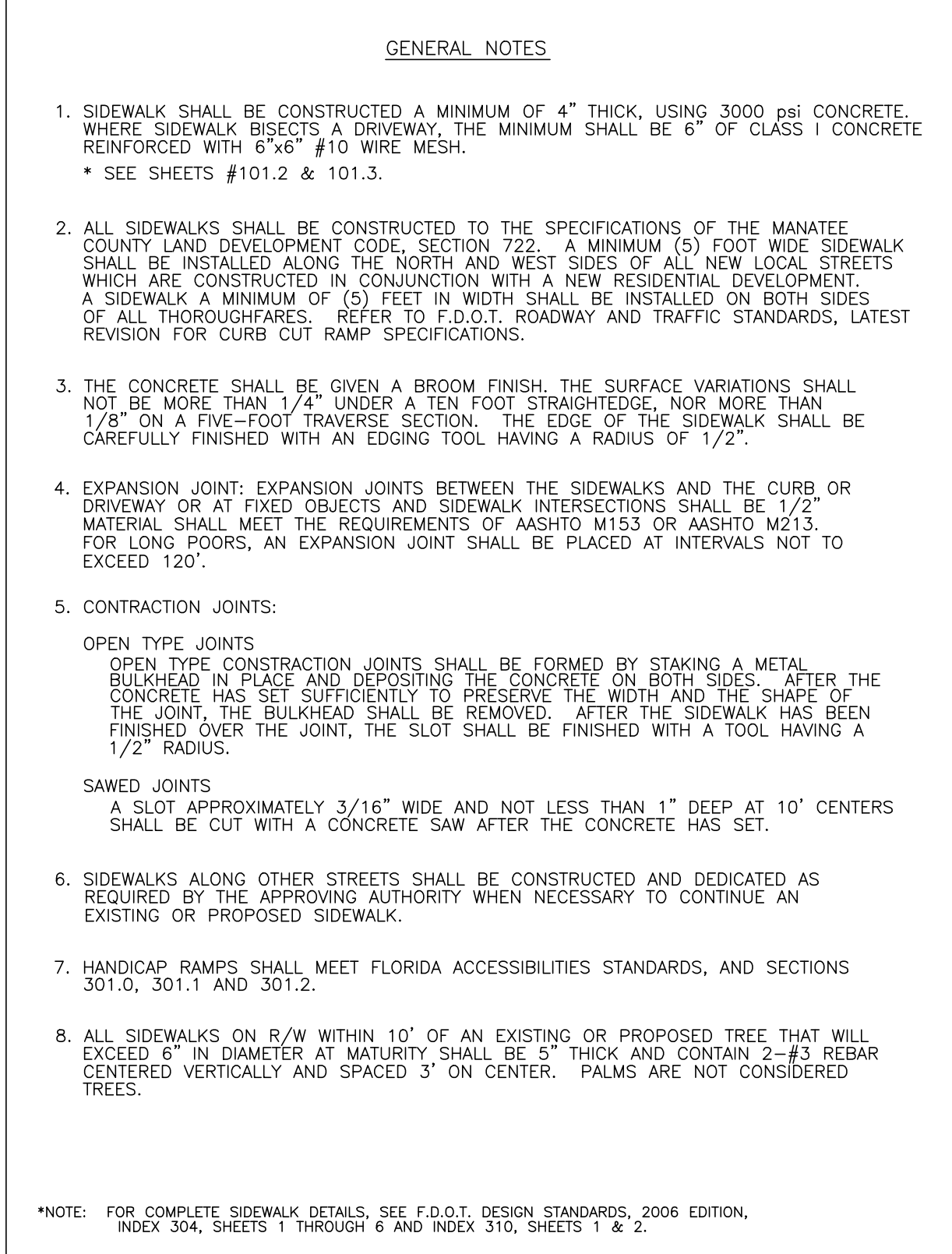
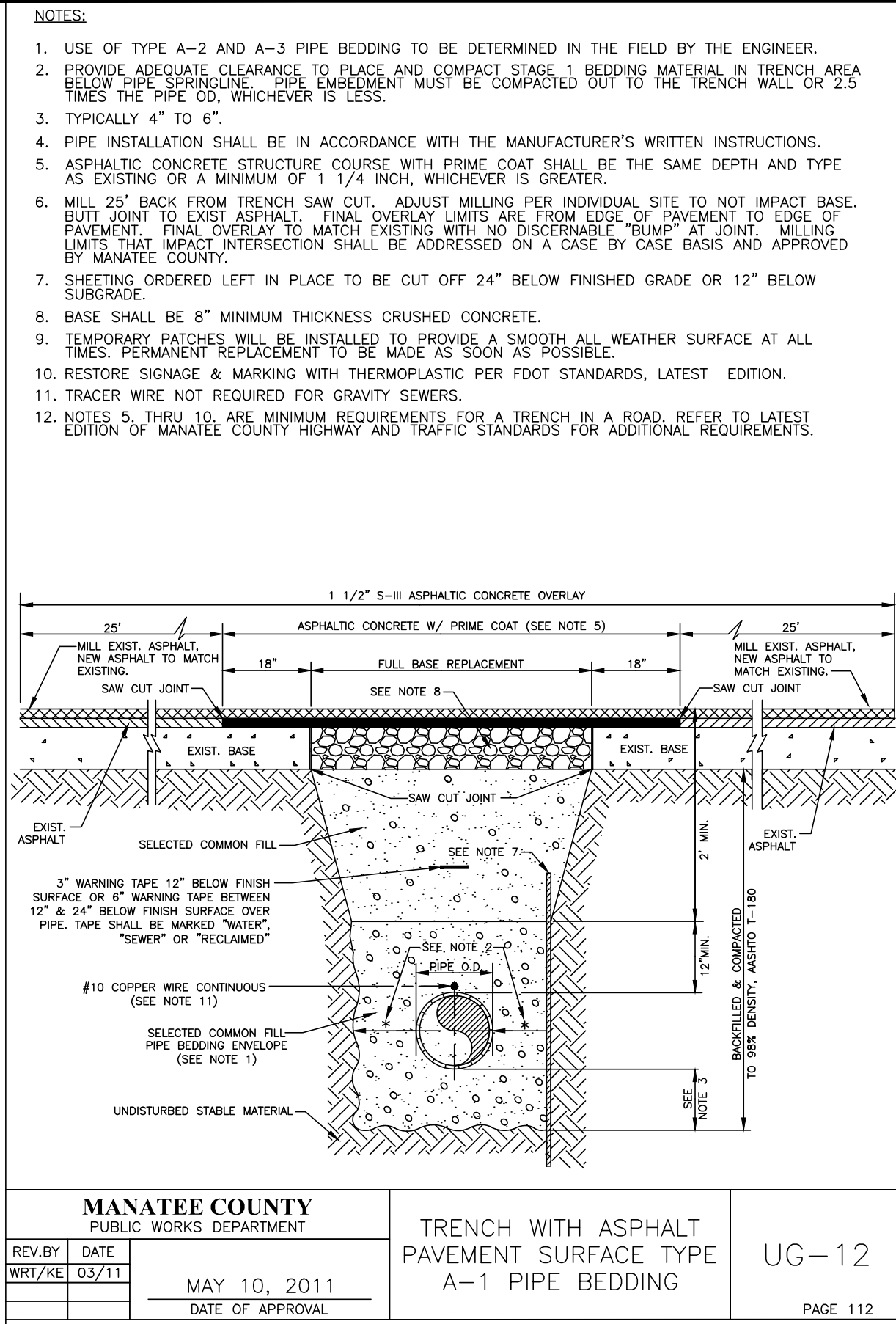
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PLAN AND PROFILE SHEET

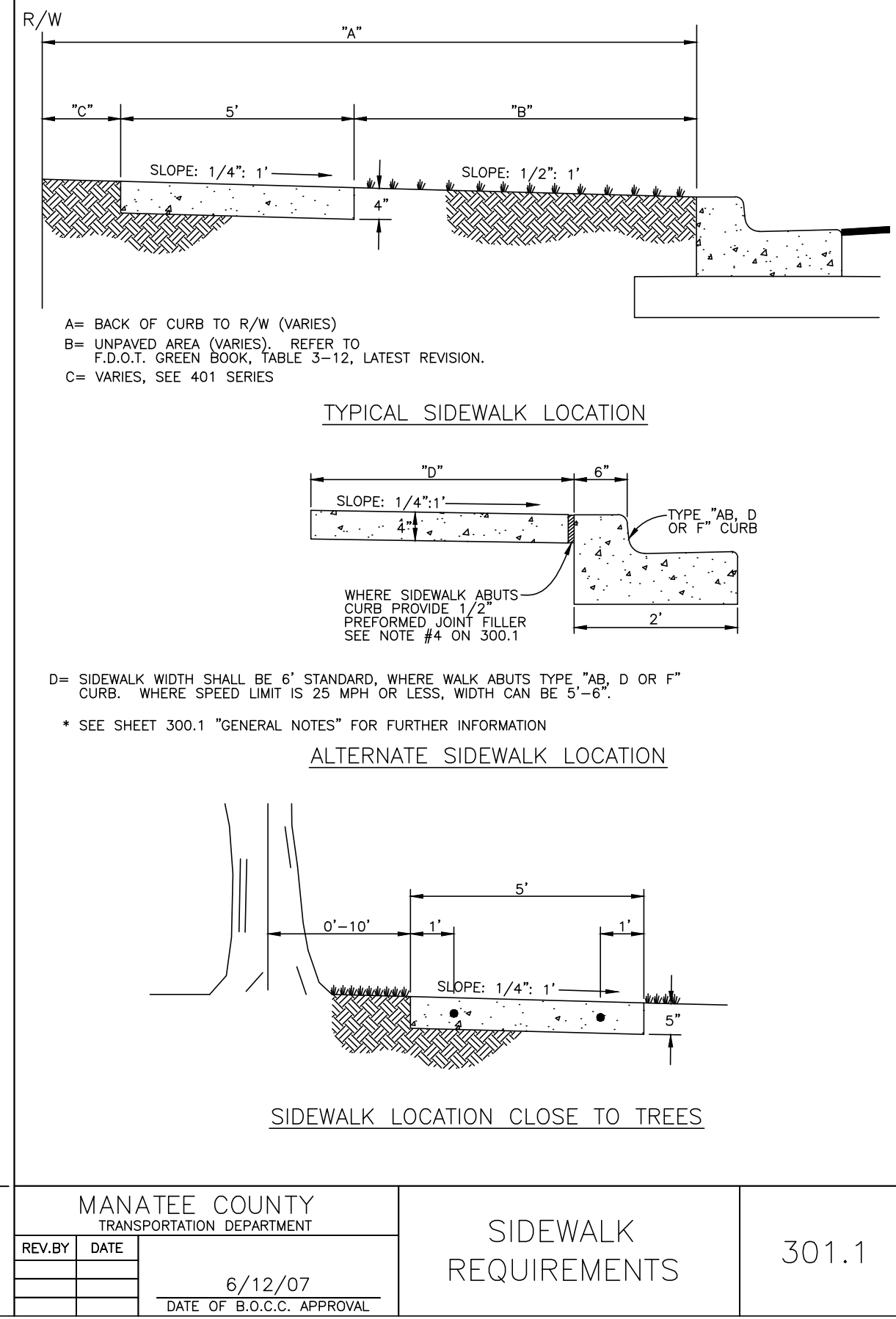
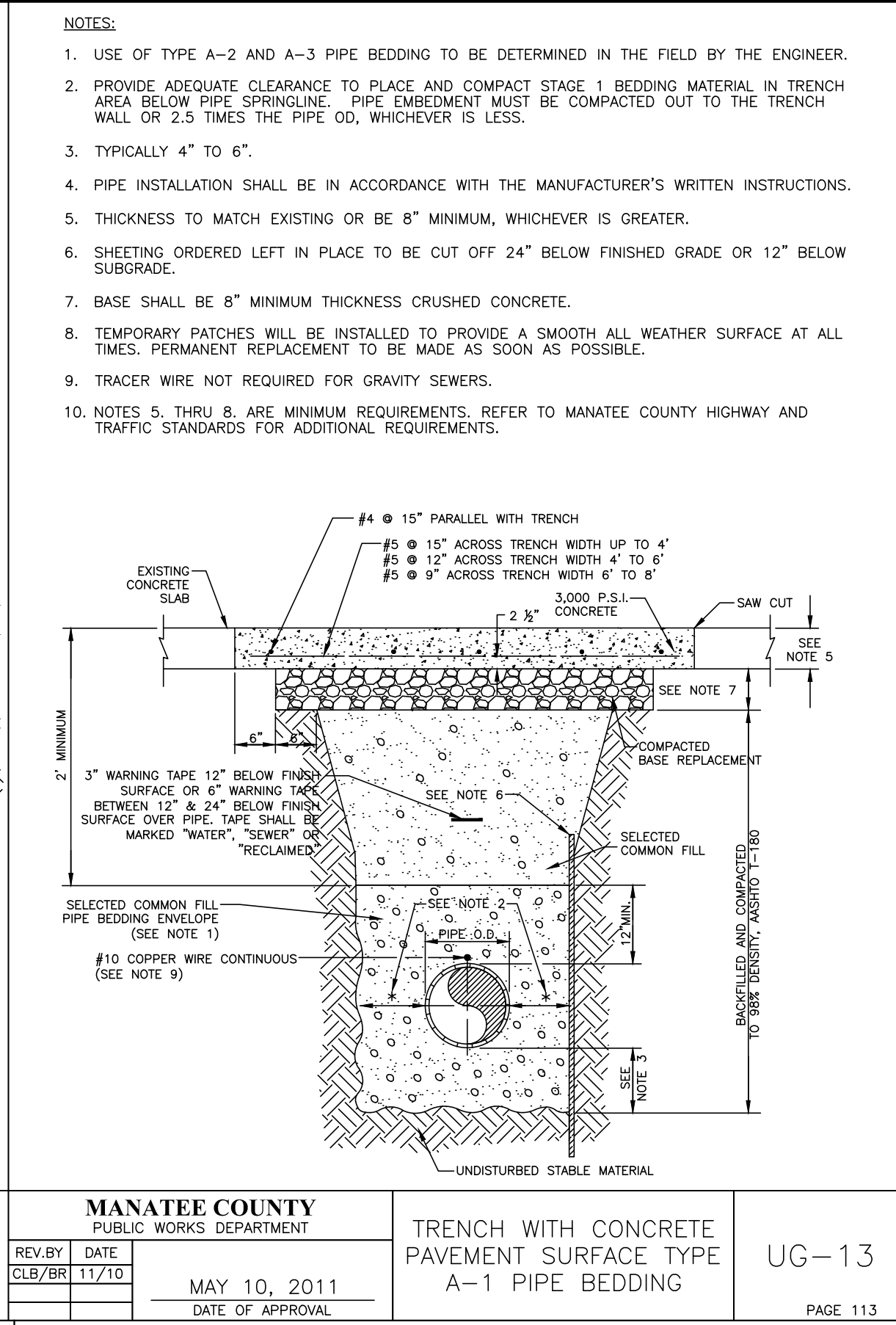
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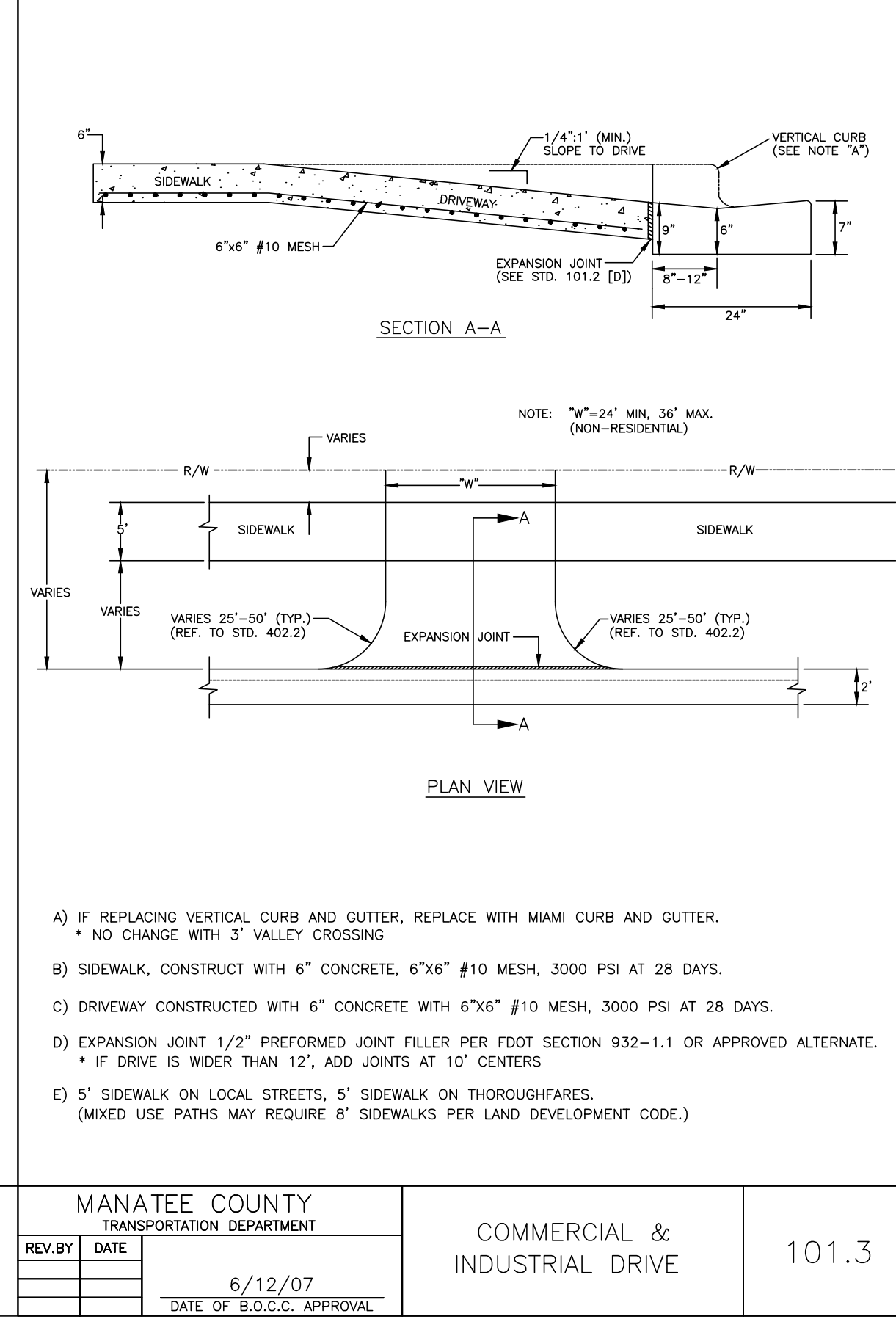
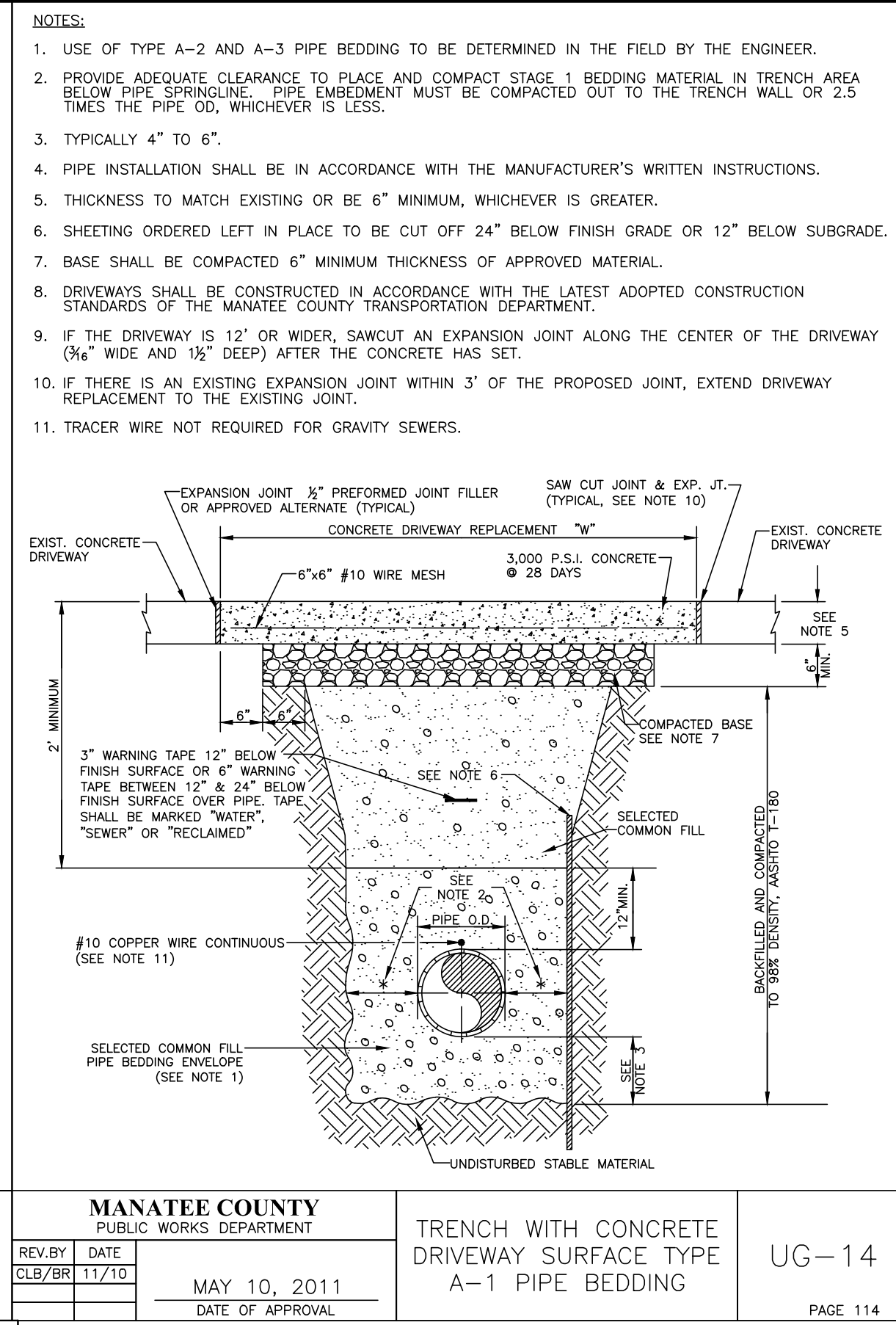
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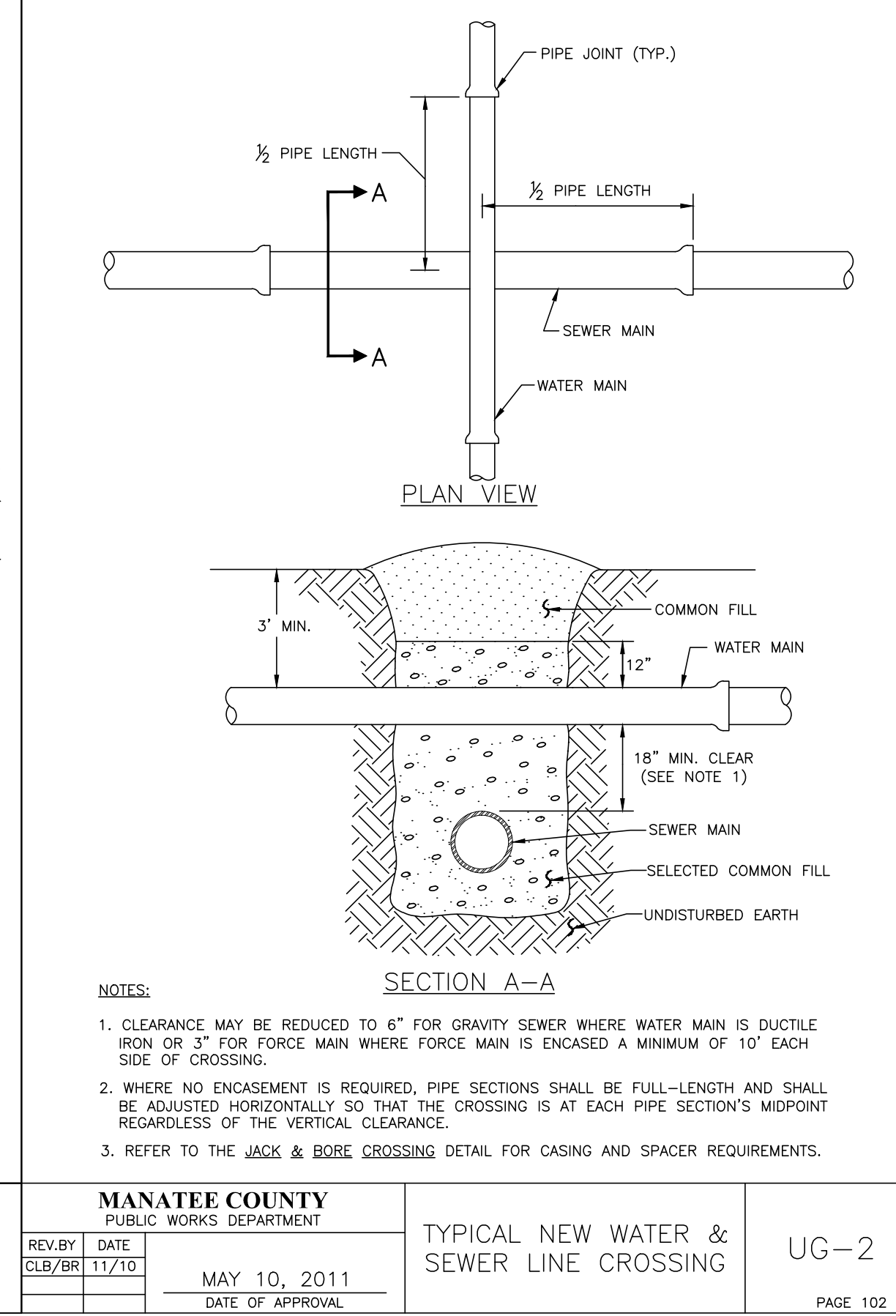
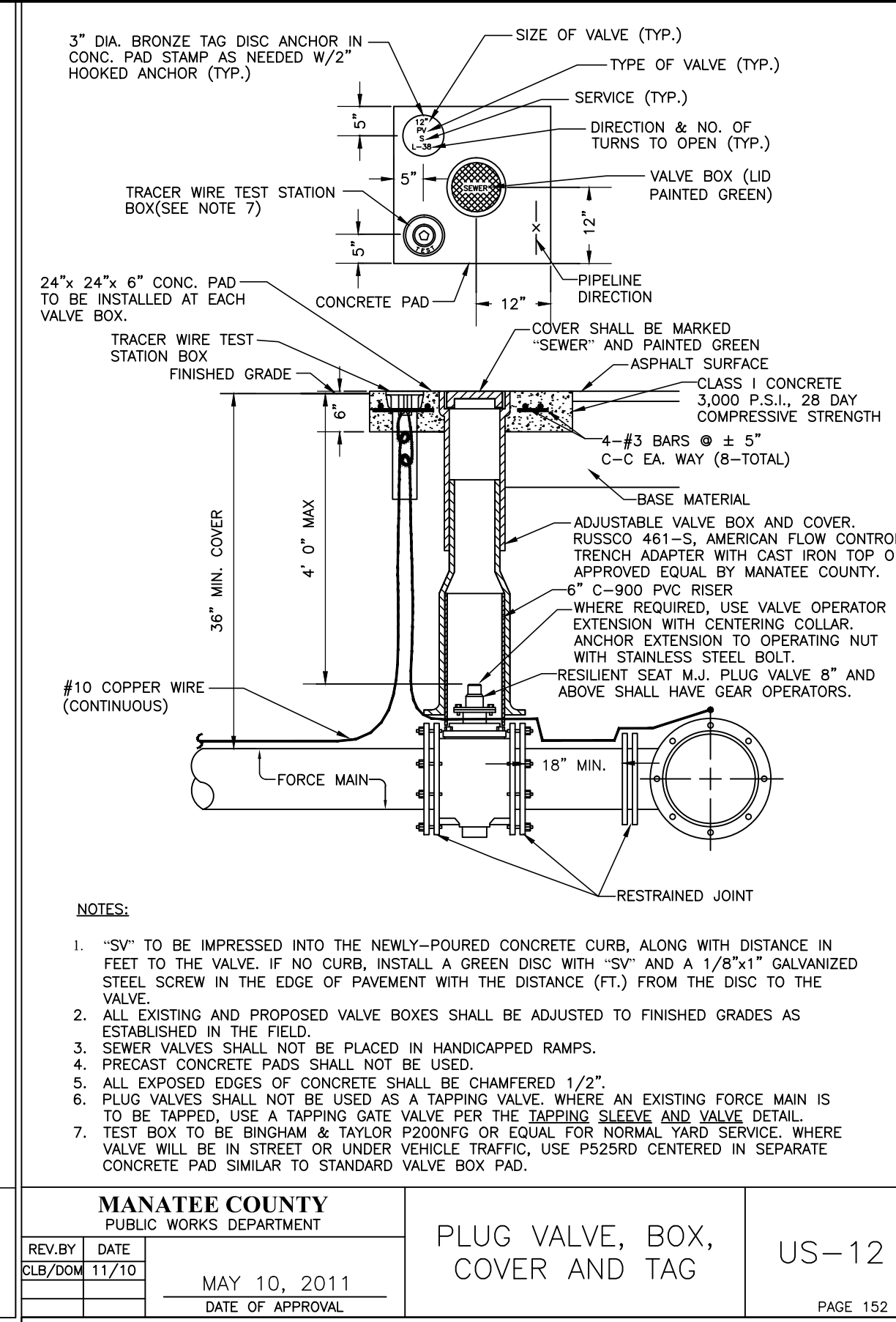
MANATEE COUNTY		TRENCH WITH ASPHALT PAVEMENT SURFACE TYPE A-1 PIPE BEDDING	UG-12
REV. BY	DATE		
WRT/KE	03/11		
	MAY 10, 2011		
	DATE OF APPROVAL		PAGE 112



MANATEE COUNTY		SIDEWALKS GENERAL NOTES	301.0
REV. BY	DATE		
	6/12/07		
	DATE OF B.O.C.C. APPROVAL		



MANATEE COUNTY		COMMERCIAL & INDUSTRIAL DRIVE	101.3
REV. BY	DATE		
	6/12/07		
	DATE OF B.O.C.C. APPROVAL		



MANATEE COUNTY		TYPICAL NEW WATER & SEWER LINE CROSSING	UG-2
REV. BY	DATE		
CLB/BR	11/10		
	MAY 10, 2011		
	DATE OF APPROVAL		PAGE 102

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FL LICENSE NUMBER
69051

FL DATE:

CONSTRUCTION DETAILS

8

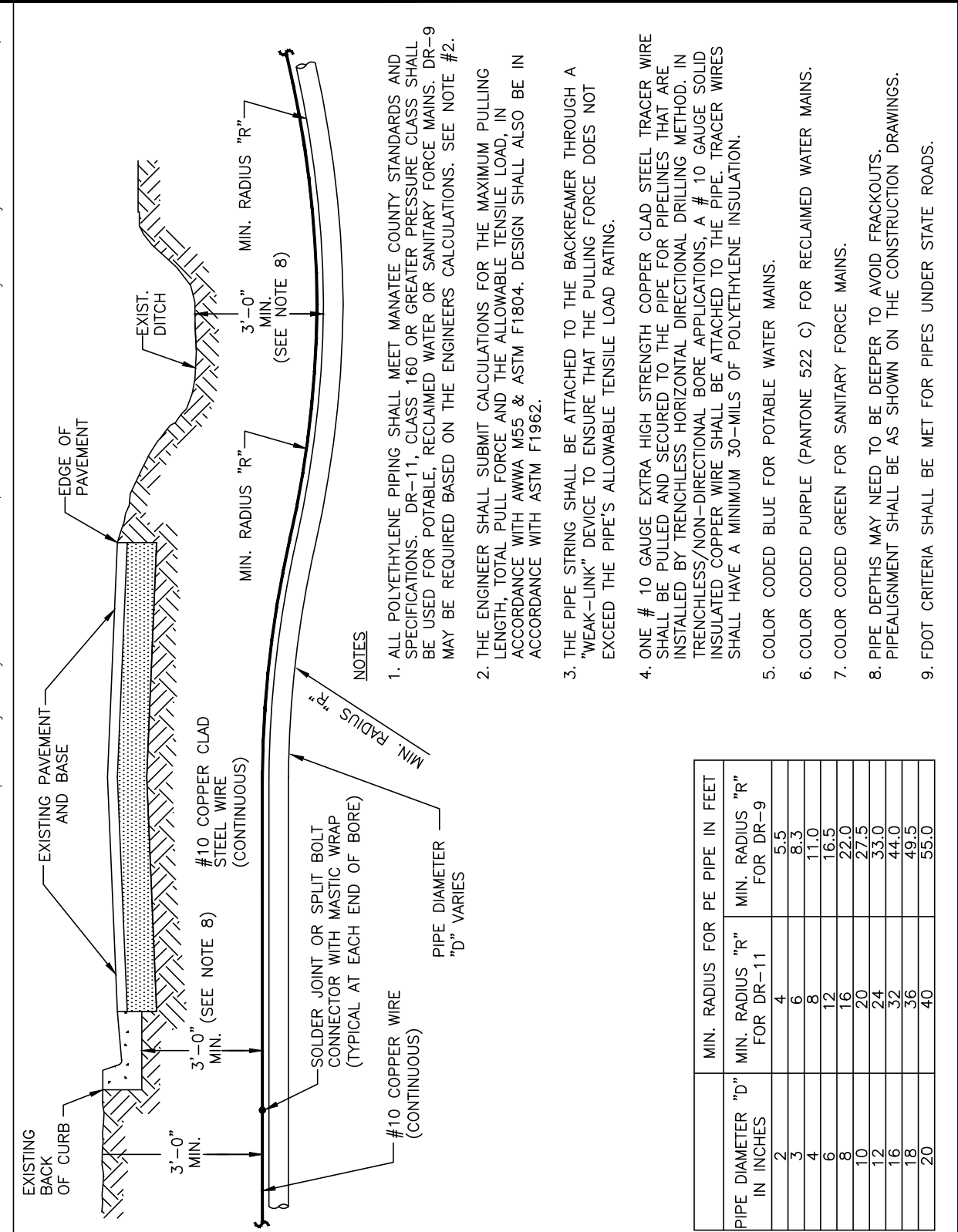
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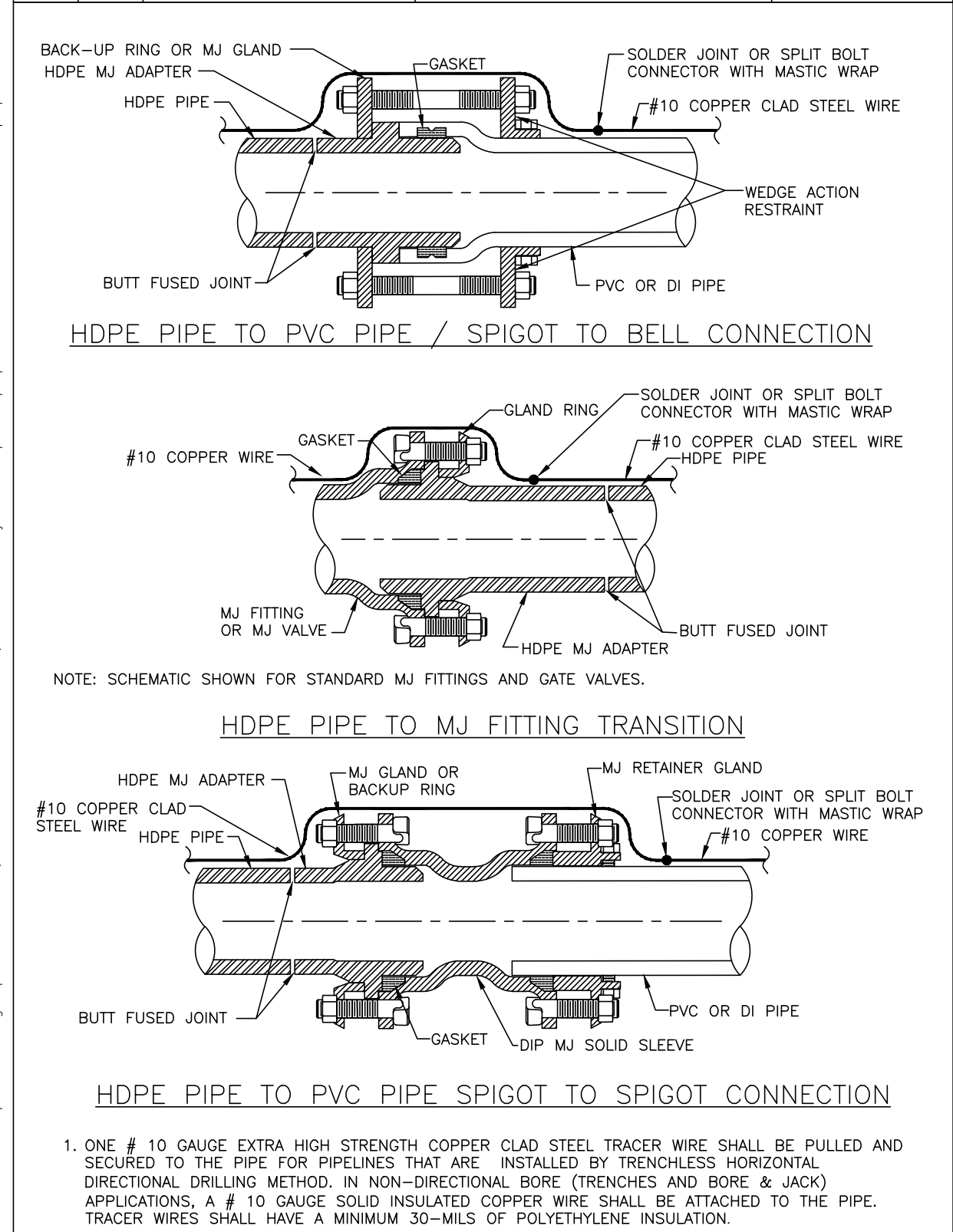
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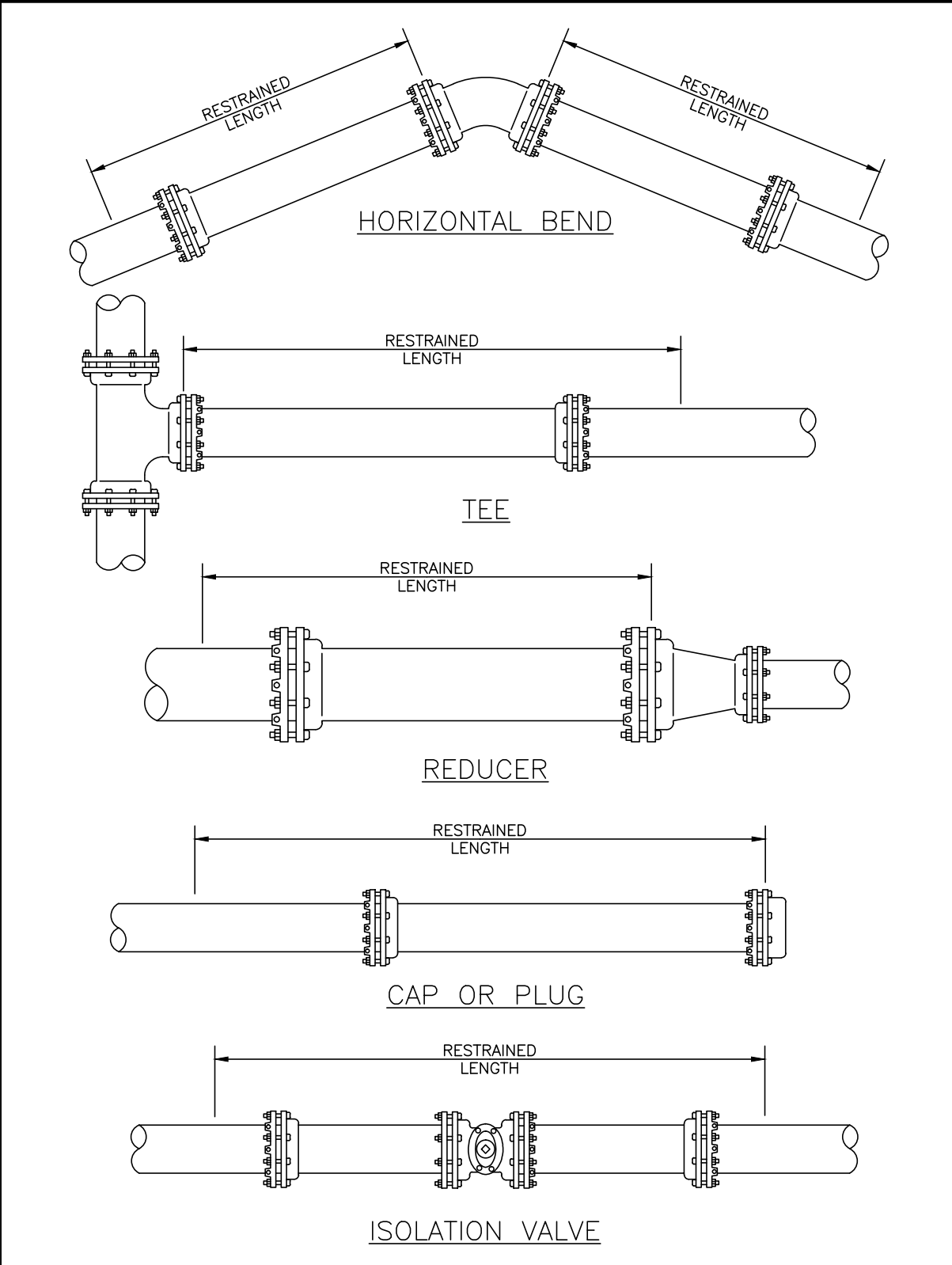
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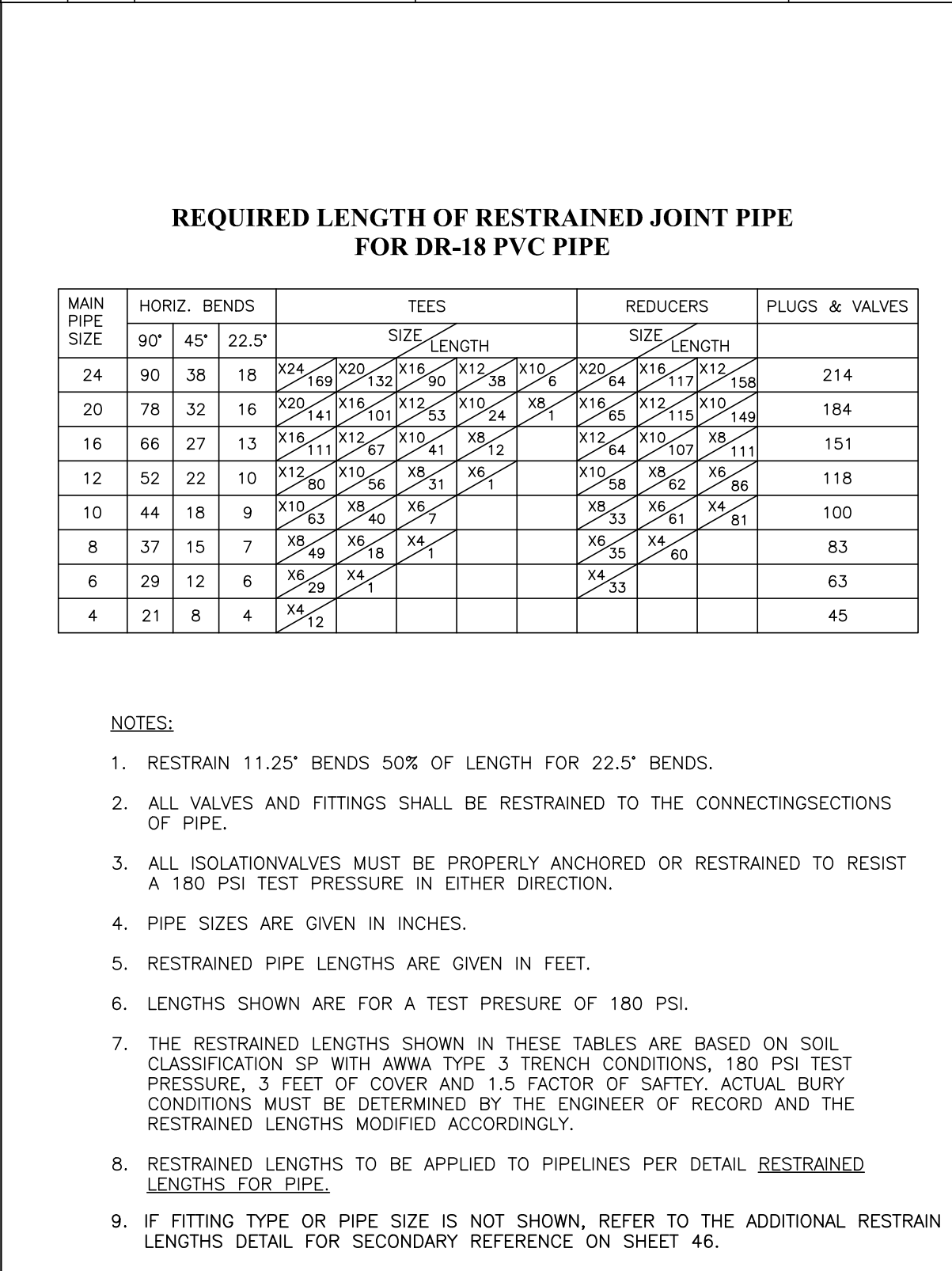
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REV. BY	DATE	REV. BY	DATE	REV. BY	DATE	REV. BY	DATE
CLB/BR	11/10	CLB/BR	11/10	CLB/BR	11/10	CLB/BR	11/10
	MAY 10, 2011		MAY 10, 2011		MAY 10, 2011		MAY 10, 2011
	DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL



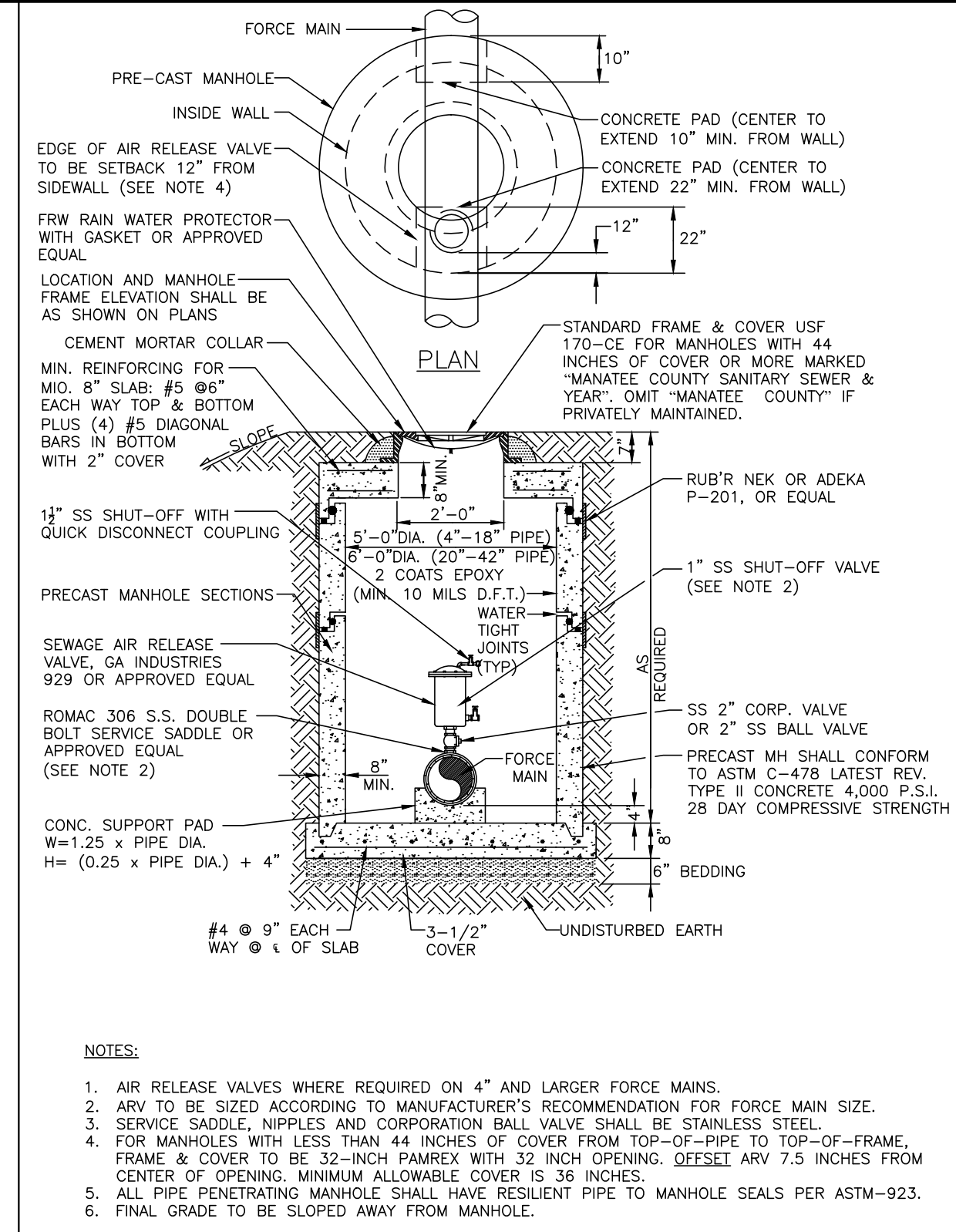
MANATEE COUNTY		PUBLIC WORKS DEPARTMENT		HDPE TO PVC OR DI PIPE ADAPTER		UG-6	
REV. BY	DATE	REV. BY	DATE	REV. BY	DATE	REV. BY	DATE
CLB/BR	11/10	CLB/BR	11/10	CLB/BR	11/10	CLB/BR	11/10
	MAY 10, 2011		MAY 10, 2011		MAY 10, 2011		MAY 10, 2011
	DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL



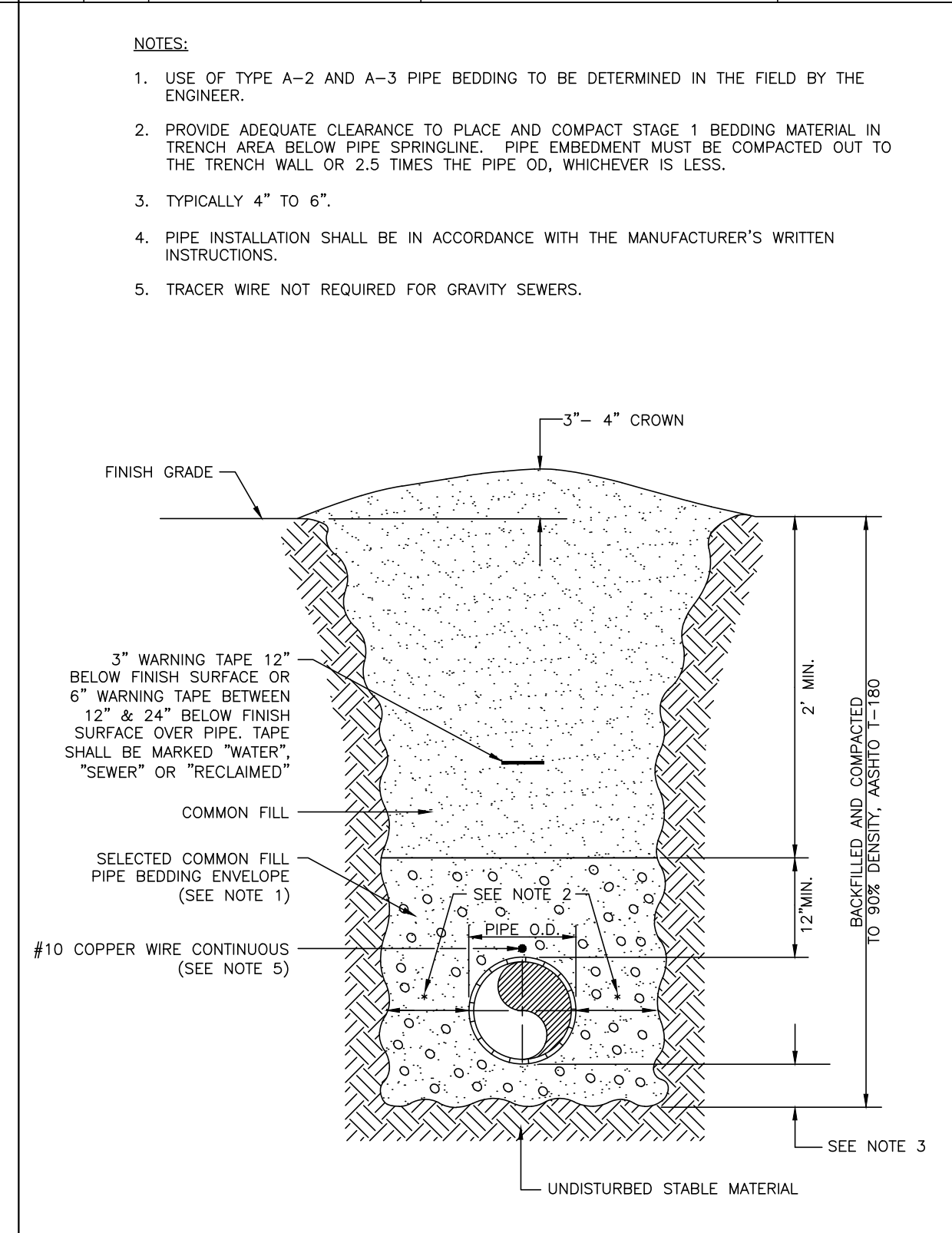
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REV. BY	DATE	REV. BY	DATE	REV. BY	DATE	REV. BY	DATE
CLB/BR	11/10	CLB/BR	11/10	CLB/BR	11/10	CLB/BR	11/10
	MAY 10, 2011		MAY 10, 2011		MAY 10, 2011		MAY 10, 2011
	DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL



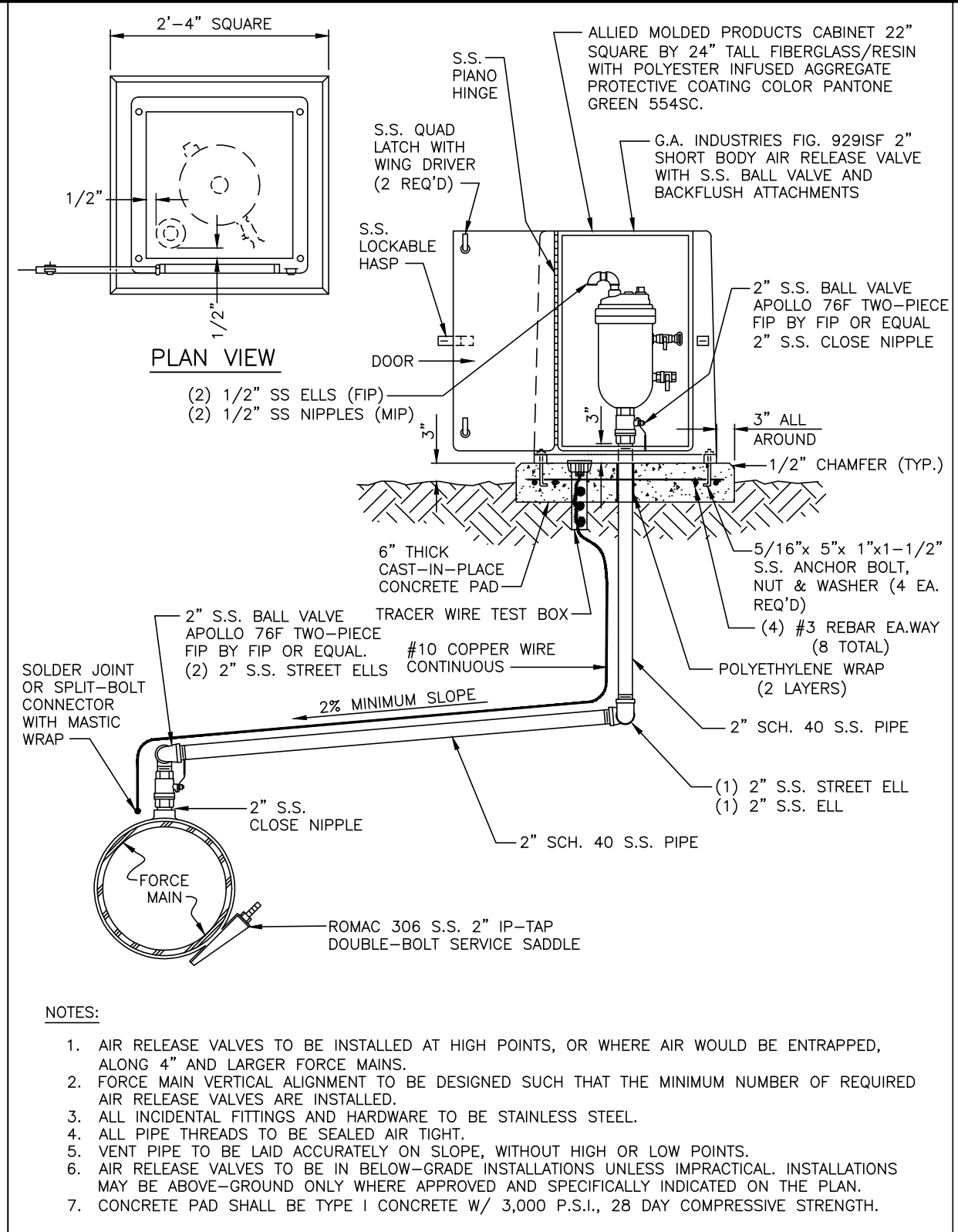
MANATEE COUNTY		PUBLIC WORKS DEPARTMENT		RESTRAINED LENGTHS FOR PVC PIPE		UG-8	
REV. BY	DATE	REV. BY	DATE	REV. BY	DATE	REV. BY	DATE
CLB/BR	11/10	CLB/BR	11/10	CLB/BR	11/10	CLB/BR	11/10
	MAY 10, 2011		MAY 10, 2011		MAY 10, 2011		MAY 10, 2011
	DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL



MANATEE COUNTY		PUBLIC WORKS DEPARTMENT		BELOW GRADE AIR RELEASE VALVE FOR FORCE MAINS		US-10	
REV. BY	DATE	REV. BY	DATE	REV. BY	DATE	REV. BY	DATE
CLB/KE	11/10	CLB/KE	11/10	CLB/KE	11/10	CLB/KE	11/10
	MAY 10, 2011		MAY 10, 2011		MAY 10, 2011		MAY 10, 2011
	DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL



MANATEE COUNTY		PUBLIC WORKS DEPARTMENT		TRENCH WITH UNIMPROVED SURFACE TYPE A-1 PIPE BEDDING		UG-11	
REV. BY	DATE	REV. BY	DATE	REV. BY	DATE	REV. BY	DATE
WRT/KE	03/11	WRT/KE	03/11	WRT/KE	03/11	WRT/KE	03/11
	MAY 10, 2011		MAY 10, 2011		MAY 10, 2011		MAY 10, 2011
	DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL



MANATEE COUNTY		PUBLIC WORKS DEPARTMENT		ABOVE-GROUND AIR RELEASE VALVE ASSY. FOR FORCE MAINS		US-25	
REV. BY	DATE	REV. BY	DATE	REV. BY	DATE	REV. BY	DATE
CLB/KE	11/10	CLB/KE	11/10	CLB/KE	11/10	CLB/KE	11/10
	MAY 10, 2011		MAY 10, 2011		MAY 10, 2011		MAY 10, 2011
	DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL		DATE OF APPROVAL

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PHONE: 813-620-1460
WWW.KIMLEY-HORN.COM CA 00000696

KHA PROJECT
148400016
DATE
4/20/2017
SCALE AS SHOWN
DESIGNED BY WWW
DRAWN BY SNH
CHECKED BY WEW

FORCE MAIN 15 REPLACEMENT

MANATEE COUNTY

LICENSED PROFESSIONAL

W. WADE WOOD, P.E.

FL LICENSE NUMBER
69051

FL DATE:

CONSTRUCTION DETAILS

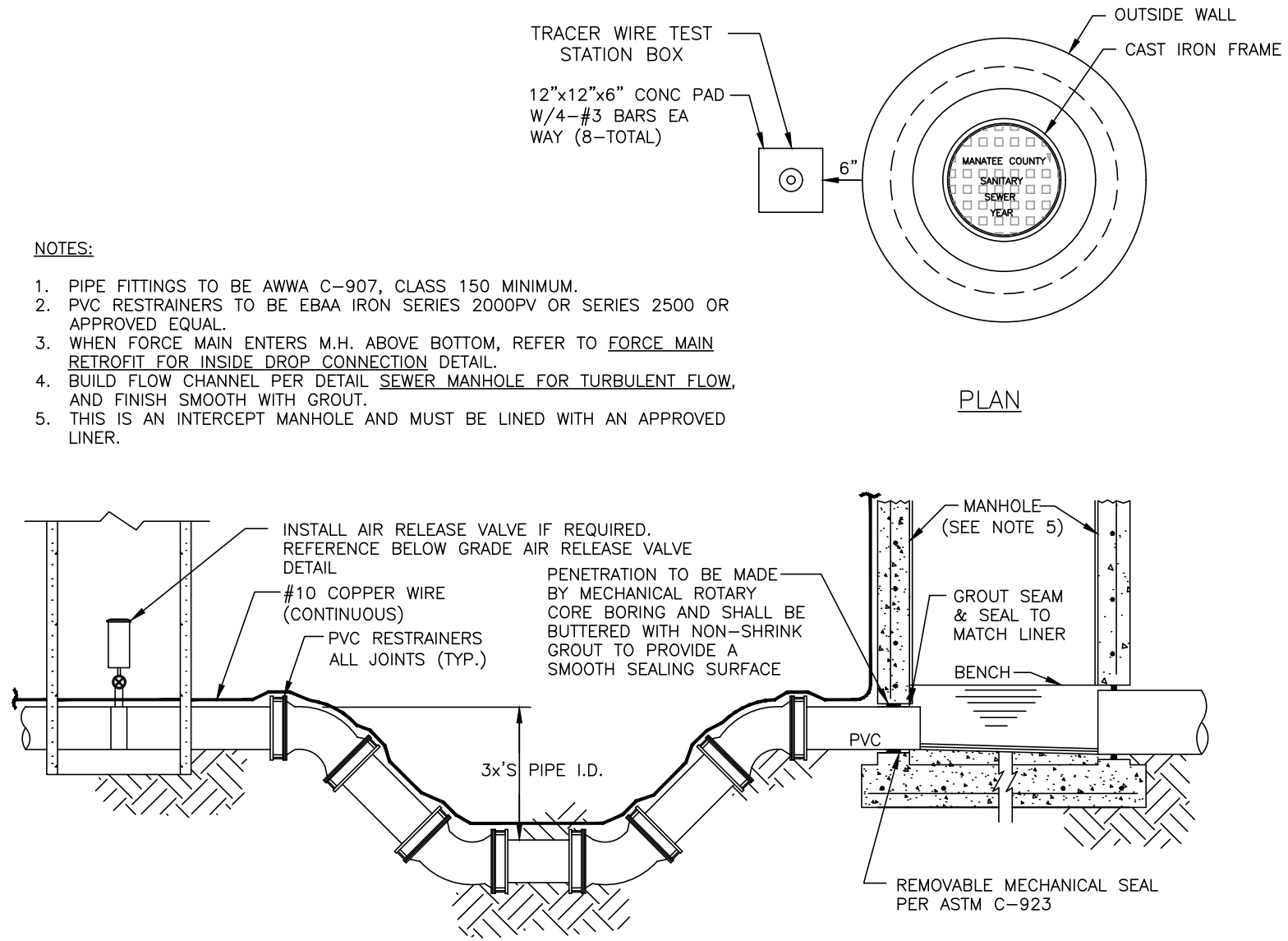
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MANATEE COUNTY PUBLIC WORKS DEPARTMENT		REV/RY DATE CUE/KE 11/10
FORCE MAIN CONNECTION TO MANHOLE		MAY 10, 2011 DATE OF APPROVAL
		US-9 PAGE 149



NOTES:

1. PIPE FITTINGS TO BE AWWA C-907, CLASS 150 MINIMUM.
2. PVC RESTRAINERS TO BE EBAA IRON SERIES 2000PVC OR SERIES 2500 OR APPROVED EQUAL.
3. WHEN FORCE MAIN ENTERS M.H. ABOVE BOTTOM, REFER TO FORCE MAIN RETROFIT FOR INSIDE DROP CONNECTION DETAIL.
4. BUILD FLOW CHANNEL PER DETAIL SEWER MANHOLE FOR TURBULENT FLOW, AND FINISH SMOOTH WITH GROUT.
5. THIS IS AN INTERCEPT MANHOLE AND MUST BE LINED WITH AN APPROVED LINER.

FITTING TYPE	PIPE SIZE										200psi
	4"	6"	8"	10"	12"	16"	18"	20"	24"	30"	36"
90° HORIZ. BEND	17	24	31	37	43	55	60	66	76	119	136
45° HORIZ. BEND	8	10	13	16	18	23	25	28	32	49	56
22.5° HORIZ. BEND	4	5	7	8	9	11	12	13	15	24	27
11.25° HORIZ. BEND	2	3	4	4	5	6	6	7	8	12	14
90° VERT.* OFFSET	UPPER BEND 38	53	70	84	99	115	140	153	179	285	330
	LOWER BEND 38	53	70	84	99	115	140	153	179	285	330
45° VERT. OFFSET	UPPER BEND 16	22	29	35	41	53	58	64	74	118	137
	LOWER BEND 4	6	7	9	10	13	14	15	18	29	33
22.5° VERT. OFFSET	UPPER BEND 8	11	14	17	20	26	28	31	36	57	66
	LOWER BEND 2	3	4	4	5	6	7	8	9	14	16
11.25° VERT. OFFSET	UPPER BEND 4	6	7	9	10	13	14	16	18	29	33
	LOWER BEND 1	1	1	2	3	3	4	4	5	7	8
PLUG/ IN-LINE VALVE	38	53	70	84	99	115	140	153	179	285	330
TEE (BRANCH RESTRAINT)	4"X Ø	20	-	-	-	-	-	-	-	-	-
	6"X Ø	11	35	-	-	-	-	-	-	-	-
	8"X Ø	2	29	51	-	-	-	-	-	-	-
	10"X Ø	1	22	46	65	-	-	-	-	-	-
	12"X Ø	1	15	41	61	79	-	-	-	-	-
	16"X Ø	1	1	30	52	72	107	-	-	-	-
	18"X Ø	1	1	24	47	68	104	120	-	-	-
	20"X Ø	1	1	18	42	64	101	117	133	-	-
	24"X Ø	1	1	5	32	55	95	112	128	158	-
	30"X Ø	1	1	1	15	42	84	103	120	152	193
REDUCER (LARGER PIPE RESTRAINT)	36"X Ø	1	1	1	1	26	73	93	111	144	187
	6"X Ø	28	-	-	-	-	-	-	-	-	-
	8"X Ø	50	30	-	-	-	-	-	-	-	-
	10"X Ø	68	52	28	-	-	-	-	-	-	-
	12"X Ø	86	72	52	29	-	-	-	-	-	-
	16"X Ø	117	107	93	75	54	-	-	-	-	-
	18"X Ø	131	122	110	95	76	29	-	-	-	-
	20"X Ø	146	138	126	113	96	54	29	-	-	-
	24"X Ø	173	166	157	146	132	98	77	54	-	-
	30"X Ø	279	272	262	251	237	201	179	155	100	-
200psi	36"X Ø	325	320	312	303	291	262	245	225	181	100

*PER DIPRA, AS THE BEND ANGLE APPROACHES 90°, LATERAL MOVEMENT OF THE OUTER LEGS APPROACHES ZERO. FOR THIS CONDITION, RESTRAIN ALL PIPE BETWEEN THE FITTINGS AND RESTRAIN THE OUTER LEGS AS DEAD ENDS.

ADDITIONAL RESTRAIN LENGTHS DETAIL FOR PVC

(SOURCES: EBAA IRON RESTRAINT LENGTH CALCULATION PROGRAM FOR PVC PIPE, RELEASE 7.1.2

NOTES:

1. THE DATA IN THE ABOVE TABLE ARE BASED UPON THE FOLLOWING INSTALLATION CONDITIONS:
SOIL TYPE-SP TEST PRESSURE-150/200 PSI
TRENCH TYPE-3 SAFETY FACTOR- 1.5
MINIMUM PIPE LENGTH ALONG TEE RUN-5'
DEPTH OF BURY-3' VERTICAL OFFSET-3'
2. THE RESTRAINED PIPE LENGTHS APPLY TO PVC PIPE.
3. ALL JOINTS BETWEEN UPPER AND LOWER BENDS SHALL BE RESTRAINED.
4. RESTRAINED PIPE LENGTHS APPLY TO PIPE ON BOTH SIDES OF FITTINGS.
5. CONTRACTOR TO REFER TO MANATEE COUNTY DETAIL UG-8 FOR PVC RESTRAIN LENGTHS. IF FITTING TYPE OR PIPE SIZE IS NOT SHOWN, REFER TO THIS DETAIL FOR SECONDARY REFERENCE.
6. RESTRAINED JOINTS SHALL EXTEND ONE JOINT BEYOND MIN. LENGTH REQUIRED.

GROUNDWATER /
DEWATERING NOTE:

THE PRESENCE OF GROUNDWATER SHOULD BE ANTICIPATED ON THIS PROJECT. CONTRACTOR'S BID SHALL INCLUDE CONSIDERATION FOR THIS ISSUE. WHEN PERFORMING GRADING OPERATIONS DURING PERIODS OF WET WEATHER, PROVIDE ADEQUATE DEWATERING, DRAINAGE AND GROUND WATER MANAGEMENT TO CONTROL MOISTURE OF SOILS.




No.	REVISIONS	DATE	BY



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KHA PROJECT 148400016	MANATEE COUNTY
DATE 4/20/2017	
SCALE AS SHOWN	
DESIGNED BY WWW	
DRAWN BY SNH	
CHECKED BY WEW	



FORCE MAIN 15
REPLACEMENT

LICENSED PROFESSIONAL
W. WADE WOOD, P.E.
FL LICENSE NUMBER 69051
FL DATE:

CONSTRUCTION DETAILS

SHEET NUMBER
10



Florida Department of Environmental Protection

Southwest District Office
13051 North Telecom Parkway, Suite 101
Temple Terrace, Florida 33637-0926

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

July 28, 2017

PERMITTEE:

Sia Mollanazar, Deputy Director of Engineering Services
Manatee County Public Works Department
1022 26th Avenue East
Bradenton, Florida 34208
Sia.Mollanazar@mymanatee.org

PERMIT NUMBER: CS41-0812063-191-DWC/CG
ISSUE DATE: July 28, 2017
EXPIRATION DATE: July 27, 2022
COUNTY: Manatee
PROJECT NAME: Force Main 1 Replacement
WWTF NAME: Manatee County Southwest Regional WRF
FACILITY ID: FLA012619

NOTIFICATION OF ACCEPTANCE OF USE OF A GENERAL PERMIT

Dear Mr. Mollanazar,

This letter acknowledges receipt of your Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System for the subject project. Our Office received the Notice on July 24, 2017.

This is to advise you that the Department does not object to your use of this general permit for the following: six-inch diameter force main pipes.

Please note the attached requirements apply to your use of this general permit for constructing the proposed domestic wastewater collection/transmission system.

You are further advised that the construction activity must conform to the description contained in your Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System and that any deviation may subject the permittee to enforcement action and possible penalties.

Mr. Mollanazar, Deputy Director of Engineering Services

Page 2

July 28, 2017

If you have any questions, please contact Katie Castor at 813-470-5733 or via email at Katie.Castor@dep.state.fl.us.

Sincerely,



For Pamala Vazquez
Program Administrator
Permitting & Waste Cleanup Program
Southwest District

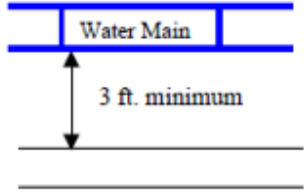
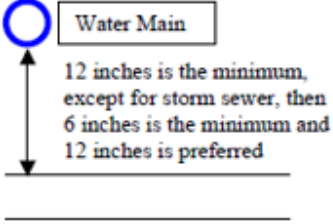
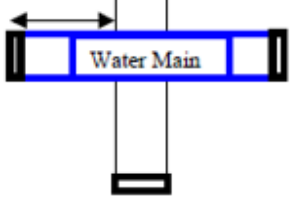
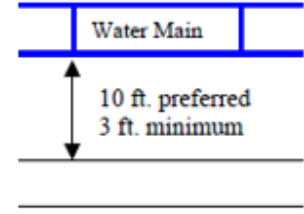
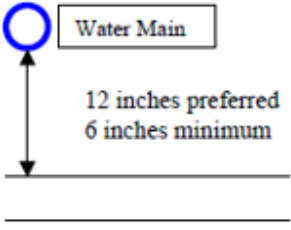
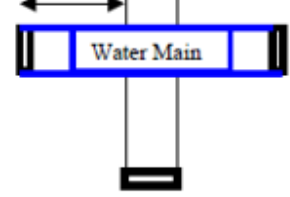
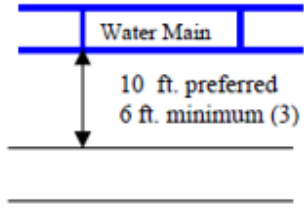
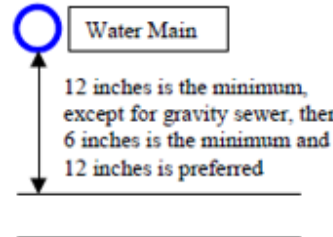
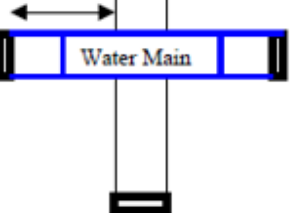
Copies furnished to:

W. Wade Wood, P.E., Kimley-Horn & Associates, Inc., Wade.Wood@kimley-horn.com
Sia Mollanazar, P.E., Manatee County Public Works Dept., Sia.Mollanazar@mymanatee.org
Kenneth Labarr, Manatee County Public Works Dept., Kenneth.Labarr@mymanatee.org
Jim Stockwell, P.E., Manatee County Public Works Dept., Jim.Stockwell@mymanatee.org
Katie Castor, FDEP, Katie.Castor@dep.state.fl.us

REQUIREMENTS FOR USE OF THE GENERAL PERMIT FOR DOMESTIC WASTEWATER COLLECTION/TRANSMISSION SYSTEMS:

1. This general permit is subject to the general permit conditions of Rule 62-4.540, F.A.C., as applicable. This rule is available at the Department's Internet site at: <http://www.dep.state.fl.us/water/rulesprog.htm#ww> [62-4.540]
2. This general permit does not relieve the permittee of the responsibility for obtaining a dredge and fill permit where it is required. [62-604.600(6)(b)1]
3. This general permit cannot be revised, except to transfer the permit. [62-604.600(6)(b)2]
4. This general permit will expire five years from the date of issuance. If the project has been started and not completed by that time, a new permit must be obtained before the expiration date in order to continue work on the project. [62-4.030]
5. Upon completion of construction of the collection/transmission system project, and before placing the facilities into operation for any purpose other than testing for leaks or testing equipment operation, the permittee shall submit to the Department's Southwest District Office Form 62-604.300(8)(b), Request for Approval to Place a Domestic Wastewater Collection/Transmission System into Operation. This form is available at the Department's Internet site at: <http://www.dep.state.fl.us/water/wastewater/forms.htm> [62-604.700(2)]
6. The new or modified collection/transmission facilities shall not be placed into service until the Department clears the project for use. [62-604.700(3)]
7. Abnormal events shall be reported to the Department's Southwest District Office in accordance with Rule 62-604.550, F.A.C. For unauthorized spills of wastewater in excess of 1000 gallons per incident, or where information indicates that public health or the environment may be endangered, oral reports shall be provided to the STATE WATCH OFFICE TOLL FREE NUMBER (800) 320-0519 as soon as practical, but no later than 24 hours from the time the permittee or other designee becomes aware of the circumstances. Unauthorized releases or spills less than 1000 gallons per incident are to be reported orally to the Department's Southwest District Office within 24 hours from the time the permittee, or other designee becomes aware of the circumstances. [62-604.550]

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH F.A.C. RULE 62-555.314

Other Pipe	Horizontal Separation	Crossings (1)	Joint Spacing @ Crossings (Full Joint Centered)
Storm Sewer, Stormwater Force Main, Reclaimed Water (2)	 3 ft. minimum	 12 inches is the minimum, except for storm sewer, then 6 inches is the minimum and 12 inches is preferred	Alternate 3 ft. minimum 
Vacuum Sanitary Sewer	 10 ft. preferred 3 ft. minimum	 12 inches preferred 6 inches minimum	Alternate 3 ft. minimum 
Gravity or Pressure Sanitary Sewer, Sanitary Sewer Force Main, Reclaimed Water (4)	 10 ft. preferred 6 ft. minimum (3)	 12 inches is the minimum, except for gravity sewer, then 6 inches is the minimum and 12 inches is preferred	Alternate 6 ft. minimum 
On-Site Sewage Treatment & Disposal System	10 ft. minimum	---	---

(1) Water main should cross above other pipe. When water main must be below other pipe, the minimum separation is 12 inches.

(2) Reclaimed water regulated under Part III of Chapter 62-610, F.A.C.

(3) 3 ft. for gravity sanitary sewer where the bottom of the water main is laid at least 6 inches above the top of the gravity sanitary sewer.

(4) Reclaimed water not regulated under Part III of Chapter 62-610, F.A.C.

Disclaimer – This document is provided for your convenience only. Please refer to F.A.C. Rule 62-555.314 for additional construction requirements.

APPENDIX B – GEOTECHNICAL REPORTS

**SUBSURFACE SOIL EXPLORATION
AND GEOTECHNICAL
ENGINEERING EVALUATION
FORCE MAIN 8, MARINA DRIVE,
HOLMES BEACH,
MANATEE COUNTY, FLORIDA**



Ardaman & Associates, Inc.

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LOUISIANA

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Baton Rouge, 316 Highlandia Drive, Baton Rouge, Louisiana 70810, Phone (225) 752-4790
Monroe, 1122 Hayes Street, Monroe, Louisiana 71292, Phone (318) 387-4103
New Orleans, 1305 Distributors Row, Suite 1, Jefferson, Louisiana 70123, Phone (504) 835-2593
Shreveport, 7222 Greenwood Road, Shreveport, Louisiana 71119, Phone (318) 636-3723

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**American Concrete Institute
American Society for Testing and Materials
Florida Institute of Consulting Engineers**



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

February 28, 2017
File No. 16-7421

TO: Kimley-Horn & Associates, Inc.
655 North Franklin Street, Suite 150
Tampa, Florida 33602

Attention: Jamison Tondreault, E.I.

SUBJECT: Subsurface Soil Exploration and Geotechnical Engineering Evaluation
Force Main 8, Marina Drive, Holmes Beach, Manatee County, Florida

Dear Jamison:

As requested and authorized by Mr. Wayne White, we have completed a subsurface soil exploration and geotechnical engineering evaluation for the subject project. We understand that the project will include construction of approximately 1,300 lineal feet of force main. We understand that portions of the pipes will be installed by cut-and-cover (open trench) methods and portions by directional drill methods.

The scope of our work included providing geotechnical engineering recommendations for trench stability, pipe bedding, use of excavated soils, the need for dewatering, thrust resistance, and backfill and compaction requirements. Boring data for use in the design of directional drills is provided for informational purposes only, since this type of construction is proprietary in nature.

SITE LOCATION

The proposed force main is located in the Holmes Beach on Anna Maria Island, Manatee County, Florida. The alignment begins near the intersection of Marina Drive with 73rd Street and runs generally southeast to south along Marina Drive to its intersection with Clark Drive. The route can be inferred from the Boring Location Plan shown on the attached Figure 1.

REVIEW OF SOIL SURVEY MAPS

Based on USDA Natural Resources Conservation Service (NRCS) "Web Soil Survey" and the 1983 "Soil Survey of Manatee County, Florida," the soils along the force main alignment are mapped primarily as the "10 - Canaveral fine sand, organic substratum" soil series, with smaller areas of the "32 - Myakka fine sand, shell substratum" soil series nearby. The soils map for the general area of the proposed Force Main 8 alignment is included in Appendix I of this report.

The mapped locations of the individual soil units and selected characteristics of each, according to the NRCS, are summarized in Appendix I of this report. The characteristics listed are the general ratings for corrosion of concrete, corrosion of steel and for shallow excavations, as reported by the NRCS. These ratings represent the “dominant condition” for the soil map unit and are not site specific.

FIELD EXPLORATION PROGRAM

Standard Penetration Test (SPT) Borings

As requested, the field exploration program consisted of performing two (2) Standard Penetration Test (SPT) borings near the proposed pipeline alignment. The Standard Penetration Test (SPT) borings were drilled to a depth of 20 feet below the existing ground surface using the methodology outlined in ASTM D1586. A summary of this boring procedure is included in Appendix II. Split-spoon soil samples recovered during performance of the borings were visually classified in the field and representative portions of the soil samples were transported to our laboratory for further visual classification and laboratory testing.

Where encountered, the groundwater level at each of the boring locations was measured during drilling. The borings were then plugged with cement grout (placed by tremie method, from bottom to top).

Test Boring Locations

The depths and approximate locations of the borings were determined by Kimley-Horn & Associates (KHA). Locations were adjusted in the field as necessary to avoid existing utilities or other obstructions, and to maintain a safe working distance from overhead power lines.

The approximate locations of the borings are schematically illustrated on Figure 1. The locations were determined in the field by visual reference to available site features and should be considered accurate only to the degree implied by the method used.

LABORATORY TESTING PROGRAM

Representative soil samples obtained during our field sampling operation were packaged and transferred to our laboratory for further visual examination and classification. The soil descriptions shown on the soil profiles are based on a visual classification procedure in general accordance with the Unified Soil Classification System (ASTM D-2487 or D-2488).

GENERAL SUBSURFACE CONDITIONS

General Soil Profile

The results of the field exploration and laboratory testing programs are graphically summarized on the soil boring profiles presented on Figure 1. The stratification of the boring profiles represents our interpretation of the field boring logs and the results of laboratory examinations of



the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

The borings encountered a general soil profile consisting primarily of very loose to dense fine sand (SP) from the ground surface to a depth of approximately 12 feet. Exceptions to this included fine sand with silt (SP-SM) from the ground surface to a depth of approximately 1 foot at boring No. 1 and an approximately ½ foot thick layer of organic silt (a.k.a. "muck") at a depth of approximately ½ to 1 foot below the ground surface at boring No. 2.

Below a depth of approximately 12 feet, the soils consisted of very loose silty fine sand (SM) to a depth of approximately 17 feet, underlain by loose fine sand with silt and shell (SP-SM) or dense fine sand (SP) to a depth of 20 feet.

The above soil profile description is in general terms only. Please refer to Figure 1 for soil profile details.

Groundwater Level

The groundwater level in the boreholes was measured during drilling. As shown on Figure 1, the groundwater level was encountered at depths of approximately 1.6 to 2.6 feet below the ground surface. Fluctuations in groundwater levels should be anticipated throughout the year, primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted. Groundwater levels may also be influenced by tidal fluctuations.

The normal seasonal high groundwater level each year typically occurs in August to September, which is the period near the end of the rainy season during a year of normal (average) rainfall. The seasonal high groundwater level is affected by a number of factors, such as the drainage characteristics of the soils, the land surface elevation, relief points (such as lakes, rivers, swamp areas, etc.) and distance to relief points.

We estimate that the normal seasonal high groundwater level probably occurs within a depth of 1 to 2 feet or less below the ground surface along most of the proposed pipeline alignment. The water table elevations associated with a flood may be higher than the normal seasonal high groundwater levels, however.

ENGINEERING EVALUATION AND RECOMMENDATIONS - CUT AND COVER

General

The results of this exploration indicate that the existing soils as encountered in the borings are suitable for supporting the proposed pipelines and associated structures, with the exception of the organic silt (muck) encountered at boring No. 2.

The following are our recommendations for overall site preparation and foundation support which we feel are best suited for the proposed pipelines and associated structures relative to the soil conditions encountered in the borings shown on Figure 1. The recommendations are made as a guide for the design engineer, parts of which should be incorporated into the project's specifications.



Pipelines and Associated Structures

Excavation

Based on the conditions encountered during the field exploration, we anticipate that the organic silt (muck), fine sand (SP), fine sand with silt (SP-SM) and silty fine sand (SM) can generally be excavated with standard earth moving equipment (i.e., front-end loaders and backhoes). Where these soils are dense (SPT N-value greater than 30), however, they may be more difficult to excavate and portions may be at least weakly cemented. Note that the N-values are listed adjacent to the boring logs on Figure 1.

The soils below the bottom of the excavations should not be disturbed by the excavation process. If soils become disturbed and difficult to compact, they should be over-excavated below the pipeline and other structures to a depth necessary to remove all disturbed soils. Over-excavated areas should be replaced with compacted backfill meeting the "Backfill Requirements" presented in a subsequent section of this report.

The excavation should be safely braced or sloped to prevent injury to personnel or damage to equipment. Temporary safe slopes should be cut at a minimum 1.5 horizontal (H) to 1 vertical (V) in accordance with OSHA, 29 CFR Part 1926 Subpart P. Flatter slopes should be used if deemed necessary based on actual conditions encountered. Surcharge loads should be kept at least 5 feet from excavations. Spoil banks adjacent to excavations should be sloped no steeper than 2.0H to 1.0V. Provisions for maintaining workers' safety within and adjacent to excavations is the sole responsibility of the Contractor.

Dewatering

The control of the groundwater may be required to achieve the necessary depths of excavation and subsequent construction, backfilling and compaction requirements presented in the following sections. The actual method(s) of dewatering should be determined by the Contractor. However, regardless of the method(s) used, we suggest drawing down the groundwater table sufficiently (i.e., 2 to 3 feet) below the bottom of the excavation(s) to preclude "pumping" and/or compaction-related problems with the foundation soils. We recommend that the dewatering be accomplished in advance of the excavation.

Pipeline Bedding

Pipe bedding material should be compacted as necessary to achieve a density equivalent to 95 percent of the maximum dry density, as determined by the Modified Proctor (ASTM D-1557), to a minimum depth of 6 inches below the bottom of the pipe. Compact deeper if recommended by the pipe manufacturer.

The organic silt (muck) is not a suitable bedding material and should be excavated and removed if it (or similar organic soils) underlies the proposed pipeline. If present below the pipe, it should be excavated from directly beneath the pipe and to a horizontal distance of at least 2 feet outside the pipe location.



We recommend that the bedding for the pipe be preshaped by means of a template prior to placement of the pipe to ensure that the upward reaction on the bottom of the pipe will be well distributed over the width of the bedding contact. Based on the cost involved with preshaping the bedding material and the construction time requirements, an alternative procedure may be to utilize a level bed for the pipe and require a higher pipe strength class that will adequately carry the load on a lower class of bedding. It would be prudent to perform an economic analysis of the two alternatives, or specify both design conditions within the contract documents and allow the Contractor to decide the most efficient method.

If level bedding is utilized, it will be necessary to place and compact the haunching backfill (backfill between the bedding and the springline of the pipe) to the springline of the pipe. This material should be placed in simultaneous layers on each side of the pipe and must be compacted in such a manner as to ensure an intimate contact with the sides of the pipe. Do not use blocking under the pipe to raise the pipe to grade.

The final backfill above the haunching or springline of the pipe must extend all the way to the trench walls and should be placed in level lifts not exceeding 12 inches. Each lift should be compacted to at least 95 percent of the maximum dry density, as determined by the Modified Proctor (ASTM D-1557). Care should be taken not to damage the pipe or deflect it by compacting directly above the pipe where there is insufficient cover material present. Minimum cover criteria should be in accordance with the pipe manufacturer's recommendations.

Where the utility line will traverse roadways and/or other permanent structures such as sidewalks, all backfill should be compacted to 95 percent of maximum dry density, as determined by the Modified Proctor (ASTM D-1557), from the top of the pipe to the ground surface. The design engineer may wish to specify greater compaction for the pavement subgrade, to be consistent with the pavement design requirements.

A geotechnical engineer or a designated representative from Ardaman & Associates, Inc. should observe and test all prepared and compacted areas to verify that all bedding, haunching and final backfill are prepared and compacted in accordance with the aforementioned specifications

Backfill Requirements

As a general guide to aid the Contractor, we recommend using fill that consists of fine sand (SP) to fine sand with silt (SP-SM) that contains less than 1 percent organic matter and no greater than 12 percent by dry weight of material passing the U.S. Standard No. 200 sieve size. Soils with more than 12 percent passing the No. 200 sieve will be more difficult to compact due to their inherent nature to retain soil moisture.

Based on the soil samples obtained during our subsurface investigation, the on-site fine sand (SP) and fine sand with silt (SP-SM) soils without roots and/or organic matter appear suitable for use as structural backfill for the pipe. However, material removed from below the groundwater table will be wet and will require time to dry sufficiently.

The silty fine sand (SM) can be used in some applications as structural backfill, but will be more difficult to moisture condition and compact due to its inherent nature to retain moisture. The



organic silt (OL or muck) is not suitable for use as backfill and should be excavated and removed from the site, if encountered during construction.

Resistance to Horizontal Forces on Pipeline Structures

Horizontal forces which act on structures such as thrust blocks or anchor blocks can be resisted to some extent by the earth pressures that develop in contact with the buried vertical face (buried vertical face is perpendicular and in front of the applied horizontal load) of the block structures and by shearing resistance mobilized along the base of the block structures and soil subgrade interface.

Allowable earth pressure resistance may be determined using an equivalent fluid density of 110 pounds per cubic foot (pcf) for moist soil above the water table and 70 pcf for submerged soils below the water table¹. The passive earth pressures are developed from ground surface² to the bottom of the block structure.

The values presented above presume that the block structures are surrounded by well compacted sand backfill extending at least 5 feet horizontally beyond the vertical buried face. In addition, it is presumed that the block structures can withstand horizontal movements on the order of one-quarter (1/4) to three-eighths (3/8) inch before mobilizing full passive resistance. The factors of safety assumed in the above recommendations are 2.5 for passive pressure with submerged conditions, and 3.0 for passive pressure without submerged conditions.

The sliding shearing resistance mobilized along the base of the block structure may be determined by the following formula:

$$\text{Allowable Shearing Resisting Force, } P = V \tan(2/3 \phi) / \text{S.F.}$$

Where: P = Shearing Resistance Force (pounds)
 V = Net Vertical Force (total weight of block and soil overlying the structure minus uplift forces including buoyancy forces) (pounds)
 ϕ = Angle of Internal Friction of Soil = 30 degrees
 S.F. = Safety Factor = 1.5

The vertical earth pressures developed by the overburden weight of soil can be calculated using

-
- 1 Equivalent fluid density (moist soil) = $K_p \gamma_m / \text{S.F.} = 110 \text{ pcf}$
 Equivalent fluid density (submerged soil) = $K_p (\gamma_s - \gamma_w) / \text{S.F.} = 70 \text{ pcf}$

Where: K_p = effective coefficient of passive earth pressure = 3.0
 S.F. = safety factor = (values given below)
 γ_m = unit weight of moist soil = 110 pcf
 γ_s = unit weight of saturated soils = 120 pcf
 γ_w = unit weight of water = 62.4 pcf

- 2 Assuming there is no excavation in the vicinity of the block structure that would reduce the available passive pressure.



the following unit weights:

- Compacted moist soil = 110 pcf
- Saturated soil = 120 pcf

Vertical pressure distributions in accordance with the above do not take into account vertical forces from construction equipment, wheel loads or other surcharge loads.

Foundation Support and Estimated Settlements

The permanent structures such as anchor blocks, thrust blocks, air release valves, blow offs, etc., bearing at least 18 inches below adjacent grade and at least 18 inches wide can be designed for the following maximum vertical bearing capacities:

- 1,500 psf on undisturbed natural granular soils.
- 2,000 psf on compacted natural or backfilled subgrade; this value assumes compaction of at least 95 percent of the Modified Proctor maximum density (ASTM D-1557, AASHTO T-180) to a depth of 1 foot below the structure.

Pipe settlement during and after construction should be negligible (less than 1/2 inch) provided the bedding and backfilling criteria in the above sections are satisfied. The volume of soil displaced by the pipe, compared to the weight of the pipe when full, will result in little if any net increase in bearing stress to the subsurface soils.

Uplift Resistance

Permanent structures submerged below the groundwater table will be subjected to uplift forces caused by buoyancy. The components resisting this buoyancy include: 1) the total weight of the pipe or structure divided by an appropriate factor of safety; 2) the buoyant weight of soil overlying the pipe or structure; and 3) the shearing forces that act on shear planes that radiate vertically upward from the perimeter of the pipe or the edges of the structure to the ground surface. The allowable unit shearing resistance may be determined by the following formula:

Allowable Shearing Resistance, $F = K_o \gamma_m h (2/3 \tan \phi) / S.F.$ (above water table)

Allowable Shearing Resistance, $F = K_o [\gamma_m h_w + \gamma_b (h - h_w)] (2/3 \tan \phi) / S.F.$ (below water table)

where: F = unit shearing resistance (psf)

K_o = coefficient of earth pressure at rest = 0.5

γ_m = unit weight of moist soil = 110 pcf

γ_b = buoyant unit weight of soil = 58 pcf

h = vertical depth (feet) below grade at which shearing resistance is determined

h_w = vertical depth (feet) below grade to groundwater table

ϕ = angle of internal friction of the soil = 30 degrees

S.F. = safety factor = 2.0

The values given for the above parameters assume that the permanent structures are covered



by clean, well-compacted, granular backfill that extends horizontally at least 2 feet beyond the structures.

Earth Pressure on Shoring and Bracing

If temporary shoring and bracing are required for any excavations, the system should be designed to resist lateral earth pressure. The design earth pressure will be a function of the flexibility of the shoring and bracing system. For a flexible system restrained laterally by braces placed as the excavation proceeds, the design earth pressure for shoring and bracing can be computed using a uniform earth pressure distribution with depth. It is recommended that soils be dewatered around the excavations. For such dewatered excavations, we recommended using the following uniform pressure distribution over the full braced height as follows:

Uniform Soil Pressure Distribution, $p = 0.65 K_a \gamma_s H$

where: p = uniform pressure distribution for design of braced excavation
 K_a = coefficient of active earth pressure = 0.33
 γ_s = unit weight of saturated soils = 120 pcf
 H = depth of excavation

An appropriate factor of safety should be applied for the design of the braced excavations.

Lateral pressure distributions determined in accordance with the above do not take hydrostatic pressures or surcharge loads into account. To the extent that such pressures and forces may act on the walls, they should be included in the design.

Construction equipment and excavated fill should be kept a minimum distance of 5 feet from the edge of the braced or shored excavation. Backfill material placed adjacent to (maintaining a minimum 5-foot horizontal clearance) the braced or shored excavation should have a minimum slope of 2.0H to 1.0V or flatter, if required by site specific conditions and/or to meet OSHA requirements.

Means and methods of excavation and bracing should be the responsibility of the Contractor; however, excavation and/or bracing should, at a minimum, comply with the requirements of the Occupational Safety Health Administration (OSHA).

Lateral Earth Pressures

Lateral loads acting on the embedded structure will include at-rest earth pressures as well as hydrostatic pressures and surcharge loads. The lateral earth pressure will be a function of both the depth below ground surface and the soil unit weight (submerged or moist) plus hydrostatic pressure (if applicable). The following equations can be used to determine the lateral at-rest earth pressure:

$$\sigma_h = K_o \gamma_m h \text{ (above water table)}$$

$$\sigma_h = K_o [\gamma_m h_w + \gamma_b (h - h_w)] \text{ (below water table)}$$



where: σ_h = lateral earth pressure (psf)
 K_o = coefficient of at rest earth pressure (0.5) (this value assumes that the backfill is lightly compacted yet not overcompacted)
 γ_m = moist unit weight of soil = 110 pcf for compacted moist soil above the water table.
 γ_b = buoyant unit weight of soil = 58 pcf for compacted saturated soil below the water table.
 h = vertical depth (feet) below grade at which lateral earth pressure is determined.
 h_w = vertical depth (feet) below grade to groundwater table

For design, an appropriate factor of safety should be applied to the lateral earth pressure calculated using the above equation. Lateral pressure distributions determined in accordance with the above do not include hydrostatic pressures or surcharge loads. Where applicable, they should be incorporated in the design.

Pipeline Directional Drill Locations

We understand that directionally drilled pipe installation is proposed for at least portions of the pipeline. The SPT borings were conducted to provide soil stratigraphy data for the direction drill design. Further subsurface exploration may be necessary in these areas after final pipe invert elevations are determined.

Classification in accordance with the Unified Soil Classification System and the SPT N-values were used to estimate unit weights, the angles of internal friction, cohesion and the shear modulus for the types of soils encountered in the borings are presented in Appendix III.

The following should be noted when reviewing the data in Appendix III:

- $\gamma_{\text{buoyant}} = \gamma_{\text{sat}} - \gamma_{\text{water}}$
- Values given in Table 1 are based on empirical correlations with the average soil conditions encountered in the referenced boring. Appropriate safety factors should be used with these values.

We caution that the soil layers shown in Appendix III are very generalized and should be used for design purposes only. The soil stratigraphy on the boring profiles (Figure 1) is more detailed than presented in Appendix III. The information in Appendix III should not be used for assessing the constructability of the proposed pipeline.

QUALITY CONTROL

We recommend establishing a comprehensive quality control program to verify that all excavation, bedding, and backfilling is conducted in accordance with the appropriate plans and specifications. Materials testing and inspection services should be provided by Ardaman & Associates, Inc. In-situ density tests should be conducted during bedding and backfilling activities to verify that the required densities are achieved.



Kimley-Horn & Associates, Inc.
 File No. 16-7421
 February 28, 2017

Backfill for the proposed pipeline should be tested at a minimum frequency of one in-place density test for each lift for each 200 lineal feet of pipe. Additional tests should be performed beneath foundations and in backfill for other associated structures. In-situ density values should be compared to laboratory Proctor moisture-density results for each of the different natural and fill soils encountered.

CLOSURE

The analyses and recommendations submitted herein are based on the data obtained from the soil borings presented on Figure 1. This report does not reflect any variations which may occur adjacent to or between the borings. The nature and extent of the variations between the borings may not become evident until during construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented in this report after performing on-site observations during the construction period and noting the characteristics of the variations.


This study is based on a relatively shallow exploration and is not intended to be an evaluation for sinkhole potential. This study does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.

This report has been prepared for the exclusive use of Kimley-Horn & Associates in accordance with generally accepted geotechnical engineering practices. In the event any changes occur in the design, nature, or location of the proposed improvements, we should review the applicability of conclusions and recommendations in this report. We recommend a general review of final design and specifications by our office to verify that earthwork and foundation recommendations are properly interpreted and implemented in the design specifications. Ardaman & Associates should attend the pre-bid and preconstruction meetings to verify that the bidders/contractor understand the recommendations contained in this report.

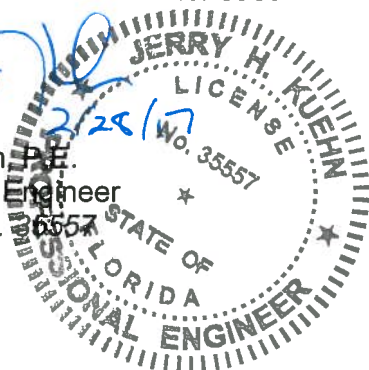
We are pleased to be of assistance to you on this phase of the project. Please contact us when we may be of further service to you or should you have any questions.


Very truly yours,

ARDAMAN & ASSOCIATES, INC.
 Certificate of Authorization No. 5950


 Jerry H. Kuehn, P.E.
 Senior Project Engineer
 Fl. License No. 35557

JHK/GSS:ly




 Gregory S. Stevens, P.E.
 Project Engineer
 Fl. License No. 71511



Ardaman & Associates, Inc.

APPENDIX I

Soil Map and Selected Data from NRCS Soil Survey

Soil Map—Manatee County, Florida
(Force Main 8)



Map Scale: 1:3,230 If printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84



MAP LEGEND

	Area of Interest (AOI)		Soil Area
	Soils		Stony Spot
	Soil Map Unit Polygons		Very Stony Spot
	Soil Map Unit Lines		Wet Spot
	Soil Map Unit Points		Other
	Special Point Features		Special Line Features
	Blowout		
	Borrow Pit		
	Clay Spot		
	Closed Depression		
	Gravel Pit		
	Gravelly Spot		
	Landfill		
	Lava Flow		
	Marsh or swamp		
	Mine or Quarry		
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		
			Water Features
			Streams and Canals
			Transportation
			Ralls
			Interstate Highways
			US Routes
			Major Roads
			Local Roads
			Background
			Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Manatee County, Florida

Survey Area Data: Version 13, Sep 14, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2014—Mar 3, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Manatee County, Florida (FL081)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10	Canaveral sand, organic substratum	11.0	80.1%
32	Myakka fine sand, shell substratum	1.3	9.7%
100	Waters of the Gulf of Mexico	1.4	10.2%
Totals for Area of Interest		13.7	100.0%

Corrosion of Concrete

Corrosion of Concrete— Summary by Map Unit — Manatee County, Florida (FL081)				
Map unit symbol	Map unit name	Rating	Acres In AOI	Percent of AOI
10	Canaveral sand, organic substratum	Low	11.0	80.1%
32	Myakka fine sand, shell substratum	High	1.3	9.7%
100	Waters of the Gulf of Mexico		1.4	10.2%
Totals for Area of Interest			13.7	100.0%

Description

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the concrete in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Corrosion of Steel

Corrosion of Steel— Summary by Map Unit — Manatee County, Florida (FL081)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10	Canaveral sand, organic substratum	Low	11.0	80.1%
32	Myakka fine sand, shell substratum	High	1.3	9.7%
100	Waters of the Gulf of Mexico		1.4	10.2%
Totals for Area of Interest			13.7	100.0%

Description

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Shallow Excavations

Shallow Excavations— Summary by Map Unit — Manatee County, Florida (FL081)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
10	Canaveral sand, organic substratum	Very limited	Canaveral, organic substratum (90%)	Unstable excavation walls (1.00)	11.0	80.1%
				Depth to saturated zone (0.73)		
			Canaveral, filled (10%)	Depth to saturated zone (1.00)		
				Unstable excavation walls (1.00)		
32	Myakka fine sand, shell substratum	Very limited	Myakka, shelly/non-hydric (85%)	Depth to saturated zone (1.00)	1.3	9.7%
				Unstable excavation walls (1.00)		
			Canaveral (10%)	Depth to saturated zone (1.00)		
				Unstable excavation walls (1.00)		
			Myakka, shelly/hydric (5%)	Depth to saturated zone (1.00)		
				Unstable excavation walls (1.00)		
100	Waters of the Gulf of Mexico	Not rated	Waters of the Gulf of Mexico (100%)		1.4	10.2%
Totals for Area of Interest					13.7	100.0%

Shallow Excavations— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Very limited	12.3	89.8%
Null or Not Rated	1.4	10.2%
Totals for Area of Interest	13.7	100.0%

Description

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX II

Soil Boring, Sampling and Test Methods

SOIL BORING, SAMPLING AND TESTING METHODS

Standard Penetration Test

The Standard Penetration Test (SPT) is a widely accepted method of in situ testing of foundation soils (ASTM D-1586). A 2-foot long, 2-inch O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load. The following tables relate N-values to a qualitative description of soil density and, for cohesive soils, an approximate unconfined compressive strength (Q_u):

Cohesionless Soils:	<u>N-Value</u>	<u>Description</u>	
	0 to 4	Very loose	
	4 to 10	Loose	
	10 to 30	Medium dense	
	30 to 50	Dense	
	Above 50	Very dense	
Cohesive Soils:	<u>N-Value</u>	<u>Description</u>	<u>Q_u (ton/ft²)</u>
	0 to 2	Very soft	Below 1/4
	2 to 4	Soft	1/4 to 1/2
	4 to 8	Medium stiff	1/2 to 1
	8 to 15	Stiff	1 to 2
	15 to 30	Very stiff	2 to 4
	Above 30	Hard	Above 4

The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, NX-size flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or prevent the loss of circulating fluid.

Representative split-spoon samples from each sampling interval and from every different stratum are brought to our laboratory in air-tight jars for further evaluation and testing, if necessary. After thorough examination and testing of the samples, the samples are discarded unless prior arrangements have been made. After completion of a test boring, the hole is kept open until a steady state groundwater level is recorded. The hole is then sealed, if necessary, and backfilled.

A hammer with an automatic drop release (auto-hammer) is sometimes used. In this case, a correction factor is applied to the raw blow counts, since the energy efficiency of the auto-hammer is greater than that of the safety hammer. Based upon calibration of the auto-hammer (per ASTM D4633) and standard practice, we use a multiplier of 1.24 to correct the auto-hammer blow counts to equivalent safety hammer "N" values.

Hand Auger Borings

Hand auger borings are used, if soil conditions are favorable, when the soil strata are to be determined within a shallow (approximately 5 to 9 feet) depth or when access is not available to power drilling equipment. A 3-inch diameter, hand bucket auger with a cutting head is simultaneously turned and pressed into the ground. The bucket auger is retrieved to the surface at approximately 6-inch intervals and its contents emptied for inspection. The soil sample so obtained is classified and representative samples put in bags or jars and transported to the laboratory for further classification and testing.

Laboratory Test Methods

Soil samples returned to our laboratory are examined by a geotechnical engineer or geotechnician to obtain more accurate descriptions of the soil strata. Laboratory testing is performed on selected samples as deemed necessary to aid in soil classification and to further define engineering properties of the soils. The test results are presented on the soil boring logs at the depths at which the respective sample was recovered, except that grain size distributions or selected other test results may be presented on separate tables, figures or plates as described in this report. The soil descriptions shown on the logs are based upon a visual-manual classification procedure in general accordance with the Unified Soil Classification System (ASTM D-2488-84) and standard practice. Following is a list of abbreviations which may be used on the boring logs or elsewhere in this report.

- 200 - Fines Content (percent passing the No. 200 sieve); ASTM D1140
- DD - Dry Density of Undisturbed Sample; ASTM D2937
- Gs - Specific Gravity of Soil; ASTM D854
- k - Hydraulic Conductivity (Coefficient of Permeability)
- LL - Liquid Limit; ASTM D423
- OC - Organic Content; ASTM D2974
- pH - pH of Soil; ASTM D2976
- PI - Plasticity Index (LL-PL); ASTM D424
- PL - Plastic Limit; ASTM D424
- Qp - Unconfined Compressive Strength by Pocket Penetrometer;
- Qu - Unconfined Compressive Strength; ASTM D2166 (soil), D7012 (rock)
- SL - Shrinkage Limit; ASTM D427
- ST - Splitting Tensile Strength; ASTM D3967 (rock)
- USCS - Unified Soil Classification System; ASTM D2487, D2488
- w - Water (Moisture) Content; ASTM D2216

Soil Classifications

The soil descriptions presented on the soil boring logs are based upon the Unified Soil Classification System (USCS), which is the generally accepted method (ASTM D-2487 and D-2488) for classifying soils for engineering purposes. The following modifiers are the most commonly used in the descriptions.

For Sands:	<u>Modifier</u>	<u>Fines, Sand or Gravel Content*</u>
	with silt or with clay	5% to 12% fines
	silty or clayey	12% to 50% fines
	with gravel or with shell	15% to 50% gravel or shell
For Silts or Clays:	<u>Modifier</u>	<u>Fines, Sand or Gravel Content*</u>
	with sand	15% to 30% sand and gravel; and % sand > % gravel
	sandy	30% to 50% sand and gravel; and % sand > % gravel
	with gravel	15% to 30% sand and gravel; and % sand < % gravel
	gravelly	30% to 50% sand and gravel; and % sand < % gravel

* may be determined by laboratory testing or estimated by visual/manual procedures. Fines content is the combined silt and clay content, or the percent passing the No. 200 sieve.

The USCS also uses a set of Group Symbols, which may also be listed on the soil boring logs. The following is a summary of these.

<u>Group Symbol</u>	<u>General Group Name*</u>	<u>Group Symbol</u>	<u>General Group Name*</u>
GW	Well-graded gravel	SW	Well-graded sand
GP	Poorly graded gravel	SP	Poorly graded sand
GW-GM	Well-graded gravel with silt	SW-SM	Well-graded sand with silt
GW-GC	Well-graded gravel with clay	SW-SC	Well-graded sand with clay
GP-GM	Poorly graded gravel with silt	SP-SM	Poorly graded sand with silt
GP-GC	Poorly graded gravel with clay	SP-SC	Poorly graded sand with clay
GM	Silty gravel	SM	Silty sand
GC	Clayey gravel	SC	Clayey sand
GC-GM	Silty, clayey gravel	SC-SM	Silty, clayey sand
CL	Lean clay	ML	Silt
CL-ML	Silty clay	MH	Elastic silt
CH	Fat clay	OL or OH	Organic silt or organic clay

* Group names may also include other modifiers, per standard or local practice.

Other soil classification standards may be used, depending on the project requirements. The AASHTO classification system is commonly used for highway design purposes and the USDA soil textural classifications are commonly used for septic (on-site sewage disposal) system design purposes.

APPENDIX III

Soil Parameter Table

Summary of Soil Parameters								
Boring No	Depth Range (ft)	Soil Classification	Average SPT N-Value	Internal Friction Angle (degrees)	Saturated Soil Weight (pcf)	(see Note 1) Moist Soil Weight (pcf)	(see Note 2) Cohesion (psf)	Shear Modulus (ksf)
1	0 - 6	SP/SP-SM	4	28	115	95	---	150
	6 - 8	SP	22	32	125	110	---	460
	8 - 17	SP/SM	4	28	115	95	---	150
	17 - 20	SP	37	34	135	120	---	700
2	0 - 6	SP	2	27	115	95	---	80
	6 - 12	SP	29	34	130	115	---	600
	12 - 20	SP	3	27	115	95	---	110

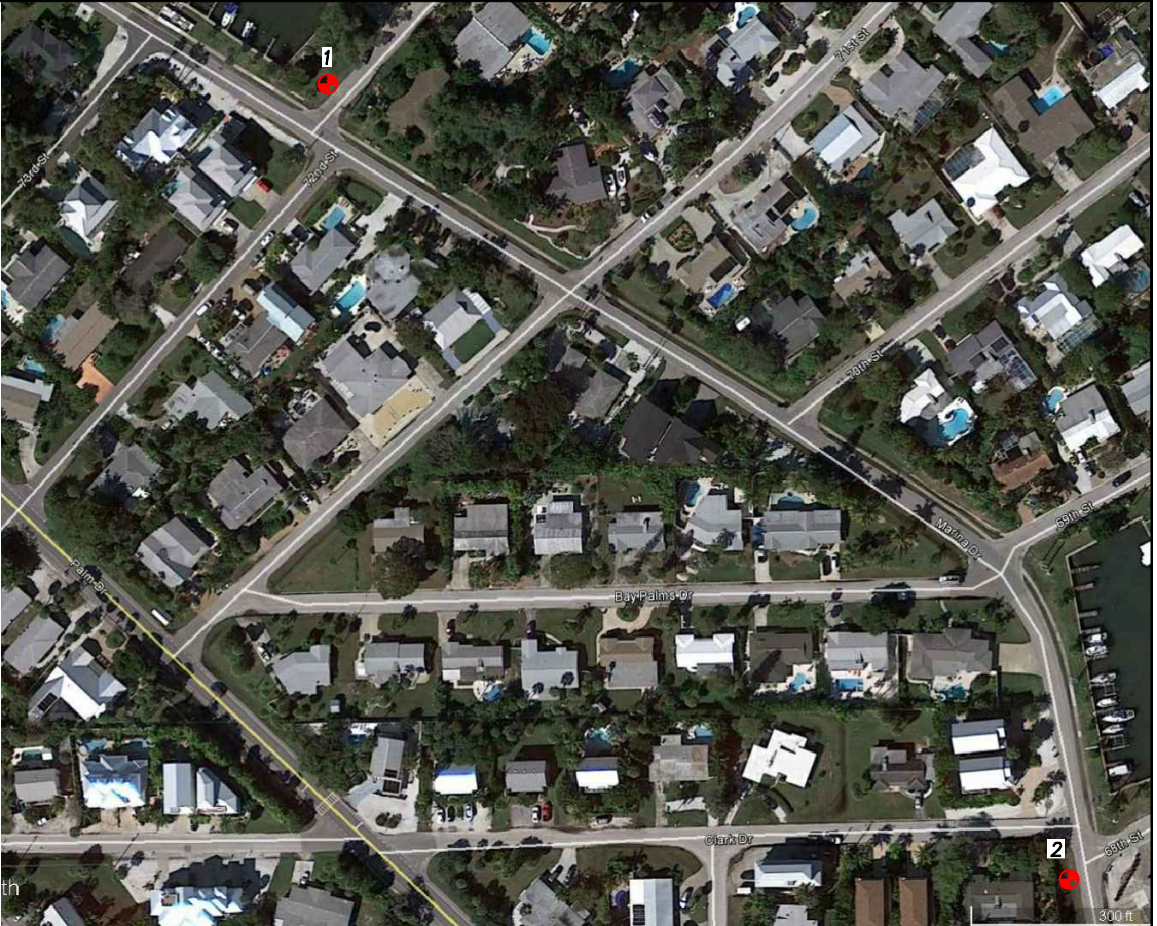
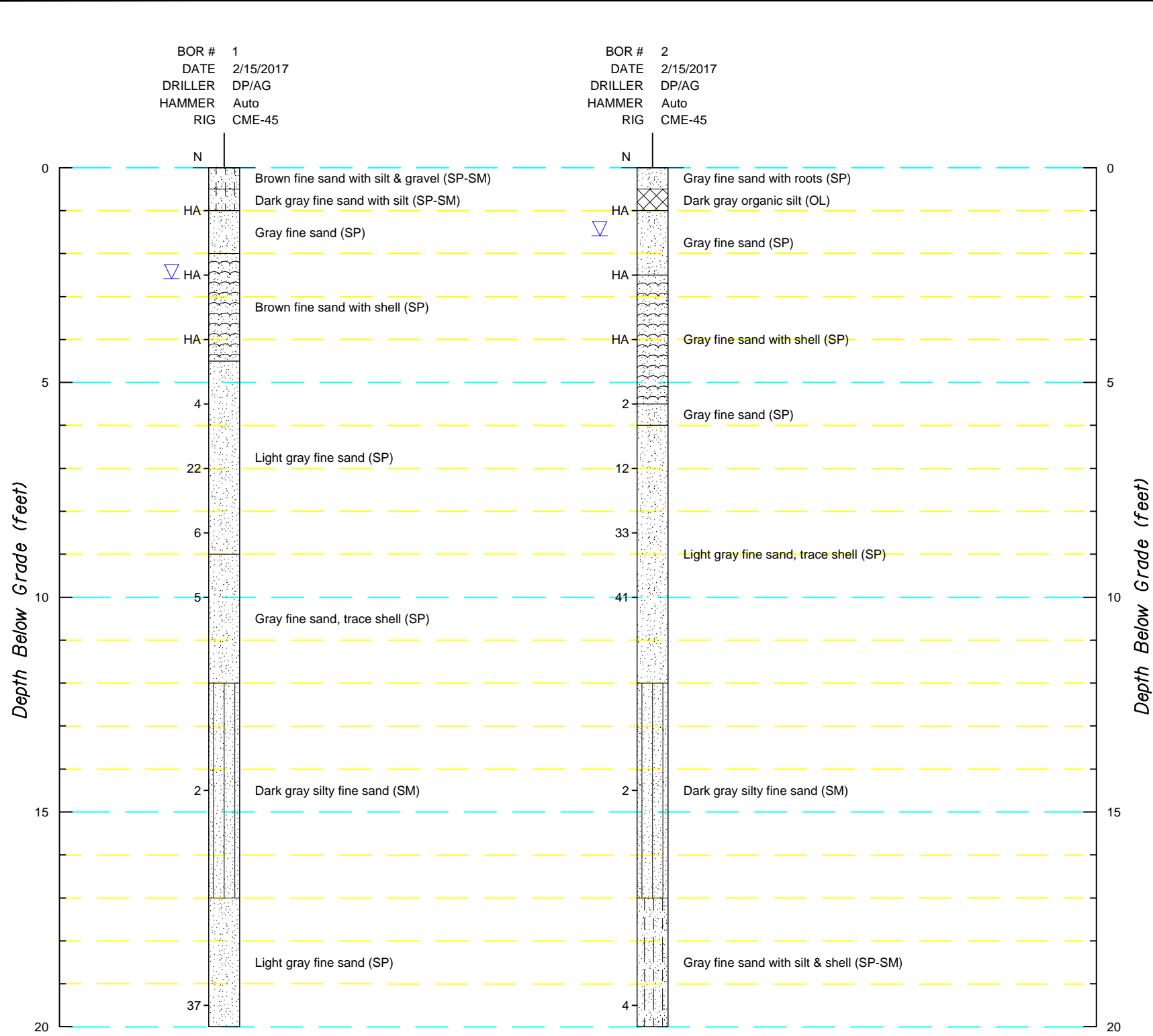
Notes: pcf = pounds per cubic foot
psf = pounds per square foot
ksf = kips per square foot

(1) Estimate for a drained soil above the groundwater table.

(2) No value indicates a soil that is generally considered cohesionless.

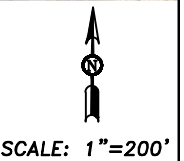
(3) The values listed above are based upon empirical correlations with the average soil conditions encountered. Appropriate safety factors should be used with these values.

(4) The soil layers presented above are generalized and should be used for design purposes only. The above values should not be used to assess constructability of the proposed pipeline.



Base Aerial From Google Earth Pro

TEST BORING LOCATIONS



LEGEND

- ▽ GROUNDWATER LEVEL MEASURED ON DATE DRILLED
- N SPT N-VALUE IN BLOWS PER FOOT (UNLESS OTHERWISE NOTED)
- SPT N VALUES CONVERTED TO EQUIVALENT SAFETY HAMMER
- HA HAND AUGER

GRANULAR MATERIALS— RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 4
LOOSE	4–10
MEDIUM DENSE	10–30
DENSE	30–50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 2
SOFT	2–4
FIRM	4–8
STIFF	8–15
VERY STIFF	15–30
HARD	GREATER THAN 30

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

Test Locations/Soil Boring Logs
Force Main 8
Marina Drive, Holmes Beach
Manatee County, Florida

DRAWN BY: KGS CHECKED BY: DATE: 2/20/17

FILE NO. 16-7421 APPROVED BY: FIGURE: 1

**SUBSURFACE SOIL EXPLORATION AND
GEOTECHNICAL ENGINEERING EVALUATION
FORCE MAIN 15,
BAY BOULEVARD,
ANNA MARIA,
MANATEE COUNTY, FLORIDA**



Ardaman & Associates, Inc.

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Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

(revised March 6, 2017)
February 23, 2017
File No. 16-7415

TO: Kimley-Horn & Associates, Inc.
655 North Franklin Street, Suite 150
Tampa, Florida 33602

Attention: Jamison Tondreault, E.I.

SUBJECT: Subsurface Soil Exploration and Geotechnical Engineering Evaluation
Force Main 15, Bay Boulevard, Anna Maria, Manatee County, Florida

Dear Jamison:

As requested and authorized by Mr. Wayne White, we have completed a subsurface soil exploration and geotechnical engineering evaluation for the subject project. We understand that the project will include construction of approximately 1,700 lineal feet of force main. We understand that portions of the pipes will be installed by cut-and-cover (open trench) methods and portions by directional drill methods.

The scope of our work included providing geotechnical engineering recommendations for trench stability, pipe bedding, use of excavated soils, the need for dewatering, thrust resistance, and backfill and compaction requirements. Boring data for use in the design of directional drills is provided for information purposes only, since this type of construction is proprietary in nature.

SITE LOCATION

The proposed force main is located in the City of Anna Maria, Manatee County, Florida. The alignment begins near the intersection of North Bay Boulevard with North Shore Drive and runs generally southeasterly along North Bay Boulevard to the south side of the canal bridge, located to the north of Pine Avenue. The route can be inferred from the Boring Location Plan shown on the attached Figure 1.

REVIEW OF SOIL SURVEY MAPS

Based on USDA Natural Resources Conservation Service (NRCS) "Web Soil Survey" and the 1983 "Soil Survey of Manatee County, Florida," the soils along the force main alignment are mapped as the "8 - Canaveral fine sand, 0 to 5 percent slopes" soil series, but with mapped areas of the "10 - Canaveral sand, organic substratum" soil series nearby. The soils map for the general area of the proposed Force Main 15 alignment is included in Appendix I of this report.

The mapped locations of the individual soil units and selected characteristics of each, according to the NRCS, are summarized in Appendix I of this report. The characteristics listed are the general ratings for corrosion of concrete, corrosion of steel and for shallow excavations, as reported by the NRCS. These ratings represent the “dominant condition” for the soil map unit and are not site specific.

FIELD EXPLORATION PROGRAM

Standard Penetration Test (SPT) Borings

As requested, the field exploration program consisted of performing two (2) Standard Penetration Test (SPT) borings near the proposed pipeline alignment. The Standard Penetration Test (SPT) borings were drilled to a depth of 20 to 40 feet below the existing ground surface using the methodology outlined in ASTM D1586. A summary of this boring procedure is included in Appendix II. Split-spoon soil samples recovered during performance of the borings were visually classified in the field and representative portions of the soil samples were transported to our laboratory for further visual classification and laboratory testing.

Where encountered, the groundwater level at each of the boring locations was measured during drilling. The borings were then plugged with cement grout (placed by tremie method, from bottom to top).

Test Boring Locations

The depths and approximate locations of the borings were determined by Kimley-Horn & Associates (KHA). Locations were adjusted in the field as necessary to avoid existing utilities or other obstructions.

The approximate locations of the borings are schematically illustrated on Figure 1. The locations were determined in the field by visual reference to available site features and should be considered accurate only to the degree implied by the method used.

LABORATORY TESTING PROGRAM

Representative soil samples obtained during our field sampling operation were packaged and transferred to our laboratory for further visual examination and classification. The soil descriptions shown on the soil profiles are based on a visual classification procedure in general accordance with the Unified Soil Classification System (ASTM D-2487 or D-2488).

GENERAL SUBSURFACE CONDITIONS

General Soil Profile

The results of the field exploration and laboratory testing programs are graphically summarized on the soil boring profiles presented on Figure 1. The stratification of the boring profiles represents our interpretation of the field boring logs and the results of laboratory examinations of



the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

The borings encountered a general soil profile consisting primarily of loose to medium dense fine sand (SP), fine sand with silt (SP-SM), sandy shell (SP), fine sand with shell (SP) and fine sand with silt and shell (SP-SM), from the ground surface to a depth of approximately 32 feet. Dense sands were encountered at a depth of 10 feet, however. Below a depth of 32 feet (at boring No. 2), the soils encountered consisted of stiff to very stiff clay and clay with sand (CL-CH) to the termination of the boring at a depth of 40 feet.

The above soil profile description is in general terms only. Please refer to Figure 1 for soil profile details.

Groundwater Level

The groundwater level in the boreholes was measured during drilling. As shown on Figure 1, the groundwater level was encountered at depths of approximately 3.3 to 3.4 feet below the ground surface. Fluctuations in groundwater levels should be anticipated throughout the year, primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted. Groundwater levels may also be influenced by tidal fluctuations.

The normal seasonal high groundwater level each year typically occurs in August to September, which is the period near the end of the rainy season during a year of normal (average) rainfall. The seasonal high groundwater level is affected by a number of factors, such as the drainage characteristics of the soils, the land surface elevation, relief points (such as lakes, rivers, swamp areas, etc.) and distance to relief points.

We estimate that the normal seasonal high groundwater level probably occurs within a depth of 2 feet or less below the ground surface along most of the proposed pipeline alignment. The water table elevations associated with a flood may be higher than the normal seasonal high groundwater levels, however.

ENGINEERING EVALUATION AND RECOMMENDATIONS - CUT AND COVER

General

The results of this exploration indicate that the existing soils as encountered in the borings are suitable for supporting the proposed pipelines and associated structures.

The following are our recommendations for overall site preparation and foundation support which we feel are best suited for the proposed pipelines and associated structures relative to the soil conditions encountered in the borings shown on Figure 1. The recommendations are made as a guide for the design engineer, parts of which should be incorporated into the project's specifications.



Pipelines and Associated Structures

Excavation

Based on the conditions encountered during the field exploration, we anticipate that the fine sand (SP) and fine sand with silt (SP-SM) can generally be excavated with standard earth moving equipment (i.e., front-end loaders and backhoes). Where these soils are dense (SPT N-value greater than 30), however, they may be more difficult to excavate and portions may be at least weakly cemented. Note that the N-values are listed adjacent to the boring logs on Figure 1.

The stiff to very stiff clays encountered below a depth of approximately 32 feet would likely be difficult to excavate due to their inherent cohesion. We understand, however, that excavations to this depth are not expected for this project.

The soils below the bottom of the excavations should not be disturbed by the excavation process. If soils become disturbed and difficult to compact, they should be over-excavated below the pipeline and other structures to a depth necessary to remove all disturbed soils. Over-excavated areas should be replaced with compacted backfill meeting the "Backfill Requirements" presented in a subsequent section of this report.

The excavation should be safely braced or sloped to prevent injury to personnel or damage to equipment. Temporary safe slopes should be cut at a minimum 1.5 horizontal (H) to 1 vertical (V) in accordance with OSHA, 29 CFR Part 1926 Subpart P. Flatter slopes should be used if deemed necessary based on actual conditions encountered. Surcharge loads should be kept at least 5 feet from excavations. Spoil banks adjacent to excavations should be sloped no steeper than 2.0H to 1.0V. Provisions for maintaining workers' safety within and adjacent to excavations is the sole responsibility of the Contractor.

Dewatering

The control of the groundwater may be required to achieve the necessary depths of excavation and subsequent construction, backfilling and compaction requirements presented in the following sections. The actual method(s) of dewatering should be determined by the Contractor. However, regardless of the method(s) used, we suggest drawing down the groundwater table sufficiently (i.e., 2 to 3 feet) below the bottom of the excavation(s) to preclude "pumping" and/or compaction-related problems with the foundation soils. We recommend that the dewatering be accomplished in advance of the excavation.

Pipeline Bedding

Pipe bedding material should be compacted as necessary to achieve a density equivalent to 95 percent of the maximum dry density, as determined by the Modified Proctor (ASTM D-1557), to a minimum depth of 6 inches below the bottom of the pipe. Compact deeper if recommended by the pipe manufacturer.

We recommend that the bedding for the pipe be preshaped by means of a template prior to placement of the pipe to ensure that the upward reaction on the bottom of the pipe will be well



distributed over the width of the bedding contact. Based on the cost involved with preshaping the bedding material and the construction time requirements, an alternative procedure may be to utilize a level bed for the pipe and require a higher pipe strength class that will adequately carry the load on a lower class of bedding. It would be prudent to perform an economic analysis of the two alternatives, or specify both design conditions within the contract documents and allow the Contractor to decide the most efficient method.

If level bedding is utilized, it will be necessary to place and compact the haunching backfill (backfill between the bedding and the springline of the pipe) to the springline of the pipe. This material should be placed in simultaneous layers on each side of the pipe and must be compacted in such a manner as to ensure an intimate contact with the sides of the pipe. Do not use blocking under the pipe to raise the pipe to grade.

The final backfill above the haunching or springline of the pipe must extend all the way to the trench walls and should be placed in level lifts not exceeding 8 inches. Each lift should be compacted to at least 95 percent of the maximum dry density, as determined by the Modified Proctor (ASTM D-1557). Care should be taken not to damage the pipe or deflect it by compacting directly above the pipe where there is insufficient cover material present. Minimum cover criteria should be in accordance with the pipe manufacturer's recommendations.

Where the utility line will traverse roadways and/or other permanent structures such as sidewalks, all backfill should be compacted to 95 percent of maximum dry density, as determined by the Modified Proctor (ASTM D-1557), from the top of the pipe to the ground surface. The design engineer may wish to specify greater compaction, such as 98 percent of Modified Proctor, for the upper one foot of the pavement subgrade, to be consistent with the pavement design requirements.

A geotechnical engineer or a designated representative from Ardaman & Associates, Inc. should observe and test all prepared and compacted areas to verify that all bedding, haunching and final backfill are prepared and compacted in accordance with the aforementioned specifications

Backfill Requirements

As a general guide to aid the Contractor, we recommend using fill that consists of fine sand (SP) to fine sand with silt (SP-SM) that contains less than 1 percent organic matter and no greater than 12 percent by dry weight of material passing the U.S. Standard No. 200 sieve size. Soils with more than 12 percent passing the No. 200 sieve will be more difficult to compact due to their inherent nature to retain soil moisture. Based on the soil samples obtained during our subsurface investigation, the on-site fine sand (SP) and fine sand with silt (SP-SM) soils without roots and/or organic matter appear suitable for use as structural backfill for the pipe. However, material removed from below the groundwater table will be wet and will require time to dry sufficiently.

The clay and clay with sand (CL-CH) are highly plastic soils and are not recommended as backfill.

Resistance to Horizontal Forces on Pipeline Structures

Horizontal forces which act on structures such as thrust blocks or anchor blocks can be resisted to some extent by the earth pressures that develop in contact with the buried vertical face (buried



vertical face is perpendicular and in front of the applied horizontal load) of the block structures and by shearing resistance mobilized along the base of the block structures and soil subgrade interface.

Allowable earth pressure resistance may be determined using an equivalent fluid density of 110 pounds per cubic foot (pcf) for moist soil above the water table and 70 pcf for submerged soils below the water table¹. The passive earth pressures are developed from ground surface² to the bottom of the block structure.

The values presented above presume that the block structures are surrounded by well compacted sand backfill extending at least 5 feet horizontally beyond the vertical buried face. In addition, it is presumed that the block structures can withstand horizontal movements on the order of one-quarter (1/4) to three-eighths (3/8) inch before mobilizing full passive resistance. The factors of safety assumed in the above recommendations are 2.5 for passive pressure with submerged conditions, and 3.0 for passive pressure without submerged conditions.

The sliding shearing resistance mobilized along the base of the block structure may be determined by the following formula:

$$\text{Allowable Shearing Resisting Force, } P = V \tan(2/3\phi)/S.F$$

Where: P = Shearing Resistance Force (pounds)
 V = Net Vertical Force (total weight of block and soil overlying the structure minus uplift forces including buoyancy forces) (pounds)
 ϕ = Angle of Internal Friction of Soil = 30 degrees
 S.F. = Safety Factor = 1.5

The vertical earth pressures developed by the overburden weight of soil can be calculated using the following unit weights:

- Compacted moist soil = 110 pcf
- Saturated soil = 120 pcf

Vertical pressure distributions in accordance with the above do not take into account vertical forces from construction equipment, wheel loads or other surcharge loads.

-
- 1 Equivalent fluid density (moist soil) = $K_p \gamma_m / S.F. = 110 \text{ pcf}$
 Equivalent fluid density (submerged soil) = $K_p (\gamma_s - \gamma_w) / S.F. = 70 \text{ pcf}$

Where: K_p = effective coefficient of passive earth pressure = 3.0
 S.F. = safety factor = (values given below)
 γ_m = unit weight of moist soil = 110 pcf
 γ_s = unit weight of saturated soils = 120 pcf
 γ_w = unit weight of water = 62.4 pcf

- 2 Assuming there is no excavation in the vicinity of the block structure that would reduce the available passive pressure.



Foundation Support and Estimated Settlements

The permanent structures such as anchor blocks, thrust blocks, air release valves, blow offs, etc., bearing at least 18 inches below adjacent grade and at least 18 inches wide can be designed for the following maximum vertical bearing capacities:

- 1,500 psf on undisturbed natural granular soils.
- 2,000 psf on compacted natural or backfilled subgrade; this value assumes compaction of at least 95 percent of the Modified Proctor maximum density (ASTM D-1557, AASHTO T-180) to a depth of 2 feet below the structure.

Pipe settlement during and after construction should be negligible (less than 1/2 inch) provided the bedding and backfilling criteria in the above sections are satisfied. The volume of soil displaced by the pipe, compared to the weight of the pipe when full, will result in little if any net increase in bearing stress to the subsurface soils.

Uplift Resistance

Permanent structures submerged below the groundwater table will be subjected to uplift forces caused by buoyancy. The components resisting this buoyancy include: 1) the total weight of the pipe or structure divided by an appropriate factor of safety; 2) the buoyant weight of soil overlying the pipe or structure; and 3) the shearing forces that act on shear planes that radiate vertically upward from the perimeter of the pipe or the edges of the structure to the ground surface. The allowable unit shearing resistance may be determined by the following formula:

Allowable Shearing Resistance, $F = K_o \gamma_m h (2/3 \tan \phi) / S.F.$ (above water table)

Allowable Shearing Resistance, $F = K_o [\gamma_m h_w + \gamma_b (h - h_w)] (2/3 \tan \phi) / S.F.$ (below water table)

where: F = unit shearing resistance (psf)
 K_o = coefficient of earth pressure at rest = 0.5
 γ_m = unit weight of moist soil = 110 pcf
 γ_b = buoyant unit weight of soil = 58 pcf
 h = vertical depth (feet) below grade at which shearing resistance is determined
 h_w = vertical depth (feet) below grade to groundwater table
 ϕ = angle of internal friction of the soil = 30 degrees
 $S.F.$ = safety factor = 2.0

The values given for the above parameters assume that the permanent structures are covered by clean, well-compacted, granular backfill that extends horizontally at least 2 feet beyond the structures.

Earth Pressure on Shoring and Bracing

If temporary shoring and bracing are required for any excavations, the system should be designed to resist lateral earth pressure. The design earth pressure will be a function of the flexibility of the shoring and bracing system. For a flexible system restrained laterally by braces placed as the



excavation proceeds, the design earth pressure for shoring and bracing can be computed using a uniform earth pressure distribution with depth. It is recommended that soils be dewatered around the excavations. For such dewatered excavations, we recommended using the following uniform pressure distribution over the full braced height as follows:

Uniform Soil Pressure Distribution, $p = 0.65 K_a \gamma_s H$

where: p = uniform pressure distribution for design of braced excavation
 K_a = coefficient of active earth pressure = 0.33
 γ_s = unit weight of saturated soils = 120 pcf
 H = depth of excavation

An appropriate factor of safety should be applied for the design of the braced excavations.

Lateral pressure distributions determined in accordance with the above do not take hydrostatic pressures or surcharge loads into account. To the extent that such pressures and forces may act on the walls, they should be included in the design.

Construction equipment and excavated fill should be kept a minimum distance of 5 feet from the edge of the braced or shored excavation. Backfill material placed adjacent to (maintaining a minimum 5-foot horizontal clearance) the braced or shored excavation should have a minimum slope of 2.0H to 1.0V or flatter, if required by site specific conditions and/or to meet OSHA requirements.

Means and methods of excavation and bracing should be the responsibility of the Contractor; however, excavation and/or bracing should, at a minimum, comply with the requirements of the Occupational Safety Health Administration (OSHA).

Lateral Earth Pressures

Lateral loads acting on the embedded structure will include at-rest earth pressures as well as hydrostatic pressures and surcharge loads. The lateral earth pressure will be a function of both the depth below ground surface and the soil unit weight (submerged or moist) plus hydrostatic pressure (if applicable). The following equations can be used to determine the lateral at-rest earth pressure:

$$\sigma_h = K_o \gamma_m h \text{ (above water table)}$$

$$\sigma_h = K_o [\gamma_m h_w + \gamma_b (h - h_w)] \text{ (below water table)}$$

where: σ_h = lateral earth pressure (psf)
 K_o = coefficient of at rest earth pressure (0.5) (this value assumes that the backfill is lightly compacted yet not overcompacted)
 γ_m = moist unit weight of soil = 110 pcf for compacted moist soil above the water table.
 γ_b = buoyant unit weight of soil = 58 pcf for compacted saturated soil below the water table.



h = vertical depth (feet) below grade at which lateral earth pressure is determined.

h_w = vertical depth (feet) below grade to groundwater table

For design, an appropriate factor of safety should be applied to the lateral earth pressure calculated using the above equation. Lateral pressure distributions determined in accordance with the above do not include hydrostatic pressures or surcharge loads. Where applicable, they should be incorporated in the design.

Pipeline Directional Drill Locations

We understand that directionally drilled pipe installation is proposed for at least portions of the pipeline. The SPT borings were conducted to provide soil stratigraphy data for the direction drill design. Further subsurface exploration may be necessary in these areas after final pipe invert elevations are determined.

Classification in accordance with the Unified Soil Classification System and the SPT N-values were used to estimate unit weights, the angles of internal friction, cohesion and the shear modulus for the types of soils encountered in the borings are presented in Appendix III.

The following should be noted when reviewing the data in Appendix III:

- $\gamma_{\text{buoyant}} = \gamma_{\text{sat}} - \gamma_{\text{water}}$
- Values given in Table 1 are based on empirical correlations with the average soil conditions encountered in the referenced boring. Appropriate safety factors should be used with these values.

We caution that the soil layers shown in Table 1 are very generalized and should be used for design purposes only. The soil stratigraphy on the boring profiles (Figure 1) is more detailed than presented in Table 1. The information in Appendix III should not be used for assessing the constructability of the proposed pipeline.

QUALITY CONTROL

We recommend establishing a comprehensive quality control program to verify that all excavation, bedding, and backfilling is conducted in accordance with the appropriate plans and specifications. Materials testing and inspection services should be provided by Ardaman & Associates, Inc. In-situ density tests should be conducted during bedding and backfilling activities to verify that the required densities are achieved.

Backfill for the proposed pipeline should be tested at a minimum frequency of one in-place density test for each lift for each 200 lineal feet of pipe. Additional tests should be performed beneath foundations and in backfill for other associated structures. In-situ density values should be compared to laboratory Proctor moisture-density results for each of the different natural and fill soils encountered.



Kimley-Horn & Associates, Inc.
 File No. 16-7415
 February 23, 2017 (revised March 6, 2017)

CLOSURE

The analyses and recommendations submitted herein are based on the data obtained from the soil borings presented on Figure 1. This report does not reflect any variations which may occur adjacent to or between the borings. The nature and extent of the variations between the borings may not become evident until during construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented in this report after performing on-site observations during the construction period and noting the characteristics of the variations.

This study is based on a relatively shallow exploration and is not intended to be an evaluation for sinkhole potential. This study does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.

This report has been prepared for the exclusive use of Kimley-Horn & Associates in accordance with generally accepted geotechnical engineering practices. In the event any changes occur in the design, nature, or location of the proposed improvements, we should review the applicability of conclusions and recommendations in this report. We recommend a general review of final design and specifications by our office to verify that earthwork and foundation recommendations are properly interpreted and implemented in the design specifications. Ardaman & Associates should attend the pre-bid and preconstruction meetings to verify that the bidders/contractor understand the recommendations contained in this report.

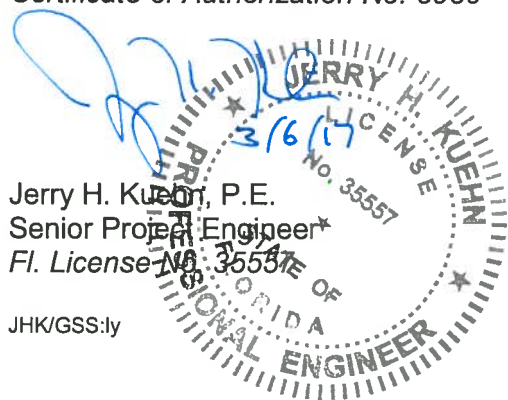
We are pleased to be of assistance to you on this phase of the project. Please contact us when we may be of further service to you or should you have any questions.

Very truly yours,

ARDAMAN & ASSOCIATES, INC.
 Certificate of Authorization No. 5950

Jerry H. Kuehn, P.E.
 Senior Project Engineer
 Fl. License No. 35557

JHK/GSS:ly



Gregory S. Stevens, P.E.
 Project Engineer
 Fl. License No. 71511



Ardaman & Associates, Inc.

APPENDIX I

Soil Map and Selected Data from NRCS Soil Survey

Soil Map—Manatee County, Florida
(Force Main 15A)






































Map Scale: 1:3,550 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

	Area of Interest (AOI)		Area of Interest (AOI)
	Soils		Soil Map Unit Polygons
			Soil Map Unit Lines
			Soil Map Unit Points
	Special Point Features		Special Line Features
	Blowout		Water Features
	Borrow Pit		Streams and Canals
	Clay Spot		Transportation
	Closed Depression		Rails
	Gravel Pit		Interstate Highways
	Gravelly Spot		US Routes
	Landfill		Major Roads
	Lava Flow		Local Roads
	Marsh or swamp		Background
	Mine or Quarry		Aerial Photography
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Manatee County, Florida
Survey Area Data: Version 13, Sep 14, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2011—Mar 3, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Manatee County, Florida (FL081)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Canaveral fine sand, 0 to 5 percent slopes	13.9	90.9%
10	Canaveral sand, organic substratum	0.9	6.0%
100	Waters of the Gulf of Mexico	0.5	3.2%
Totals for Area of Interest		15.3	100.0%

Corrosion of Concrete

Corrosion of Concrete— Summary by Map Unit — Manatee County, Florida (FL081)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Canaveral fine sand, 0 to 5 percent slopes	Low	13.9	90.9%
10	Canaveral sand, organic substratum	Low	0.9	6.0%
100	Waters of the Gulf of Mexico		0.5	3.2%
Totals for Area of Interest			15.3	100.0%

Description

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the concrete in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Corrosion of Steel

Corrosion of Steel— Summary by Map Unit — Manatee County, Florida (FL081)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Canaveral fine sand, 0 to 5 percent slopes	High	13.9	90.9%
10	Canaveral sand, organic substratum	Low	0.9	6.0%
100	Waters of the Gulf of Mexico		0.5	3.2%
Totals for Area of Interest			15.3	100.0%

Description

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Shallow Excavations

Shallow Excavations— Summary by Map Unit — Manatee County, Florida (FL081)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
8	Canaveral fine sand, 0 to 5 percent slopes	Very limited	Canaveral (90%)	Depth to saturated zone (1.00)	13.9	90.9%
				Unstable excavation walls (1.00)		
			Myakka, non-hydric (10%)	Depth to saturated zone (1.00)		
				Unstable excavation walls (1.00)		
10	Canaveral sand, organic substratum	Very limited	Canaveral, organic substratum (90%)	Unstable excavation walls (1.00)	0.9	6.0%
				Depth to saturated zone (0.73)		
			Canaveral, filled (10%)	Depth to saturated zone (1.00)		
				Unstable excavation walls (1.00)		
100	Waters of the Gulf of Mexico	Not rated	Waters of the Gulf of Mexico (100%)		0.5	3.2%
Totals for Area of Interest					15.3	100.0%

Shallow Excavations— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Very limited	14.8	96.8%
Null or Not Rated	0.5	3.2%
Totals for Area of Interest	15.3	100.0%

Description

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX II

Soil Boring, Sampling and Test Methods

SOIL BORING, SAMPLING AND TESTING METHODS

Standard Penetration Test

The Standard Penetration Test (SPT) is a widely accepted method of in situ testing of foundation soils (ASTM D-1586). A 2-foot long, 2-inch O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load. The following tables relate N-values to a qualitative description of soil density and, for cohesive soils, an approximate unconfined compressive strength (Q_u):

Cohesionless Soils:	<u>N-Value</u>	<u>Description</u>	
	0 to 4	Very loose	
	4 to 10	Loose	
	10 to 30	Medium dense	
	30 to 50	Dense	
	Above 50	Very dense	
Cohesive Soils:	<u>N-Value</u>	<u>Description</u>	<u>Q_u (ton/ft²)</u>
	0 to 2	Very soft	Below 1/4
	2 to 4	Soft	1/4 to 1/2
	4 to 8	Medium stiff	1/2 to 1
	8 to 15	Stiff	1 to 2
	15 to 30	Very stiff	2 to 4
	Above 30	Hard	Above 4

The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, NX-size flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or prevent the loss of circulating fluid.

Representative split-spoon samples from each sampling interval and from every different stratum are brought to our laboratory in air-tight jars for further evaluation and testing, if necessary. After thorough examination and testing of the samples, the samples are discarded unless prior arrangements have been made. After completion of a test boring, the hole is kept open until a steady state groundwater level is recorded. The hole is then sealed, if necessary, and backfilled.

A hammer with an automatic drop release (auto-hammer) is sometimes used. In this case, a correction factor is applied to the raw blow counts, since the energy efficiency of the auto-hammer is greater than that of the safety hammer. Based upon calibration of the auto-hammer (per ASTM D4633) and standard practice, we use a multiplier of 1.24 to correct the auto-hammer blow counts to equivalent safety hammer "N" values.

Hand Auger Borings

Hand auger borings are used, if soil conditions are favorable, when the soil strata are to be determined within a shallow (approximately 5 to 9 feet) depth or when access is not available to power drilling equipment. A 3-inch diameter, hand bucket auger with a cutting head is simultaneously turned and pressed into the ground. The bucket auger is retrieved to the surface at approximately 6-inch intervals and its contents emptied for inspection. The soil sample so obtained is classified and representative samples put in bags or jars and transported to the laboratory for further classification and testing.

Laboratory Test Methods

Soil samples returned to our laboratory are examined by a geotechnical engineer or geotechnician to obtain more accurate descriptions of the soil strata. Laboratory testing is performed on selected samples as deemed necessary to aid in soil classification and to further define engineering properties of the soils. The test results are presented on the soil boring logs at the depths at which the respective sample was recovered, except that grain size distributions or selected other test results may be presented on separate tables, figures or plates as described in this report. The soil descriptions shown on the logs are based upon a visual-manual classification procedure in general accordance with the Unified Soil Classification System (ASTM D-2488-84) and standard practice. Following is a list of abbreviations which may be used on the boring logs or elsewhere in this report.

-200	- Fines Content (percent passing the No. 200 sieve); ASTM D1140
DD	- Dry Density of Undisturbed Sample; ASTM D2937
Gs	- Specific Gravity of Soil; ASTM D854
k	- Hydraulic Conductivity (Coefficient of Permeability)
LL	- Liquid Limit; ASTM D423
OC	- Organic Content; ASTM D2974
pH	- pH of Soil; ASTM D2976
PI	- Plasticity Index (LL-PL); ASTM D424
PL	- Plastic Limit; ASTM D424
Qp	- Unconfined Compressive Strength by Pocket Penetrometer;
Qu	- Unconfined Compressive Strength; ASTM D2166 (soil), D7012 (rock)
SL	- Shrinkage Limit; ASTM D427
ST	- Splitting Tensile Strength; ASTM D3967 (rock)
USCS	- Unified Soil Classification System; ASTM D2487, D2488
w	- Water (Moisture) Content; ASTM D2216

Soil Classifications

The soil descriptions presented on the soil boring logs are based upon the Unified Soil Classification System (USCS), which is the generally accepted method (ASTM D-2487 and D-2488) for classifying soils for engineering purposes. The following modifiers are the most commonly used in the descriptions.

For Sands:	<u>Modifier</u>	<u>Fines, Sand or Gravel Content*</u>
	with silt or with clay	5% to 12% fines
	silty or clayey	12% to 50% fines
	with gravel or with shell	15% to 50% gravel or shell
For Silts or Clays:	<u>Modifier</u>	<u>Fines, Sand or Gravel Content*</u>
	with sand	15% to 30% sand and gravel; and % sand > % gravel
	sandy	30% to 50% sand and gravel; and % sand > % gravel
	with gravel	15% to 30% sand and gravel; and % sand < % gravel
	gravelly	30% to 50% sand and gravel; and % sand < % gravel

* may be determined by laboratory testing or estimated by visual/manual procedures. Fines content is the combined silt and clay content, or the percent passing the No. 200 sieve.

The USCS also uses a set of Group Symbols, which may also be listed on the soil boring logs. The following is a summary of these.

<u>Group Symbol</u>	<u>General Group Name*</u>	<u>Group Symbol</u>	<u>General Group Name*</u>
GW	Well-graded gravel	SW	Well-graded sand
GP	Poorly graded gravel	SP	Poorly graded sand
GW-GM	Well-graded gravel with silt	SW-SM	Well-graded sand with silt
GW-GC	Well-graded gravel with clay	SW-SC	Well-graded sand with clay
GP-GM	Poorly graded gravel with silt	SP-SM	Poorly graded sand with silt
GP-GC	Poorly graded gravel with clay	SP-SC	Poorly graded sand with clay
GM	Silty gravel	SM	Silty sand
GC	Clayey gravel	SC	Clayey sand
GC-GM	Silty, clayey gravel	SC-SM	Silty, clayey sand
CL	Lean clay	ML	Silt
CL-ML	Silty clay	MH	Elastic silt
CH	Fat clay	OL or OH	Organic silt or organic clay

* Group names may also include other modifiers, per standard or local practice.

Other soil classification standards may be used, depending on the project requirements. The AASHTO classification system is commonly used for highway design purposes and the USDA soil textural classifications are commonly used for septic (on-site sewage disposal) system design purposes.

APPENDIX III

Soil Parameter Table

Summary of Soil Parameters								
Boring No	Depth Range (ft)	Soil Classification	Average SPT N-Value	Internal Friction Angle (degrees)	Saturated Soil Weight (pcf)	(see Note 1) Moist Soil Weight (pcf)	(see Note 2) Cohesion (psf)	Shear Modulus (ksf)
1	0 - 9	SP	19	32	125	110	---	230
	9 - 12	SP	32	33	130	115	---	460
	12 - 17	SP	22	32	125	110	---	330
	17 - 20	SP-SM	12	31	120	105	---	210
2	0 - 6	SP/SP-SM	11	30	120	105	---	200
	6 - 12	SP	24	33	127	112	---	360
	12 - 17	SP	4	28	115	95	---	70
	17 - 27	SP/SP-SM	24	33	130	115	---	380
	27 - 32	SP-SM	14	31	120	105	---	250
	32 - 40	CL-CH	15	---	130	---	2000	170

Notes: pcf = pounds per cubic foot
psf = pounds per square foot
ksf = kips per square foot

(1) Estimate for a drained soil above the groundwater table.

(2) No value indicates a soil that is generally considered cohesionless.

(3) The values listed above are based upon empirical correlations with the average soil conditions encountered. Appropriate safety factors should be used with these values.

(4) The soil layers presented above are generalized and should be used for design purposes only. The above values should not be used to assess constructability of the proposed pipeline.

**SUBSURFACE SOIL EXPLORATION AND
GEOTECHNICAL ENGINEERING EVALUATION
FORCE MAIN 1,
BRADENTON BEACH,
MANATEE COUNTY, FLORIDA**



Ardaman & Associates, Inc.

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Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

March 22, 2017
File No. 16-7420

TO: Kimley-Horn & Associates, Inc.
655 North Franklin Street, Suite 150
Tampa, Florida 33602

Attention: Wade Wood

SUBJECT: Subsurface Soil Exploration and Geotechnical Engineering Evaluation
Force Main 1, Bradenton Beach, Manatee County, Florida

Dear Wade:

As requested and authorized by Mr. Wayne White, we have completed a subsurface soil exploration and geotechnical engineering evaluation for the subject project. We understand that the project will include construction of approximately 3,000 lineal feet of force main. We understand that portions of the pipes will be installed by cut-and-cover (open trench) methods and portions by directional drill methods.

The scope of our work included providing geotechnical engineering recommendations for trench stability, pipe bedding, use of excavated soils, the need for dewatering, thrust resistance, and backfill and compaction requirements. Boring data for use in the design of directional drills is provided for informational purposes only, since this type of construction is proprietary in nature.

SITE LOCATION

The proposed force main is located in Bradenton Beach on Anna Maria Island, Manatee County, Florida. We understand that the alignment begins near Cortez Road and runs generally southward along Church Street North and Bay Drive South, then west along 5th Street South, south along Gulf Drive, and east along 6th Street South.

REVIEW OF SOIL SURVEY MAPS

Based on USDA Natural Resources Conservation Service (NRCS) "Web Soil Survey" and the 1983 "Soil Survey of Manatee County, Florida," the soils along the force main alignment are mapped primarily as the "8 – Canaveral fine sand, 0 to 5 percent slopes" soil series, with a relatively small area of "10 - Canaveral sand, organic substratum" soil series at its north end. The beach area to the west of Gulf Drive is mapped as the "2 – Beaches" soil series. The soils map for the general area of the proposed Force Main 1 alignment is included in Appendix I of this report.

The mapped locations of the individual soil units and selected characteristics of each, according to the NRCS, are summarized in Appendix I of this report. The characteristics listed are the general ratings for corrosion of concrete, corrosion of steel and for shallow excavations, as reported by the NRCS. These ratings represent the “dominant condition” for the soil map unit and are not site specific.

FIELD EXPLORATION PROGRAM

Standard Penetration Test (SPT) Borings

As requested, the field exploration program included performing two (2) Standard Penetration Test (SPT) borings near the proposed pipeline alignment. The SPT borings were performed at locations 1B and 2, as shown on the attached Figure 1. The SPT borings were drilled to a depth of 20 feet below the existing ground surface using the methodology outlined in ASTM D1586.

The number of test borings, boring depths and approximate locations were determined by Kimley-Horn & Associates. Since one of the requested locations (location 1A) was not accessible to our SPT drill rig due to overhead power lines, a hand auger boring was performed at this location instead of an SPT boring. The hand auger boring was performed to a depth of 6 feet below the existing ground surface.

Since location 1A was not accessible to our drill rig, several attempts were made to perform the SPT boring on the west side of Gulf Drive, as near as practical to the desired location (1A). However, very hard materials that appeared to be buried concrete rubble or rip rap were encountered at a depth of approximately 3 feet below the ground surface at each boring attempted on the west side of Gulf Drive. Drilling an SPT boring on the west side of Gulf Drive was, therefore, abandoned and the SPT boring was relocated to the east side of Gulf Drive, at a location along the north side of 5th Street South (location 1B). The buried rubble or rip rap was not encountered with the respective depths of borings 1A (6 feet) or 1B (20 feet).

A summary of the boring procedures are included in Appendix II. Split-spoon soil samples recovered during performance of the borings were visually classified in the field and representative portions of the soil samples were transported to our laboratory for further visual classification and laboratory testing.

Where encountered, the groundwater level at each of the boring locations was measured during drilling. The SPT borings were then plugged with cement grout (placed by tremie method, from bottom to top).

Test Boring Locations

The depths and approximate locations of the borings were requested by Kimley-Horn & Associates (KHA). Locations were adjusted in the field as necessary to avoid existing utilities or other obstructions, and to maintain a safe working distance from overhead power lines. Additional information relative to the relocation of one of the SPT borings (from 1A to 1B) is included in the preceding section of this report.



The approximate locations of the borings are schematically illustrated on Figure 1. The locations were determined in the field by visual reference to available site features and should be considered accurate only to the degree implied by the method used.

LABORATORY TESTING PROGRAM

Representative soil samples obtained during our field sampling operation were packaged and transferred to our laboratory for further visual examination and classification. The soil descriptions shown on the soil profiles are based on a visual classification procedure in general accordance with the Unified Soil Classification System (ASTM D-2487 or D-2488).

GENERAL SUBSURFACE CONDITIONS

General Soil Profile

The results of the field exploration and laboratory testing programs are graphically summarized on the soil boring profiles presented on Figure 1. The stratification of the boring profiles represents our interpretation of the field boring logs and the results of laboratory examinations of the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

The borings encountered a general soil profile consisting primarily of loose to medium dense fine sand (SP) with varying amounts of shell from the ground surface to a depth of approximately 20 feet. Exceptions to this included:

- Very dense (SPT N=77) fine sand with silt (SP-SM) below a depth of approximately 17 below ground surface at boring No. 2. This soil was partially cemented.
- An approximately 2 feet thick layer of organics at a depth of 2.5 to 4.5 feet below the ground surface at boring No. 1. This included sand mixed with organics and sandy organic silt (muck).

The above soil profile description is in general terms only. Please refer to Figure 1 for soil profile details.

Groundwater Level

The groundwater level in the boreholes was measured during drilling. As shown on Figure 1, the groundwater level was encountered at depths of approximately 3 to 5 feet below the ground surface. Fluctuations in groundwater levels should be anticipated throughout the year, primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted. Groundwater levels may also be influenced by tidal fluctuations.

The normal seasonal high groundwater level each year typically occurs in August to September, which is the period near the end of the rainy season during a year of normal (average) rainfall. The seasonal high groundwater level is affected by a number of factors, such as the drainage



characteristics of the soils, the land surface elevation, relief points (such as lakes, rivers, swamp areas, etc.) and distance to relief points.

We estimate that the normal seasonal high groundwater level probably occurs within a depth of 1 to 2 feet or less below the ground surface along most of the proposed pipeline alignment. The water table elevations associated with a flood may be higher than the normal seasonal high groundwater levels, however.

ENGINEERING EVALUATION AND RECOMMENDATIONS - CUT AND COVER

General

The results of this exploration indicate that the existing soils as encountered in the borings are suitable for supporting the proposed pipelines and associated structures, with the exception of the organic soils (i.e. the "sand & organics" and the "sandy organic silt") encountered at boring No. 2 and the debris/rubble on which several attempted borings were abandoned on the west side of Gulf Drive.

The organic soils and debris/rubble are not be suitable for providing pipeline or structure foundation support. The deleterious material must be removed ("demucked") to its entire vertical limits and to a minimum horizontal margin outside the pipeline/structure perimeters equivalent to the depth to the bottom of the deleterious material, but not less than a 3-foot horizontal margin if the depth to the bottom of the deleterious material is less than 3 feet. The excavated deleterious material must not be used as fill material and should be disposed of as directed by the owner. The excavations should be sloped or braced to prevent slope failure. Means and methods of preventing slope failure and providing a safe work zone relative to excavations should be the responsibility of the contractor. "Demucking" will extend to depths below the groundwater table. Demucking should be performed "in the dry". The use of well points and/or sheet piles may be required to help control groundwater during excavation and backfilling. Regardless of the dewatering method used, we recommend that the groundwater table be maintained at least 24 inches below all earthwork and compaction surfaces. Actual limits and quantities of demucking will be determined during construction. Prior to backfilling the excavation, the bottom of the excavation must be inspected to verify the complete removal of deleterious material. Over-excavated areas resulting from the removal of unsuitable materials should be backfilled in accordance with the fill soils section of this report. Backfilling shall be performed, in accordance with the recommendations below.

The following are our recommendations for overall site preparation and foundation support which we feel are best suited for the proposed pipelines and associated structures relative to the soil conditions encountered in the borings shown on Figure 1. The recommendations are made as a guide for the design engineer, parts of which should be incorporated into the project's specifications.



Pipelines and Associated Structures

Excavation

Based on the conditions encountered during the field exploration, we anticipate that the organic soils, fine sand (SP) and fine sand with silt (SP-SM) can generally be excavated with standard earth moving equipment (i.e., front-end loaders and backhoes). Where these soils are dense or very dense (SPT N-value greater than 30), however, they may be more difficult to excavate and portions may be at least weakly cemented. Note that the N-values are listed adjacent to the boring logs on Figure 1. Any excavations performed in the area of our abandoned borings on the west side of Gulf Drive may need specialized excavation equipment to excavate through the buried debris/rubble that was encountered.

The soils below the bottom of the excavations should not be disturbed by the excavation process. If soils become disturbed and difficult to compact, they should be over-excavated below the pipeline and other structures to a depth necessary to remove all disturbed soils. Over-excavated areas should be replaced with compacted backfill meeting the "Backfill Requirements" presented in a subsequent section of this report.

The excavation should be safely braced or sloped to prevent injury to personnel or damage to equipment. Temporary safe slopes should be cut at a minimum 1.5 horizontal (H) to 1 vertical (V) in accordance with OSHA, 29 CFR Part 1926 Subpart P. Flatter slopes should be used if deemed necessary based on actual conditions encountered. Surcharge loads should be kept at least 5 feet from excavations. Spoil banks adjacent to excavations should be sloped no steeper than 2.0H to 1.0V. Provisions for maintaining workers' safety within and adjacent to excavations is the sole responsibility of the Contractor.

Dewatering

The control of the groundwater may be required to achieve the necessary depths of excavation and subsequent construction, backfilling and compaction requirements presented in the following sections. The actual method(s) of dewatering should be determined by the Contractor. However, regardless of the method(s) used, we suggest drawing down the groundwater table sufficiently (i.e., 2 to 3 feet) below the bottom of the excavation(s) to preclude "pumping" and/or compaction-related problems with the foundation soils. We recommend that the dewatering be accomplished in advance of the excavation.

Pipeline Bedding

Pipe bedding material should be compacted as necessary to achieve a density equivalent to 95 percent of the maximum dry density, as determined by the Modified Proctor (ASTM D-1557), to a minimum depth of 6 inches below the bottom of the pipe. Compact deeper if recommended by the pipe manufacturer.

The organic soils (i.e. the "sand & organics" and the "sandy organic silt") are not a suitable bedding material and should be excavated and removed if they (or similar organic soils) underlie the proposed pipeline. If present below the pipe, the organic soils should be excavated from directly beneath the pipe and to a horizontal distance of at least 3 feet outside the pipe location.



We recommend that the bedding for the pipe be preshaped by means of a template prior to placement of the pipe to ensure that the upward reaction on the bottom of the pipe will be well distributed over the width of the bedding contact. Based on the cost involved with preshaping the bedding material and the construction time requirements, an alternative procedure may be to utilize a level bed for the pipe and require a higher pipe strength class that will adequately carry the load on a lower class of bedding. It would be prudent to perform an economic analysis of the two alternatives, or specify both design conditions within the contract documents and allow the Contractor to decide the most efficient method.

If level bedding is utilized, it will be necessary to place and compact the haunching backfill (backfill between the bedding and the springline of the pipe) to the springline of the pipe. This material should be placed in simultaneous layers on each side of the pipe and must be compacted in such a manner as to ensure an intimate contact with the sides of the pipe. Do not use blocking under the pipe to raise the pipe to grade.

The final backfill above the haunching or springline of the pipe must extend all the way to the trench walls and should be placed in level lifts not exceeding 12 inches. Each lift should be compacted to at least 95 percent of the maximum dry density, as determined by the Modified Proctor (ASTM D-1557). Care should be taken not to damage the pipe or deflect it by compacting directly above the pipe where there is insufficient cover material present. Minimum cover criteria should be in accordance with the pipe manufacturer's recommendations.

Where the utility line will traverse roadways and/or other permanent structures such as sidewalks, all backfill should be compacted to 95 percent of maximum dry density, as determined by the Modified Proctor (ASTM D-1557), from the top of the pipe to the ground surface. The design engineer may wish to specify greater compaction for the pavement subgrade, to be consistent with the pavement design requirements.

A geotechnical engineer or a designated representative from Ardaman & Associates, Inc. should observe and test all prepared and compacted areas to verify that all bedding, haunching and final backfill are prepared and compacted in accordance with the aforementioned specifications

Backfill Requirements

As a general guide to aid the Contractor, we recommend using fill that consists of fine sand (SP) to fine sand with silt (SP-SM) that contains less than 1 percent organic matter and no greater than 12 percent by dry weight of material passing the U.S. Standard No. 200 sieve size. Soils with more than 12 percent passing the No. 200 sieve will be more difficult to compact due to their inherent nature to retain soil moisture.

Based on the soil samples obtained during our subsurface investigation, the on-site fine sand (SP) and fine sand with silt (SP-SM) soils without roots and/or organic matter appear suitable for use as structural backfill for the pipe. However, material removed from below the groundwater table will be wet and will require time to dry sufficiently.

Although not encountered in the borings, silty fine sand (SM) could be used in some applications as structural backfill, but will be more difficult to moisture condition and compact due to its inherent



nature to retain moisture. The organic soils encountered (i.e. the “sand & organics” and the “sandy organic silt”) are not suitable for use as backfill and should be excavated and removed from the site, if encountered during construction.

Resistance to Horizontal Forces on Pipeline Structures

Horizontal forces which act on structures such as thrust blocks or anchor blocks can be resisted to some extent by the earth pressures that develop in contact with the buried vertical face (buried vertical face is perpendicular and in front of the applied horizontal load) of the block structures and by shearing resistance mobilized along the base of the block structures and soil subgrade interface.

Allowable earth pressure resistance may be determined using an equivalent fluid density of 110 pounds per cubic foot (pcf) for moist soil above the water table and 70 pcf for submerged soils below the water table¹. The passive earth pressures are developed from ground surface² to the bottom of the block structure.

The values presented above presume that the block structures are surrounded by well compacted sand backfill extending at least 5 feet horizontally beyond the vertical buried face. In addition, it is presumed that the block structures can withstand horizontal movements on the order of one-quarter (1/4) to three-eighths (3/8) inch before mobilizing full passive resistance. The factors of safety assumed in the above recommendations are 2.5 for passive pressure with submerged conditions, and 3.0 for passive pressure without submerged conditions.

The sliding shearing resistance mobilized along the base of the block structure may be determined by the following formula:

$$\text{Allowable Shearing Resisting Force, } P = V \tan(2/3 \phi) / S.F.$$

Where: P = Shearing Resistance Force (pounds)
 V = Net Vertical Force (total weight of block and soil overlying the structure minus uplift forces including buoyancy forces) (pounds)
 ϕ = Angle of Internal Friction of Soil = 30 degrees
 S.F. = Safety Factor = 1.5

-
- 1 Equivalent fluid density (moist soil) = $K_p \gamma_m / S.F.$ = 110 pcf
 Equivalent fluid density (submerged soil) = $K_p (\gamma_s - \gamma_w) / S.F.$ = 70 pcf

Where: K_p = effective coefficient of passive earth pressure = 3.0
 S.F. = safety factor = (values given below)
 γ_m = unit weight of moist soil = 110 pcf
 γ_s = unit weight of saturated soils = 120 pcf
 γ_w = unit weight of water = 62.4 pcf

- 2 Assuming there is no excavation in the vicinity of the block structure that would reduce the available passive pressure.



The vertical earth pressures developed by the overburden weight of soil can be calculated using the following unit weights:

- Compacted moist soil = 110 pcf
- Saturated soil = 120 pcf

Vertical pressure distributions in accordance with the above do not take into account vertical forces from construction equipment, wheel loads or other surcharge loads.

Foundation Support and Estimated Settlements

The permanent structures such as anchor blocks, thrust blocks, air release valves, blow offs, etc., bearing at least 18 inches below adjacent grade and at least 18 inches wide can be designed for the following maximum vertical bearing capacities:

- 1,500 psf on undisturbed natural granular soils.
- 2,000 psf on compacted natural or backfilled subgrade; this value assumes compaction of at least 95 percent of the Modified Proctor maximum density (ASTM D-1557, AASHTO T-180) to a depth of 1 foot below the structure.

Pipe settlement during and after construction should be negligible (less than 1/2 inch) provided the bedding and backfilling criteria in the above sections are satisfied. The volume of soil displaced by the pipe, compared to the weight of the pipe when full, will result in little if any net increase in bearing stress to the subsurface soils.

Uplift Resistance

Permanent structures submerged below the groundwater table will be subjected to uplift forces caused by buoyancy. The components resisting this buoyancy include: 1) the total weight of the pipe or structure divided by an appropriate factor of safety; 2) the buoyant weight of soil overlying the pipe or structure; and 3) the shearing forces that act on shear planes that radiate vertically upward from the perimeter of the pipe or the edges of the structure to the ground surface. The allowable unit shearing resistance may be determined by the following formula:

Allowable Shearing Resistance, $F = K_o \gamma_m h (2/3 \tan \phi) / S.F.$ (above water table)

Allowable Shearing Resistance, $F = K_o [\gamma_m h_w + \gamma_b (h - h_w)] (2/3 \tan \phi) / S.F.$ (below water table)

where: F = unit shearing resistance (psf)

K_o = coefficient of earth pressure at rest = 0.5

γ_m = unit weight of moist soil = 110 pcf

γ_b = buoyant unit weight of soil = 58 pcf

h = vertical depth (feet) below grade at which shearing resistance is determined

h_w = vertical depth (feet) below grade to groundwater table

ϕ = angle of internal friction of the soil = 30 degrees

S.F. = safety factor = 2.0



The values given for the above parameters assume that the permanent structures are covered by clean, well-compacted, granular backfill that extends horizontally at least 2 feet beyond the structures.

Earth Pressure on Shoring and Bracing

If temporary shoring and bracing are required for any excavations, the system should be designed to resist lateral earth pressure. The design earth pressure will be a function of the flexibility of the shoring and bracing system. For a flexible system restrained laterally by braces placed as the excavation proceeds, the design earth pressure for shoring and bracing can be computed using a uniform earth pressure distribution with depth. It is recommended that soils be dewatered around the excavations. For such dewatered excavations, we recommended using the following uniform pressure distribution over the full braced height as follows:

Uniform Soil Pressure Distribution, $p = 0.65 K_a \gamma_s H$

where: p = uniform pressure distribution for design of braced excavation
 K_a = coefficient of active earth pressure = 0.33
 γ_s = unit weight of saturated soils = 120 pcf
 H = depth of excavation

An appropriate factor of safety should be applied for the design of the braced excavations.

Lateral pressure distributions determined in accordance with the above do not take hydrostatic pressures or surcharge loads into account. To the extent that such pressures and forces may act on the walls, they should be included in the design.

Construction equipment and excavated fill should be kept a minimum distance of 5 feet from the edge of the braced or shored excavation. Backfill material placed adjacent to (maintaining a minimum 5-foot horizontal clearance) the braced or shored excavation should have a minimum slope of 2.0H to 1.0V or flatter, if required by site specific conditions and/or to meet OSHA requirements.

Means and methods of excavation and bracing should be the responsibility of the Contractor; however, excavation and/or bracing should, at a minimum, comply with the requirements of the Occupational Safety Health Administration (OSHA).

Lateral Earth Pressures

Lateral loads acting on the embedded structure will include at-rest earth pressures as well as hydrostatic pressures and surcharge loads. The lateral earth pressure will be a function of both the depth below ground surface and the soil unit weight (submerged or moist) plus hydrostatic pressure (if applicable). The following equations can be used to determine the lateral at-rest earth pressure:

$$\sigma_h = K_o \gamma_m h \text{ (above water table)}$$

$$\sigma_h = K_o [\gamma_m h_w + \gamma_b (h - h_w)] \text{ (below water table)}$$



where: σ_h = lateral earth pressure (psf)
 K_o = coefficient of at rest earth pressure (0.5) (this value assumes that the backfill is lightly compacted yet not overcompacted)
 γ_m = moist unit weight of soil = 110 pcf for compacted moist soil above the water table.
 γ_b = buoyant unit weight of soil = 58 pcf for compacted saturated soil below the water table.
 h = vertical depth (feet) below grade at which lateral earth pressure is determined.
 h_w = vertical depth (feet) below grade to groundwater table

For design, an appropriate factor of safety should be applied to the lateral earth pressure calculated using the above equation. Lateral pressure distributions determined in accordance with the above do not include hydrostatic pressures or surcharge loads. Where applicable, they should be incorporated in the design.

Pipeline Directional Drill Locations

We understand that directionally drilled pipe installation is proposed for at least portions of the pipeline. The SPT borings were conducted to provide soil stratigraphy data for the direction drill design. Further subsurface exploration may be necessary in these areas after final pipe invert elevations are determined.

Classification in accordance with the Unified Soil Classification System and the SPT N-values were used to estimate unit weights, the angles of internal friction, cohesion and the shear modulus for the types of soils encountered in the borings are presented in Appendix III.

The following should be noted when reviewing the data in Appendix III:

- $\gamma_{\text{buoyant}} = \gamma_{\text{sat}} - \gamma_{\text{water}}$
- Values given in Table 1 are based on empirical correlations with the average soil conditions encountered in the referenced boring. Appropriate safety factors should be used with these values.

We caution that the soil layers shown in Appendix III are very generalized and should be used for design purposes only. The soil stratigraphy on the boring profiles (Figure 1) is more detailed than presented in Appendix III. The information in Appendix III should not be used for assessing the constructability of the proposed pipeline. The success of the directional drill program will depend on the means and methods of the directional drill contractor.

QUALITY CONTROL

We recommend establishing a comprehensive quality control program to verify that all excavation, bedding, and backfilling is conducted in accordance with the appropriate plans and specifications. Materials testing and inspection services should be provided by Ardaman & Associates, Inc. In-



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 March 22, 2017

situ density tests should be conducted during bedding and backfilling activities to verify that the required densities are achieved.

Backfill for the proposed pipeline should be tested at a minimum frequency of one in-place density test for each lift for each 200 lineal feet of pipe. Additional tests should be performed beneath foundations and in backfill for other associated structures. In-situ density values should be compared to laboratory Proctor moisture-density results for each of the different natural and fill soils encountered.

CLOSURE

The analyses and recommendations submitted herein are based on the data obtained from the soil borings presented on Figure 1. This report does not reflect any variations which may occur adjacent to or between the borings. The nature and extent of the variations between the borings may not become evident until during construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented in this report after performing on-site observations during the construction period and noting the characteristics of the variations.

This study is based on a relatively shallow exploration and is not intended to be an evaluation for sinkhole potential. This study does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.

This report has been prepared for the exclusive use of Kimley-Horn & Associates in accordance with generally accepted geotechnical engineering practices. In the event any changes occur in the design, nature, or location of the proposed improvements, we should review the applicability of conclusions and recommendations in this report. We recommend a general review of final design and specifications by our office to verify that earthwork and foundation recommendations are properly interpreted and implemented in the design specifications. Ardaman & Associates should attend the pre-bid and preconstruction meetings to verify that the bidders/contractor understand the recommendations contained in this report.

We are pleased to be of assistance to you on this phase of the project. Please contact us when we may be of further service to you or should you have any questions.

Very truly yours,

ARDAMAN & ASSOCIATES, INC.
 Certificate of Authorization No. 5950

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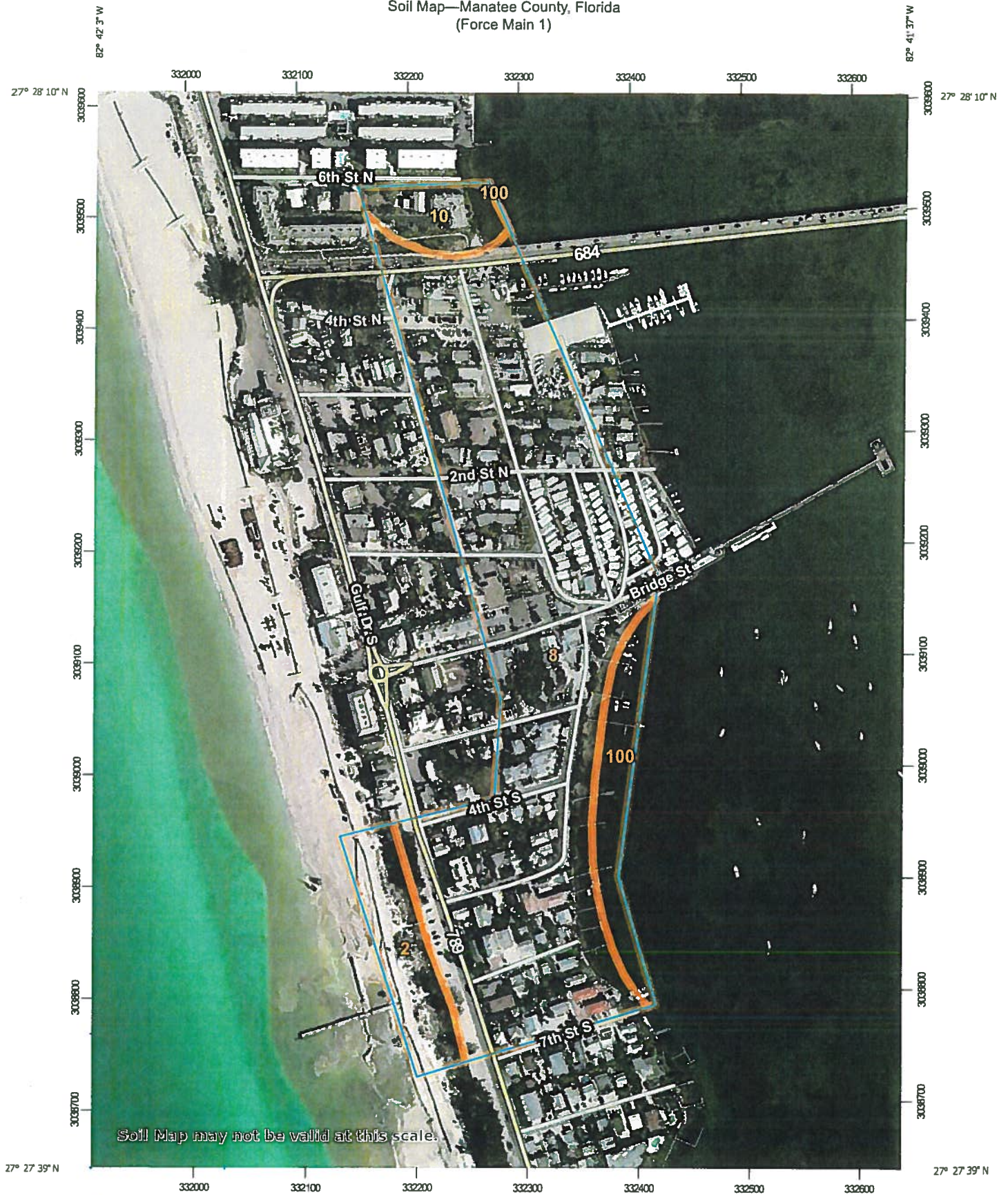


Ardaman & Associates, Inc.

APPENDIX I

Soil Map and Selected Data from NRCS Soil Survey

Soil Map—Manatee County, Florida
(Force Main 1)



Soil Map may not be valid at this scale.

Map Scale: 1:4,710 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 17N WGS84




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

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MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Area of Interest (AOI)	 Stony Spot
 Soils	 Very Stony Spot
 Soil Map Unit Polygons	 Wet Spot
 Soil Map Unit Lines	 Other
 Soil Map Unit Points	 Special Line Features
 Special Point Features	 Water Features
 Blowout	 Streams and Canals
 Borrow Pit	 Transportation
 Clay Spot	 Rails
 Closed Depression	 Interstate Highways
 Gravel Pit	 US Routes
 Gravelly Spot	 Major Roads
 Landfill	 Local Roads
 Lava Flow	 Background
 Marsh or swamp	 Aerial Photography
 Mine or Quarry	
 Miscellaneous Water	
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Manatee County, Florida
Survey Area Data: Version 13, Sep 14, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2011—Mar 3, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Manatee County, Florida (FL081)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Beaches	2.7	8.4%
8	Canaveral fine sand, 0 to 5 percent slopes	25.3	79.2%
10	Canaveral sand, organic substratum	1.7	5.2%
100	Waters of the Gulf of Mexico	2.3	7.3%
Totals for Area of Interest		32.0	100.0%

Corrosion of Concrete

Corrosion of Concrete— Summary by Map Unit — Manatee County, Florida (FL081)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Beaches		2.7	8.4%
8	Canaveral fine sand, 0 to 5 percent slopes	Low	25.3	79.2%
10	Canaveral sand, organic substratum	Low	1.7	5.2%
100	Waters of the Gulf of Mexico		2.3	7.3%
Totals for Area of Interest			32.0	100.0%

Description

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the concrete in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Corrosion of Steel

Corrosion of Steel— Summary by Map Unit — Manatee County, Florida (FL081)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Beaches		2.7	8.4%
8	Canaveral fine sand, 0 to 5 percent slopes	High	25.3	79.2%
10	Canaveral sand, organic substratum	Low	1.7	5.2%
100	Waters of the Gulf of Mexico		2.3	7.3%
Totals for Area of Interest			32.0	100.0%

Description

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Shallow Excavations

Shallow Excavations— Summary by Map Unit — Manatee County, Florida (FL081)						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
2	Beaches	Not rated	Beaches (95%)		2.7	8.4%
8	Canaveral fine sand, 0 to 5 percent slopes	Very limited	Canaveral (90%)	Depth to saturated zone (1.00) Unstable excavation walls (1.00)	25.3	79.2%
			Myakka, non-hydric (10%)	Depth to saturated zone (1.00) Unstable excavation walls (1.00)		
10	Canaveral sand, organic substratum	Very limited	Canaveral, organic substratum (90%)	Unstable excavation walls (1.00) Depth to saturated zone (0.73)	1.7	5.2%
			Canaveral, filled (10%)	Depth to saturated zone (1.00) Unstable excavation walls (1.00)		
100	Waters of the Gulf of Mexico	Not rated	Waters of the Gulf of Mexico (100%)		2.3	7.3%
Totals for Area of Interest					32.0	100.0%

Shallow Excavations— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Very limited	27.0	84.4%
Null or Not Rated	5.0	15.6%
Totals for Area of Interest	32.0	100.0%

Description

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX II

Soil Boring, Sampling and Test Methods

SOIL BORING, SAMPLING AND TESTING METHODS

Standard Penetration Test

The Standard Penetration Test (SPT) is a widely accepted method of in situ testing of foundation soils (ASTM D-1586). A 2-foot long, 2-inch O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load. The following tables relate N-values to a qualitative description of soil density and, for cohesive soils, an approximate unconfined compressive strength (Q_u):

Cohesionless Soils:	<u>N-Value</u>	<u>Description</u>	
	0 to 4	Very loose	
	4 to 10	Loose	
	10 to 30	Medium dense	
	30 to 50	Dense	
	Above 50	Very dense	
Cohesive Soils:	<u>N-Value</u>	<u>Description</u>	<u>Q_u (ton/ft²)</u>
	0 to 2	Very soft	Below 1/4
	2 to 4	Soft	1/4 to 1/2
	4 to 8	Medium stiff	1/2 to 1
	8 to 15	Stiff	1 to 2
	15 to 30	Very stiff	2 to 4
	Above 30	Hard	Above 4

The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, NX-size flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or prevent the loss of circulating fluid.

Representative split-spoon samples from each sampling interval and from every different stratum are brought to our laboratory in air-tight jars for further evaluation and testing, if necessary. After thorough examination and testing of the samples, the samples are discarded unless prior arrangements have been made. After completion of a test boring, the hole is kept open until a steady state groundwater level is recorded. The hole is then sealed, if necessary, and backfilled.

A hammer with an automatic drop release (auto-hammer) is sometimes used. In this case, a correction factor is applied to the raw blow counts, since the energy efficiency of the auto-hammer is greater than that of the safety hammer. Based upon calibration of the auto-hammer (per ASTM D4633) and standard practice, we use a multiplier of 1.24 to correct the auto-hammer blow counts to equivalent safety hammer "N" values.

Auger Borings

Auger borings are used when a relatively large, continuous sampling of soil strata close to ground surface is desired. A 4-inch diameter, continuous flight, helical auger with a cutting head at its end is screwed into the ground in 5-foot sections. It is powered by the rotating action of the Kelly bar of a rotary drill rig. The sample is recovered by withdrawing the auger out of the ground without rotating it. The soil sample so obtained is classified and representative samples put in bags or jars and brought back to the laboratory for further classification and testing.

Hand Auger Borings

Hand auger borings are used, if soil conditions are favorable, when the soil strata are to be determined within a shallow (approximately 5 to 9 feet) depth or when access is not available to power drilling equipment. A 3-inch diameter, hand bucket auger with a cutting head is simultaneously turned and pressed into the ground. The bucket auger is retrieved to the surface at approximately 6-inch intervals and its contents emptied for inspection. The soil sample so obtained is classified and representative samples put in bags or jars and transported to the laboratory for further classification and testing.

Laboratory Test Methods

Soil samples returned to our laboratory are examined by a geotechnical engineer or geotechnician to obtain more accurate descriptions of the soil strata. Laboratory testing is performed on selected samples as deemed necessary to aid in soil classification and to further define engineering properties of the soils. The test results are presented on the soil boring logs at the depths at which the respective sample was recovered, except that grain size distributions or selected other test results may be presented on separate tables, figures or plates as described in this report. The soil descriptions shown on the logs are based upon a visual-manual classification procedure in general accordance with the Unified Soil Classification System (ASTM D-2488-84) and standard practice. Following is a list of abbreviations which may be used on the boring logs or elsewhere in this report.

-200	- Fines Content (percent passing the No. 200 sieve); ASTM D1140
DD	- Dry Density of Undisturbed Sample; ASTM D2937
Gs	- Specific Gravity of Soil; ASTM D854
k	- Hydraulic Conductivity (Coefficient of Permeability)
LL	- Liquid Limit; ASTM D423
OC	- Organic Content; ASTM D2974
pH	- pH of Soil; ASTM D2976
PI	- Plasticity Index (LL-PL); ASTM D424
PL	- Plastic Limit; ASTM D424
Qp	- Unconfined Compressive Strength by Pocket Penetrometer;
Qu	- Unconfined Compressive Strength; ASTM D2166 (soil), D7012 (rock)
SL	- Shrinkage Limit; ASTM D427
ST	- Splitting Tensile Strength; ASTM D3967 (rock)
USCS	- Unified Soil Classification System; ASTM D2487, D2488
w	- Water (Moisture) Content; ASTM D2216

Soil Classifications

The soil descriptions presented on the soil boring logs are based upon the Unified Soil Classification System (USCS), which is the generally accepted method (ASTM D-2487 and D-2488) for classifying soils for engineering purposes. The following modifiers are the most commonly used in the descriptions.

For Sands:	<u>Modifier</u>	<u>Fines, Sand or Gravel Content*</u>
	with silt or with clay	5% to 12% fines
	silty or clayey	12% to 50% fines
	with gravel or with shell	15% to 50% gravel or shell
For Silts or Clays:	<u>Modifier</u>	<u>Fines, Sand or Gravel Content*</u>
	with sand	15% to 30% sand and gravel; and % sand > % gravel
	sandy	30% to 50% sand and gravel; and % sand > % gravel
	with gravel	15% to 30% sand and gravel; and % sand < % gravel
	gravelly	30% to 50% sand and gravel; and % sand < % gravel

* may be determined by laboratory testing or estimated by visual/manual procedures. Fines content is the combined silt and clay content, or the percent passing the No. 200 sieve.

The USCS also uses a set of Group Symbols, which may also be listed on the soil boring logs. The following is a summary of these.

<u>Group Symbol</u>	<u>General Group Name*</u>	<u>Group Symbol</u>	<u>General Group Name*</u>
GW	Well-graded gravel	SW	Well-graded sand
GP	Poorly graded gravel	SP	Poorly graded sand
GW-GM	Well-graded gravel with silt	SW-SM	Well-graded sand with silt
GW-GC	Well-graded gravel with clay	SW-SC	Well-graded sand with clay
GP-GM	Poorly graded gravel with silt	SP-SM	Poorly graded sand with silt
GP-GC	Poorly graded gravel with clay	SP-SC	Poorly graded sand with clay
GM	Silty gravel	SM	Silty sand
GC	Clayey gravel	SC	Clayey sand
GC-GM	Silty, clayey gravel	SC-SM	Silty, clayey sand
CL	Lean clay	ML	Silt
CL-ML	Silty clay	MH	Elastic silt
CH	Fat clay	OL or OH	Organic silt or organic clay

* Group names may also include other modifiers, per standard or local practice.

Other soil classification standards may be used, depending on the project requirements. The AASHTO classification system is commonly used for highway design purposes and the USDA soil textural classifications are commonly used for septic (on-site sewage disposal) system design purposes.

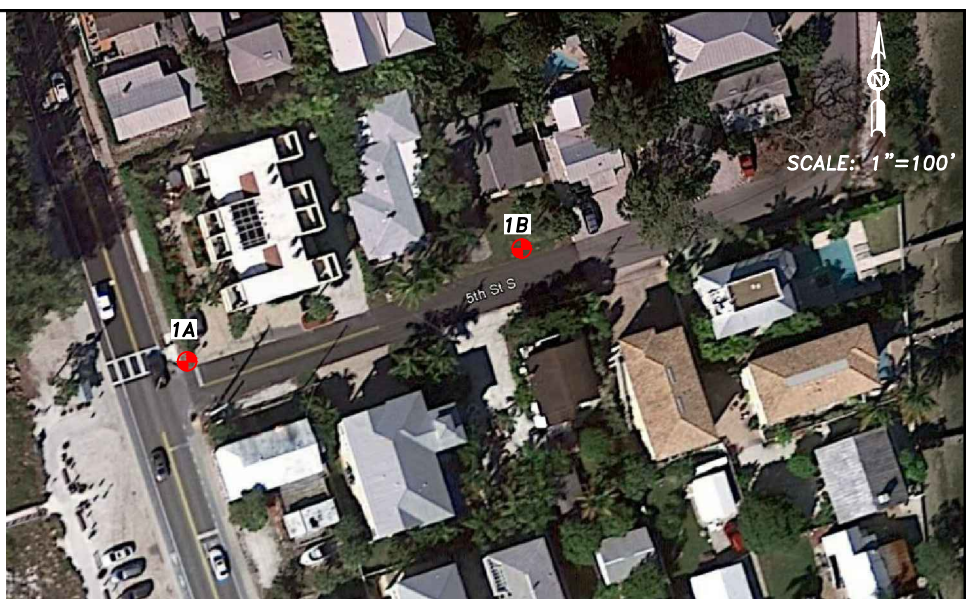
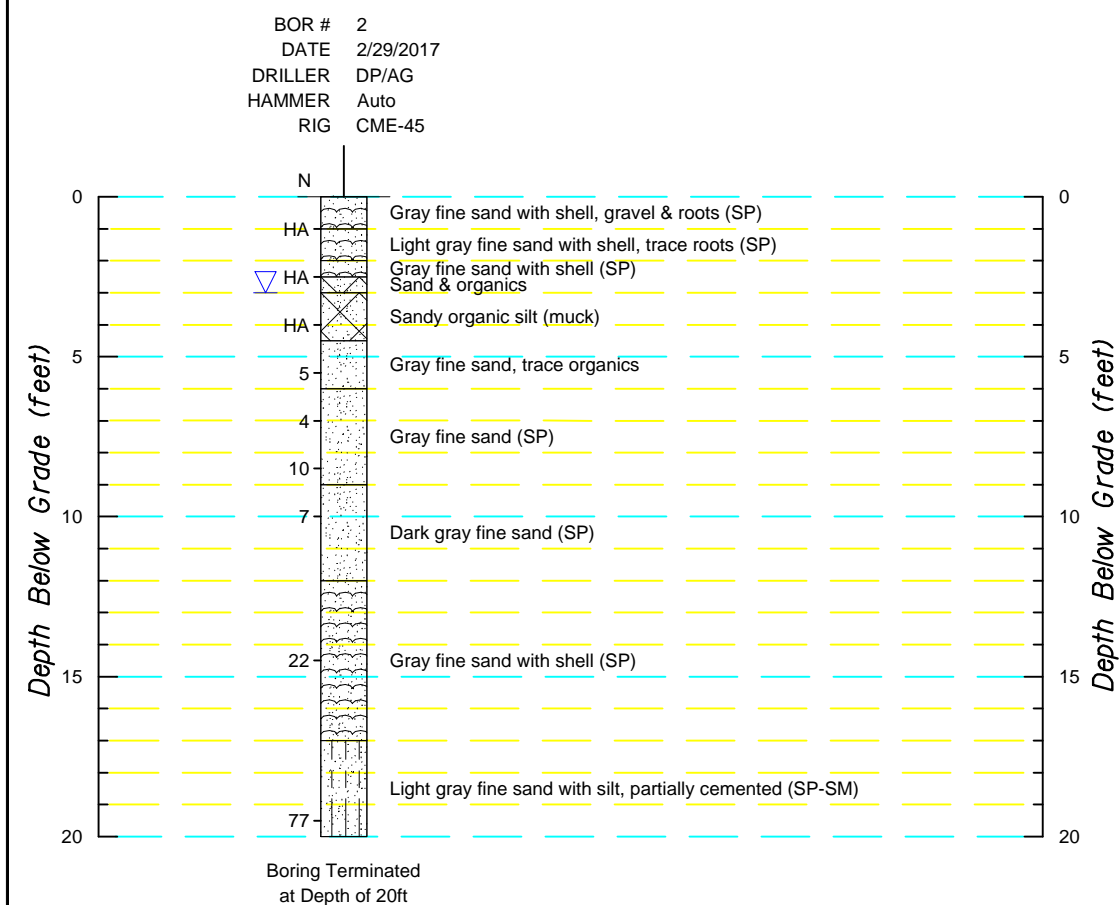
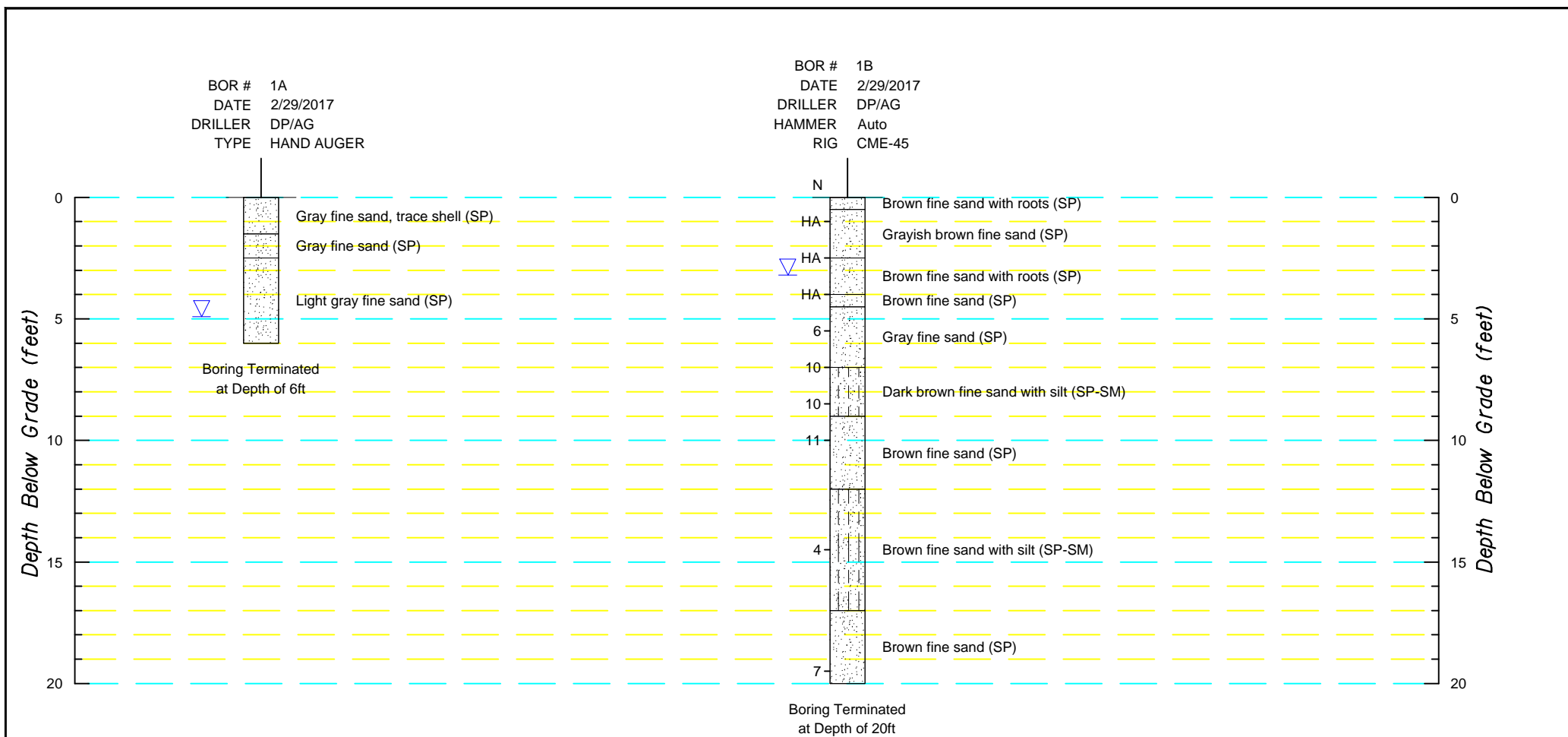
APPENDIX III

Tables

Summary of Soil Parameters								
Boring No	Depth Range (ft)	Soil Classification	Average SPT N-Value	Internal Friction Angle (degrees)	Saturated Soil Weight (pcf)	(see Note 1) Moist Soil Weight (pcf)	(see Note 2) Cohesion (psf)	Shear Modulus (ksf)
1B	0 - 6	SP	6	29	116	97	---	160
	6 - 12	SP/SP-SM	10	30	120	102	---	170
	12 - 17	SP-SM	4	28	114	94	---	150
	17 - 20	SP	7	29	117	98	---	160
2	0 - 2.5	SP	---	28	115	95	---	150
	2.5 - 4.5	soil w/ organics	---	0	80	70	---	0
	4.5 - 7	SP	5	28	115	95	---	150
	7 - 12	SP	9	30	119	101	---	170
	12 - 17	SP	22	34	126	111	---	460
	17 - 20	SP	77	>34	>130	>120	---	>900

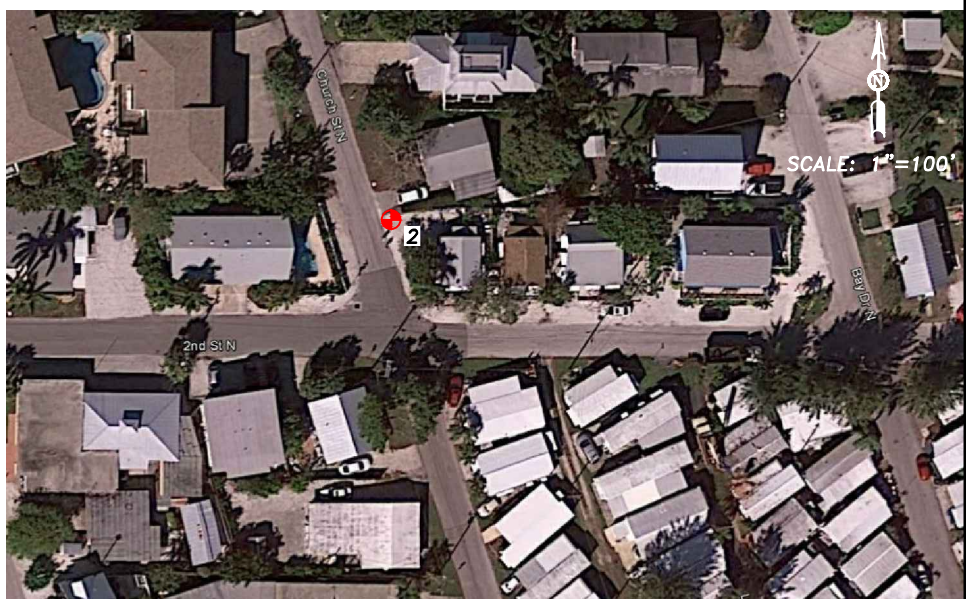
Notes: pcf = pounds per cubic foot
psf = pounds per square foot
ksf = kips per square foot
N.A. = value not available

- (1) Estimate for a drained soil above the groundwater table.
- (2) No value indicates a soil that is generally considered cohesionless.
- (3) The values listed above are based upon empirical correlations with the average soil conditions encountered. Appropriate safety factors should be used with these values.
- (4) The soil layers presented above are generalized and should be used for design purposes only. The above values should not be used to assess constructability of the proposed pipeline.



Base Aerial From Google Earth Pro

TEST BORING LOCATIONS



Base Aerial From Google Earth Pro

TEST BORING LOCATIONS

Cemented or calcareous soils were encountered within the borings. This material may behave as rock and may contain rock inclusions. Excavations into or through cemented or calcareous soils may be difficult and may require non-conventional construction techniques and specialized equipment.

LEGEND

- ▽ GROUNDWATER LEVEL MEASURED ON DATE DRILLED
- N SPT N-VALUE IN BLOWS PER FOOT (UNLESS OTHERWISE NOTED)
- SPT N VALUES CONVERTED TO EQUIVALENT SAFETY HAMMER
- HA HAND AUGER

GRANULAR MATERIALS— RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 4
LOOSE	4–10
MEDIUM DENSE	10–30
DENSE	30–50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 2
SOFT	2–4
FIRM	4–8
STIFF	8–15
VERY STIFF	15–30
HARD	GREATER THAN 30

Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants		
Test Locations/Soil Boring Logs Force Main 1 Church Street, Bradenton Beach Manatee County, Florida		
DRAWN BY: KGS	CHECKED BY:	DATE: 3/13/17
FILE NO. 16-7420	APPROVED BY:	FIGURE: 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

June 2, 2017
File No. 16-7420

TO: Kimley-Horn & Associates, Inc.
655 North Franklin Street, Suite 150
Tampa, FL 33602

Attention: Wade Wood
Email: wade.wood@kimley-horn.com

SUBJECT: Soil Corrosivity Testing for
"Force Main 1," Bradenton Beach, Manatee County, Florida

Dear Wade:

As requested, our firm has completed corrosivity testing of four (4) soil samples obtained from hand auger borings performed at the subject site, in general accordance with our proposal dated March 29, 2017. This report presents the test results.

Field Sampling

Our services included conducting two (2) hand auger borings to a depth of 6 feet below the existing ground surface, to obtain soil samples of sufficient volume for soil corrosivity tests (pH, electrical resistivity, chloride content and sulfate content). These borings were performed adjacent to the locations of our previous boring Nos. 1B and 2. The boring locations and soil profile encountered at each location are shown on Figure 1 or our report dated March 22, 2017.

Laboratory Testing

Two samples from each boring were selected for laboratory testing. The laboratory testing program included determining electrical resistivity, pH, sulfates content and chlorides content of the samples. The tests were performed in accordance with the procedures of the Florida Department of Transportation (FDOT) "Field Test Manual for On-Site Corrosion Evaluation" and the test results are summarized in the table below:

Boring No.	1B	1B	2	2
Sample No.	1	2	1	3
Depth (feet)	½ - 3½	3½ - 6	1 - 2½	4½ - 6
Soil Description	Grayish brown to brown fine sand, trace roots	Brown to gray fine sand	Light gray to gray fine sand with shell, trace roots	Gray fine sand, trace organics
Soil pH	7.7	7.4	7.5	7.3
Chlorides (ppm)	75	45	165	180
Sulfates (ppm)	132	68	169	143
Resistivity (ohm-cm)	4,000	4,800	5,600	2,000


Kimley-Horn & Associates, Inc.
File No. 16-7420
June 2, 2017

The FDOT "Structures Design Guidelines" (Sec. 1.3 – Environmental Classifications) would classify the samples tested as either "slightly aggressive" or "moderately aggressive," depending upon whether the soil contact is with concrete or steel. We recommend that the client contact the subject pipeline's design engineer to determine the relevance of these results to the subject project.

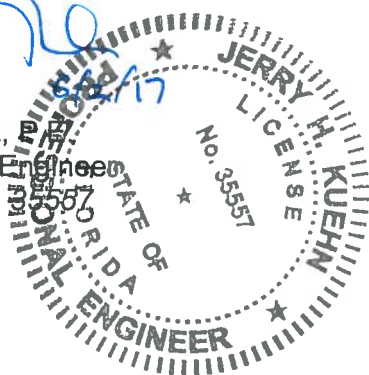
We appreciate the opportunity to be of your service. Please contact our office if you have any questions concerning this report or if we may be of further assistance.


Sincerely yours,

ARDAMAN & ASSOCIATES, INC.
Certificate of Authorization No. 5950


Jerry H. Kuehn, P.E.
Senior Project Engineer
Fl. License No. 35557

JHK/GSS:ly




Gregory S. Stevens, P.E.
Project Engineer
Fl. License No. 71511



APPENDIX C – SUE REPORTS



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

EAI JOB No.: 2017031.03

DATE: 12-14-17

TEST HOLE
NUMBER

20

LOCATE BY: EM, ZW

SURVEY BY:

CHECKED BY:

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER

SIZE / TYPE EXPECTED:

SIZE FOUND: 1.25" I.D. O.D. NOMINAL SIZE:

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER: Frontier

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER PIN Flags

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER USIC

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER

MEASURED DEPTH: 1.48 ft. 0.451 m

NOTES:

(1) 1.25" Black DBC
BT

Marina & 72nd ST

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

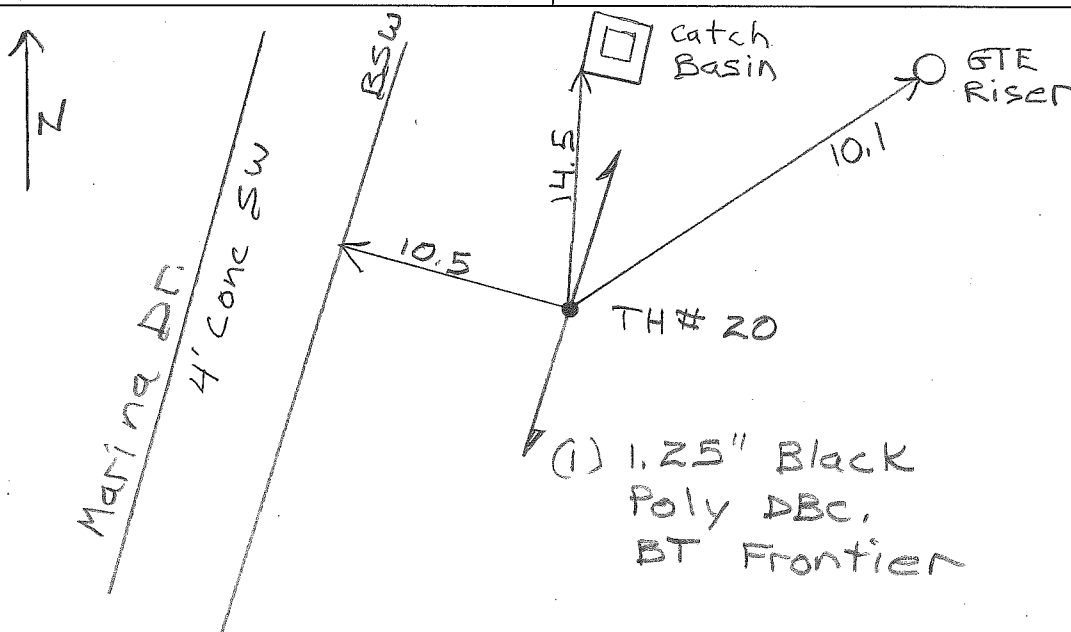
HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA: SURVEY PT. # STATION
ROADWAY OFFSET ft. LT. RT.
BASELINE: SURVEY CONSTR. OTHER SURVEY PT. ELEV.

SURVEYED
PLAN
SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

EAI JOB No.: 2017031.03 DATE: 12-14-17

TEST HOLE

NUMBER 21

LOCATE BY: EM, ZW

SURVEY BY:

CHECKED BY:

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER

SIZE / TYPE EXPECTED:

SIZE FOUND: I.D. O.D. NOMINAL SIZE:

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER: Frontier

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER Pin Flags

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER USIC

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR

HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK

DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY

ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT

X-CUT OTHER

MEASURED DEPTH: 2.91 ft. 0.886 m

NOTES:

(1) 2" +/- Black Poly Con.
BT
size and measure down
Approximate due to water
and pipe location being under
some sort of French Drain to CB

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

DIRECTION FACING

COVER (MEASURED DEPTH)

2.91

EXISTING GRADE
(APPROXIMATE)

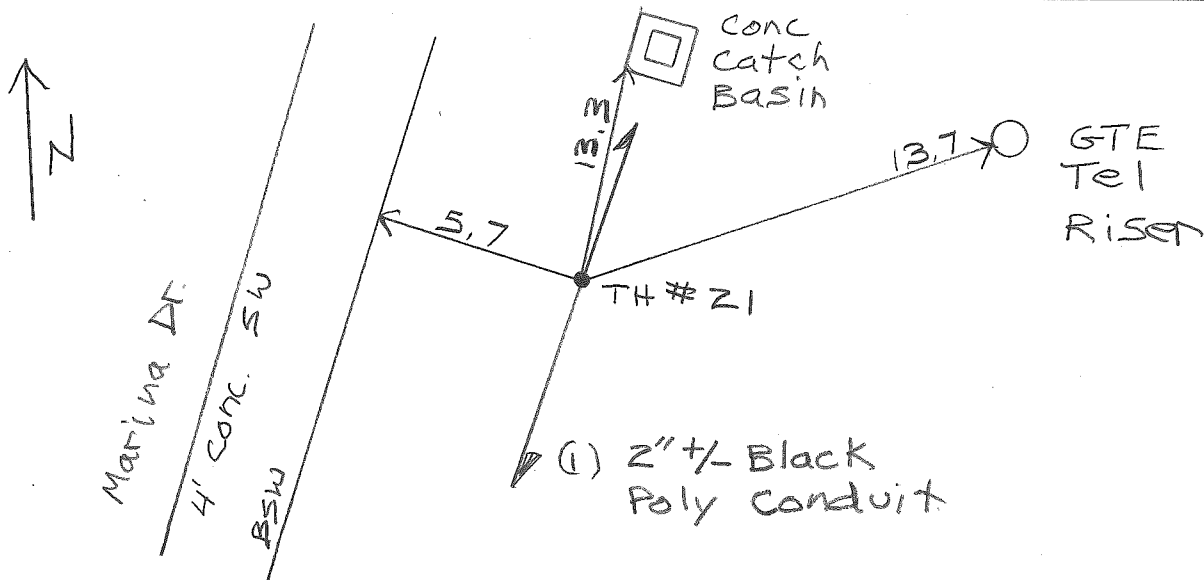
ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA: SURVEY PT. # STATION
ROADWAY OFFSET ft. LT. RT.
BASELINE: SURVEY CONSTR. OTHER SURVEY PT. ELEV.

SURVEYED
PLAN
SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE
NUMBER 1

EAI JOB No.: 2017031.00

DATE: 5-30-17

LOCATE BY: EM, ZH, DH

SURVEY BY: _____

CHECKED BY: WCS 6/14/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 17.4 I.D. O.D. NOMINAL SIZE: 16

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: City of Bradenton Beach

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: CEAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER _____

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER Mag nail

MEASURED DEPTH: 2.8 ft. 0.85 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 16" Black DIP WL.
Test holed WL @ Tee to 6" Service unintentionally. Had thrust block around most of pipe. 16" Size From Plans. MD to Top thrust block = 2.05. MD to top of pipe is approx.

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

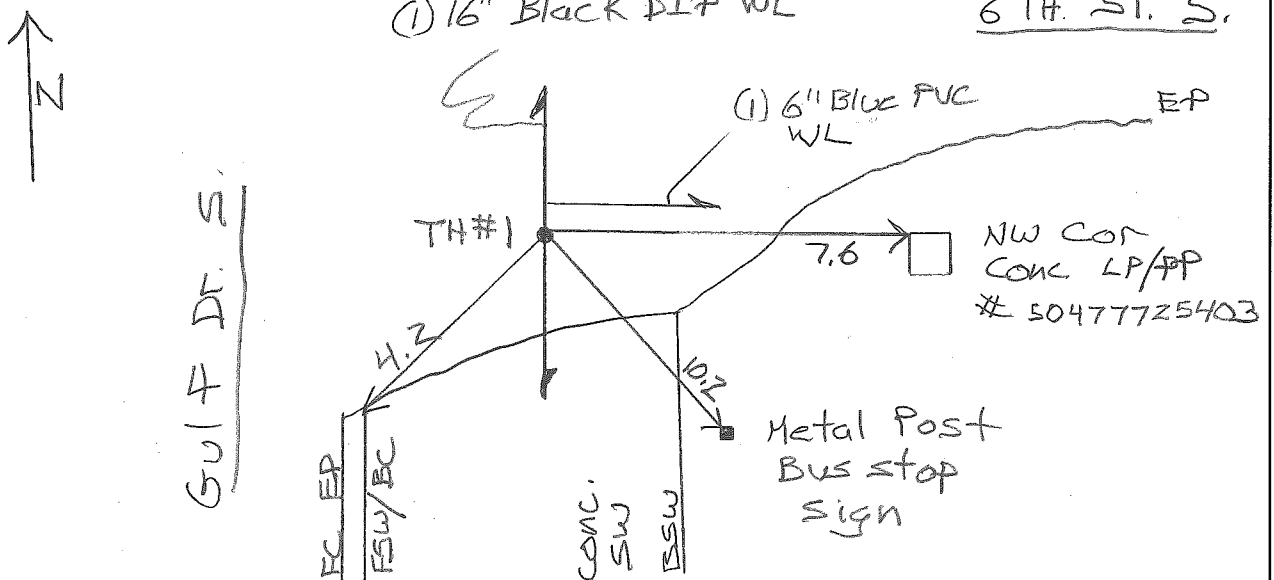
DIRECTION FACING

N

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE

EAI JOB No.: 2017031.00

DATE: 5-31-17

NUMBER

Z

LOCATE BY: EM, ZH, DH

SURVEY BY:

CHECKED BY: WCS 6/14/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER

SIZE / TYPE EXPECTED:

SIZE FOUND: 17.4 I.D. O.D. NOMINAL SIZE: 16"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER: City of Bradenton Beach

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER Mag nail

MEASURED DEPTH: 3.63 ft. 1.108 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 16" BLACK DIP WL.

GULF DR. S & 5TH. ST. S

CROSS SECTION SKETCH:

DIRECTION FACING

S

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

3.63

EXISTING GRADE
(APPROXIMATE)

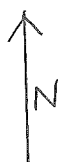
ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



GULF DR. S

(1) 16" BLACK
DIP WL

TH # 2

2 WV

5TH. ST. S

EP/FSW

CONC. SW

BSW

N.W. Cor
CONC. LP/PP
#50477715904

SURVEY DATA:

SURVEY PT. #

STATION

SURVEYED

ROADWAY

OFFSET

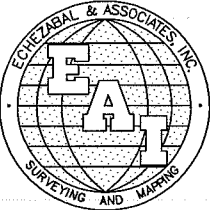
ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER

SURVEY PT. ELEV.

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE
NUMBER 3

EAI JOB No.: 2017031.00

DATE: 5-31-17

LOCATE BY: EM, ZH, DH

SURVEY BY: _____

CHECKED BY: WLS 6/14/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 4.5 I.D. O.D. NOMINAL SIZE: 4"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: Frontier

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER Pin Flags

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER _____

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER Mag Nail

MEASURED DEPTH: 2.25 ft. 0.687 m ✓
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 4" Peach PVC
Telecom Line.
Frontier.

Bay Dr. S & 3rd St. S.

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

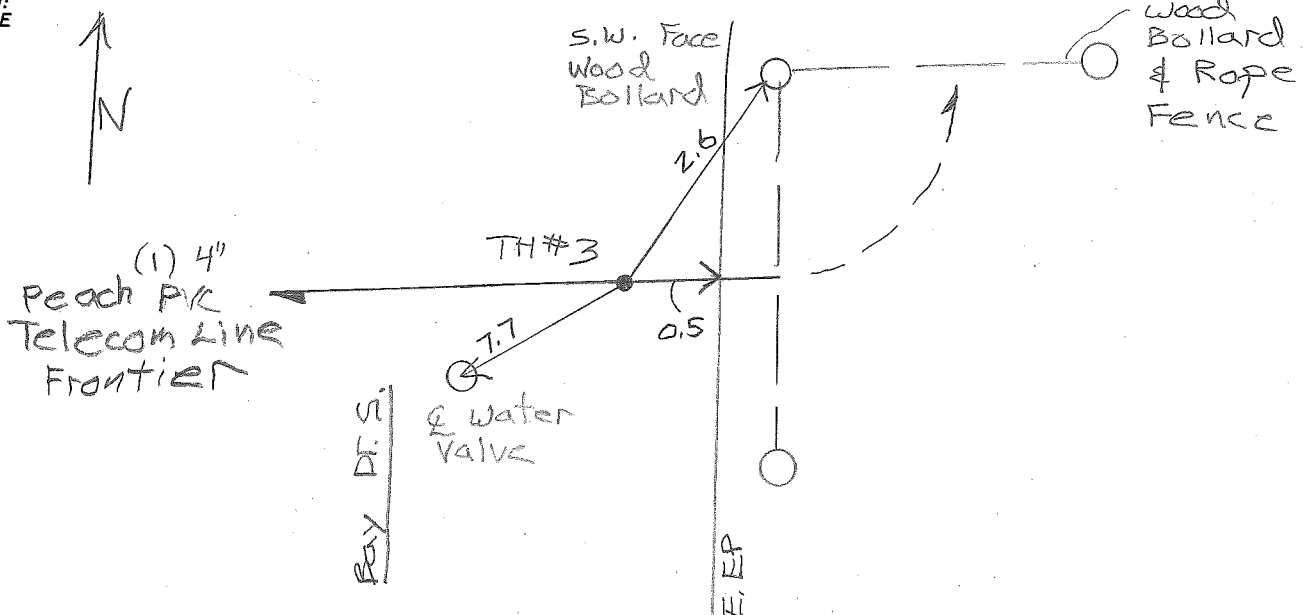
DIRECTION FACING

E

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA: SURVEY PT. # _____ STATION _____
ROADWAY _____ OFFSET _____ ft. LT. RT.
BASELINE: SURVEY CONSTR. OTHER _____ SURVEY PT. ELEV. _____

SURVEYED
PLAN
SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE
NUMBER 4

EAI JOB No.: 2017031.00

DATE: 5-31-17

LOCATE BY: EM, ZH, DH

SURVEY BY: _____

CHECKED BY: TKS 6/14/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 2.375 I.D. Ø O.D. NOMINAL SIZE: 2"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: City of Bradenton Beach

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER _____

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED _____

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER Mag nail

MEASURED DEPTH: 2.96 ft. 0.903 m ✓
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 2" Gray Steel WL

Bay Dr. S. & 3rd ST. S.

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

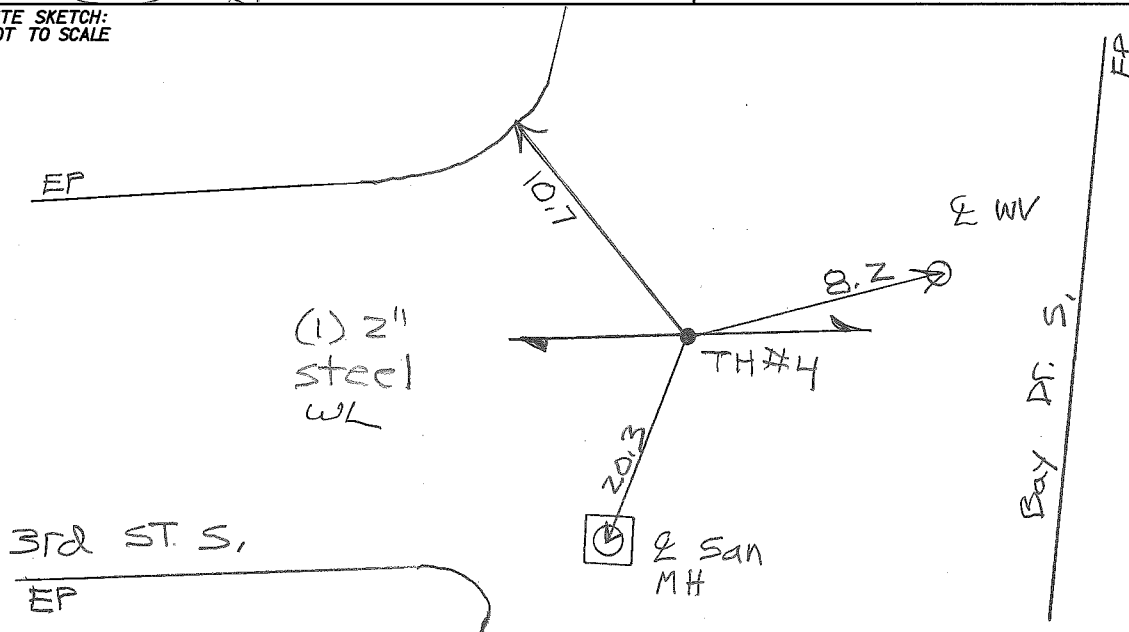
ELEV. (BOTTOM OF UTILITY)

DIRECTION FACING

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN, BEACH

TEST HOLE
NUMBER

5

EAI JOB No.: 2017031.00

DATE: 6-1-17

LOCATE BY: EM, KW, DH

SURVEY BY:

CHECKED BY: TKS 6/4/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER

SIZE / TYPE EXPECTED:

SIZE FOUND: 4.5" I.D. O.D. NOMINAL SIZE: 4"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER: Teco Peoples Gas

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER

MEASURED DEPTH: 4.74 ft. 1.443 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 4" yellow POLY GAS
Line

Bay Dr. S. & 3rd St. S.

CROSS SECTION SKETCH:

DIRECTION FACING

W

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

4.74

ELEV. (TOP OF UTILITY)

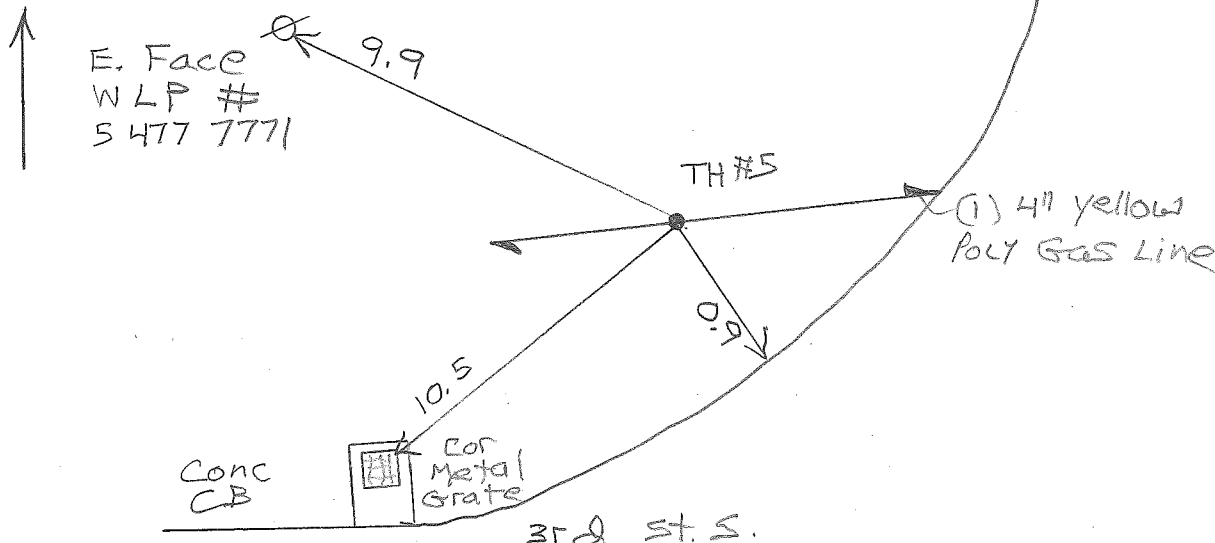
HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. #

STATION

SURVEYED

ROADWAY

OFFSET

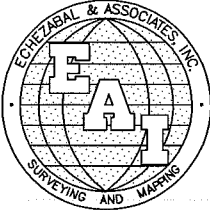
ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER

SURVEY PT. ELEV.

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE
NUMBER

6

EAI JOB No.: 2017031.00

DATE: 6-1-17

LOCATE BY: EM, KW, DH

SURVEY BY: _____

CHECKED BY: WLS 6/4/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 6.9 I.D. O.D. NOMINAL SIZE: 6"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: Bradenton Beach

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER _____

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER Mag nail

MEASURED DEPTH:

(SURVEY MARKER TO TOP OF UTILITY)

3.37 ft. 1.027 m

NOTES:

(1) 6" Black DIP.

Bridge & Bay

CROSS SECTION SKETCH:

DIRECTION FACING

E

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

3.37

ELEV. (TOP OF UTILITY)

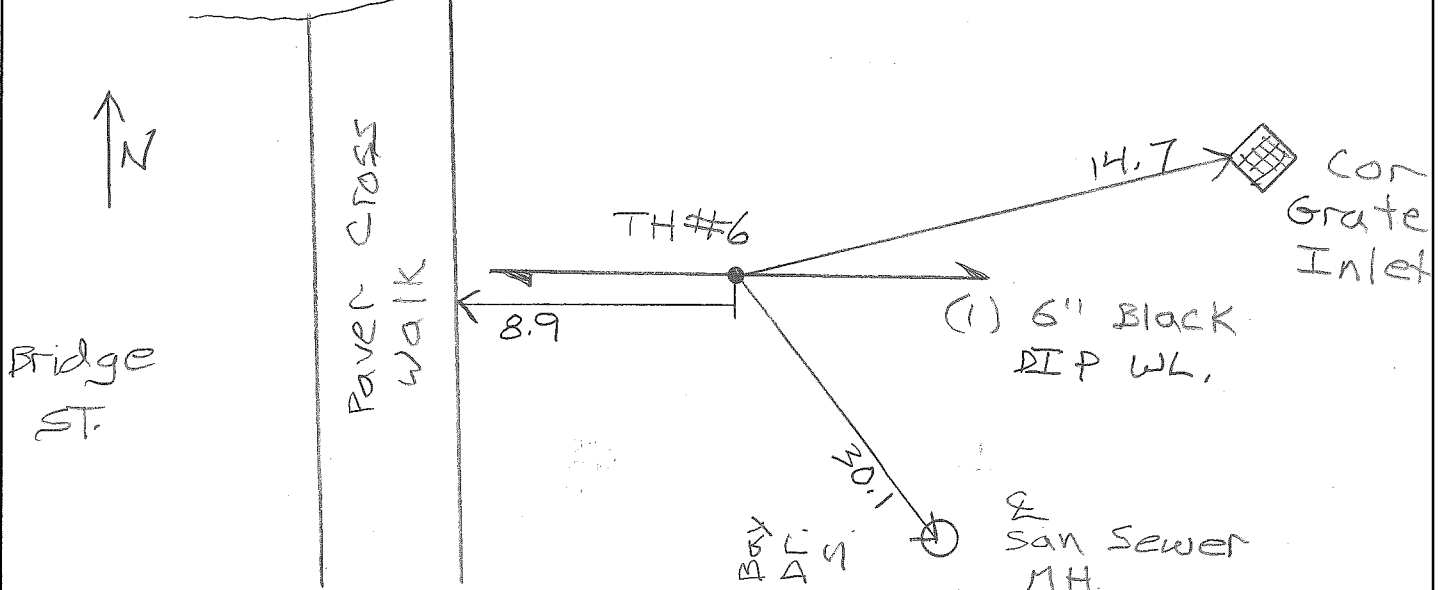
HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE
NUMBER 7

EAI JOB No.: 2017031.00

DATE: 6-5-17

LOCATE BY: EM, ZH, AW, DH, RB SURVEY BY: _____

CHECKED BY: WCS 6/14/17

REQUESTED LOCATE: ☒ GAS ☐ STORM ☐ SANITARY CATV ☐ F.O.C. RECLAIMED
☐ FORCE MAIN ☐ ELEC ☐ TELECOM ☐ TRAFFIC SIG. ☐ WATER ☐ ST. LIGHTS
☐ ITS ☐ UNKNOWN ☐ OTHER _____

LOCATED UTILITY: ☒ GAS ☐ STORM ☐ SANITARY CATV ☐ F.O.C. RECLAIMED
☐ FORCE MAIN ☐ ELEC ☐ TELECOM ☐ TRAFFIC SIG. ☐ WATER ☐ ST. LIGHTS
☐ ITS ☐ UNKNOWN ☐ OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP ☒ POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 4.5 I.D. ☒ O.D. NOMINAL SIZE: 4"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
☒ YELLOW ☐ PINK ☐ PEACH ☐ OTHER _____

UTILITY OWNER: Teco people's Gas

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: ☐ PAINT MARKS ☒ SIGN ☐ FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: ☒ EAI ☐ UTIL. OWNER ☐ UNK. ☐ OTHER _____

WAS UTILITY TONABLE?: ☒ YES ☐ NO

TRACER FOUND: PLASTIC TAPE METAL TAPE ☒ WIRE ☐ NONE ☐ OTHER _____

VISUAL CONFIRMATION OF UTILITY: ☒ YES ☐ NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT ☒ GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: ☒ HARD ☐ SOFT ☐ WET ☒ MOIST ☐ DRY ☐ SAND ☒ CLAY
☒ ROCK ☐ SOLID ROCK ☐ LIMEROCK ☐ NOT NOTED

MARKER SET: ☒ 3/8" ROD ☐ NAIL/FLASHER ☐ 60d NAIL ☐ HUB ☐ PAINT DOT
X-CUT OTHER _____

MEASURED DEPTH: 3.75 ft. 1.144 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES: (1) 4" yellow Poly Gas Line

Bay Dr. S & Third ST.

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

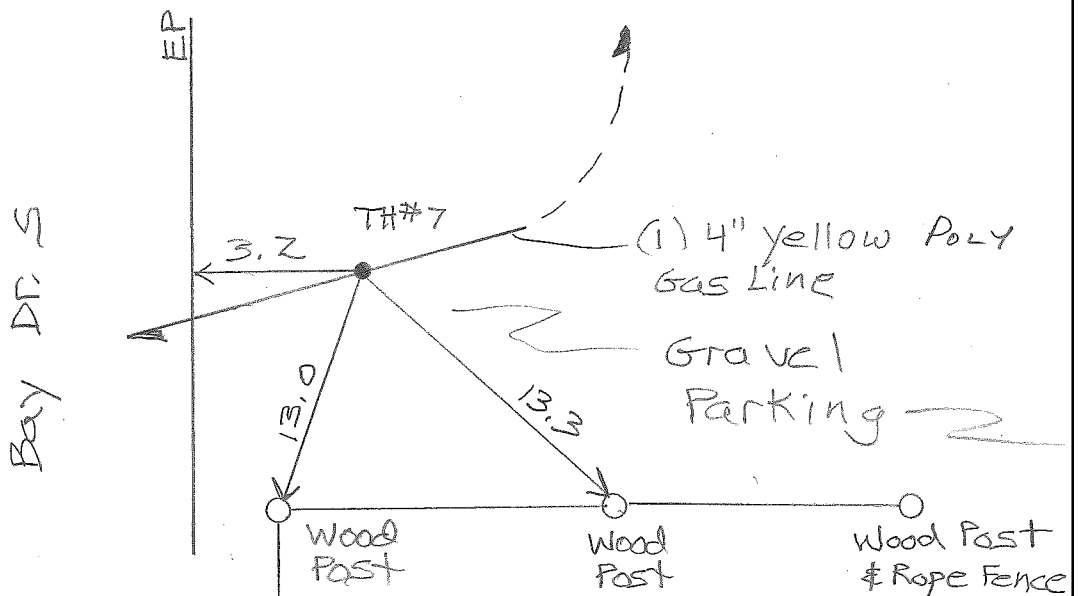
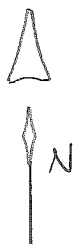
DIRECTION FACING

SW

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE

EAI JOB No.: 2017031.00

DATE: 6-5-17

NUMBER

8

LOCATE BY: EM, ZW, AW, DH, RB SURVEY BY: _____

CHECKED BY: TCS 4/14/17

REQUESTED LOCATE: ☒ GAS ☐ STORM ☐ SANITARY ☐ CATV ☐ F.O.C. ☐ RECLAIMED
☐ FORCE MAIN ☐ ELEC ☐ TELECOM ☐ TRAFFIC SIG. ☐ WATER ☐ ST. LIGHTS
☐ ITS ☐ UNKNOWN ☐ OTHER _____

LOCATED UTILITY: ☒ GAS ☐ STORM ☐ SANITARY ☐ CATV ☐ F.O.C. ☐ RECLAIMED
☐ FORCE MAIN ☐ ELEC ☐ TELECOM ☐ TRAFFIC SIG. ☐ WATER ☐ ST. LIGHTS
☐ ITS ☐ UNKNOWN ☐ OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP ☒ POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 4.5" I.D. ☒ O.D. NOMINAL SIZE: 4"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
☒ YELLOW ☐ PINK ☐ PEACH ☐ OTHER _____

UTILITY OWNER: TECO PEOPLES GAS

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: ☐ PAINT MARKS ☐ SIGN ☐ FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: ☒ EAI ☐ UTIL. OWNER ☐ UNK. ☐ OTHER _____

WAS UTILITY TONABLE?: ☒ YES ☐ NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE ☒ NONE ☐ OTHER _____

VISUAL CONFIRMATION OF UTILITY: ☒ YES ☐ NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR

HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ☒ ASPH. ☐ CONC. ☐ BRICK ☐ MANHOLE ☐ GRASS ☐ LIMEROCK

DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD ☒ SOFT ☐ WET ☐ MOIST ☐ DRY ☒ SAND ☐ CLAY

ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: ☒ 3/8" ROD ☐ NAIL/FLASHER ☐ 60d NAIL ☐ HUB ☐ PAINT DOT

X-CUT ☒ OTHER Mag nail

MEASURED DEPTH: _____
(SURVEY MARKER TO TOP OF UTILITY) 3.53 ft. 1.076 m

NOTES:

(1) 4" yellow POLY Gas Line.

N. of circle @ ch

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



BC/FSW

PC/EP

9.1

0.2

White Stop Bar

TH#8

(1) 4" yellow
Poly Gas Line

22.0

Cor
Mobile
home #1

SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN, BEACH

TEST HOLE
NUMBER 9

EAI JOB No.: 2017031.00

DATE: 6-6-17

LOCATE BY: EM, DH

SURVEY BY: _____

CHECKED BY: TCS 6/14/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 6.9 I.D. O.D. NOMINAL SIZE: 6"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: Manatee Co.

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER Plans

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER _____

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR

HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK

DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY

ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT

X-CUT OTHER Mag nail

MEASURED DEPTH: 2.98 ft. 0.908 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 6" DIP Sanitary
Force Main

S. Side roundabout

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

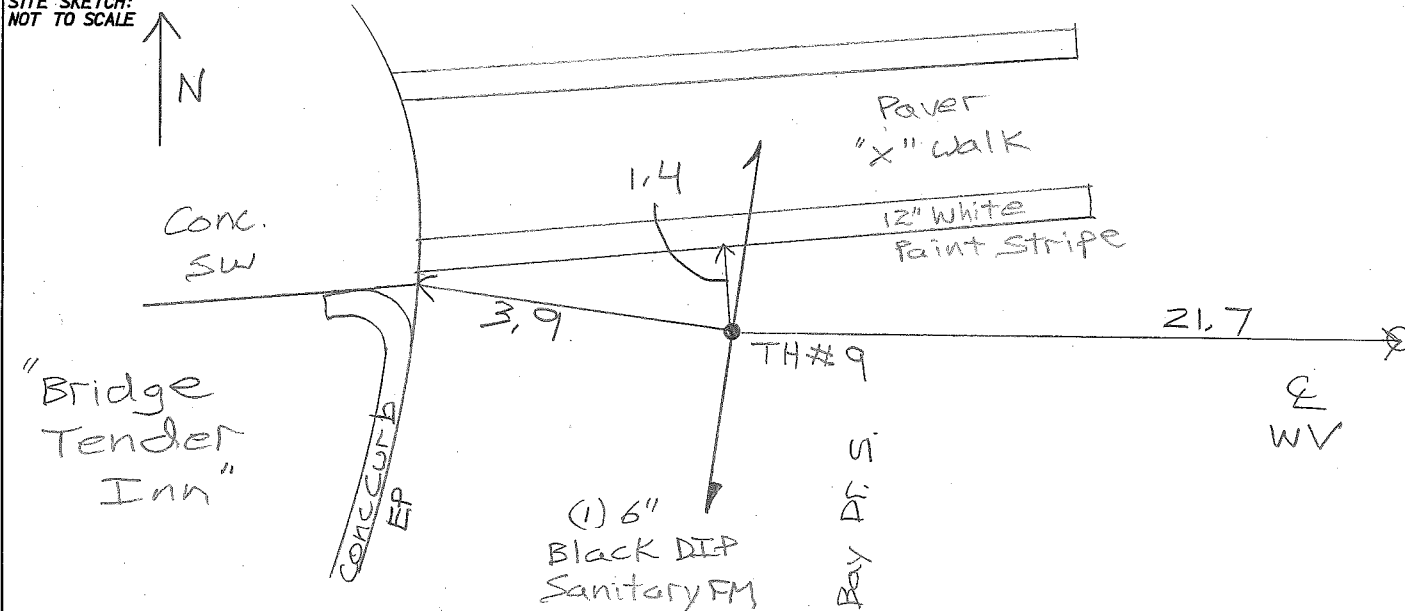
DIRECTION FACING

S

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN, BEACH

TEST HOLE
NUMBER

10

EAI JOB No.: 2017031.00

DATE: 6-6-17

LOCATE BY: EM, ZH, DH

SURVEY BY: _____

CHECKED BY: 7/5 4/14/17

REQUESTED LOCATE: ☒ GAS ☐ STORM ☐ SANITARY ☐ CATV ☐ F.O.C. ☐ RECLAIMED
☐ FORCE MAIN ☐ ELEC ☐ TELECOM ☐ TRAFFIC SIG. ☐ WATER ☐ ST. LIGHTS
☐ ITS ☐ UNKNOWN ☐ OTHER _____

LOCATED UTILITY: ☒ GAS ☐ STORM ☐ SANITARY ☐ CATV ☐ F.O.C. ☐ RECLAIMED
☐ FORCE MAIN ☐ ELEC ☐ TELECOM ☐ TRAFFIC SIG. ☐ WATER ☐ ST. LIGHTS
☐ ITS ☐ UNKNOWN ☐ OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP ☒ POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 4.5 I.D. ☒ O.D. NOMINAL SIZE: 4"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
☒ YELLOW ☐ PINK ☐ PEACH ☐ OTHER _____

UTILITY OWNER: TECO PEOPLES GAS

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: ☒ EAI ☒ UTIL. OWNER ☐ UNK. ☐ OTHER _____

WAS UTILITY TONABLE?: ☒ YES ☐ NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE ☒ NONE ☐ OTHER _____

VISUAL CONFIRMATION OF UTILITY: ☒ YES ☐ NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ☒ ASPH. ☐ CONC. ☐ BRICK ☐ MANHOLE ☐ GRASS ☐ LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD ☒ SOFT ☒ WET ☐ MOIST ☐ DRY ☒ SAND ☐ CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT ☒ OTHER Mag nail

MEASURED DEPTH: 6.44 ft. 1.963 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 4" yellow poly
gas line.

S. side roundabout
@ Bay & Bridge

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

6.44

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

DIRECTION FACING

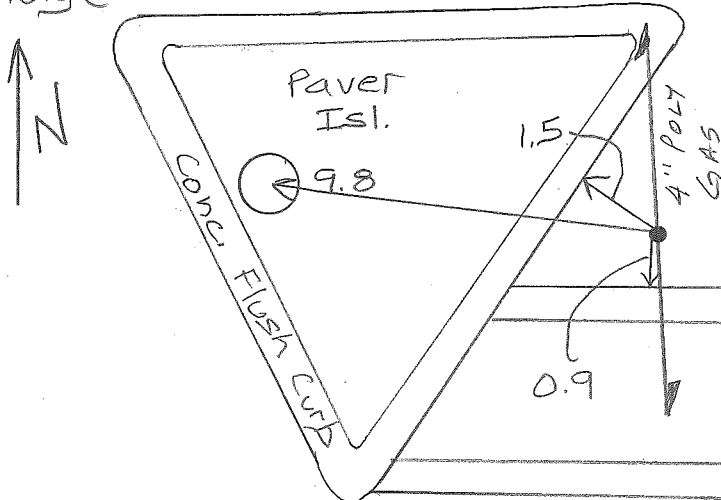
N, NW

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE

Bridge St.



Bay Dr. S.

SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: END OF LIFE - FORCE MAIN - BRADEN BEACH

TEST HOLE
NUMBER 11

EAI JOB No.: 2017031.00

DATE: 6-6-17

LOCATE BY: EM, ZH, DH

SURVEY BY: _____

CHECKED BY: NB 6/14/17

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 6.9 I.D. O.D. NOMINAL SIZE: 6"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER UNK.

UTILITY OWNER: Manatee Co

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER Plans

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER and mud.

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR

HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK

DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY

ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT

X-CUT OTHER Mag Nail.

MEASURED DEPTH: 4.68 ft. 1.427 m ✓
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 6" DIP San. FM
*water & mud intrusion prevented
visual confirmation of pipe. water
probing found a six inch apparent
DIP.

N. of roundabout
@ Bay & Bridge

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

4.68

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

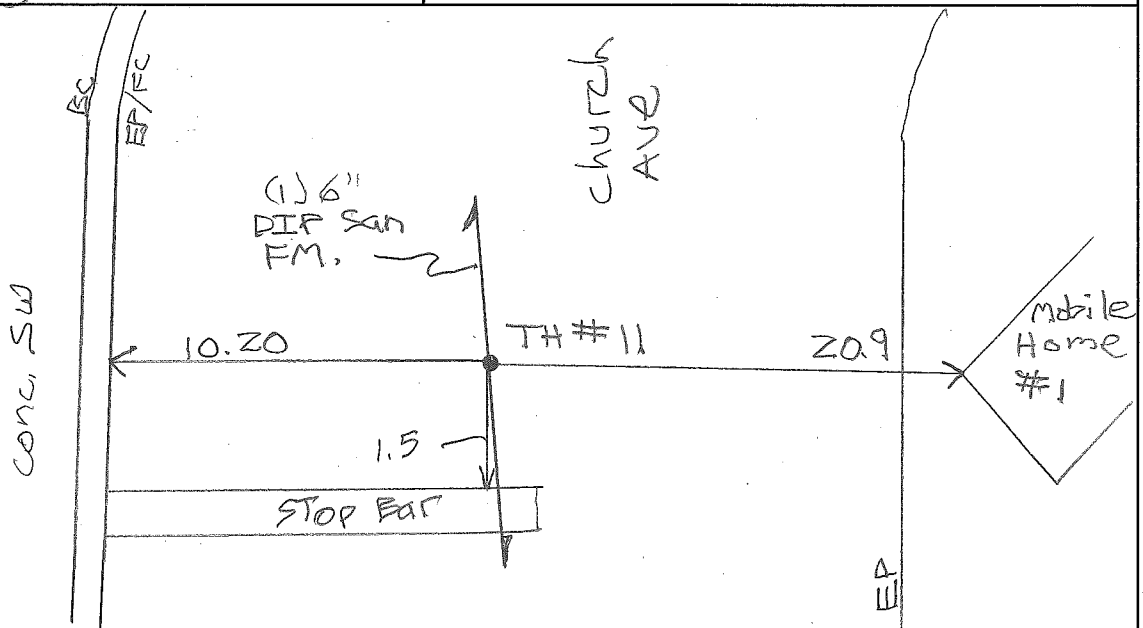
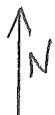
DIRECTION FACING

S

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

EAI JOB No.: 2017031.03 DATE: 12-12-17

TEST HOLE
NUMBER

12

LOCATE BY: EM, ZW

SURVEY BY: _____

CHECKED BY: _____

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 5/8" I.D. 0.0 NOMINAL SIZE: _____

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: Frontier

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER _____

MEASURED DEPTH: 2.76 ft. 0.842 m

NOTES:

(1) 5/8" Black DBC

5th St. S.

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

2.76

ELEV. (TOP OF UTILITY)

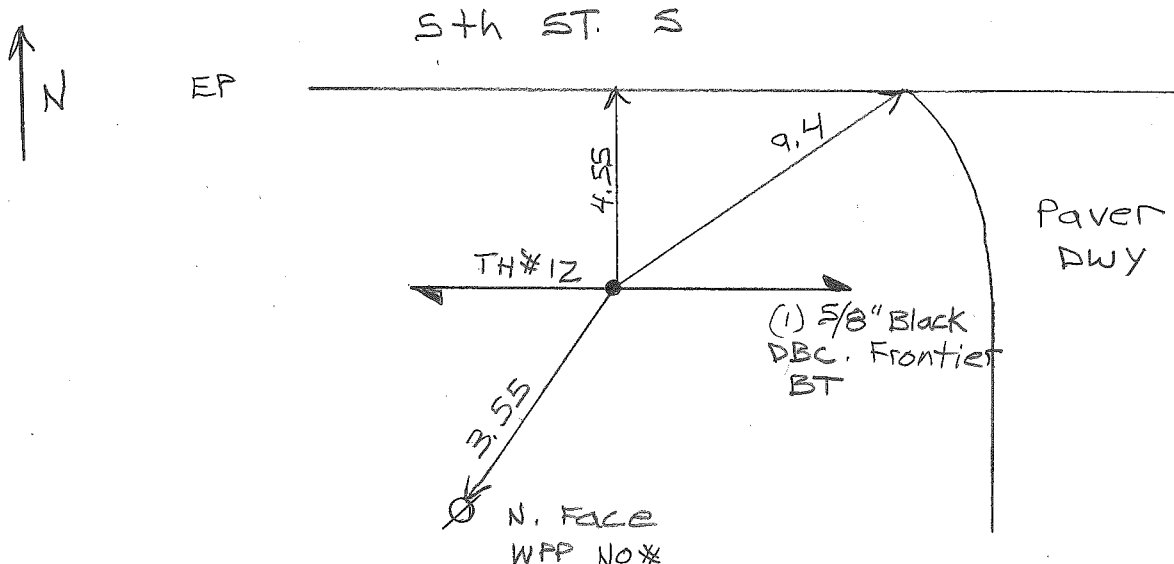
HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA: SURVEY PT. # _____ STATION _____
ROADWAY _____ OFFSET _____ ft. LT. RT. _____
BASELINE: SURVEY CONSTR. OTHER _____ SURVEY PT. ELEV. _____

SURVEYED
PLAN
SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

EAI JOB No.: 2017031.03

DATE: 12/12/17

TEST HOLE
NUMBER

13

LOCATE BY: EM, 2W

SURVEY BY:

CHECKED BY:

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER

SIZE / TYPE EXPECTED:

SIZE FOUND: 5/8 I.D. 0.0 NOMINAL SIZE:

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER: Frontier

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER

MEASURED DEPTH: 2.24 ft. 0.683 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 5/8" Black DBC

5th. ST. S.

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

DIRECTION FACING

COVER (MEASURED DEPTH)

2.24

EXISTING GRADE
(APPROXIMATE)

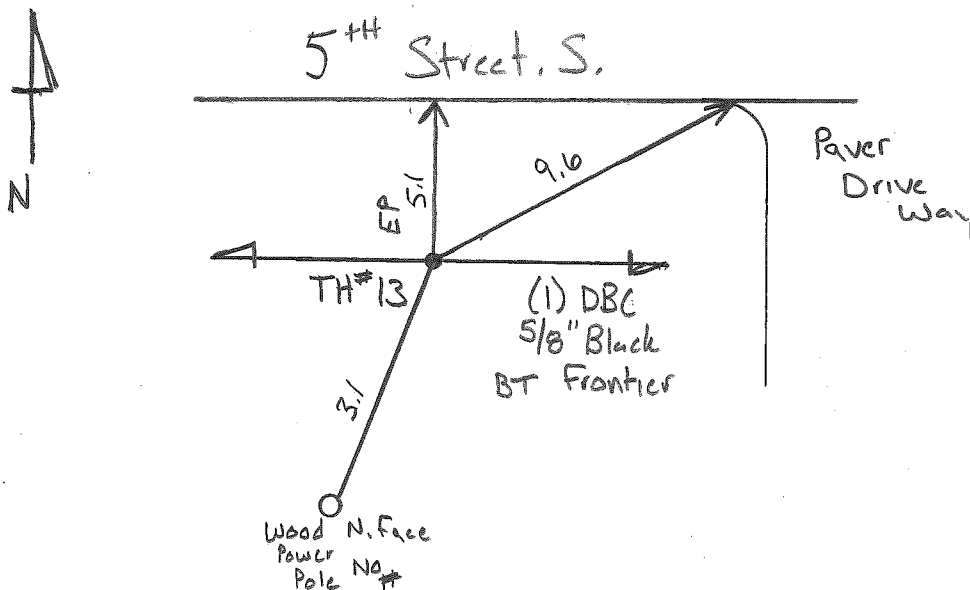
ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA: SURVEY PT. # STATION
ROADWAY OFFSET ft. LT. RT.
BASELINE: SURVEY CONSTR. OTHER SURVEY PT. ELEV.

SURVEYED
PLAN
SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFETEST HOLE
NUMBER 14EAI JOB No.: 2017031.03 DATE: 12-12-17LOCATE BY: EM, ZW

SURVEY BY: _____

CHECKED BY: _____

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 5/8" I.D. O.D. NOMINAL SIZE: _____COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____UTILITY OWNER: Frontier

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____WAS UTILITY TONABLE?: YES NOTRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHERVISUAL CONFIRMATION OF UTILITY: YES NOREASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTEDMARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER _____MEASURED DEPTH: 2.09 ft. 0.637 m ✓
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 5/8" Black DBC

Int. of Bay Dr. S
& 5th St. S

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

2.09

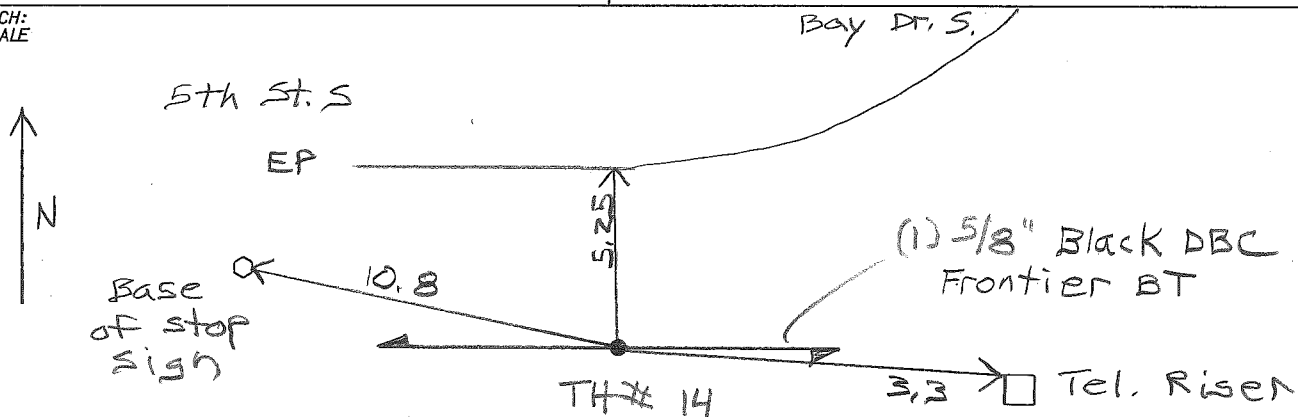
ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALESURVEY DATA: SURVEY PT. # _____ STATION _____
ROADWAY _____ OFFSET _____ ft. LT. RT. _____
BASELINE: SURVEY CONSTR. OTHER _____ SURVEY PT. ELEV. _____SURVEYED
PLAN
SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

TEST HOLE
NUMBER

15

EAI JOB No.: 2017031.03

DATE: 12-12-17

LOCATE BY: EM, ZW

SURVEY BY:

CHECKED BY:

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHERLOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHERMATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER

SIZE / TYPE EXPECTED:

SIZE FOUND: 5/8" I.D. O.D. NOMINAL SIZE:COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHERUTILITY OWNER: Frontier

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHERDESIGNATED BY: EAI UTIL. OWNER UNK. OTHERWAS UTILITY TONABLE?: YES NOTRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHERVISUAL CONFIRMATION OF UTILITY: YES NOREASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHERIF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHERSURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHERSOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTEDMARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER

MEASURED DEPTH:

(SURVEY MARKER TO TOP OF UTILITY)

1.87 ft. 0.568 m

NOTES:

(1) 5/8" Black

Int of Bay Dr.
S. & 5th ST. S

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

1.87

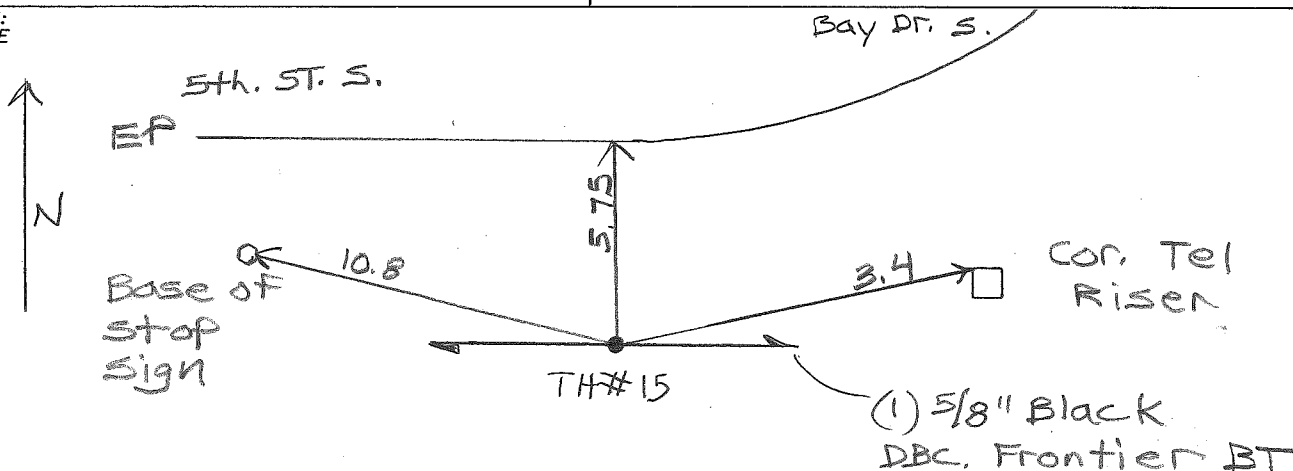
ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE

SURVEY DATA:

SURVEY PT. #

STATION

SURVEYED

ROADWAY

OFFSET

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER

SURVEY PT. ELEV.

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

TEST HOLE
NUMBER

24 16

EAI JOB No.: 2017031.03

DATE: 12-18-17

LOCATE BY: EM, ZW, QC

SURVEY BY: _____

CHECKED BY: _____

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER Fiberglass/Plastic?

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 7" I.D. O.D. NOMINAL SIZE: 6"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: Manatee Co

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER _____

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER Magnail

MEASURED DEPTH: 2.81 ft. 0.856 m ✓
(SURVEY MARKER TO TOP OF UTILITY)

NOTES: (1) 6" Plastic, Black
WL.

50' +/- N of 4th. St.
S. on S Bay St.

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

DIRECTION FACING

COVER (MEASURED DEPTH)

EXISTING GRADE
(APPROXIMATE)

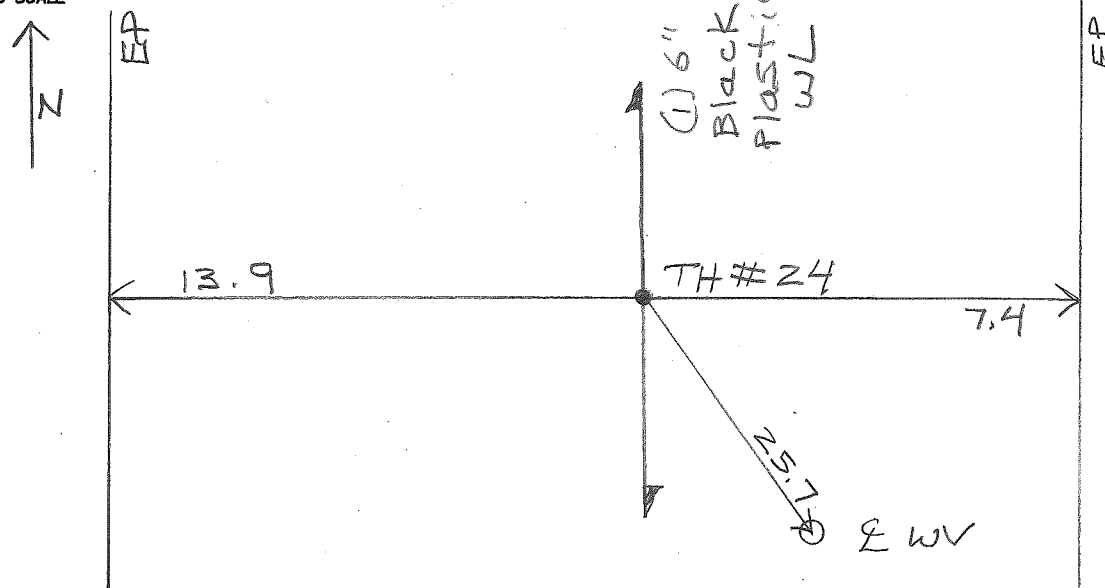
ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

EAI JOB No.: 2017031.03

DATE: 12-12-17

TEST HOLE
NUMBER

17

LOCATE BY: EM, ZW

SURVEY BY:

CHECKED BY:

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER

SIZE / TYPE EXPECTED:

SIZE FOUND: 6.9" I.D. O.D. NOMINAL SIZE: 6"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER:

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER

MEASURED DEPTH:

(SURVEY MARKER TO TOP OF UTILITY)

2.69 ft. 0.819 m

NOTES:

(1) 6" Black DIP WL

church Ave
@ 2nd St. N.

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

2.69

ELEV. (TOP OF UTILITY)

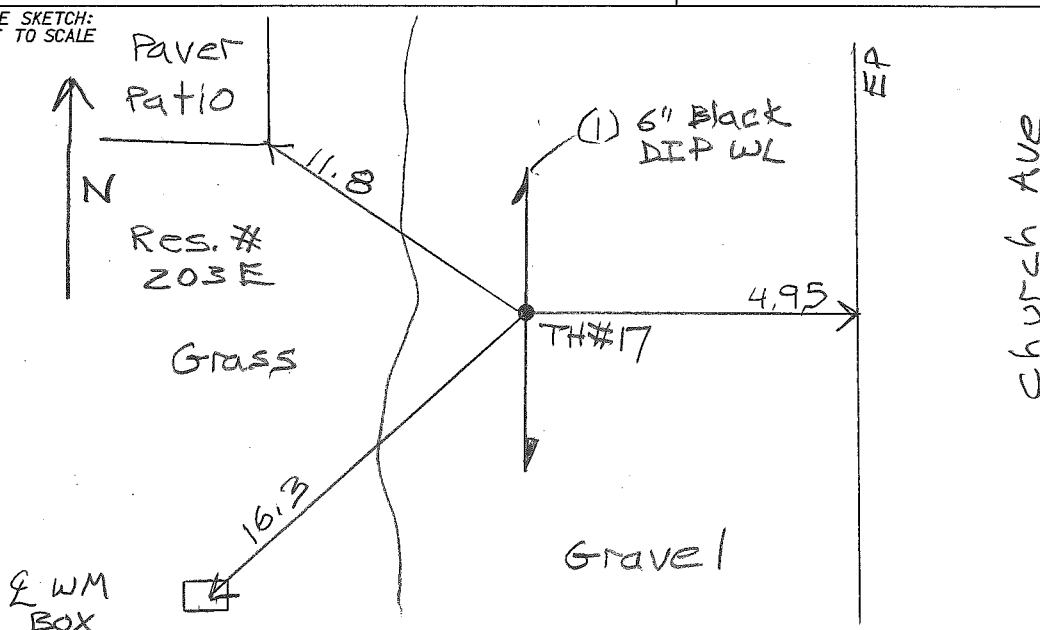
HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA: SURVEY PT. # STATION
ROADWAY OFFSET ft. LT. RT.
BASELINE: SURVEY CONSTR. OTHER SURVEY PT. ELEV.

SURVEYED
PLAN
SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

TEST HOLE
NUMBER 18

EAI JOB No.: 2017031.03 DATE: 12-13-17

LOCATE BY: EM, ZW

SURVEY BY: _____

CHECKED BY: _____

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 1.9 I.D. O.D. NOMINAL SIZE: 1.5

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: _____

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER Mag Nail

MEASURED DEPTH: 2.42 ft. 0.738 m

NOTES:

(1) 1.5" yellow Poly Gas Line

Bay Dr. S and Bridge ST.

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

DIRECTION FACING

COVER (MEASURED DEPTH)

2.42

EXISTING GRADE
(APPROXIMATE)

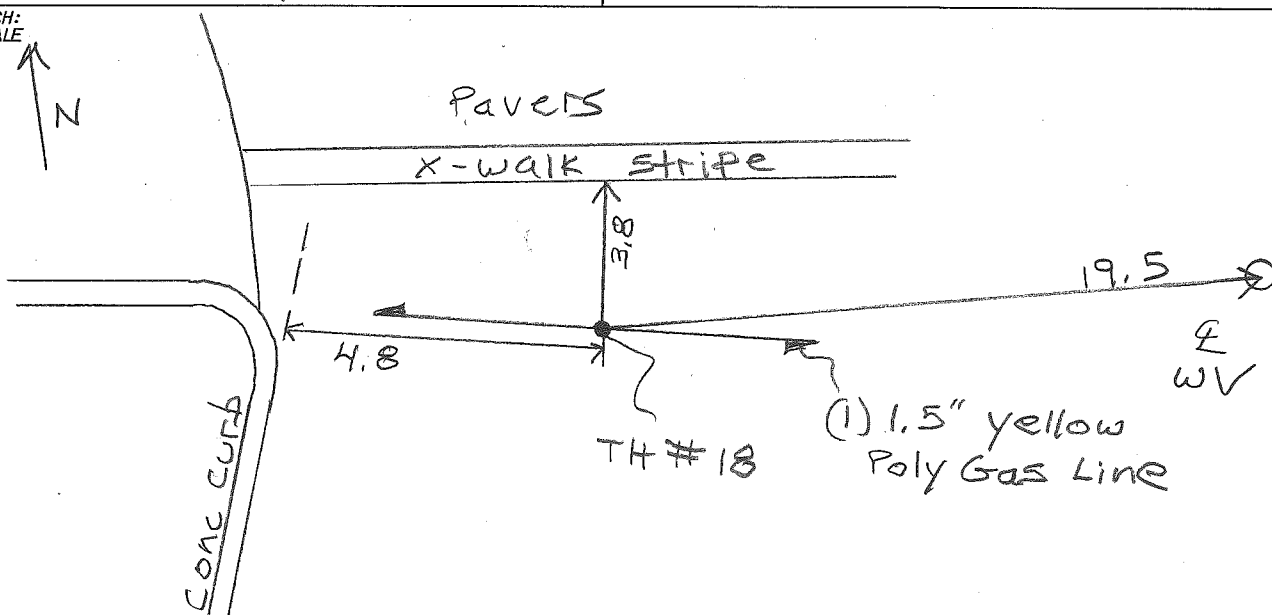
ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA: SURVEY PT. # _____ STATION _____
ROADWAY _____ OFFSET _____ ft. LT. RT. _____
BASELINE: SURVEY CONSTR. OTHER _____ SURVEY PT. ELEV. _____

SURVEYED
PLAN
SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

TEST HOLE
NUMBER

19

EAI JOB No.: 2017031.03

DATE: 12-19-17

LOCATE BY: EM, ZW

SURVEY BY:

CHECKED BY:

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER Asbestos conc.

SIZE / TYPE EXPECTED:

SIZE FOUND: 1" I.D. O.D. NOMINAL SIZE: 6"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER: Manatee Co.

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER Plans

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR

HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK

DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY

ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT

X-CUT OTHER Mag Nail

MEASURED DEPTH: 3.04 ft. 0.928 m ✓
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 6" Gray asbestos
Conc. WL

N. side of
Roundabout

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

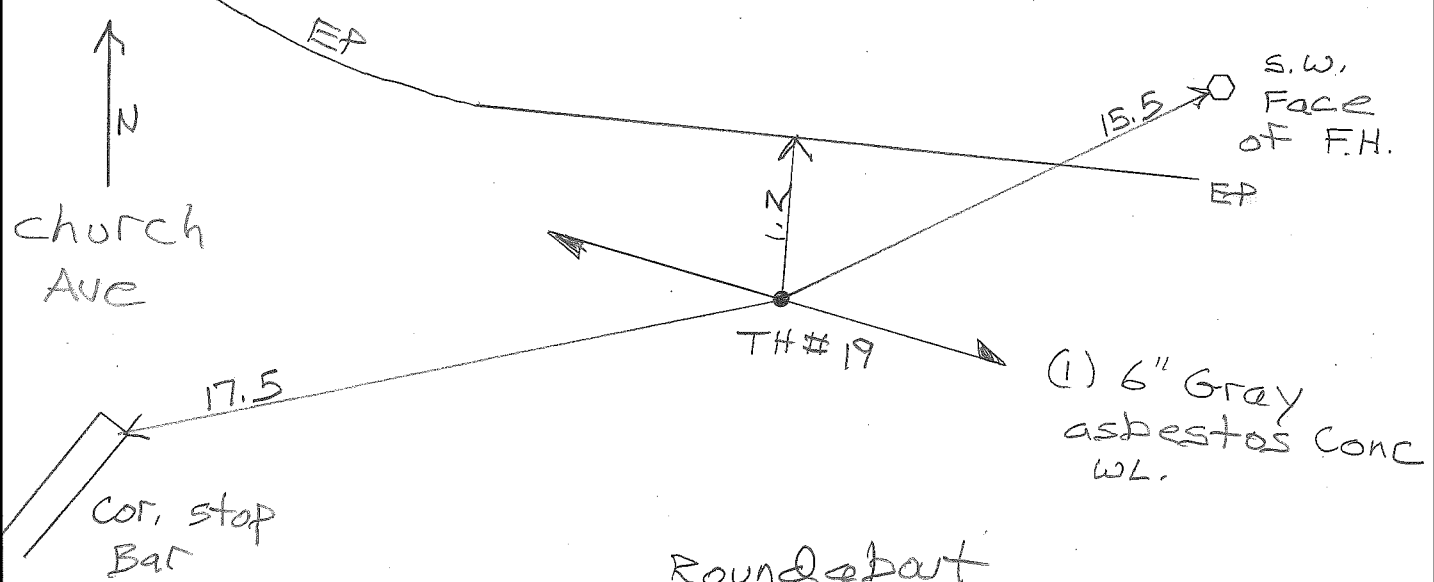
HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. #

STATION

SURVEYED

ROADWAY

OFFSET

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER

SURVEY PT. ELEV.

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

EAI JOB No.: 2017031.03

DATE: 12-14-17

TEST HOLE
NUMBER

22

LOCATE BY: EM, ZW

SURVEY BY:

CHECKED BY:

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER

SIZE / TYPE EXPECTED:

SIZE FOUND: 8.625 I.D. 0.0 NOMINAL SIZE: 8"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER: Manatee Co.

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER Pin Flags

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER

MEASURED DEPTH: 3.87 ft. 1.180 m
(SURVEY MARKER TO TOP OF UTILITY)

NOTES:

(1) 8" Blue PVC WL

N. side Bridge @ Boat Yard

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

3.87

ELEV. (TOP OF UTILITY)

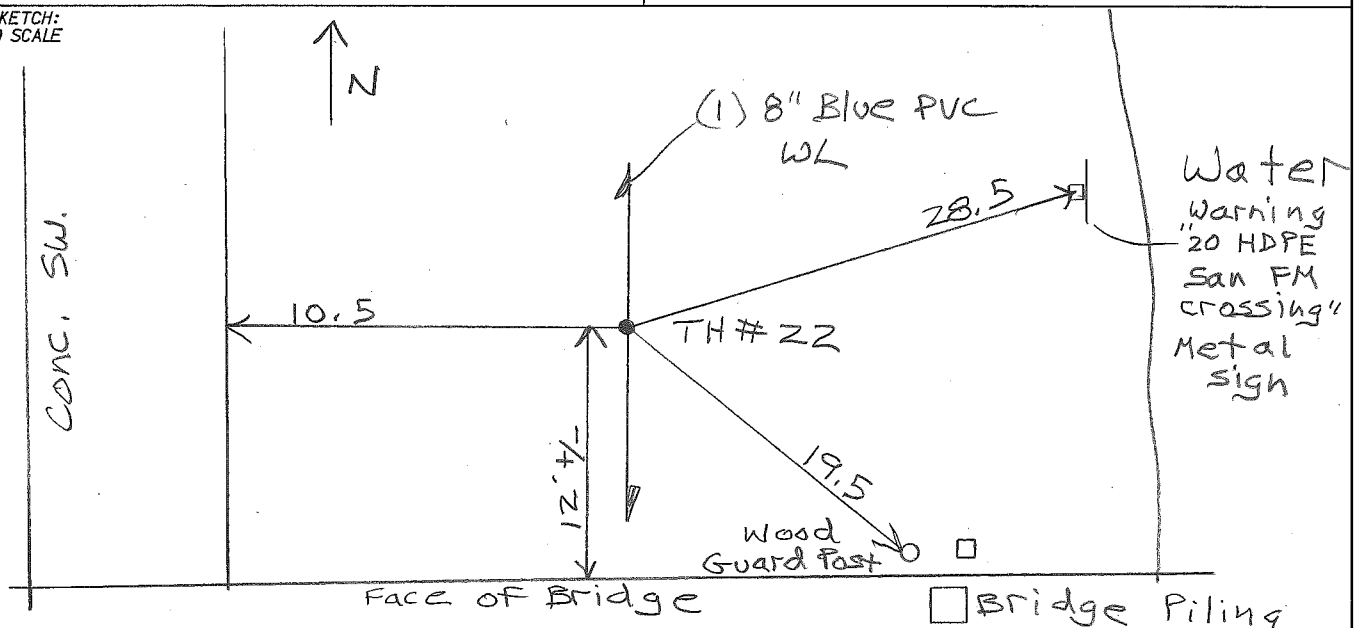
HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. #

STATION

SURVEYED

ROADWAY

OFFSET

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER

SURVEY PT. ELEV.

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFETEST HOLE
NUMBER23EAI JOB No.: 2017031.03DATE: 12-14-17LOCATE BY: EM, ZW

SURVEY BY: _____

CHECKED BY: _____

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER _____

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 1.9" I.D. O.D. NOMINAL SIZE: 1.5"COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____UTILITY OWNER: Frontier

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER USICWAS UTILITY TONABLE?: YES NOTRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHERVISUAL CONFIRMATION OF UTILITY: YES NOREASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR
HAND PROBE WATER PROBE ASPH. PATCH OTHER _____SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK
DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY
ROCK SOLID ROCK LIMEROCK NOT NOTEDMARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT
X-CUT OTHER _____MEASURED DEPTH: 2.82 ft. 0.860 m

NOTES:

(2) 1.5" Black Poly Conduits
Telecom, BT, Frontier.N. side of Roundabout

CROSS SECTION SKETCH:

DIRECTION FACING

SE

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

2.82

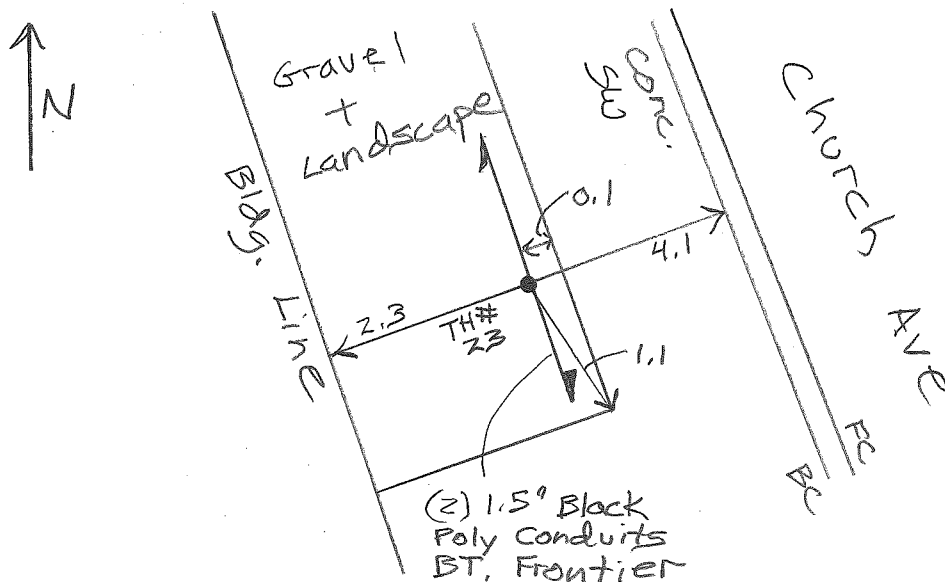
ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

2"

ELEV. (BOTTOM OF UTILITY)

WIDTH (MULTIPLE DUCTS)

4"SITE SKETCH:
NOT TO SCALE

SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED

11/5/14



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

TEST HOLE
NUMBER

25

EAI JOB No.: 2017031.03

DATE: 12-18-17

LOCATE BY: EM, ZW, QC

SURVEY BY: _____

CHECKED BY: _____

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER _____

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER Plastic Fiberglass

SIZE / TYPE EXPECTED: _____

SIZE FOUND: 7.1" I.D. 6" O.D. NOMINAL SIZE: 6"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER _____

UTILITY OWNER: Manatee Co.

FIELD REP.: _____ PHONE #: _____

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER _____

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER _____

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER _____

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER _____

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR

HAND PROBE WATER PROBE ASPH. PATCH OTHER _____

SURFACE TYPE: ASPH CONC. BRICK MANHOLE GRASS LIMEROCK

DIRT GRAVEL VAULT SHELL PULL BOX OTHER _____

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY

ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT

X-CUT OTHER Mag nail

MEASURED DEPTH:

(SURVEY MARKER TO TOP OF UTILITY)

2.45 ft. 0.748 m

NOTES:

(1) 6" Black Plastic
WL

Bay Dr. S @ 3rd St.
S.

CROSS SECTION SKETCH:

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

ELEV. (TOP OF UTILITY)

HEIGHT (MULTIPLE DUCTS)

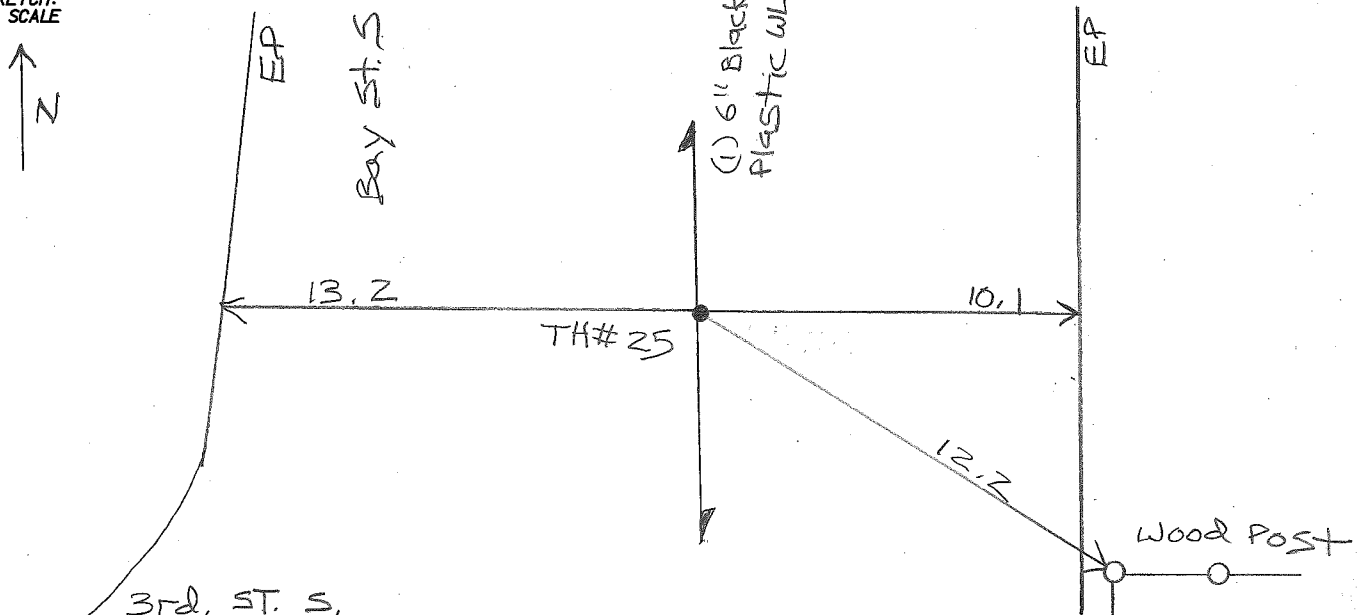
ELEV. (BOTTOM OF UTILITY)

DIRECTION FACING

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. # _____

STATION _____

SURVEYED

ROADWAY _____

OFFSET _____

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER _____

SURVEY PT. ELEV. _____

SCALED



S.U.E. (Vvh) TEST HOLE - FIELD WORK SHEET

PROJECT: MANATEE CO. - FORCE MAIN END OF LIFE

EAI JOB No.: 2017031.03

DATE: 12-20-17

TEST HOLE

NUMBER

25 26

LOCATE BY: EM, ZW, TW

SURVEY BY:

CHECKED BY:

REQUESTED LOCATE: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

LOCATED UTILITY: GAS STORM SANITARY CATV F.O.C. RECLAIMED
FORCE MAIN ELEC TELECOM TRAFFIC SIG. WATER ST. LIGHTS
ITS UNKNOWN OTHER

MATERIAL FOUND: DBC (DIRECT BURY CABLE) CONC. VCP DIP CIP POLY
LEAD PVC WRAPPED STEEL EPOXY STEEL CONCRETE STEEL
RCP CMP UNKNOWN OTHER Asbestos Conc.

SIZE / TYPE EXPECTED:

SIZE FOUND: 7" I.D. O.D. NOMINAL SIZE: 6"

COLOR: WHITE GRAY BLUE GREEN PURPLE BLACK ORANGE
YELLOW PINK PEACH OTHER

UTILITY OWNER: Manatee Co.

FIELD REP.: PHONE #:

HOW WAS OWNER DETERMINED?: PAINT MARKS SIGN FIELD REP.

NAME ON MH / HAND HOLE / PEDESTAL OTHER Plans

DESIGNATED BY: EAI UTIL. OWNER UNK. OTHER

WAS UTILITY TONABLE?: YES NO

TRACER FOUND: PLASTIC TAPE METAL TAPE WIRE NONE OTHER

VISUAL CONFIRMATION OF UTILITY: YES NO

REASON FOR NO VISUAL CONFIRMATION OF UTILITY: WATER INTRUSION DEPTH
SOIL TYPE OTHER

IF NOT VISUAL HOW WAS LOCATION DETERMINED: RADIO DETECTION GPR

HAND PROBE WATER PROBE ASPH. PATCH OTHER

SURFACE TYPE: ASPH. CONC. BRICK MANHOLE GRASS LIMEROCK

DIRT GRAVEL VAULT SHELL PULL BOX OTHER

SOIL CONDITION: HARD SOFT WET MOIST DRY SAND CLAY

ROCK SOLID ROCK LIMEROCK NOT NOTED

MARKER SET: 3/8" ROD NAIL/FLASHER 60d NAIL HUB PAINT DOT

X-CUT OTHER Mag Nail

MEASURED DEPTH:

(SURVEY MARKER TO TOP OF UTILITY)

2.80 ft. 0.855 m

NOTES:

(1) 6" Black Asbestos
Conc. WL.

church Ave @ 1st.
St. N.

CROSS SECTION SKETCH:

DIRECTION FACING

ELEV. SURVEY MARK

COVER (MEASURED DEPTH)

2.80

ELEV. (TOP OF UTILITY)

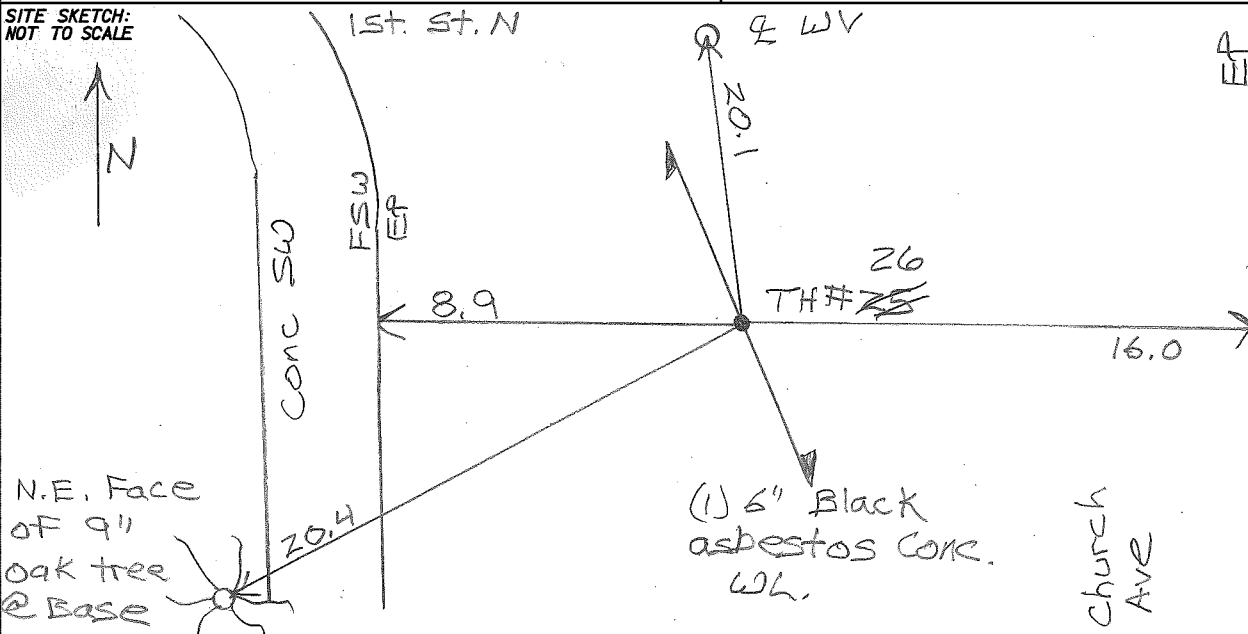
HEIGHT (MULTIPLE DUCTS)

ELEV. (BOTTOM OF UTILITY)

EXISTING GRADE
(APPROXIMATE)

WIDTH (MULTIPLE DUCTS)

SITE SKETCH:
NOT TO SCALE



SURVEY DATA:

SURVEY PT. #

STATION

SURVEYED

ROADWAY

OFFSET

ft. LT. RT.

PLAN

BASELINE: SURVEY CONSTR. OTHER

SURVEY PT. ELEV.

SCALED