

Technical Specifications

City of Boca Raton

Old Floresta, Lake Floresta Park, and Tunison Palms Infrastructure Upgrades

RFP 2026-006-NP

January 2026



City of Boca Raton
Old Floresta, Lake Floresta Park, and Tunison Palms
Infrastructure Upgrades
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DIVISION 1

GENERAL REQUIREMENTS

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SECTION 01010

SUMMARY OF WORK

PART 1 -- GENERAL

1.01 LOCATION OF WORK

- A. All Work of this Contract is located in the Lake Floresta Park, Tunison Palms, and Old Floresta Historic District neighborhoods between NW 12th Avenue and the El Rio Canal (west / east), and W. Palmetto Park Road and the Lake Worth Drainage District (LWDD) L-8 Canal (south / north), in Boca Raton, Florida. The project limits are shown on the Drawings.

1.02 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment, tools, services and incidentals to complete all Work required by these Specifications and as shown on the Drawings.
- B. The Contractor shall perform the Work complete, in place, disinfect where applicable, and make ready for continuous service, and shall complete repairs, replacements and restoration required as a result of damages caused during this construction.
- C. 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.

1.03 GENERAL DESCRIPTION OF CONTRACT

- A. In general, the Work includes water and sewer infrastructure improvements and roadway, stormwater, and right-of-way improvements within the Lake Floresta Park, Tunison Palms, and Old Floresta Historic District neighborhoods. The project area is bounded by the LWDD L-8 Canal to the north, the El Rio Canal to the east, W. Palmetto Park Rd to the south, and NW 12th Avenue to the west. The scope of work is generally outlined below and more specifically identified in the Contract Documents.
 - 1. Installation of approximately 34,190 linear feet of water mains and 7,040 linear feet of force mains within road rights-of-way to replace existing mains. This includes abandonment of the existing water main and force main systems, tie-ins to existing systems, new water services, relocation and reconnection of the water services from the new water main to the house where existing water mains were located at the rear of properties, new fire hydrants, as well as restoration of private and public property.
 - 2. Rehabilitation and conversion of existing Educator Lift Station (LS) No. 27 into a duplex style submersible pump station utilizing the existing precast concrete manhole as the pump station wet well and including installation of a new valve

vault, force main piping, tie-in to existing gravity sewer, and necessary modifications/improvements for electrical / instrumentation and controls equipment.

3. Replacement of existing submersible sewage pumps at existing LS No. 53 including necessary electrical modifications / improvements required to support upsized pumps.
4. Roadway, stormwater, and right-of-way improvements including removal and replacement of existing pathways, stormwater improvements, milling and resurfacing of the roadways, new signage and pavement markings, and other improvements as indicated on the plans.
 - a. All work and Materials shall conform to the FY 2024-25 Edition of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction" unless stated otherwise in the Special Provisions and shall be the basis for construction of the work.
 - b. Any reference in the "DOT Specifications" to the Engineer or Department shall mean the Engineer of Record or the CITY of Boca Raton on this project. Specific references are made to certain portions of the "DOT Specifications" in these specifications to facilitate the Contractor. References to Owner shall mean the City of Boca Raton.
 - c. A copy of the Florida Department of Transportation Standard Specifications is available through FDOT.
 - i. The FDOT Standard Specifications for Road and Bridge Construction - Technical Special Provisions (see Appendix H) shall have precedence over the FDOT Standard Specifications.
5. In the event of conflicting provisions, the more specific provision will take precedence over the less specific; the more stringent will take precedence over the less stringent; the more expensive item will take precedence over the less expensive. On all drawings, figures take precedence over scaled dimensions. Scaling of dimensions, if done, is done at the Contractor's own risk.

1.04 ITEMS SPECIFIED ON DRAWINGS

- A. Items of material, equipment, machinery, etc. may be specified on the Drawings and not in the Specifications. Such items shall be provided by the Contractor in accordance with the Specification on the Drawings.

1.05 CONTRACTOR'S USE OF PREMISES

- A. Coordinate use of premises with the Engineer. All conflicts over use of the premises shall be resolved without additional cost to the Owner.
- B. Contractor shall assume full responsibility for security of all Contractor's and Subcontractor's materials and equipment stored on the site.
- C. Site Security - The Contractor shall provide construction site security.

- D. If directed by the Owner or Engineer, move any stored items which interfere with operations of Owner at no additional cost to the Owner.
- E. Obtain and pay for use of additional storage or work areas if needed to perform the Work.
- F. On-site areas, if available, for construction staging and/or storage are shown on the Drawings. Obtain and pay for off-site staging/storage areas as required if on-site areas are insufficient for construction activities. No storage facility is provided by the Owner.

1.06 OWNER OCCUPANCY

- A. Coordinate all construction operations with Owner and Engineer to minimize conflict and to facilitate Owner usage.

1.07 ABBREVIATIONS AND REFERENCES

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

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

AASHTO	-	The American Association of State Highway and Transportation Officials
ACI	-	American Concrete Institute
AGA	-	American Gas Association
AGMA	-	American Gear Manufacturers Association
IEEE	-	Institute of Electrical and Electronic Engineers
AISC	-	American Institute of Steel Construction
AISI	-	American Iron and Steel Institute
AFBMA	-	Anti-Friction Bearing Manufacturer's Association
ANSI	-	American National Standards Institute
API	-	American Petroleum Institute
ASCE	-	American Society of Civil Engineers
ASME	-	American Society of Mechanical Engineers

ASTM	-	American Society of Testing Materials
AWPA	-	American Wood Preservers Association
AWS	-	American Welding Society
AWWA	-	American Water Works Association
FED.SPEC.	-	Federal Specifications
FDOT	-	Florida Department of Transportation
CIPRA	-	Cast Iron Pipe Research Association
DIPRA	-	Ductile Iron Pipe Research Association
NCPI	-	National Clay Pipe Institute
NEMA	-	National Electrical Manufacturers Association
NFPA	-	National Fire Protection Association
NEWWA	-	New England Water Works Association
TCA	-	Tile Council of America Inc.
AWPA	-	American Wood Preservation Association
NAVY SPEC.	-	Navy Department Specification
NEC	-	National Electric Code
NLMA	-	National Lumber Manufacturers Association
SAE	-	Society of Automotive Engineers Standards
SFBC	-	South Florida Building Code
SHBI	-	Steel Heating Boiler Institute
SBCC	-	Standard Building Code Congress International, Inc.
DOT	-	Department of Transportation
U.L., Inc.	-	Underwriter's Laboratories, Inc.
OSHA	-	Occupation Health and Safety Act
SSPC	-	Steel Structures Painting Council
ISA	-	Instrument Society of America
EPA	-	Environmental Protection Agency (U.S.)

- C. When no reference is made to a code, standard, or specification, the standard specifications of the ASTM, the ANSI, the ASME, the IEEE, or the NEMA shall govern.
- D. Where a reference to FDOT Standard Specification is made, the FDOT Standard Specifications for Road and Bridge Construction shall apply.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.01 CONTRACT FORMS

- A. Forms to be used for administration of the Contract and coordination of the Work are provided following this page.

END OF SECTION

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APPLICATION FOR PAYMENT NO. _____

To: _____ (OWNER)
From: _____ (CONTRACTOR)
Contract: _____
Project: _____
OWNER's Contract No. _____ ENGINEER's Project No. _____
For Work accomplished through the date of: _____.

1. Original Contract Price: \$ _____
2. Net change by Change Orders and Written Amendments (+ or -): \$ _____
3. Current Contract Price (1 plus 2): \$ _____
4. Total completed and stored to date: \$ _____
5. Retainage (per Agreement):
 _____ % of completed Work: \$ _____
 _____ % of stored material: \$ _____
 Total Retainage: \$ _____
6. Total completed and stored to date less retainage (4 minus 5): \$ _____
7. Less previous Application for Payments: \$ _____
8. **DUE THIS APPLICATION (6 MINUS 7):** \$ _____

Accompanying Documentation: _____

CONTRACTOR'S Certification:

The undersigned CONTRACTOR certifies that (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied on account to discharge CONTRACTOR's legitimate obligations incurred in connection with Work covered by prior Applications for Payment numbered 1 through _____ inclusive; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to OWNER indemnifying OWNER against any such Lien, security interest or encumbrance); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and not defective.

Dated _____

CONTRACTOR

By: _____

State of _____

County of _____

Subscribed and sworn to before me this _____
day of _____, _____

Notary Public

My Commission expires: _____

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

Dated _____

ENGINEER

By: _____

EJCDC No. 1910-8-E (1996 Edition)

Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America and the Construction Specification Institute.

ITEM	UNIT PRICE	ESTIMATED QUANTITY	SCHEDULE OF VALUES AMOUNT	QUANTITY COMPLETED	AMOUNT	%	MATERIAL STORED	AMOUNT COMPLETED AND STORED
1.	\$		\$		\$		\$	\$
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								
16.								
17.								
18.								
19.								
20.								
21.								
22.								
23.								
24.								
25.								
26.								
27.								
28.								
29.								
30.								
TOTAL			\$		\$		\$	\$

Note: Total Schedule of Values Amount should equal the current Contract Price.

FIELD ORDER

Project: _____ Field Order Number: _____

From: _____
To: _____ Date: _____

A/E Project Number: _____
Re: _____ Contract For: _____

You are hereby directed to execute promptly this Field Order which interprets the Contract Documents or orders minor changes in the Work without change in Contract Sum or Contract Time.

If you consider that a change in Contract Sum or Contract Time is required, submit a Change Order Request to the A/E immediately and prior to proceeding with this Work.

Specification Section:	Paragraph:	Drawing Reference:	Detail:
------------------------	------------	--------------------	---------

Description of Interpretation or Change:

☐ Attachments

Signed by: _____ Date: _____

Copies: ☐ Owner ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ File

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WORK CHANGE DIRECTIVE

No. _____

DATE OF ISSUANCE _____

EFFECTIVE DATE _____

OWNER _____

CONTRACTOR _____

Contract: _____

Project: _____

OWNER's Contract No. _____ ENGINEER's Project No. _____

You are directed to proceed promptly with the following change(s):
Description:

Purpose of Work Change Directive:

Attachments: (List documents supporting change)

If OWNER or CONTRACTOR believe that the above change has affected Contract Price any Claim for a Change Order based thereon will involve one or more of the following methods as defined in the Contract Documents.

Method of determining change in
Contract Price:

- ☐ Unit Prices
☐ Lump Sum
☐ Cost of the Work _____

Estimated increase (decrease) in Contract Price:
\$ _____.
If the change involves an increase, the estimated
amount is not to be exceeded without further
authorization.

Estimated increase (decrease) in Contract Times:
Substantial Completion: _____ days;
Ready for final payment: _____ days.

RECOMMENDED:

AUTHORIZED:

ENGINEER

By: _____

OWNER

By: _____

EJCDC No. 1910-8-F (1996 Edition)

Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America and the Construction Specifications Institute.

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CHANGE ORDER

No. _____

DATE OF ISSUANCE _____

EFFECTIVE DATE _____

OWNER _____

CONTRACTOR _____

Contract: _____

Project: _____

OWNER's Contract No. _____ ENGINEER's Contract No. _____

ENGINEER _____

You are directed to make the following changes in the Contract Documents:

Description:

Reason for Change Order:

Attachments: (List documents supporting change)

CHANGE IN CONTRACT PRICE:
Original Contract Price \$ _____
Net Increase (Decrease) from previous Change Orders No. ____ to ____: \$ _____
Contract Price prior to this Change Order: \$ _____
Net increase (decrease) of this Change Order: \$ _____
Contract Price with all approved Change Orders: \$ _____

CHANGE IN CONTRACT TIMES:
Original Contract Times: Substantial Completion: _____ Ready for final payment: _____ (days or dates)
Net change from previous Change Orders No. ____ to No. ____: Substantial Completion: _____ Ready for final payment: _____ (days)
Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____ (days or dates)
Net increase (decrease) this Change Order: Substantial Completion: _____ Ready for final payment: _____ (days)
Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____ (days or dates)

RECOMMENDED:

APPROVED:

ACCEPTED:

By: _____ By: _____ By: _____
ENGINEER (Authorized Signature) OWNER (Authorized Signature) CONTRACTOR (Authorized Signature)

Date: _____ Date: _____ Date: _____

EJCDC 1910-8-B (1996 Edition)

Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associated General Contractors of America and the Construction Specifications Institute.

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CERTIFICATE OF SUBSTANTIAL COMPLETION

DATE OF ISSUANCE _____

OWNER _____

CONTRACTOR _____

Contract: _____

Project: _____

OWNER's Contract No. _____ ENGINEER's Project No. _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To _____

OWNER

And To _____

CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees shall be as follows:

OWNER: _____

CONTRACTOR: _____

The following documents are attached to and made a part of this Certificate:

[For items to be attached see definition of Substantial Completion as supplemented and other specifically noted conditions precedent to achieving Substantial Completion as required by Contract Documents.]

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on _____
Date

ENGINEER

By: _____
(Authorized Signature)

CONTRACTOR accepts this Certificate of Substantial Completion on _____
Date

CONTRACTOR

By: _____
(Authorized Signature)

OWNER accepts this Certificate of Substantial Completion on _____
Date

OWNER

By: _____
(Authorized Signature)

CERTIFICATE OF FINAL COMPLETION

DATE OF ISSUANCE:

OWNER: City of Boca Raton (City)

CONTRACTOR: _____

Contract: Old Floresta Infrastructure Upgrades

Project: _____

OWNER's Contract No.: _____ ENGINEER's Project No.: _____

The Project to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR, and ENGINEER, and that all punchlist items included in the Certificate of Substantial Completion have been completed. The Project is hereby declared to have reached final completion and that all portions of the project have been fully completed and are in compliance with the Contract Documents on

DATE OF FINAL COMPLETION

Executed by ENGINEER on _____
Date

Holtz Consulting Engineers
ENGINEER

By: _____
(Authorized Signature)

CONTRACTOR accepts this Certificate of Final Completion on _____
Date

CONTRACTOR

By: _____
(Authorized Signature)

OWNER accepts this Certificate of Final Completion on _____
Date

OWNER

By: _____
(Authorized Signature)

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SECTION 01014

CONSTRUCTION SEQUENCING

PART 1 - GENERAL

1.01 SITE CONDITIONS

- A. Several areas of construction under this Contract must be coordinated with the Owner and Engineer within the project area and accomplished in a logical order to maintain existing utility services, traffic flow, and minimize disruptions to residents within the project area, and to allow construction to be completed within the time allowed by Contract Documents. Contractor will also coordinate his activities with the other contractors as necessary to allow orderly and timely completion of all the Work.
- B. When access through construction areas must be disrupted, Contractor will provide alternate acceptable access for City and operation personnel or other contractors. Disruption of normal traffic shall require prior review and written approval by City.
- C. Contractor is required to coordinate his activities in the interface or common areas with other contractors and the operations personnel.
- D. Interconnections to be made with existing utilities may depend on the closure of existing valves. These valves may be old, may be difficult to operate, and may not seal properly. Contractor shall notify the Owner and Engineer prior to operations requiring their closure sufficiently in advance to allow the Owner to confirm proper operation and sealing of the valves. Only Owner's personnel shall operate existing valves and equipment. If necessary based on the condition of existing valves, Contractor shall coordinate corrective measures or temporary facilities necessary to attain the shut-off needed to perform the Work at no additional cost to the Owner and without interrupting existing utility services.

1.02 GENERAL CONSTRUCTION CONSTRAINTS

- A. Contractor shall not interfere with the operation of existing utility services or adjacent facilities during construction of the improvements. This section lists constraints which Contractor shall consider in developing the overall plan of construction. This list of constraints is not intended to release Contractor from responsibility to coordinate the Work in any manner that will ensure project completion within the time allowed. A construction sequence within each major area of Work, where necessary, is included in Paragraph 1.04 of this section.
- B. The Contractor shall be responsible for coordinating the Work in any manner that will ensure project completion within the time allowed.
- C. The Owner may require Contractor to perform facility shutdown work during non-regular working days and hours at no additional cost to the Owner.

- D. Contractor shall be aware that there will be other contractors on site undertaking other work. The Contractor will be expected to cooperate fully in the coordination of the Work with all other onsite contractors so as not to cause delays or additional costs to the Owner.
- E. Contractor is made aware that any request to perform work and or implement road closure type Maintenance of Traffic (MOT) facilities outside of normal working hours or during nighttime hours will require formal review of and approval from City Management. Review of work proposed outside of normal working hours shall be performed on a case by case basis and cannot be guaranteed for any of the proposed contract work. No additional payment shall be made to the Contractor for rejection of requested night time working operations.

1.03 EXISTING UTILITY SERVICE CONSTRAINTS

- A. The existing utility services shall remain in service at all times while the Contractor completes the Work. Contractor shall coordinate this Work with the Engineer and Owner.

1.04 CONSTRUCTION SEQUENCE

- A. Within 14 days after the effective date of the Notice to Proceed, submit to the Engineer a Construction Sequence Schedule. The schedule shall be in a Gant chart format using Primavera or Microsoft Project, and shall show, at a minimum, work as described in Section 01010 performed in a manner that maintains existing utility services, traffic flow, and vehicular access to all properties throughout construction, except as specifically noted herein, as required by Contract.
- B. General Sequencing Constraints
 - 1. The Contractor shall divide the overall project area into four contiguous areas, each comprising no more than 6,000 linear feet of open-cut water main installation. The Contractor may undertake work that results in disturbance of existing conditions (e.g., any excavations, interruption of normal traffic, etc.) in only one of the identified areas at a time, and must complete all work, including restoration of all utility services and driveway/sidewalk repairs, with the exception of final milling and resurfacing of roadway pavement within that area prior to moving to the next construction area. Upon request of the Contractor, contingent upon satisfactory demonstration of timely and adequate restoration, the Owner and Engineer may grant approval for the Contractor to exceed the 6,000 linear feet limitation of open cut water main construction at any given time.
 - 2. CONTRACTOR shall not order nor receive delivery for critical project materials more than 3 months in advance of anticipated installation date, unless otherwise approved in writing by the OWNER/ENGINEER. Note that force main construction shall not occur until after proposed water mains have been installed, placed into service, and existing water mains have been abandoned, as necessary

3. Following installation of water mains and temporary restoration of roadway, sidewalks, and driveways impacted by water main construction, Contractor shall perform flushing/pigging, pressure testing, disinfection, sampling, final connection to existing water services, and cutting/capping/grouting/abandonment of existing water mains. Existing water mains shall not be cut/capped/abandoned prior to transfer of all proposed water services throughout the project area unless otherwise approved in writing by the Owner/Engineer.
 - a. Contractor shall submit a proposed water main abandonment plan and sequence. At a minimum, plan shall include a detailed schedule, staffing plan, line stop plan, restraining plan, proposed tie-in materials, and a list of emergency repair materials available on-site for tie-in work. Owner/Engineer may request additional documentation prior to allowing the Contractor to proceed with tie-ins. Contractor shall be prepared to install and maintain multiple line stops in service simultaneously as necessary to effectively isolate water mains proposed for abandonment.
 - b. Contractor shall furnish sufficient labor force, equipment, tie-in materials (including emergency repair clamps and additional ductile iron mechanical joint bends/sleeves for each utility tie-in location and to the sole satisfaction of the OWNER. Contractor shall also ensure that additional line stop equipment (including saddles, valves, plugs, etc...) is available within 12-hours notice for emergency operations as necessary.
4. Following completion of abandonment of existing water mains, Contractor shall proceed with construction of proposed force mains. Construction of proposed force mains shall not begin prior to abandonment of existing water mains in order to prevent additional utility conflicts with existing to-be-abandoned water mains, unless otherwise approved in writing by the Owner/Engineer.
 - a. Following regulatory clearance to place proposed force main facilities into service, Contractor shall perform tie-ins and cutting/capping/abandonment of existing force main. Contractor shall submit a proposed force main tie-in and abandonment plan to the Owner/Engineer for review a min. 30-days in advance of proposed tie-in date. Tie-ins shall not be performed prior to Owner/Engineer review of proposed plan. At a minimum, plan shall include a detailed schedule, staffing plan, double line stop bypass assembly plan, restraining plan, proposed tie-in materials, and list of emergency repair materials available on-site for tie-in work. Owner/Engineer may request additional documentation prior to allowing the Contractor to proceed with tie-ins. Contractor shall be prepared to maintain a double line stop bypass assembly for a min. of 14 calendar days or more as needed based upon Contractor's means and methods. Contractor's plan shall consider transition from one common force main to the two parallel 14" and 8" force mains located at NW 9th Ct. Recent potholing provided evidence that the existing force mains are 14" and 10" at NW 9th Ct. However, historical record drawings note existing force mains are 14" and 8" at this location.

Double line stop bypass assembly shall remain in service throughout the duration of transitioning from existing to proposed force mains.

- b. Lift Station No. 53 pump replacement/improvements are anticipated to be performed in tandem / during transition from existing force main to new force main and while the double line stop bypass assembly is in service. Proposed pump replacement and electrical improvements shall be performed prior to rerouting LS No. 53 through the proposed new force main along NW 10th Ct.
 - c. Transition of Lift Station No. 73 from existing to proposed force main is anticipated to be performed in tandem / during transition from existing force main to new force main and while the double line stop bypass assembly is in service.
 - d. Contractor shall furnish sufficient labor force, equipment, tie-in materials (including emergency repair clamps and additional ductile iron mechanical joint bends/sleeves for each utility tie-in location and to the sole satisfaction of the OWNER. Contractor shall also ensure that additional line stop equipment (including saddles, valves, plugs, etc...) is available within 12-hours notice for emergency operations as necessary.
 - e. Contractor shall furnish sufficient means for containing, collecting, and disposing of sewage collected during force main tie-in and abandonment operations (vac-trucks or approved equal). Contractor shall coordinate maintaining vac-trucks or similar on standby throughout force main tie-in operations as necessary.
- 5. Proposed stormwater and drainage improvements shall not commence construction prior to completing installation of proposed water and force main improvements, unless otherwise approved in writing by the Owner/Engineer.
 - 6. Contractor shall submit proposed sequence of construction and corresponding Maintenance of Traffic (MOT) plan for Owner/Engineer review and acceptance.
 - 7. Damaged and/or removed sidewalk shall be replaced within fourteen (14) calendar days from date of damage/removal. Any damage/removal which creates a public safety concern shall be repaired/replaced immediately.
 - 8. Final milling and resurfacing of roadway pavement shall not commence until all underground utility work, and all other surface restoration in all areas have been completed and approved.
 - 9. All driveways shall be made accessible at the end of each working day.
 - 10. After proposed improvement piping is installed, the Contractor shall restore the first and second lifts of asphalt (temporary patch) within fourteen (14) days after installation of the piping. Prior to installation of temporary patch within paved areas, temporarily restored trenches shall be backfilled/compacted/maintained to City's sole satisfaction including but not limited to installation of compacted limerock and/or millings. Under no

circumstances shall subgrade backfill be backfilled to grade in traffic areas unless otherwise authorized by City personnel.

11. All affected residents and property owners shall be notified in writing a minimum of two (2) weeks prior to any disruption to or construction in the road or rights-of-way adjacent to their homes. The notification shall also indicate any special traffic, parking arrangements, or home access that will affect residents. At no time during construction shall sidewalk construction prevent ingress/egress for individual homeowners/residents. Contractor shall provide means for crossing or otherwise navigating around, to the satisfaction of the Owner, all concrete sidewalks while curing.
12. All affected residents shall be notified a minimum of 48 hours prior to interruption of water service. Water service interruptions shall be scheduled to minimize the duration of the interruption, and in no case shall exceed four (4) hours.
13. Access for emergency vehicles shall be maintained at all times to all homes and businesses.
14. Provisions shall be made with local bus transit, school buses, garbage collection, mail delivery, and other affected services for continuation of service.
15. All excavations shall be restored, barricaded (outside traffic areas only w/ prior written approval), or covered with steel road plate at the end of each work day, and when work is suspended for greater than 8 hours, to prevent hazardous conditions.
16. Security of materials storage areas is the Contractor's responsibility. Pipe and material shall not be strung out along installation routes for longer than five (5) calendar days prior to installation. The above provisions affecting vehicular traffic shall be addressed in the Temporary Traffic Control Plan specified in Section 01570.

1.05 EXISTING BELOW AND ABOVE GRADE FACILITIES

- A. The Contract Documents may contain limited data relative to existing utility installations and structures above and below the ground surface due to lack of accurate records of these installations. Data shown are not guaranteed as to their completeness or accuracy. It is the responsibility of the Contractor to make additional investigations in accordance with Contract Documents in a timely fashion to be fully informed of the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations and schedule to avoid construction time delays and additional costs to the Owner.
- B. The Contractor shall protect all utility installations and structures from damage during the Work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the Engineer. The Contractor shall so arrange his operations as to avoid any damage to these

facilities. All required protective devices and construction shall be provided by the Contractor at their expense. All existing utilities damaged by the Contractor which are shown on the Drawings or have been located in the field by Contractor's field investigation shall be repaired by the Contractor, at their expense, as directed by the Engineer. No separate payment shall be made for such protection or repairs to utility installations or structures.

- C. Utility installations or structures owned or controlled by the Owner or other governmental body which are shown on the Drawings to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as a part of the general cost of doing the Work and shall be included in the prices bid for the various contract items. No separate payment shall be made therefor.
- D. The Contractor shall, at all times in performance of the Work, employ approved methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of utility installations and structures; and shall, at all times in the performance of the Work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the Owner thereof to that end.
- E. The Contractor shall maintain current and accurate Record Drawings of the Work and of any existing above grade facility not shown on the Drawings within the project site area.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01021

ALLOWANCES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. Include in the Total Base Bid amount all allowances stated in the Contract Documents.
- B. Include in the Schedule of Payment Values the amount of each Allowance specified herein.

1.02 RELATED REQUIREMENTS

- A. Section 01025 – Measurement and Payment
- B. Section 01300 – Submittals

1.03 CONTRACT ALLOWANCES

- A. Included in the Contract is the following allowance:

Bid Item	Description	Not to Exceed Amount
99	Ductile Iron Fittings (Water Main)	\$58,500.00
100	Ductile Iron Fittings (Force Main)	\$252,000.00
127	Clear and Grade Swale Allowance	\$20,000.00
	TOTAL	

- B. Reimbursement.

- 1. The Contractor is not entitled to the entire allowance amount as part of the Contract. Reimbursement will be made up to the maximum amount identified for the allowance. If at the completion of the project the actual reimbursements total less than the amount in 1.03.A, the difference shall be deducted by Change Order.
- 2. Payment of the allowance shall be based on documentation from the Contractor as deemed required by the Engineer.
- 3. The allowance for Bid Item 99 applies to payment for increasing quantities for Bid

Item 21 beyond what is shown in the bid schedule. If Owner elects to increase the quantity of Bid Item 21, it shall be paid for under allowance for Bid Item 99. The use of the allowance funds in Bid Item 99 shall be based upon the Engineer's review of data collected under this project in consultation with the Owner. The value of any work authorized by the Owner for use of the allowance shall be based on the value of Bid Item 21.

4. The allowance for Bid Item 100 applies to payment for increasing quantities for Bid Item 22 beyond what is shown in the bid schedule. If Owner elects to increase the quantity of Bid Item 22, it shall be paid for under allowance for Bid Item 100. The use of the allowance funds in Bid Item 100 shall be based upon the Engineer's review of data collected under this project in consultation with the Owner. The value of any work authorized by the Owner for use of the allowance shall be based on the value of Bid Item 22.
5. The allowance for Bid Item 127 applies to payment for increasing quantities for Bid Items 125 and/or 126 beyond what is shown in the bid schedule. If Owner elects to increase the quantity of Bid Items 125 or 126, it shall be paid for under allowance for Bid Item 127. The use of the allowance funds in Bid Item 127 shall be based upon the Engineer's review of data collected under this project in consultation with the Owner. The value of any work authorized by the Owner for use of the allowance shall be based on the value of Bid Items 125 and 126.
6. The performance of work associated with allowance bid items shall be performed concurrent with the Old Floresta Infrastructure Upgrades. No additional Contract time shall be granted as part of the use of this allowance.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE

- A. This section describes the methods by which measurement will be made of the quantities for which payment will be made for this project. Payment will be made for those items listed in the Bid Form only as full and complete payment for materials, labor, tools, and equipment, for performing all operations necessary to complete the Work. The omission of reference to any item in this description shall not alter the intent of the Bid Form or relieve the CONTRACTOR of any requirements of the Contract. No separate payment shall be made for project administration, overhead and profit, or incidental work such as pressure testing, disinfection, warranties, etc. All work not specifically listed in the Bid Form shall be included in the prices for the various items listed on the Bid Form.
- B. FDOT references to FDOT pay items were used for roadway, sidewalk, and stormwater construction items commonly used by FDOT and can be found in the FDOT Basis of Estimates Manual. Unless specifically modified in the language below or as noted in Appendix H, FDOT pay items and pay item numbers are in accordance with the FY 2024-25 Edition of the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction. Changes to standard FDOT units of measure, scope of work, acceptance criteria, method of measurement, payment, or other provisions are noted in the individual bid item language. Non-standard FDOT pay items include an "X" (e.g. "104-X"). Bid Item descriptions as defined herein shall take precedence over the FDOT specifications.
- C. Partial payments shall be made for approved materials stored at the project site at the presentation of material invoices in the proper manner, in accordance with the Conditions of the Contract.
- D. CONTRACTOR is advised that bid items may be deleted if not required. No compensation will be made for deleted/not used bid items.
- E. CONTRACTOR shall note construction sequencing requirements as detailed in Section 01014 – Construction Sequencing. CONTRACTOR shall not order nor receive delivery for critical project materials more than 3 months in advance of anticipated installation date, unless otherwise approved in writing by the OWNER/ENGINEER. Note that force main construction shall not occur until after proposed water mains have been installed, placed into service, and existing water mains have been abandoned, as necessary.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MEASUREMENT AND PAYMENT

A. Bid Item 1: Mobilization and Demobilization.

The CONTRACTOR's bid lump sum price shall include all labor, materials, equipment, expenses, fees, taxes, overhead, and profit necessary to mobilize all required equipment, materials, labor forces (on/off jobsite), temporary facilities/utilities, furnishing construction survey layouts and staking, implementing a construction mitigation plan, permits (e.g., dewatering), etc. to the project site, ready to begin work on the project, as well as demobilization, removal, clean-up, all necessary restoration, administrative activities associated with project close-out, and requirements as detailed in FDOT Standard Specifications Section 0101-1 (unless otherwise specified herein). Work to be included as part of this bid line item also includes public outreach activities required by the CONTRACTOR during the course of the Contract, including preparation and distribution of door hangers to the residents for notification of upcoming construction activities (CONTRACTOR is required to tag each property ahead of mainline work on each affected street and each work activity on private property) and/or service interruptions for hookups and tie-ins, and attendance at public meetings as well as preparation of boards or other supporting materials for use at such meetings. Pay item for Mobilization applies to the entire project. Partial payments for mobilization and demobilization will be made according to the following:

Percent of Original Contract Amount Earned	Allowable Percent of the Bid Lump Sum Price to be Paid
10%	25%
25%	50%
50%	75%
100%	100%

Payment item for mobilization and demobilization shall not exceed five percent (5%) of the Contract Price. Should the bid price for mobilization and demobilization exceed five percent (5%) of the Contract Price, any amount over will be paid with the CONTRACTOR's final payment application.

B. Bid Item 2: Insurance and Bonds.

The CONTRACTOR's bid lump sum price shall include all expenses, overhead, and profit for procuring and maintaining in force for the duration of the project all specified bonds and insurance required by the Contract Documents and State and federal law. Payment will be made at the bid price in the monthly Application for Payment subsequent to the provision of proof of all required bonds and insurance. Payment item for bonds and insurance shall not exceed two percent (2%) of the Contract Price. Should the bid price for bonds and insurance exceed 2% of the Contract Price, any amount over the 2% will be paid with the CONTRACTOR's final payment application.

C. Bid Item 3: Maintenance of Traffic (MOT).

The CONTRACTOR's bid lump sum price shall include preparation, administration, execution, and all aspects of compliance with traffic regulations and maintenance of traffic as specified in Section 01570, including preparation, implementation, and processing of detailed Maintenance of Traffic (MOT) Plans for approval by the City of Boca Raton Traffic Engineer and Palm Beach County Traffic Engineering prepared and signed by a Work Site Traffic Supervisor (WTS) as certified by the American Traffic Safety Services Association (A.T.S.S.A.) or by a Florida-licensed traffic engineer and shall be in accordance with FDOT Standard Specifications, Section 102. All requirements under Specification Section 01570 fall under this bid item. This pay item includes furnishing all materials, labor, and equipment required to install, maintain, and remove any and all required traffic control measures to control the flow of traffic through the work area within the public rights of way during the various phases of the project. Preparation and submittal of any MOT plans to required agencies as well as coordination with those parties shall also be included in this item. Portable Changeable Message Signs are required to be placed two weeks in advance of all projects at a minimum of two (2) locations and remain in place for the duration of construction activities.

Payment for Bid Item 3 will be made in equal monthly amounts throughout the duration of active construction. No more than 5% of pay item may be billed prior to CONTRACTOR's mobilization onto project site.

D. Bid Item 4: Audio Video Documentation.

The CONTRACTOR's bid lump sum price shall include all labor, materials, equipment, and incidentals necessary to produce and submit the audio-video documentation in accordance with Specification Section 01320 (all requirements under Section 01320 fall under this bid item).

Payment for Bid Item 4 will be made in equal monthly amounts throughout the duration of active construction.

E. Bid Item 5: Project Record Documents

The CONTRACTOR's bid lump sum price shall include all labor, materials, equipment, expenses, fees, taxes, overhead and profit necessary to produce and submit the Project Record Documents for the complete project in accordance with Specification Section 01720 (all requirements under Section 01720 fall under this bid item).

Payment for Bid Item 5 will be made in full upon completion, submittal, and approval of all project record documents required under Section 01720.

F. Bid Item 6: Utility Locates

The CONTRACTOR's bid lump sum price shall include full compensation for labor, materials, equipment and incidentals necessary to locate and trace the underground utility lines using electromagnetic (EM), ground penetrating radar (GPR), and testholes to confirm the location of existing underground utilities that may pose a conflict or otherwise impact this Work. Conflicts may be determined as shown on the plans and/or observed in the field. The CONTRACTOR shall be responsible to locate all buried pipelines, power,

sanitary (including sewer laterals) and telephone and control utilities. This work also includes marking the located lines with the appropriate colors and performing soft dig excavations in areas of conflict, as deemed necessary by the CONTRACTOR to construct the work as shown on the Contract Drawings and as specified herein. This work is necessary to verify existing utilities to develop detailed pipe layout drawings, schedule(s) of materials and equipment, and shop drawings based on the findings of the field locations and investigations. The CONTRACTOR shall include all information collected from their utility location work and the associated soft dig excavations on their as-built drawings. CONTRACTOR shall abide by all Sunshine 811 requirements. No additional payment shall be made to the CONTRACTOR for re-work required and/or damage caused by the CONTRACTOR's failure to perform adequate subsurface utility investigation prior to beginning construction.

Subsurface Utility Locate Quality levels A through D, as necessary for performing utility locates, are described below:

Quality Level A - Precise horizontal and vertical location of utilities obtained by the actual exposure and subsequent measurement of subsurface utilities, usually at a specific point.

Quality Level B - Information obtained through the application of appropriate surface geophysical methods to determine the existence and approximate horizontal position of subsurface utilities.

Quality Level C - Information obtained by surveying and plotting visible above-ground utility features and by using professional judgment in correlating this information to Quality Level D.

Quality Level D - Information derived from existing records or oral recollections.

G. Bid Item 7: NPDES Permit/Environmental and Erosion Control Measures.

Measurement for payment for preparation and implementation of the NPDES Permit/Environmental and Erosion Control Measures, which includes NPDES and SWPPP requirements for this item, will be made at the lump sum price named in the Bid Schedule.

Payment for this item shall include preparation, submittal, and approval of NPDES Permit Application (Notice of Intent and Notice of Termination), reporting by a person holding a certification as an FDEP NPDES Construction Site Inspector, preparing Stormwater Prevention Pollution Plan (SWPPP) and implementation of best management practices (BMP) and environmental pollution protection throughout construction including but not limited to silt fences, temporary stabilized gravel construction entrance(s), concrete wash down area(s), sandbags, and straw bales, gutter buddies adjacent to existing and proposed curb inlets, drainage structure/inlet protection, and turbidity barriers.

Payment for this item will be made in equal monthly payments throughout the duration of active construction and will not be issued prior to Mobilization.

H. Bid Items 8 through 14: Furnish and Install Water Main and Pipe

The CONTRACTOR's bid unit price per linear foot (LF) shall include all labor, materials, equipment, and incidentals necessary to furnish and install water main piping as shown on the Drawings and specified herein, and as directed by the ENGINEER, including but not limited to providing all necessary pipe trench excavation (including hand digging), disposal of all excess material, bracing, sheeting, dewatering, bedding, backfill and compaction of trenches, identification/location tape, pipe/joint restraints, density testing, flushing, pressure testing, pigging and cannon flushing, disinfection, spool pieces, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, concrete cover where min. cover cannot be met, cleaning the site of work location, existing pipe support and point repairs on existing water main piping (including asbestos cement piping (ACP)) when new water main is routed under existing water main piping, providing temporary restoration of mailboxes, temporary restoration of driveways, temporary restoration of roads, temporary restoration of structures, removal / disposal / replacement of sidewalks / driveways / asphaltic-concrete / rock / base / subgrade (including necessary sawcutting), protection of existing utilities, structures, trees, shrubs, and lawns, protection and repair of existing irrigation systems and all other work required for the complete and functional installation of the water main.

Payment for this item includes all restoration work including, but not limited to, grading, temporary cover as deemed necessary by the Authorities Having Jurisdiction, temporary and final roadway restoration (not including final milling and resurfacing), temporary and final paver/concrete restoration (at raised Traffic Calming Speed Humps), temporary and final restoration of asphalt Traffic Calming Speed Humps, temporary and final restoration of landscaped/enhanced traffic calming areas/humps (including landscaping), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final restoration of concrete sidewalk and access driveways as necessary for proposed utility work (including within Palm Beach County rights-of-way), and temporary and final paver/ornate driveway restoration.

- a. Roadway restoration within City rights-of-way under this line item includes but is not limited to furnishing and placement of LBR 40 stabilized subgrade, LBR 100 limerock base (2T or 16" minimum thickness whichever is greater), One (1) lift of minimum two inch (2") SP-12.5 asphalt over open-cut width (W+4')), tack coat, applying prime coat and furnishing all such material to complete to the cross-section and thickness as shown in the Contract Documents including excavation, grading, importing material, transportation, handling, cleaning, positioning, compacting of limerock base to LBR 100 and subgrade to LBR 40, densities passed, removal and disposal of all necessary pavement, base material, subgrade and installation of temporary asphalt as deemed necessary by the CITY/OWNER.
- b. This pay item includes complete restoration of Traffic Calming Enhanced Speed Humps. See Traffic Calming Construction Detail Enhanced Speed Hump.
- c. Roadway restoration within Palm Beach County (PBC) rights-of-way under this line item includes but not limited to furnishing and placement of LBR 40 stabilized subgrade, LBR 100 limerock base (16" minimum thickness with 6" maximum per layer), first asphalt lift: 1 1/2" of Type SP-12.5 Structural Course (Traffic Level C) and second lift: 1" FC-9.5 over open-cut width (W+4')), tack coat (0.05 Gal/SY), applying prime coat (RC-70 at 0.10 Gal/SY) and furnishing all such material to

complete to the cross-section and thickness as shown in the Contract Documents including excavation, grading, importing material, transportation, handling, cleaning, positioning, compacting of limerock base to LBR 100 and subgrade to LBR 40, densities passed, removal and disposal of all necessary pavement, base material, subgrade and installation of temporary asphalt as deemed necessary by the CITY/OWNER and PBC.

Final sod/swale restoration included under this pay item shall include but not limited to the following:

- a. The CONTRACTOR is required to mow all sodded areas immediately prior to final acceptance of the project by the CITY/OWNER.
- b. The CONTRACTOR shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance including payment for the water.
- c. Removal and disposal of existing sod, furnish and install new sod, 4" layer of topsoil, clearing, grading, and disposal of excess material.
- d. Meet the requirements in Section 02500- Surface Restoration, 3.01 Grading and Sodding.
- e. Restoration of irrigation and sod shall be completed within 3 calendar days.

I. Bid Items 15 through 19: Furnish and Install Force Main and Pipe

The CONTRACTOR's bid unit price per linear foot (LF) shall include all labor, materials, equipment, and incidentals necessary to furnish and install force main piping as shown on the Drawings, as specified herein, and as directed by the ENGINEER, including but not limited to providing all necessary pipe trench excavation (including hand digging), surveying, erosion control, dewatering, disposal of all excess material, bracing, sheeting, dewatering, rock removal, bedding, backfill and compaction of trenches, identification/location tape, pipe/joint restraints, density testing, pigging and cannon flushing, pressure testing, spool pieces, maintaining uninterrupted services of existing utilities, concrete cover where min. cover cannot be met, cleaning the site of work location, existing pipe support and point repairs on existing utility piping (including asbestos cement piping (ACP)) when new force main is routed under/over existing utilities, providing temporary restoration of mailboxes, temporary restoration of driveways, temporary restoration of roads, temporary restoration of structures, removal / disposal / replacement of sidewalks / driveways / asphaltic concrete / rock base / subgrade (including necessary sawcutting), protection of existing utilities, structures, trees, shrubs, and lawns, protection and repair of existing irrigation systems and all other work required for the complete and functional installation of the force main.

Payment for this item includes all restoration work including, but not limited to, grading, temporary cover as deemed necessary by the Authorities Having Jurisdiction, temporary and final roadway restoration (not including final milling and resurfacing), temporary and final paver/concrete restoration (at raised Traffic Calming Speed Humps), temporary and final restoration of asphalt Traffic Calming Speed Humps, temporary and final restoration of landscaped/enhanced traffic calming areas/humps (including landscaping), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final restoration of concrete sidewalk and access driveways as necessary for proposed

utility work (including within Palm Beach County rights-of-way), and temporary and final paver/ornate driveway restoration.

- a. Roadway restoration within City rights-of-way under this line item includes but is not limited to furnishing and placement of LBR 40 stabilized subgrade, LBR 100 limerock base (2T or 16" minimum thickness whichever is greater), One (1) lift of minimum two inch (2") SP-12.5 asphalt over open-cut width (W+4')), tack coat, applying prime coat and furnishing all such material to complete to the cross-section and thickness as shown in the Contract Documents including excavation, grading, importing material, transportation, handling, cleaning, positioning, compacting of limerock base to LBR 100 and subgrade to LBR 40, densities passed, removal and disposal of all necessary pavement, base material, subgrade and installation of temporary asphalt as deemed necessary by the CITY/OWNER.
- b. This pay item includes complete restoration of Traffic Calming Enhanced Speed Humps. See Traffic Calming Construction Detail Enhanced Speed Hump.
- c. Roadway restoration within Palm Beach County (PBC) rights-of-way under this line item includes but not limited to furnishing and placement of LBR 40 stabilized subgrade, LBR 100 limerock base (16" minimum thickness with 6" maximum per layer), first asphalt lift: 1 1/2" of Type SP-12.5 Structural Course (Traffic Level C) and second lift: 1" FC-9.5 over open-cut width (W+4')), tack coat (0.05 Gal/SY), applying prime coat (RC-70 at 0.10 Gal/SY) and furnishing all such material to complete to the cross-section and thickness as shown in the Contract Documents including excavation, grading, importing material, transportation, handling, cleaning, positioning, compacting of limerock base to LBR 100 and subgrade to LBR 40, densities passed, removal and disposal of all necessary pavement, base material, subgrade and installation of temporary asphalt as deemed necessary by the CITY/OWNER and PBC.

Final sod/swale restoration included under this pay item shall include but not limited to the following:

- a. The CONTRACTOR is required to mow all sodded areas immediately prior to final acceptance of the project by the CITY/OWNER.
- b. The CONTRACTOR shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance including payment for the water.
- c. Removal and disposal of existing sod, furnish and install new sod, 4" layer of topsoil, clearing, grading, and disposal of excess material.
- d. Meet the requirements in Section 02500- Surface Restoration, 3.01 Grading and Sodding.
- e. Restoration of irrigation and sod shall be completed within 3 calendar days.

J. Bid Item 20: Furnish and Install 6" DR-11 HDPE Force Main via Horizontal Directional Drill

The CONTRACTOR's bid unit price per linear foot (LF) shall be measured horizontally, and shall include all labor, materials, equipment, tools, and incidentals necessary for the complete construction of a HDPE force main via horizontal directional drill (HDD), as shown on the Drawings and specified herein, and as directed by the ENGINEER. For installations that include more than one conduit and/or pipe installed in parallel (in one pull), the horizontal linear foot unit price shall include all conduits and/or pipes. This item includes, but is not limited to, all welding, fusing, drilling, reaming, slurry, disposal of drilling fluid and excess materials and cuttings, furnishing and installing all pipe and tracer wire, MJ adapters w/ 316 stainless steel stiffeners, density testing, flushing, hydrostatic testing, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, and lawns, protection and repair of existing irrigation systems, restoration of both sod, swales, landscaping, and sidewalks, and all other work required for the complete installation of the force main not covered under other bid items.

Payment for this item includes all restoration work including, but not limited to, grading, temporary cover as deemed necessary by the Authorities Having Jurisdiction, temporary and final roadway/pathway restoration (not including final milling and resurfacing), sod/swale restoration, and final landscape restoration along the corridor affected by HDD operations.

Final sod/swale restoration included under this pay item shall include but not limited to the following:

- a. The CONTRACTOR is required to mow all sodded areas immediately prior to final acceptance of the project by the CITY/OWNER.
- b. The CONTRACTOR shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance including payment for the water.
- c. Removal and disposal of existing sod, furnish and install new sod, 4" layer of topsoil, clearing, grading, and disposal of excess material.
- d. Meet the requirements in Section 02500- Surface Restoration, 3.01 Grading and Sodding.
- e. Restoration of irrigation and sod shall be completed within 3 calendar days.

K. Bid Item 21 and 22: Furnish and Install DIP Fittings

The CONTRACTOR's bid unit price per ton (TON) shall include all labor, materials, equipment, tools, and incidentals necessary for the complete installation of the underground fittings, gaskets, restraints, stiffeners, adapters, and all other materials for a complete installation, as shown on the Drawings and specified herein.

Weight shall be based on compact fitting weight only, not including restraining glands (megalugs).

Additional fittings required as a result of CONTRACTOR means/methods which are not otherwise required nor shown on the Contract Drawings shall not be included in billable tonnage. Such additional fittings include but are not limited to additional sleeves and/or bends required as a result of failure to properly align existing / proposed or proposed / proposed pipe segments and/or additional sleeves required due to CONTRACTOR's proposed phasing of construction.

L. Bid Item 23: Investigation and Determination of New Meter Location

The CONTRACTOR's bid unit price per each (EA) shall include full compensation for labor, materials, equipment and incidentals necessary to investigate and field verify the location, size, and condition of the existing water meter, service line, and existing house valve, and coordinate with the CITY/OWNER and ENGINEER to determine the location for the new meter and new service tie-in (at house valve or existing meter) based on site conditions, constructability, residents' preference regarding work on private property, and the CITY/OWNER's final and sole discretion. This item also includes performing investigations as necessary to identify any/all existing auxiliary water sources located at the property, as defined by F.A.C. and Florida Plumbing Code. This item also includes performing investigations as necessary to identify whether an existing potable water irrigation backflow prevention device is installed and/or is required including identifying type/size required in accordance with Florida Plumbing Code.

New meter locations shown on the Drawings are for graphical purposes only. Payment for this item includes coordination with CITY/OWNER and ENGINEER to determine the appropriate location for the new meter and service tie-in and also includes submission of line sketch templates for properties requiring investigation as directed by OWNER. Contractor shall submit separate line sketch for each property which details existing property layout (generalized layout showing property line, street name(s), water main location, and house with cardinal directions), proposed service line layout/size, existing/proposed meter locations (1 thru 15), proposed connection point (house/exist. meter), connection to existing irrigation including identification of potable vs. auxiliary (well, canal, etc...) water source, existing backflow preventer presence/type/size, and existing meter size.

M. Bid Item 24 through 26: Furnish & Install New Water Meter and Meter Box Assembly

The CONTRACTOR's bid unit price per each (EA) shall be full compensation for a complete installation, including the new meter box, automatic meter reading (AMR) register, brass fittings, poly tubing and adapters, bushings, nipples, unions/couplings, wyes/tees, and any and all tools or materials required for a complete connection to proposed city-side and private-side water services, 6-inch thick compacted ¾-inch rock base extended 12-inch beyond the meter box perimeter, bedding, cutting and plugging the existing water service on the city-side of the meter, removal and disposal of existing water meter box and service, and all else necessary for a complete and functional installation.

Payment for this item shall be made upon the complete installation of the meter assembly along with providing field installation / billing data including the completed old and new meter number (including old and new AMR register number), meter readings, and new meter GPS coordinates/location. All required data shall be submitted in the format provided in the Section 01720 Project Record Document Form. Additionally, all installations shall be documented and digitally photographed before and after installation. Photographs taken

prior to installation shall include a view of all piping within the meter box, current meter reading, and a note that provides the meter identification number and address of the meter. Photographs taken post-installation shall include a view of all piping within the meter box, current meter reading, meter serial number information, and the transponder serial number with the installation address written on it. Digital copies of the photographs shall be provided to the City and labeled appropriately.

Water meters shall be provided to the CONTRACTOR in batches at the discretion of the CITY/OWNER on no greater than a weekly basis during active meter/service transfers. The CITY/OWNER shall not issue additional batches of meters until the CONTRACTOR has submitted complete and accurate data, per the Section 01720 Project Record Document Form, for at least seventy-five percent (75%) of the meters issued in the previous batch. No payment shall be made to the CONTRACTOR for the work performed until all required data and supporting documentation have been submitted in accordance with this provision. CONTRACTOR shall furnish all necessary field installation / billing data to the CITY/OWNER on a weekly basis during active meter/service transfers.

This item includes reading and recording of the existing meter readings prior to and upon installation of the new meter, along with delivering the existing meter to CITY/OWNER utility services. New meters are to be furnished by the CITY/OWNER and installed by the CONTRACTOR. New Meter boxes shall be furnished and installed by the CONTRACTOR. Old water meters shall be delivered to the CITY/OWNER. Payment for this item also includes removing the factory provided meter register and installing new AMR registers provided to the CONTRACTOR by the CITY/OWNER. Factory provided registers shall be returned to the CITY/OWNER. CONTRACTOR shall record the sticker tag bar code that comes with the new AMR register on the meter change-out sheet. This line item also includes changing out the register cover of the AMR with the register cover originally on the meter.

Payment this line item includes all restoration work for components impacted by installation including, but not limited to, grading, irrigation, temporary and final roadway restoration (not including final milling and resurfacing), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final concrete sidewalk and driveway restoration, temporary and final paver driveway restoration.

Final sod restoration included under this pay item shall include but not limited to the following:

- The CONTRACTOR is required to mow all sodded areas immediately prior to final acceptance of the project by the CITY/OWNER.
- The CONTRACTOR shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance including payment for the water.
- Removal and disposal of existing sod, furnish and install new sod, 4" layer of topsoil, clearing, grading, and disposal of excess material.
- Meet the requirements in Section 2500 - Surface Restoration, 3.01 Grading and Sodding.

Restoration of irrigation and sod shall be completed within 3 calendar days.

N. Bid Item Nos. 27 thru 28: Furnish & Install Dual Check Valve Assemblies

The CONTRACTOR's bid unit price per each (EA) shall be full compensation for furnishing and installing a replaceable dual check assembly and necessary fittings/couplings/unions including furnishing all tools or materials required for a complete and functional installation as shown on the Contract Drawings, as specified herein, and/or as directed by the CITY/OWNER/ENGINEER.

Payment this line item includes all restoration work including, but not limited to, grading, sodding, irrigation, restoration of all areas/surfaces/structures impacted by installation (not including final milling and resurfacing), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final concrete sidewalk and access driveways, temporary and final paver driveway restoration.

Restoration of irrigation and sod shall be completed within 3 calendar days.

O. Bid Item Nos. 29 thru 30: Furnish & Install Meter Setter Assemblies

The CONTRACTOR's bid unit price per each (EA) shall be full compensation for furnishing and installing specified meter setter and necessary fittings/couplings/unions including furnishing all tools or materials required for a complete and functional installation as shown on the Contract Drawings, as specified herein, and/or as directed by the OWNER/ENGINEER. Meter Setter assemblies shall only be installed where specifically directed by the OWNER/ENGINEER as necessary to tie-in to existing service lines.

Payment this line item includes all restoration work including, but not limited to, grading, sodding, irrigation, restoration of all areas/surfaces/structures impacted by installation (not including final milling and resurfacing), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final concrete sidewalk and access driveways, temporary and final paver driveway restoration.

Restoration of irrigation and sod shall be completed within 3 calendar days.

P. Bid Items 31 through 36: Furnish & Install New Single and Double Water Service

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, and incidentals necessary to furnish and install a water service from the new or existing water main to the new meter box including furnishing and installing 2-inch polyethylene (PE) water service tubing, 3" casing pipe and roadway crossing (for services crossing swale to swale, crossing roads greater than 2-lanes, or as otherwise indicated), location wire, service saddles, corporation stops, curb stops, poly tubing and poly adapters, nipples, wyes/tees, elbows, fittings and all other materials required for the complete connection (excluding piping/appurtenances to connect the proposed meter to the house and meter assembly fittings included under separate Bid Items), as shown on the Drawings and specified herein, and as directed by the ENGINEER, including but not limited to: excavation, disposal of all excess materials, bracing, sheeting, and dewatering, bedding, backfilling and compaction of trenches.

This item also includes density testing, concrete testing, flushing, hydrostatic testing, disinfection, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of

existing utilities, structures, trees, shrubs, and lawns, and all other work required for the complete installation of the service connection.

Short water service shall be defined by 25 feet or less of service piping (from main to front of new water meter box location). Long water service shall be defined by more than 25 feet of service piping (from main to front of new water meter box location).

Water service locations shown on plan views are for graphical purposes only. This line item includes coordination with CITY/OWNER and ENGINEER to determine the appropriate location for new water services at main line.

This item includes alternative means/methods for installation as required by specific site conditions at different properties to facilitate installation of proposed replacement service lines including trenchless installation where necessary to avoid damaging existing landscaping and/or hardscaping. CONTRACTOR acknowledges that existing right-of-way is often thoroughly built-out and coordinated trenchless installation shall be required.

Payment for this bid item includes all restoration work including, but not limited to, grading, temporary cover as deemed necessary by the Authorities Having Jurisdiction, irrigation restoration, restoration of landscaping and hardscaping disturbed by construction, temporary and final roadway restoration (not including final milling and resurfacing), temporary and final paver/concrete restoration (at raised Traffic Calming Speed Humps), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final concrete sidewalk and access driveways including within F.D.O.T. and Palm Beach County rights-of-way, temporary and final paver driveway restoration.

- a. Roadway restoration within City rights-of-way under this line item includes but is not limited to furnishing and placement of LBR 40 stabilized subgrade, LBR 100 limerock base (2T or 16" minimum thickness whichever is greater), One (1) lift of minimum two inch (2") SP-12.5 asphalt over open-cut width (W+4')), tack coat, applying prime coat and furnishing all such material to complete to the cross-section and thickness as shown in the Contract Documents including excavation, grading, importing material, transportation, handling, cleaning, positioning, compacting of limerock base to LBR 100 and subgrade to LBR 40, densities passed, removal and disposal of all necessary pavement, base material, subgrade and installation of temporary asphalt as deemed necessary by the CITY/OWNER.
- b. Roadway restoration within Palm Beach County (PBC) rights-of-way under this line item includes but not limited to furnishing and placement of LBR 40 stabilized subgrade, LBR 100 limerock base (16" minimum thickness with 6" maximum per layer), first asphalt lift: 1 1/2" of Type SP-12.5 Structural Course (Traffic Level C) and second lift: 1" FC-9.5 over open-cut width (W+4')), tack coat (0.05 Gal/SY), applying prime coat (RC-70 at 0.10 Gal/SY) and furnishing all such material to complete to the cross-section and thickness as shown in the Contract Documents including excavation, grading, importing material, transportation, handling, cleaning, positioning, compacting of limerock base to LBR 100 and subgrade to LBR 40, densities passed, removal and disposal of all necessary pavement, base material, subgrade and installation of temporary asphalt as deemed necessary by the CITY/OWNER and PBC.

Final Sod restoration included under this pay item shall include but not limited to the following:

- The CONTRACTOR is required to mow all sodded areas immediately prior to final acceptance of the project by the CITY/OWNER.
- The CONTRACTOR shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance including payment for the water.
- Removal and disposal of existing sod, furnish and install new sod, 4" layer of topsoil, clearing, grading, and disposal of excess material.
- Meet the requirements in Section 2500 - Surface Restoration, 3.01 Grading and Sodding.
- Restoration of irrigation and sod shall be completed with 3 calendar days.

Q. Bid Items 37 through 38: Furnish & Install Water Service Pipe and Fittings on Residential Private Property (Rear Water Service Relocation) (See Sheet G-4 for add. Details)

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, and incidentals necessary to furnish and install a horizontally directional drilled (HDD) (or other trenchless methods as reviewed/accepted by OWNER) 1- inch, 1.5-inch, or 2-inch service on private property from new meter location at front of property to existing water service connection point at the existing house valve or at the old meter. Water service pipe / fittings shall be schedule 40 PVC or copper matching the pipe size of the existing water service or the proposed meter size, whichever is greater. Hand digging/excavation may be used at the connection points only. Trenching and excavation by machinery on private property will not be permitted. The connection location is to be determined under Bid Item 23, prior to commencement of the work in this bid item. Should the site conditions require use of hand digging/excavation (without machinery) in lieu of HDD, it will be paid out of this bid item at no additional cost to the CITY/OWNER. The number of rear yard water services will be determined by the count of units installed and accepted by CITY/OWNER and ENGINEER. The CONTRACTOR will be required to provide a complete and working water service to each structure.

This bid item includes all water service piping and fittings for tie-in connection at the downstream side of the new meter and to the existing water service connection point at the existing house valve or at the old water meter which will include cutting existing water service and connecting new water service piping with all required fittings and in accordance with statutory plumbing code, any site/property specific tie-in requirements as called-out and/or as required, all excavation for the trench, disposal of all excess materials, backfilling and compaction of trenches, flushing, hydrostatic testing, disinfection, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, irrigation systems, and lawns, applying for and obtaining building plumbing permit from CITY/OWNER, crew time for searching/excavating for existing water service plus any other labor or materials for a complete and working water service. Connections shall be made within five feet of the existing house valve or old meter as detailed on the Contract Plans. This bid item includes reconnection of existing irrigation systems or other water connections on the service line. This item also includes demolition, abandonment, and legal disposal of existing water service as shown on the Drawings and as specified herein. No greater than 25% of unit shall be billable prior to completing final connection.

This item includes cutting, capping, and plugging existing water service near new tie-in connection point.

This item includes all restoration of private property including but not limited to replacement or repair of existing driveways landscaping, sodding, irrigation systems, driveways, decorative walls, fencing, mailboxes, asphalt, pavers, and concrete and all else necessary for a complete and functional installation.

CONTRACTOR acknowledges that existing private property is often thoroughly built-out and coordinated trenchless installation shall be required at some properties.

Restoration must be to the satisfaction of the CITY/OWNER.

Restoration of irrigation and sod shall be completed within 3 calendar days.

This line item includes Proper Grounding of the Existing Structures Electrical System, per FBC, if necessary.

A State of Florida licensed plumber must perform this work as it is on private property.

- R. Bid Items 39 through 40: Furnish & Install Water Service Pipe and Fittings on Residential Private Property (Rear Water Service Relocation) (Old Floresta Historic District Limits per Sheet G-4)

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, and incidentals necessary to furnish and install a horizontally directional drilled (HDD) (or other trenchless methods as reviewed/accepted by OWNER) 1- inch, 1.5-inch, or 2-inch service on private property from new meter location at front of property to existing water service connection point at the existing house valve or at the old meter. Water service pipe / fittings shall be schedule 40 PVC or copper matching the pipe size of the existing water service or the proposed meter size, whichever is greater. Hand digging/excavation may be used at the connection points only. Trenching and excavation by machinery on private property will not be permitted. The connection location is to be determined under Bid Item 23, prior to commencement of the work in this bid item. Should the site conditions require use of hand digging/excavation (without machinery) in lieu of HDD, it will be paid out of this bid item at no additional cost to the CITY/OWNER. The number of rear yard water services will be determined by the count of units installed and accepted by CITY/OWNER and ENGINEER. The CONTRACTOR will be required to provide a complete and working water service to each structure.

This bid item includes all water service piping and fittings for tie-in connection at the downstream side of the new meter and to the existing water service connection point at the existing house valve or at the old water meter which will include cutting existing water service and connecting new water service piping with all required fittings and in accordance with statutory plumbing code, any site/property specific tie-in requirements as called-out and/or as required, all excavation for the trench, disposal of all excess materials, backfilling and compaction of trenches, flushing, hydrostatic testing, disinfection, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, irrigation systems, and lawns, applying for and

obtaining building plumbing permit from CITY/OWNER, crew time for searching/excavating for existing water service plus any other labor or materials for a complete and working water service. Connections shall be made within five feet of the existing house valve or old meter as detailed on the Contract Plans. This bid item includes reconnection of existing irrigation systems or other water connections on the service line. This item also includes demolition, abandonment, and legal disposal of existing water service as shown on the Drawings and as specified herein. No greater than 25% of unit shall be billable prior to completing final connection.

This item includes cutting, capping, and plugging existing water service near new tie-in connection point.

This item includes all restoration of private property including but not limited to replacement or repair of existing driveways landscaping, sodding, irrigation systems, driveways, decorative walls, fencing, mailboxes, asphalt, pavers, and concrete and all else necessary for a complete and functional installation.

CONTRACTOR acknowledges that existing private property is often thoroughly built-out and coordinated trenchless installation shall be required at some properties.

Restoration must be to the satisfaction of the CITY/OWNER. Restoration of irrigation and sod shall be completed within 3 calendar days.

This line item includes Proper Grounding of the Existing Structures Electrical System, per FBC, if necessary.

A State of Florida licensed plumber must perform this work as it is on private property.

Unit pricing herein includes additional work as necessary for furnishing/installing rear-to-front conversions within the Old Floresta Historic District Limits as denoted on Sheet G-5 of the Contract Drawings. Additional work includes, but is not limited to, working around mature landscaping, limited right-of-way / swale space, and built-out hardscapes as may be required within the predefined Old Floresta Historic District limits on the Contract Drawings. Unit pricing includes the use of multiple installation techniques, as approved by the Owner/Engineer, at each property as necessary to complete installation. Contractor shall review field conditions as necessary in advance of construction.

- S. Bid Item 41: Furnish & Install Water Service Pipe and Fittings on Private Property with connection to existing water service on private property after existing water meter located near front of property (Existing Front Meter)

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, and incidentals necessary to furnish and install new 1-inch, 1.5-inch, or 2-inch water service piping on private property from new meter location at front of property to existing water service connection point after existing water meter located near front of property. Includes cutting and capping existing water service on city-side at existing water main located in rights-of-ways and any site/property specific tie-in requirements as called-out and/or as required.

Water service pipe / fittings shall be schedule 40 PVC or copper matching the pipe size of the existing water service or the proposed meter size, whichever is greater. This bid item is for water service piping, fittings/valves, and connection to existing water service on the customer side of the new water meter which will include all excavation for the trench, disposal of all excess materials, backfilling and compaction of trenches, density testing, flushing, hydrostatic testing, disinfection, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, irrigation systems, and lawns, applying for and obtaining building plumbing permit from CITY/OWNER, crew time for searching/excavating for existing water service, cutting and plugging existing water service on customers side of existing water meter, cutting existing water service and connecting new water service piping after existing water meter located at front of property, water service fittings on the customer side of the water meter, and all fittings required to connect the new water service to the existing water service as required per statutory plumbing code. This item also includes demolition, abandonment, and legal disposal of existing water service and water meter assemblies as shown on the Drawings and as specified herein.

This line item includes all restoration of private property including but not limited to existing driveways, landscaping, sodding, irrigation, decorative walls, fencing, mailboxes, asphalt, pavers, and concrete and all else necessary for a complete and functional installation. Restoration must be to the satisfaction of the CITY/OWNER. Restoration of irrigation and sod shall be completed within 3 calendar days.

A State of Florida licensed plumber must perform this work as it is on private property.

T. Bid Item Nos. 42 through 43: Furnish & Install Reduced Pressure Zone (RPZ) Assembly on Potable Water Irrigation System Connection

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, and incidentals necessary to furnish and install lead-free RPZ assembly on an existing potable water irrigation system connection. Hand digging/excavation may be used at the connection/installation points only. Trenching and excavation by machinery on private property will not be permitted. The connection location shall be coordinated with the ENGINEER, CITY/OWNER, and Property Owner, as defined in the RPZ for Potable Irrigation installation detail, prior to commencement of the work item. The CONTRACTOR will be required to provide a complete and working RPZ assembly. Type, location, size, and quantity of backflow device shall be determined in the field during construction.

Water service pipe / fittings shall be schedule 40 PVC matching the pipe size of the existing irrigation service. This line item is for all irrigation service piping and fittings required for the installation of a RPZ assembly as shown in the attached detail and as specified herein including cutting/reconnecting existing irrigation service, all required fittings, all excavation, disposal of all excess materials, backfilling and compaction, flushing, testing, disinfection, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, water service, irrigation systems, and lawns, crew time for searching/identifying proposed RPZ assembly

installation location on existing irrigation system plus any other labor or materials for a complete and working RPZ assembly installed in accordance with Florida Building Code.

This item includes all restoration of private property including but not limited to replacement or repair of existing driveways landscaping, sodding, irrigation systems, driveways, decorative walls, fencing, mailboxes, asphalt, pavers, and concrete and all else necessary for a complete and functional installation. Restoration must be to the satisfaction of the CITY/OWNER. Restoration of sod shall be completed within 3 calendar days.

A State of Florida licensed plumber must perform this work as it is on private property.

U. Bid Item Nos. 44 through 45: Furnish & Install Pressure Vacuum Breaker (PVB) Assembly on Potable Water Irrigation System Connection

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, and incidentals necessary to furnish and install lead-free PVB assembly on an existing potable water irrigation system connection. Hand digging/excavation may be used at the connection/installation points only. Trenching and excavation by machinery on private property will not be permitted. The connection location shall be coordinated with the ENGINEER, CITY/OWNER, and Property Owner, as defined in the Pressure Type Vacuum Breaker for Potable Irrigation installation detail, prior to commencement of the work item. The CONTRACTOR will be required to provide a complete and working PVB assembly. Type, location, size, and quantity of backflow device shall be determined in the field during construction.

Water service pipe / fittings shall be schedule 40 PVC matching the pipe size of the existing irrigation service. This line item is for all irrigation service piping and fittings required for the installation of a PVB assembly as shown in the attached detail and as specified herein including cutting/reconnecting existing irrigation service, all required fittings, all excavation, disposal of all excess materials, backfilling and compaction, flushing, testing, disinfection, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, water service, irrigation systems, and lawns, crew time for searching/identifying proposed PVB assembly installation location on existing irrigation system plus any other labor or materials for a complete and working PVB assembly installed in accordance with Florida Building Code.

This item includes all restoration of private property including but not limited to replacement or repair of existing driveways landscaping, sodding, irrigation systems, driveways, decorative walls, fencing, mailboxes, asphalt, pavers, and concrete and all else necessary for a complete and functional installation. Restoration must be to the satisfaction of the CITY/OWNER. Restoration of sod shall be completed within 3 calendar days.

A State of Florida licensed plumber must perform this work as it is on private property.

V. Bid Item Nos. 46 through 48: Furnish & Install Atmospheric Vacuum Breaker (AVB) Assembly on Potable Water Irrigation System Connection

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, and incidentals necessary to furnish and install lead-free AVB assembly on an existing potable water irrigation system connection. Hand digging/excavation may be used at the connection/installation points only. Trenching and excavation by machinery on private property will not be permitted. The connection location shall be coordinated with the ENGINEER, CITY/OWNER, and Property Owner, as defined in the attached Atmospheric Type Vacuum Breaker for Potable Irrigation installation detail, prior to commencement of the work item. The CONTRACTOR will be required to provide a complete and working AVB assembly. Type, location, size, and quantity of backflow device shall be determined in the field during construction.

Water service pipe / fittings shall be schedule 40 PVC matching the pipe size of the existing irrigation service. This line item is for all irrigation service piping and fittings required for the installation of an AVB assembly as shown in the attached detail and as specified herein including cutting/reconnecting existing irrigation service, all required fittings, all excavation, disposal of all excess materials, backfilling and compaction, flushing, testing, disinfection, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, water service, irrigation systems, and lawns, crew time for searching/identifying proposed AVB assembly installation location on existing irrigation system plus any other labor or materials for a complete and working AVB assembly installed in accordance with Florida Building Code.

This item includes all restoration of private property including but not limited to replacement or repair of existing driveways landscaping, sodding, irrigation systems, driveways, decorative walls, fencing, mailboxes, asphalt, pavers, and concrete and all else necessary for a complete and functional installation. Restoration must be to the satisfaction of the CITY/OWNER. Restoration of sod shall be completed within 3 calendar days.

A State of Florida licensed plumber must perform this work as it is on private property.

W. Bid Item No. 49: Testing of PVB or RPZ Assembly

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, and incidentals necessary to test PVB and RPZ assemblies, as installed under separate line item, to confirm assemblies operate/function as designed and intended by the original manufacturer and to the sole satisfaction of the CITY/OWNER/ENGINEER. This item also includes any and all restoration of private property required as a result of work performed under this line item, to the sole satisfaction of the CITY/OWNER. Restoration of sod shall be completed within 3 calendar days. Payment for this item shall only be made for verified final successful testing of installed PVB or RPZ assemblies, as installed and tested in accordance with Florida Building Code.

A State of Florida licensed plumber must perform this work as it is on private property.

X. Bid Item 50 through 60: Furnish and Install Valve W/ Box

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, tools, and incidentals necessary to furnish and install valves with boxes, including completed installation of the valve per Valve Box and Concrete Valve Pad/Identification Disc Detail gaskets, restraints, concrete supports, valve box and covers, extension to finish grade, concrete pad at each valve box with one No. 3 cont., 3-inch dia. bronze disc anchored in concrete pad and all other materials for a complete installation, as shown on the Drawings and specified herein.

Y. Bid Item No. 61: Furnish & Install Fire Hydrant Assembly and 6" Gate Valve

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, tools, and incidentals necessary for the complete installation of the fire hydrant assembly, valve, interconnecting piping and lateral. This item does not include the lateral Tee fitting. This item shall include, but is not limited to: furnishing and installing fire hydrant assembly, 6-inch gate valve (including valve box and extension to finished grade and concrete collar in unpaved areas), 6-inch ductile iron pipe from gate valve to fire hydrant, 6" x12" gradelock with M.J. split glands, bends, pipe restraints, Factory Silver, stainless steel (type 304 or better) nuts and bolts for buried hardware, fire hydrant extensions, excavation for the trench, disposal of all excess materials, bracing, sheeting, and dewatering, and all accessories, tracer wire, backfilling and compaction of pipe trenches, density testing, flushing, hydrostatic testing, maintaining uninterrupted flow of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, and lawns, and all other work required for the complete installation of the hydrant, valve, and pipe.

6-inch ductile iron pipe from lateral tee to gate valve paid under Furnish and Install Water Main Pipe and not this item.

Payment for this bid item includes all restoration work including, but not limited to, grading, temporary cover as deemed necessary by the Authorities Having Jurisdiction, irrigation restoration, restoration of landscaping and hardscaping disturbed by construction, temporary and final roadway restoration (not including final milling and resurfacing), temporary and final paver restoration (at raised Traffic Calming Speed Humps), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final concrete sidewalk and access driveways including within F.D.O.T. and Palm Beach County rights-of-way, and temporary and final paver driveway restoration.

This line item shall include removing and salvaging existing fire hydrant assemblies including plugging of the existing main, delivery of the fire hydrant assembly to CITY/OWNER and all restoration WORK.

Z. Bid Items No. 62 through 67: Furnish and Install Tapping Sleeve and Valve

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, tools, and incidentals necessary for the complete installation of the underground tapping sleeve and tapping valve including gaskets, restraints, excavation for the trench, disposal of all excess materials, containment and legal disposal of spilled fluids, bracing, sheeting, and dewatering, backfilling and compaction of trenches, density testing,

maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, irrigation systems, and lawns, pipe material specific requirements including all necessary materials, equipment, labor, and/or pre-evaluation work for installation on PCCP style utilities, and all other materials for a complete installation and for completing the wet tapping operation, as shown on the Drawings and as specified herein.

Payment for this item includes all restoration work including, but not limited to, grading, temporary cover as deemed necessary by the Authorities Having Jurisdiction, temporary and final roadway restoration (not including final milling and resurfacing), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final concrete sidewalk and access driveways including within F.D.O.T. and Palm Beach County rights-of-way, temporary and final paver driveway restoration.

- a. Roadway restoration within City rights-of-way under this line item includes but is not limited to furnishing and placement of LBR 40 stabilized subgrade, LBR 100 limerock base (2T or 16" minimum thickness whichever is greater), One (1) lift of minimum two inch (2") SP-12.5 asphalt over open-cut width (W+4')), tack coat, applying prime coat and furnishing all such material to complete to the cross-section and thickness as shown in the Contract Documents including excavation, grading, importing material, transportation, handling, cleaning, positioning, compacting of limerock base to LBR 100 and subgrade to LBR 40, densities passed, removal and disposal of all necessary pavement, base material, subgrade and installation of temporary asphalt as deemed necessary by the CITY/OWNER.
- b. Roadway restoration within Palm Beach County (PBC) rights-of-way under this line item includes but not limited to furnishing and placement of LBR 40 stabilized subgrade, LBR 100 limerock base (16" minimum thickness with 6" maximum per layer), first asphalt lift: 1 1/2" of Type SP-12.5 Structural Course (Traffic Level C) and second lift: 1" FC-9.5 over open-cut width (W+4')), tack coat (0.05 Gal/SY), applying prime coat (RC-70 at 0.10 Gal/SY) and furnishing all such material to complete to the cross-section and thickness as shown in the Contract Documents including excavation, grading, importing material, transportation, handling, cleaning, positioning, compacting of limerock base to LBR 100 and subgrade to LBR 40, densities passed, removal and disposal of all necessary pavement, base material, subgrade and installation of temporary asphalt as deemed necessary by the CITY/OWNER and PBC.

Final sod/swale restoration included under this pay item shall include but not be limited to the following:

- a. The CONTRACTOR is required to mow all sodded areas immediately prior to final acceptance of the project by the CITY/OWNER.
- b. The CONTRACTOR shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance including payment for the water.
- c. Removal and disposal of existing sod, furnish and install new sod, 4" layer of topsoil, clearing, grading, and disposal of excess material.

- d. Meet the requirements in Section 02500- Surface Restoration, 3.01 Grading and Sodding.
- e. Restoration of irrigation and sod shall be completed within 3 calendar days.

AA. Bid Item 68 through 73: Furnish & Install Line Stop

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, tools, and incidentals necessary to complete the installation of the line stop, including restraining the existing water main a minimum of one (1) joint from the line stop location or as directed on the contract plans (for dead-end conditions), concrete pad/jacket, excavation for the trench, restraining of existing utilities as required in the Contract Plans, disposal of all excess materials, containment and legal disposal of spilled fluids, flushing/disinfection to the sole satisfaction of the OWNER/ENGINEER, bracing, sheeting, dewatering, backfilling and compaction of trenches, density testing, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, excavation as necessary for exploration and installation, pipe material specific requirements including all necessary materials, equipment, labor, and/or pre-evaluation work required for installation on PCCP style utilities, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, irrigation systems, and lawns, and all other materials for a complete installation of the line stop as shown on the Drawings and as specified herein.

Line stops shall be used when nearby existing valves cannot be used to isolate existing flows when cutting into an existing main and at the discretion and approval of the CITY/OWNER and ENGINEER.

Payment for this item includes all restoration work including, but not limited to, grading, temporary cover as deemed necessary by the Authorities Having Jurisdiction, temporary and final roadway restoration (not including final milling and resurfacing), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final concrete sidewalk and access driveways including within F.D.O.T. and Palm Beach County rights-of-way, temporary and final paver driveway restoration.

Final sod/swale restoration included under this pay item shall include but not limited to the following:

- a. The CONTRACTOR is required to mow all sodded areas immediately prior to final acceptance of the project by the CITY/OWNER.
- b. The CONTRACTOR shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance including payment for the water.
- c. Removal and disposal of existing sod, furnish and install new sod, 4" layer of topsoil, clearing, grading, and disposal of excess material.
- d. Meet the requirements in Section 02500- Surface Restoration, 3.01 Grading and Sodding.
- e. Restoration of irrigation and sod shall be completed within 3 calendar days.

AB. Bid Item 74: Furnish & Install 14"x12" Double Line Stop Bypass Assembly

The CONTRACTOR's bid lump sum price shall include all labor, materials, equipment, tools, and incidentals necessary to complete the installation of the double line stop and bypass piping assembly including restraining the existing force main a minimum of one (1) joint from the line stop locations or as directed on the contract plans (for dead-end conditions), concrete pad/jacket, excavation for the trench, restraining of existing utilities as required in the Contract Plans, furnishing/installing tapping sleeve assemblies and performing wet-taps, furnishing/installing all fittings and bypass pipe spool pieces as necessary, monitoring/maintaining line stop and bypass assembly/equipment throughout construction, protection of double line stop bypass assembly equipment, furnishing/installing/maintaining proper maintenance of traffic as necessary throughout bypass operations, disposal of all excess materials, containment and legal disposal of spilled fluids, bracing, sheeting, dewatering, backfilling and compaction of trenches, density testing, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, excavation as necessary for exploration and installation, pipe material specific requirements, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, irrigation systems, and lawns, and all other materials/labor/equipment necessary for a complete installation of the double line stop bypass assembly as shown on the Drawings and as specified herein. Lump sum price includes furnishing, installing, and maintaining double line stop bypass assembly in service for a min. of 14 calendar days. Additional time as needed by Contractor due to Contractor means/methods/scheduling shall be included in contract lump sum price. See Sheet C-10 for additional details on Double Line Stop requirements.

Payment for this item includes all restoration work including, but not limited to, grading, temporary cover as deemed necessary by the Authorities Having Jurisdiction, temporary and final roadway restoration (not including final milling and resurfacing), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final concrete sidewalk and access driveways including within F.D.O.T. and Palm Beach County rights-of-way, temporary and final paver driveway restoration.

Final sod/swale restoration included under this pay item shall include but not limited to the following:

- f. The CONTRACTOR is required to mow all sodded areas immediately prior to final acceptance of the project by the CITY/OWNER.
- g. The CONTRACTOR shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance including payment for the water.
- h. Removal and disposal of existing sod, furnish and install new sod, 4" layer of topsoil, clearing, grading, and disposal of excess material.
- i. Meet the requirements in Section 02500- Surface Restoration, 3.01 Grading and Sodding.
- j. Restoration of irrigation and sod shall be completed within 3 calendar days.

AC. Bid Item 75: Furnish & Install Excavatable Flowable Fill Per FDOT Specification Section 121

The CONTRACTOR's bid unit price per cubic yard (CY) shall include all labor, materials, equipment, and incidentals necessary for the installation of flowable fill meeting FDOT Specification Section 121, in selected excavation locations determined by the CITY/OWNER in accordance with the Contract Documents. The use of this line item is at the discretion of the CITY/OWNER and ENGINEER.

The intended use of this bid item may vary and includes but is not limited to placing excavatable flowable fill around proposed/existing utilities where standard backfill compaction is restricted due to depth and/or proximity to other utilities (such as around gravity sewer pipe crossings). The use of the line item is at the sole discretion and approval of the CITY/OWNER and ENGINEER and may require "short-loads" of ready-mix flowable fill. Unit pricing includes short loading costs.

AD. Bid Item 76: Furnish and Install Sample Points

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, tools, and incidentals necessary for the complete installation of sample point, testing, removal and disposal after sampling is complete as shown on the Drawings and specified herein and as necessary for restoration of all landscapes, hardscapes, and softscapes impacted by the sample point assembly. This item shall also include properly plugging the sample point after sampling, as directed by the ENGINEER

AE. Bid Item 77: Chlorinating/Testing

The CONTRACTOR's bid unit price per linear foot (LF) of water main shall include all labor, materials, equipment, and incidentals necessary to flush and disinfect, as necessary for satisfactory bacteriological sampling and clearance, the new water mains, as shown on the Drawings and specified herein, and as directed by the ENGINEER. This item shall include coordination and planning for disposal of flushing water and disinfecting solutions, and coordination of bacteriological sampling with the CITY/OWNER. All work shall be in accordance with the CITY/OWNER specifications, applicable AWWA standards, and the Palm Beach County Health Department. Payment for chlorination and testing shall be contingent on acceptance and clearance to place the water main in service being granted by the Palm Beach County Health Department. Note that expenses for re-flushing, disinfection, and sampling required due to previously failed bacteriological samples shall be borne by the CONTRACTOR, and will not be paid by the CITY/OWNER.

Failing bacteriological tests must be retested on all portions of the water main connected to that failed testing site, not just the one local site that fails.

AF. Bid Item 78: Furnish and Install Fill and Flush Assembly

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, tools, and incidentals necessary for the complete installation of the fill and flush assembly, as shown on the Drawings and specified herein and as necessary for restoration of all landscapes, hardscapes, and softscapes impacted by the Fill/Flush assembly.

AG. Bid Item 79 through 81: Air Valve Manholes and Air Valve Assemblies

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, tools, and incidentals necessary for the complete installation of the complete Air Release Valve (ARV) manhole (including offset and doghouse style construction) and ARV assembly, including ring/cover, riser rings (as necessary), supports (inc. Unistrut), coatings, valve assembly, including saddles, corporation stops, piping and sleeves, corp/curb stop valves, angle valves, concrete collars, necessary excavation (including hand digging), surveying, erosion control, dewatering, disposal of all excess material, bracing, sheeting, dewatering, rock removal, bedding and filter fabric, backfill and compaction of trenches, identification/location tape, pipe/joint restraints, density testing, flushing, maintaining uninterrupted services of existing utilities, cleaning the site of work location, existing pipe support and point repairs on existing utility piping (including asbestos cement piping (ACP)), providing temporary restoration of mailboxes, temporary restoration of driveways, temporary restoration of roads, temporary restoration of structures, removal/disposal of sidewalks/driveways/asphaltic concrete/rock base/subgrade (including necessary sawcutting), protection of existing utilities, structures, trees, shrubs, and lawns, protection and repair of existing irrigation systems and all other materials/work for a complete installation, as shown on the Drawings and as specified herein. Installation of ARV structures and assemblies shall take place following installation of force main piping and following review of as-builts. OWNER/ENGINEER shall confirm final location of proposed ARV structures following review of as-builts. CONTRACTOR shall construct top of pipe elevations in accordance with Drawings and shall bring any discrepancies to the OWNER/ENGINEER's attention prior to deviating from contract Drawings. Final quantity and location of ARV manholes and assemblies may differ from Contract Documents pending review of as-builts. Unit pricing herein includes installation on proposed and/or existing utilities following installation of water and force main utilities and includes installation at alternative locations as directed by OWNER/ENGINEER based on review of as-builts.

AH. Bid Item 82 through 84: Remove and Legally Dispose of Abandoned Utilities

The CONTRACTOR's bid unit price per linear foot (LF) shall include all labor, materials, equipment, and incidentals necessary to abandon, excavate, and legally dispose of existing to-be-abandoned utilities where shown on the Drawings, where directed by the CITY/OWNER/ENGINEER, and as specified herein, including but not limited to: cutting existing pipe, capping existing pipe, excavation, legal disposal of removed utilities, disposal of all excess materials, bracing, sheeting, dewatering, trench backfilling and compaction, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, and lawns, restoration of both sod and sidewalks, restoration of private property, landscaping, irrigation systems, hardscaping, and all other work required for the complete installation.

The CONTRACTOR's bid unit price per linear foot (LF) shall include all labor, equipment, materials, and incidentals necessary to comply with contract and legal requirements for the handling and disposal of asbestos-cement containing pipe materials.

CONTRACTOR shall verify that all existing house connections have been disconnected prior to removal of existing pipes. Any damages incurred to private property due to house

connections not disconnected prior to removing the pipe, the CONTRACTOR shall repair and/or replace damage at no expense to the CITY/OWNER.

CONTRACTOR shall furnish and install all necessary sewage containment/collection equipment/measures during removal/abandonment operations. CONTRACTOR shall collect and legally dispose of all hazardous fluids produced as a result of utility cutting/removal operations. CONTRACTOR shall furnish the services of a licensed environmental cleanup CONTRACTOR as necessary to professionally clean and dispose of contaminated soils/subgrade as necessary at no additional cost to CITY/OWNER for any spills resulting from CONTRACTOR's failure to adequately contain hazardous fluids. CONTRACTOR's bid unit price per linear foot (LF) shall include all labor, equipment, materials, and incidentals necessary for removal of aerial-crossing utilities as indicated on the Contract Plans, including both above and below-grade portions of crossings/utilities and including complying with any and all regulatory requirements for removal of facilities.

Costs associated with removal and legal disposal of subaqueous / aerial utility crossing as shown on Contract Plans are included herein. Removal/disposal shall be to Owner's sole satisfaction.

Al. Bid Item 85 through 96: Abandon, Cut and Cap, and Grout Fill Existing Water Main and Force Main Pipe

The CONTRACTOR's bid unit price per linear foot (LF) shall include all labor, materials, equipment, and incidentals necessary to abandon, cut, cap and grout fill the existing water main and force main piping where shown on the Drawings and specified herein, and as directed by the ENGINEER, including but not limited to: fully grouting existing pipe per FDOT Specification Section 121 and plugging of such pipe, furnishing and installing vent caps at sufficient spacing to allow for proper grouting, cutting existing pipe, capping existing pipe, excavation, disposal of all excess materials, bracing, sheeting, dewatering, restraining of existing water mains and force mains to remain in service as required in the Contract Plans, removing and returning existing hydrants/valves to the City, removal of previously installed tapping sleeves and installation of caps as necessary (tapping valves to be salvaged and returned to City), trench backfilling and compaction, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, and lawns, restoration of both sod and sidewalks, restoration of private property, landscaping, irrigation systems, hardscaping, and all other work required for the complete installation.

CONTRACTOR shall verify that all existing service connections have been disconnected prior to grouting of existing pipelines. Any damages incurred to private property due to service connections not disconnected prior to grouting the pipe, the CONTRACTOR shall repair and/or replace damage at no expense to the CITY/OWNER.

CONTRACTOR shall furnish and install all necessary sewage containment/collection equipment/measures during cut/cap and abandonment operations. CONTRACTOR shall collect and legally dispose of all hazardous fluids produced as a result of cutting/capping and/or grouting operations. CONTRACTOR shall furnish the services of a licensed environmental cleanup CONTRACTOR as necessary to professionally clean and dispose of contaminated soils/subgrade as necessary at no additional cost to CITY/OWNER for any spills resulting from CONTRACTOR's failure to adequately contain hazardous fluids.

This item also includes cutting and capping existing 2-inch to 3-inch water mains to be abandoned in place. Pictures shall be provided of existing 2-inch to 3-inch mains designated to be cut and capped and abandoned in place to ensure that these mains do not accidentally remain in service. CONTRACTOR shall record information as required in Section 01720.

This item also includes all necessary labor, materials, equipment, and incidentals necessary to legally remove/dispose of any canal crossing facilities designated for removal/disposal/abandonment including protection of existing bodies of water from discharge and/or disturbance. CONTRACTOR shall restore all existing property affected to existing/better conditions and to sole satisfaction of OWNER.

AJ. Bid Item 97: Adjust Existing Manhole Rim/Catch Basin/Structure to Finished Grade

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, tools, and incidentals necessary to adjust existing manholes to finished grade. This item includes, but is not limited to: the completed adjustment/resetting of manhole covers, excavation, pavement restoration, adjustment rings, cutting of structure, removal and replacement of brickwork, additional brickwork, mortar, backfill, compaction, coordination with franchise utilities, providing access to driveways and roadways at all times, protection of existing utilities, structures, trees, shrubs, and lawns, and all other work required for the complete installation.

This line item is a result of proposed asphalt milling and re-surfacing operations which may require the adjustment of existing manhole/catch basin/structure rims to finished grade to meet the Mill and Overlay Section(s).

AK. Bid Item 98: Adjust Existing Valve Boxes to Finished Grade

The CONTRACTOR's bid unit price per each (EA) shall include all labor, materials, equipment, tools, and incidentals necessary to adjust existing valve boxes to finished grade. This item includes, but is not limited to: the adjustment/resetting of valve boxes, excavation, pavement restoration, completed horizontal and vertical adjustment of the valve boxes, extensions, and replacement of damaged boxes (if required), providing access to driveways and roadways at all times, protection of existing utilities, structures, trees, shrubs, and lawns, and all other work required for the complete adjustment.

This item is a result of proposed asphalt milling and re-surfacing operations which may require the adjustment of existing valve boxes to finished grade to meet the Mill and Overlay Section(s).

AL. Bid Items 99 and 100: Ductile Iron Fittings Allowance

Bid Items 99 and 100 are allowance items to be utilized only as authorized by the CITY/OWNER. The allowance for Bid Item 99 applies to payment for increasing quantities for Bid Item 21 and the allowance for Bid Item 100 applies to payment for increasing quantities for Bid Item 22 beyond what is shown in the bid schedule and plans as required based on the determination of existing conditions determined during construction. Furnishing and installing ductile iron fittings under these allowance items shall be measured and paid for as described in Bid Item Nos. 21 and 22, respectively, and at the

unit cost per ton (TON) indicated in the Bid Form of Bid Item Nos. 21 and 22, respectively. Refer to Specification Section 01021 titled "Allowances". Only additional work substantiated by the CONTRACTOR and approved by the ENGINEER will be paid as part of this bid item. Any portion of this allowance that remains after all authorized payments have been made will be withheld from contract payments and will remain with the CITY/OWNER.

The CITY/OWNER reserves the right to award any, all, or none of the money associated with this allowance item.

AM. Bid Item 101: Tie-in for 20-inch Prestressed Concrete Cylinder Pipe and 24-inch Cast Iron Pipe Water Main

The CONTRACTOR's bid lump sum price shall include all labor, materials, equipment, and incidentals necessary to cut and tie-in to existing prestressed concrete cylinder pipe (PCCP) water main and cast-iron pipe (CIP) WM where shown on the Drawings, as specified herein, and as directed by the ENGINEER, including but not limited to: evaluation of pipe construction type (utility exploration), confirmation of PCCP joint type and restraint system, confirmation of pipe outer diameter and inner cylinder diameter, cutting and removal of existing pipe in accordance with manufacturer recommendations, furnishing and installing a custom DIP-to-PCCP transition coupling as recommended by the manufacturer and as necessary to complete tie-in as proposed on the construction plans and as directed by the ENGINEER, exploratory excavation, excavation for abandonment, disposal of all excess materials, bracing, sheeting, dewatering, restraining of the existing water main to remain in service as directed in Contract Plans, disinfection of water mains as directed in Contract Plans and to the sole satisfaction of the OWNER/ENGINEER, trench backfilling and compaction, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, and lawns, restoration of both roadway, sod, and sidewalks, restoration of private property, landscaping, irrigation systems, hardscaping, and all other work required for the complete installation and tie-in.

AN. Bid Item 102: Tie-ins for Permanent Force Main Connections

The CONTRACTOR's bid lump sum price shall include all labor, materials, equipment, and incidentals necessary to cut and tie-in proposed force main permanent connections where shown on the Drawings, as specified herein, and as directed by the ENGINEER, including but not limited to: evaluation of pipe construction type, confirmation of pipe size/material/joint-location, restraining of existing force mains as necessary, cutting and removal of existing pipe, exploratory excavation for utility routing investigation, excavation for tie-ins, disposal of all excess materials, bracing, sheeting, dewatering, trench backfilling and compaction, maintaining uninterrupted services of existing utilities, providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, and lawns, restoration of both roadway, sod, and sidewalks, restoration of private property, landscaping, irrigation systems, hardscaping, and all other work as shown in the Drawings, as specified herein, and as required for the complete installation.

Payment of this line item includes furnishing sufficient labor, materials, and equipment for performance of the tie-ins in accordance with contract requirements including vac-trucks and/or alternative sewage collection/management/disposal means as approved by the

OWNER/ENGINEER, temporary piping, overnight work (including maintaining linestops in place overnight as necessary), and all other incidentals required for performing multiple tie-ins simultaneously or in OWNER approved phased utility transfer.

AO. Bid Item 103: Lift Station No. 53 Improvements

The CONTRACTOR's bid lump sum price shall include all labor, materials, equipment, and incidentals necessary to complete the proposed improvements at existing Lift Station No. 53 including furnishing/installing replacement submersible sewage pumps, associated electrical improvements (conduit, wiring, tie-ins, electrical appurtenances), force main tie-ins (including modified valve vault piping and coating restorations), base plate modifications as necessary, replacement base elbows as necessary, guide rail modifications as necessary, supports, coating systems restoration, excavation (including hand digging), restoration of landscaping, erosion control, dewatering, disposal of all excess material, bracing, sheeting, dewatering, rock removal, bedding, backfill and compaction of trenches, maintaining uninterrupted services of existing utilities, cleaning the site of work location, support/protection/restoration of existing utility systems/piping, temporary/final restoration of all areas impacted/affected by work herein (excluding final milling/resurfacing), and all other components/appurtenances necessary to provide a functioning and complete pump station as detailed in the Drawings and as specified herein. Miscellaneous hardware and labor required for complete and successful installation, testing, and start-up of the station is included herein.

Payment of this line item includes furnishing / installing / operating / maintaining bypass pumping facilities as necessary to ensure uninterrupted services of the existing utilities as necessary throughout construction including all piping, pumps, pump enclosure, temporary suction/discharge lines and temporary tie-ins, pipe restraints, bypass ramps, fuel, pump maintenance, alarm/notification systems and necessary support labor staff, and all other incidentals necessary for operation of the temporary bypass pumping systems as shown in the Drawings and as detailed herein. See Section 02734 for additional details.

AP. Bid Item 104: Lift Station No. 27 Improvements

The CONTRACTOR's bid lump sum price shall include all labor, materials, equipment, and incidentals necessary to complete the reconstruction of existing Lift Station No. 27 including conversion from a dry-pit eductor pump station to a duplex submersible pump station shown on the Drawings and specified herein, and as directed by the ENGINEER, including but not limited to: furnishing/installing concrete manhole extensions, concrete valve vaults, top slabs / hatches / covers, complete electrical / I&C components (conduit, control panel, RTU Panel, rack, etc...), submersible sewage pumps, piping, base plates, base elbows, guide rails, valves, fittings, supports, concrete slab/reinforcement, water service assembly (backflow preventer and support), bollards, odor control system, discharge piping tie-in, gravity sewer overflow bypass piping, coating systems/restoration, excavation (including hand digging), landscaping (inc. clearing/grubbing/removal of trees/shrubs as necessary), landscape restoration as necessary, surveying, erosion control, dewatering, disposal of all excess material, bracing, sheeting, dewatering, rock removal, bedding, backfill and compaction of trenches, identification/location tape, pipe/joint restraints, density testing, grading, flushing, maintaining uninterrupted services of existing utilities, cleaning the site of work location, support/protection/restoration of existing utility systems/piping, temporary/final restoration of all areas impacted/affected by work herein (excluding final milling/resurfacing), protection/restoration of existing irrigation

systems, and all other components/appurtenances necessary to provide a functioning and complete pump station as detailed in the Drawings and as specified herein. Miscellaneous hardware and labor required for complete and successful installation, testing, and start-up of the station is included herein.

Payment of this line item includes complete demolition and abandonment of the existing dry can eductor station including removal and legal disposal of all civil/mechanical/electrical materials/components proposed for removal/disposal, grouting/abandonment of the dry-can / eductor casing (including cleaning as necessary in advance of grouting), and existing system components as detailed in the Drawings and as specified herein.

Payment of this line item includes furnishing / installing / operating / maintaining the temporary sewage bypass pumping system including all piping, pumps, pump enclosure, temporary suction/discharge lines and tie-ins to existing gravity sewer manholes, concrete/coating restoration of manholes, pipe restraints, bypass ramps, fuel, pump maintenance, alarm/notification systems and necessary support labor staff, and all other incidentals necessary for operation of the temporary bypass pumping systems as shown in the Drawings and as detailed herein. See Section 02734 for additional details.

AQ. Bid Item 105: Clearing and Grubbing – FDOT Pay Item No. 0110-1-1

The Contractor's bid unit price per acre (AC) for clearing and grubbing as detailed in FDOT Standard Specifications Section 110, as shown on the Drawings, and as specified herein including but not limited to clearing/grubbing, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

AR. Bid Item 106: Removal of Existing Concrete – FDOT Pay Item No. 0110-4-10

The Contractor's bid unit price per square yard (SY) for removal of existing concrete as detailed in FDOT Standard Specifications Section 110, as shown on the Drawings, and as specified herein.

This line item is intended for the removal of concrete as indicated on the drawings and/or as identified in the field during construction due to poor condition, cracks, and unacceptable slopes. The CONTRACTOR shall be paid under this bid item only for quantities where concrete sidewalk is shown and delineated on the Drawings and/or identified/marked in the field by OWNER/ENGINEER during construction to be removed and replaced. Removal of concrete pathways/sidewalks/driveways required as part of installation of the new water/force mains, services, and other appurtenances, or due to damage to pavement during construction activities, shall be required and paid for under other bid items, as described therein.

AS. Bid Item 107: Replace/Relocate Single Mailbox – FDOT Pay Item No. 0110-7-1

The Contractor's bid unit price per each (EA) for replacing and/or relocating single mailbox as detailed in FDOT Standard Specifications Section 110, as shown on the Drawings, and as specified herein including but not limited to furnishing and installing replacement mailbox in-kind or relocating existing single mailbox, excavation, temporary/permanent restoration

(including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

AT. Bid Item 108: Tree Removal – FDOT Pay Item No. 0110-23

The Contractor's bid unit price per each (EA) for removal of existing trees/shrubs/vegetation as detailed in FDOT Standard Specifications Section 110, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

AU. Bid Item 109: Relocate Trees and Palms, Palm, >= 14' of Clear Trunk – FDOT Pay Item No. 0581-1-2

The Contractor's bid unit price per each (EA) for relocation of existing palm trees as detailed in FDOT Standard Specifications Section 581, as shown on the Drawings, and as specified herein including but not limited to root pruning as necessary, excavation/embankment for removal and relocation, temporary/permanent restoration (including sodding to match existing or as indicated on plans), providing clean backfill, fertilizing and irrigating tree as necessary for re-establishment, furnishing/installing tree support/bracing, warranting tree, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

AV. Bid Item 110: Concrete Sidewalk – 4" Thick – FDOT Pay Item No. 0522-1

The Contractor's bid unit price per square yard (SY) for furnishing and installing Concrete Sidewalk – 4" Thick, as detailed in FDOT Standard Specifications Section 522, as shown on the Drawings, and as specified herein. Pay item includes compensation for all labor, materials, and equipment to reconstruct driveways and driveway tie-ins affected by sidewalk installation.

This line item is intended for the installation of concrete as indicated on the drawings and/or as identified in the field during construction due to poor condition, cracks, and unacceptable slopes. The CONTRACTOR shall be paid under this bid item only for quantities where concrete sidewalk is shown and delineated on the Drawings and/or identified/marked in the field by OWNER/ENGINEER during construction to be removed and replaced. Removal and replacement/restoration of concrete pathways/sidewalks/driveways required as part of installation of the new water/force mains, services, and other appurtenances, or due to damage to pavement during construction activities, shall be required and paid for under other bid items, as described therein.

CONTRACTOR shall bid this item based on the limits reflected on the Drawings. Costs for areas greater than that shown on the Drawings due to CONTRACTOR unnecessarily damaging pavement will be borne by the CONTRACTOR and will not be paid by the CITY/OWNER.

AW. Bid Item 111: Concrete Sidewalk and Driveways – 6” Thick – FDOT Pay Item No. 0522-2

The Contractor’s bid unit price per square yard (SY) for furnishing and installing Concrete Sidewalk and Driveways – 6” Thick, as detailed in FDOT Standard Specifications Section 522, as shown on the Drawings, and as specified herein. Pay item includes compensation for all labor, materials, and equipment to reconstruct driveways and driveway tie-ins affected by sidewalk installation.

This line item is intended for the installation of concrete as indicated on the drawings and/or as identified in the field during construction due to poor condition, cracks, and unacceptable slopes. The CONTRACTOR shall be paid under this bid item only for quantities where concrete sidewalk is shown and delineated on the Drawings and/or identified/marked in the field by OWNER/ENGINEER during construction to be removed and replaced. Removal and replacement/restoration of concrete pathways/sidewalks/driveways required as part of installation of the new water/force mains, services, and other appurtenances, or due to damage to pavement during construction activities, shall be required and paid for under other bid items, as described therein.

CONTRACTOR shall bid this item based on the limits reflected on the Drawings. Costs for areas greater than that shown on the Drawings due to CONTRACTOR unnecessarily damaging pavement will be borne by the CONTRACTOR and will not be paid by the CITY/OWNER.

AX. Bid Item 112: Furnish and Install Truncated Domes Per FDOT Index 304

The CONTRACTOR’s bid unit price per square feet (SF) shall include all labor, materials, equipment, and incidentals necessary for furnishing and installing cast-in-place truncated dome detectable warnings. This item includes but is not limited to: cutting and placement in concrete, finishing concrete, etc. and all necessary for complete and functional installation per the manufacturer’s specification.

Payment will be made only for the actual number of square feet of cast-in-place truncated dome detectable warnings installed, complete and in place. No payment will be made for excess or waste due to cutting and breakage.

Cast-in-place truncated dome detectable warnings shall conform to FDOT design standards, current edition.

AY. Bid Item 113: Furnish and Install Pipe Handrail – Guiderail, Aluminum – FDOT Pay Item No. 0515-1-2

The Contractor’s bid unit price per linear foot (LF) for furnishing and installing Pipe Handrail – Guiderail, Aluminum, as detailed in FDOT Standard Specifications Section 515, as shown on the Drawings, and as specified herein including but not limited to furnishing and installing handrailing, anchoring including concrete and anchor bolts, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

- AZ. Bid Item 114: Furnish and Install Pipe Culvert, Round, 15" S/CD – FDOT Pay Item No. 0430-175-115

The Contractor's bid unit price per linear foot (LF) for furnishing and installing Pipe Culvert, Round, 15" S/CD, as detailed in FDOT Standard Specifications Section 430, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

- BA. Bid Item 115: Furnish and Install Pipe Culvert, Round, 18" S/CD – FDOT Pay Item No. 0430-175-118

The Contractor's bid unit price per linear foot (LF) for furnishing and installing Pipe Culvert, Round, 18" S/CD, as detailed in FDOT Standard Specifications Section 430, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

- BB. Bid Item 116: Furnish and Install Pipe Culvert, Round, 24" S/CD – FDOT Pay Item No. 0430-175-124

The Contractor's bid unit price per linear foot (LF) for furnishing and installing Pipe Culvert, Round, 24" S/CD, as detailed in FDOT Standard Specifications Section 430, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

- BC. Bid Item 117: Furnish and Install Pipe Culvert, Elliptical, 12" S/CD – FDOT Pay Item No. 0430-175-212

The Contractor's bid unit price per linear foot (LF) for furnishing and installing Pipe Culvert, Elliptical, 12" S/CD, as detailed in FDOT Standard Specifications Section 430, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

- BD. Bid Item 118: Furnish and Install STRT Conc. Endwall (24", Single, 0-Degrees, Round) – FDOT Pay Item No. 0430-524-100

The Contractor's bid unit price per each (EA) for furnishing and installing STRT Conc. Endwall (24", Single, 0-Degrees, Round), as detailed in FDOT Standard Specifications Section 430, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent

restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

BE. Bid Item 119: Furnish and Install 15" Trench Drain – FDOT Pay Item No. 0436-1-1

The Contractor's bid unit price per linear foot (LF) for furnishing and installing 15" Trench Drain, as detailed in FDOT Standard Specifications Section 436, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

BF. Bid Item 120: Furnish and Install 15" French Drain – FDOT Pay Item No. 0443-70-2

The Contractor's bid unit price per linear foot (LF) for furnishing and installing 15" French Drain, as detailed in FDOT Standard Specifications Section 443, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

BG. Bid Item 121: Furnish and Install 18" French Drain – FDOT Pay Item No. 0443-70-3

The Contractor's bid unit price per linear foot (LF) for furnishing and installing 18" French Drain, as detailed in FDOT Standard Specifications Section 443, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

BH. Bid Item 122: Furnish and Install Manhole, Type P-7, (< 10' Deep) – FDOT Pay Item No. 0425-2-41

The Contractor's bid unit price per each (EA) for furnishing and installing Manhole, Type P-7, (< 10'), as detailed in FDOT Standard Specifications Section 425, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

BI. Bid Item 123: Furnish and Install Ditch Bottom Inlet (Type C) – FDOT Pay Item No. 0425-1-521

The Contractor's bid unit price per each (EA) for furnishing and installing Ditch Bottom Inlet (Type C), as detailed in FDOT Standard Specifications Section 425, as shown on the Drawings, and as specified herein including but not limited to pruning / root removal as

necessary, excavation, embankment, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

BJ. Bid Item 124: Furnish and Install Concrete Drop Curb – FDOT Pay Item No. 0520-2

The Contractor's bid unit price per linear foot (LF) for furnishing and installing Concrete Drop Curb, as detailed in FDOT Standard Specifications Section 520, as shown on the Drawings, and as specified herein including but not limited to excavation, placement/compaction of embankment as necessary to achieve proposed grades, installation of curb pads, temporary/permanent restoration (including sodding to match existing or as indicated on plans), legal removal/disposal, and all other necessary incidentals required to perform the work in accordance with the contract drawings and specifications.

BK. Bid Item Nos. 125 and 126: Clear and Grade Swale and Enhanced Clear and Grade Swale (including furnish and installation of new sod)

The CONTRACTOR's bid unit price per square yard (SY) shall include all labor, materials, equipment, and incidentals necessary to clear and grade swale from edge of pavement to street side of sidewalk, not including driveways. This item includes, but is not limited to: removal and disposal of existing sod and excess material, removal of obstacle(s) in swale, importing of fill material, earthwork, excavation, clearing and grubbing, grading of swale area, sign relocation/adjustment, mailbox relocation/adjustment, cleanup of the area disturbed by this construction, providing access to driveways and roadways at all times, protection of existing utilities, structures, trees, shrubs, and lawns, and furnishing and installing coarse aggregate, exfiltration trench, filter fabric, and all other work required for the complete installation.

Final sod/swale restoration included under this pay item shall include but not limited to the following:

- a. The CONTRACTOR is required to mow all sodded areas immediately prior to final acceptance of the project by the CITY/OWNER.
- b. The CONTRACTOR shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance including payment for the water.
- c. Removal and disposal of existing sod, furnish and install new sod, 4" layer of topsoil, 6" layer of coarse aggregate, exfiltration trench, clearing, grading, and disposal of excess material.
- d. Meet the requirements in Section 02500 - Surface Restoration, 3.01 Grading and Sodding.
- e. Restoration of irrigation and sod shall be completed within 3 calendar days.
- f. Replacement of sod shall match existing sod type.

This line item is intended for the clearing and grading of swales at locations indicated on the plans. This line item also includes relocation of existing landscaping in conflict with the

swale clearing and grading at the approval of CITY/OWNER and ENGINEER. These line items do not apply to locations where other excavation work is already proposed and where backfill/re-grading is already necessary under separate line item descriptions due to other proposed work such as installation of utilities, installation of stormwater infrastructure, and/or similar work as determined by the ENGINEER.

BL. Bid Item 127: Clear and Grade Swale Allowance

Bid Item "Clear and Grade Swale Allowance" is an allowance item to be utilized only as authorized by the CITY/OWNER. The allowance for Bid Item 127 applies to payment for increasing quantities for Bid Item Nos. 125 and 126 beyond what is shown in the bid schedule as required based on the determination of existing conditions determined during construction. Contractor to confirm locations for clearing and grading a minimum of 30 calendar days in advance of such work with Owner. Clearing and grading of swales under this allowance item shall be measured and paid for as described in Bid Item Nos. 125 and 126 and at a unit cost per square yard (SY) indicated in the Bid Form for Bid Item Nos. 125 and 126. Refer to Specification Section 01021 titled "Allowances". Only additional work substantiated by the CONTRACTOR and approved by the ENGINEER will be paid as part of this bid item. Any portion of this allowance that remains after all authorized payments have been made will be withheld from contract payments and will remain with the CITY/OWNER.

The CITY/OWNER reserves the right to award any, all, or none of the money associated with this allowance item.

BM. Bid Item 128: Mill Existing Roadway Asphalt (Average 1-inch Depth)

The CONTRACTOR's bid unit price per square yard (SY) shall include all labor, materials, equipment, and incidentals necessary for the milling of existing pavement within City and Palm Beach County rights-of-way as defined in the bid form, as shown on the Drawings and specified herein, and as directed by the ENGINEER. This item includes, but is not limited to: milling, removal and disposal of milled material without stockpiling at site, night work operations (if approved by City Management – no approval is guaranteed), restoration of traffic loop detectors, temporary pavement markings, saw-cutting of all pavement and all cleanup of the area disturbed by this construction, reworking of limerock base where necessary, saw-cutting of driveways as necessary to provide clean/professional tie-ins, saw-cutting for butt-joint keyway tie-ins, providing access to driveways and roadways at all times, protection of existing utilities, structures, trees, shrubs, and lawns, and all other work required for the complete installation. This item also includes all additional costs, including hauling/disposal fees, associated with adjusting milled depth as necessary and as noted on the Contract Plans for roadway crown reconstruction.

This item also includes trimming of existing overhanging tree limbs in conflict with milling machinery and equipment to facilitate milling operations. Trimming of existing trees shall be at the approval of the CITY/OWNER and ENGINEER. Although it is preferred that the CONTRACTOR utilize appropriate size milling machinery and equipment to avoid trimming of existing trees.

Costs for areas greater than that shown on the Drawings due to CONTRACTOR unnecessarily damaging pavement will be borne by the CONTRACTOR and will not be paid by the CITY/OWNER.

Milling operation cannot progress more than 2,000 feet beyond the pavement restoration operation.

This pay item includes milling of existing asphalt pavement in both City and Palm Beach County rights-of-way as required per standard details and specifications of the authority having jurisdiction over specific location. W. Palmetto Park Rd. is a Palm Beach County right-of-way road.

BN. Bid Item 129: Furnish and Place Asphalt Overlay (Average 1-inch Depth)

The CONTRACTOR's bid unit price per square yard (SY) shall include all labor, materials, equipment, and incidentals necessary for the placement of asphalt concrete pavement within City and Palm Beach County rights-of-way at the thickness indicated on the Bid Form and as shown on the Drawings and specified herein, and as directed by the ENGINEER. This item includes, but is not limited to: preparing the milled surface and installing the finish course, applying prime coat, applying a tack coat and furnishing, placing and compacting all asphalt surface, install keyways, complete in place to the cross section and thickness shown on the Drawings, restoration of traffic loop detectors, temporary pavement markings, milling and saw cutting of all pavement (including driveway tie-in joints), night work operations (if approved by City Management – no approval is guaranteed), and all cleanup of the area disturbed by this construction, providing access to driveways and roadways at all times, protection of existing utilities, structures, trees, shrubs, and lawns, and all other work required for the complete installation. This item includes all additional costs, including furnishing and placing additional asphalt thickness in accordance with the Contract Specifications, as necessary and as noted on the Contract Plans for roadway crown reconstruction.

CONTRACTOR shall bid this item based on the limits reflected on the Drawings. Costs for areas greater than that shown on the Drawings due to CONTRACTOR unnecessarily damaging pavement will be borne by the CONTRACTOR and will not be paid by the CITY/OWNER.

This pay item includes furnishing and placing asphalt overlay in both City and Palm Beach County rights-of-way as required per standard details and specifications of the authority having jurisdiction over specific location. W. Palmetto Park Rd. is a Palm Beach County right-of-way road.

BO. Bid Item 130: Furnish and Install Temporary Striping (Paint) – FDOT Pay Item No. 0710-90

The Contractor's bid lump sum price (LS) for furnishing and installing Temporary Striping (Paint), as detailed in FDOT Standard Specifications Section 710, as shown on the Drawings, and as specified herein. Pay item includes providing temporary striping iteratively as construction progresses and as needed. Temporary striping shall be in accordance with FDOT standards and specifications in order to provide a safe environment for the public.

- BP. Bid Item 131: Furnish and Install Raised Pavement Marker, Type B (Y-Y) – FDOT Pay Item No. 0706-1-3

The Contractor's bid unit price per each (EA) for furnishing and installing raised pavement marker, Type B (Y-Y), as detailed in FDOT Standard Specifications Section 706, as shown on the Drawings and as specified herein. This pay item includes all pavement markers, including but not limited to bi-directional, and mono-directional and RPMs as may be required.

- BQ. Bid Item 132: Furnish and Install 6" Solid Yellow (Standard Thermoplastic) – FDOT Pay Item No. 711-16-201

The Contractor's bid unit price per gross mile (GM) for furnishing and installing 6" Solid Yellow (Standard Thermoplastic), as detailed in FDOT Standard Specifications Section 711, as shown on the Drawings, and as specified herein. In addition to the provisions of the FDOT Specifications, this pay item includes all labor, materials, and equipment for furnishing and placement of thermoplastic pavement markings at the locations shown on the plans.

- BR. Bid Item 133: Furnish and Install 6" Solid White (Standard Thermoplastic) – FDOT Pay Item No. 711-16-101

The Contractor's bid unit price per gross mile (GM) for furnishing and installing 6" Solid White (Standard Thermoplastic), as detailed in FDOT Standard Specifications Section 711, as shown on the Drawings, and as specified herein. In addition to the provisions of the FDOT Specifications, this pay item includes all labor, materials, and equipment for furnishing and placement of thermoplastic pavement markings at the locations shown on the plans.

- BS. Bid Item 134: Furnish and Install 24" Solid White (Standard Thermoplastic) – FDOT Pay Item No. 711-11-125

The Contractor's bid unit price per linear foot (LF) for furnishing and installing 24" Solid White (Standard Thermoplastic), as detailed in FDOT Standard Specifications Section 711, as shown on the Drawings, and as specified herein. In addition to the provisions of the FDOT Specifications, this pay item includes all labor, materials, and equipment for furnishing and placement of thermoplastic pavement markings at the locations shown on the plans.

- BT. Bid Item 135: Furnish and Install Thermoplastic Speed Hump Marking – FDOT Pay Item No. 711-11-130

The Contractor's bid unit price per each (EA) for furnishing and installing Thermoplastic Speed Hump Marking, as detailed in FDOT Standard Specifications Section 711, as shown on the Drawings, and as specified herein. In addition to the provisions of the FDOT Specifications, this pay item includes all labor, materials, and equipment for furnishing and placement of thermoplastic pavement markings at the locations shown on the plans.

- BU. Bid Item 136: Furnish and Install Thermoplastic Message or Symbol, Standard, White – FDOT Pay Item No. 711-11-160

The Contractor's bid unit price per each (EA) for furnishing and installing Thermoplastic Message or Symbol, Standard, White, as detailed in FDOT Standard Specifications Section 711, as shown on the Drawings, and as specified herein. In addition to the provisions of the FDOT Specifications, this pay item includes all labor, materials, and equipment for furnishing and placement of thermoplastic pavement markings at the locations shown on the plans.

- BV. Bid Item 137: Relocate/Replace Single Sign Post – FDOT Pay Item No. 0700-1-50

The Contractor's bid unit price per assembly (AS) for Single Post Sign Relocation, as detailed in FDOT Standard Specifications Section 700, as shown on the Drawings, and as specified herein.

- BW. Bid Item 138: Fire Hydrant Flow Testing

The CONTRACTOR's bid unit price per each (EA) fire hydrant tested shall include all labor, materials, equipment, tools, and incidentals necessary for the complete flow testing of the fire hydrant assembly in accordance with Appendix I including restoring rights-of-ways impacted by testing to pre-existing conditions and to sole satisfaction of OWNER, furnishing/installing/maintaining maintenance of traffic required to perform testing, protection of existing facilities, management of discharge water (to prevent disruption of rights-of-way), providing access to driveways and roadways at all times, cleaning the site of the work location, protection of existing utilities, structures, trees, shrubs, and lawns, and all other work required for the complete testing of the fire hydrant. Payment shall not be made to Contractor prior to receipt of completed Hydrant Testing Data Collection form, as provided in Appendix I.

– END OF SECTION –

SECTION 01110

ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Work covered by this Section consists of furnishing all labor, materials and equipment and performing all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract.
- B. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.
- C. The control of environmental pollution requires consideration of air, water and land, and involves management of noise and solid waste, as well as other pollutants.
- D. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the Work.
- E. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching or other special surface treatments as are required to prevent silting and muddying of streams, rivers, canals, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area.
- F. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.
- G. The Contractor shall secure, at his cost, a surface water management permit from the South Florida Water Management District for any construction dewatering activities associated with this project.

1.02 APPLICABLE REGULATIONS

- A. Comply with all applicable Federal, State and local laws and regulations concerning environmental pollution control and abatement.

1.03 NOTIFICATIONS

- A. The Engineer will notify the Contractor in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the Contractor in writing, through the Engineer, of any non-compliance with State or local requirements. The Contractor shall, after receipt of such notice from the Engineer or from the regulatory agency through the Engineer, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the Work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

1.04 IMPLEMENTATION

- A. Prior to commencement of the Work, meet with the Engineer to develop mutual understandings relative to compliance with this provision and administration of the environmental pollution control program.
- B. Remove temporary environmental control features, when approved by the Engineer, and incorporate permanent control features into the project at the earliest practicable time.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EROSION CONTROL

- A. Provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented. Ditches around construction area shall also be used to carry away water resulting from dewatering of excavated areas. If dewatering is necessary, a dewatering plan must be prepared by a certified Registered Professional Engineer in the State of Florida and submitted to the Engineer and Owner; then submitted and approved by SFWMD prior to the commencement of work requiring dewatering. Contractor must comply with permits. However, no water from dewatering activities may be discharged offsite. At the completion of the Work, ditches shall be backfilled and the ground surface restored to original condition.

3.02 PROTECTION OF CANALS

- A. Care shall be taken to prevent, or reduce to a minimum, any damage to any canal from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such canals. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the canal, shall not be directly returned to the canal. Such waters will be diverted through a settling basin or filter before being directed into the canal.
- B. The Contractor shall not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels.
- C. All preventive measures shall be taken to avoid spillage of petroleum products and other pollutants.
- D. Water being flushed from structures or pipelines after disinfection, with a chlorine residual of 2 mg/L or greater, shall be treated with a dechlorination solution, in a method approved by the Engineer, prior to discharge.

3.03 PROTECTION OF LAND RESOURCES

- A. Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Drawings.
- B. Outside of areas requiring earthwork for the construction of the new facilities, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.
- C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment, dumping or other operations, protect such trees by placing boards, planks, or poles around them. Monuments and markers shall be protected similarly before beginning operations near them.
- D. Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition. The Engineer will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and disposed of.

All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-in in diameter shall be coated as soon as possible with an

approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.

Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer, shall be immediately removed and replaced.

- E. The locations of the Contractor's storage, and other construction buildings, required temporarily in the performance of the Work, shall be cleared portions of the job site or areas to be cleared as shown on the Drawings and shall require written approval of the Engineer. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Drawings showing storage facilities shall be submitted for approval of the Engineer.
- F. If the Contractor proposes to construct temporary roads or embankments and excavations for plant and/or work areas, he shall submit the following for approval at least ten days prior to scheduled start of such temporary work.
 - 1. A layout of all temporary roads, excavations and embankments to be constructed within the work area.
 - 2. Details of temporary road construction.
 - 3. Drawings and cross sections of proposed embankments and their foundations, including a description of proposed materials.
 - 4. A landscaping drawing showing the proposed restoration of the area. Removal of any trees and shrubs outside the limits of existing clearing area shall be indicated. The drawing shall also indicate location of required guard posts or barriers required to control vehicular traffic passing close to trees and shrubs to be maintained undamaged. The drawing shall provide for the obliteration of construction scars as such and shall provide for a natural appearing final condition of the area. Modification of the Contractor's approved drawings shall be made only with the written approval of the Engineer. No unauthorized road construction, excavation or embankment construction including disposal areas will be permitted.
- G. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess of waste materials, or any other vestiges of construction as directed by the Engineer. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. The disturbed areas shall be prepared and sodded as described in Section 02500, or as approved by the Engineer.
- H. All debris and excess material will be disposed of outside wetland or floodplain areas in an environmentally sound manner.

3.04 PROTECTION OF AIR QUALITY

- A. Burning. The use of burning at the project site for the disposal of refuse and debris will not be permitted.
- B. Dust Control. The Contractor will be required to maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded, and which would cause a hazard or nuisance to others.
- C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with approval from the Engineer.
- D. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the Work proceeds and whenever a dust nuisance or hazard occurs, as determined by the Engineer.

3.05 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

- A. During the life of this Contract, maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

3.06 NOISE CONTROL

- A. The Contractor shall make every effort to minimize noises caused by his operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with local, State and Federal regulations.

3.07 NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM SITE

- A. The Contractor shall provide for and be responsible for the prevention, control, and abatement of erosion and water pollution until completion and acceptance of the Project. The Contractor shall provide all temporary erosion control features necessary to prevent, control, and abate erosion and water pollution, and shall prepare and submit as the operator and permittee, along with the applicable application fee, the "Notice of Intent to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities" (NOI) prior to commencing construction and the "Notice of Termination" (NOT) upon final completion of construction. The Contractor, as required by the NPDES permit program, shall prepare and submit a stormwater pollution prevention plan (SWPPP). This SWPPP shall be modified and updated by the Contractor as necessary, to meet the requirements of the NPDES permit issued, at no additional cost to the Owner. The Contractor shall also comply with the inspections,

maintenance, reporting, and all other provisions of the NPDES permitting program, and the cost for the compliance with this program is to be included in the Contractor's bid price for this work.

B. When all disturbed soils have been stabilized and temporary erosion and sediment control measures have been removed, this constitutes elimination of stormwater discharges associated with industrial activities.

C. At the time of elimination of stormwater discharges associated with industrial activities, the Contractor, Contractor's Subcontractor, and Owner shall complete and submit a Notice of Termination (NOT) to the following:

Storm Water Notice of Intent

401 M Street, SW

Washington, DC 20460

Florida Department of Environmental Protection

400 N. Congress Avenue, Suite 200

West Palm Beach, FL 33401

D. The NOT form is appended to the Stormwater Pollution Plan.

- END OF SECTION -

SECTION 01153

CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section provides further specification of the requirements and procedures for implementing changes to the Work.
- B. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- C. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
- D.
 - 1. A Field Order;
 - 2. A Change Order; or
 - 3. Engineer's written interpretation or clarification (e.g. Engineer's response to a Request for Information).

1.02 DEFINITIONS

- A. Field Order: A written order to the Contractor signed by the Engineer and the Contractor, which is issued to interpret/clarify the Contract Documents, and/or order minor changes in the work. The work described by a Field Order is to be accomplished without change to the Contract Price or the Contract Time.
- B. Work Change Directive: A written order to the Contractor, signed by the Engineer, Owner, and Contractor, which is issued to identify a change in the Work which is anticipated to require a change to the Contract Price and/or Contract Times. A Work Change Directive generally will be issued to maintain progress of the Work and minimize delays. A Work Change Directive shall include an estimate of the potential change to the Contract Price and/or Contract Times, and shall be incorporated into the Contract by subsequent execution of a Change Order.
- C. Refer to the General Conditions for definitions of other terms used in this Section.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as Owner and Contractor may otherwise agree in writing.

1.04 OWNER'S RESPONSIBILITIES

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 1.05A of this Section.

1.05 CHANGE ORDERS

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

- 1. Changes in the Work which are:

- a. Ordered by Owner pursuant to Article 38 of the General Conditions;
 - b. Required because of acceptance of defective Work under Article 23 of the General Conditions or Owner's correction of defective Work under Article 46 of the General Conditions; or
 - c. Agreed to by the parties.

- 2. Changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive.

- 3. Changes in the Contract Price and Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 36.B of the General Conditions; provided that, in lieu of executing any such Change Order, and appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 1.03A of this Section.

- B. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

1.06 WORK CHANGE DIRECTIVES

- A. Engineer may issue a Work Change Directive authorizing Contractor to proceed with a change for subsequent inclusion in a Change Order.

- B. The Work Change Directive will describe changes in the work, both additions and deletions, with attachments of revised Contract Documents to define details of the change and will designate the method of determining any change in the Contract Price and any change in Contract Times.

- C. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order

following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.07 FIELD ORDERS

- A. A Field Order is issued by signature and date of the Engineer to describe interpretations or clarifications of Contract Documents, order minor changes in the Work, and/or memorialize trade-offs, and receipt is acknowledged by signature and date of the Contractor.
- B. Field Order work will be accomplished without change in the Contract Price, Contract Times, and/or claims for other costs.

1.08 PROPOSALS AND CLAIMS

- A. Owner or Engineer may initiate changes by submitting a Request for Proposal (RFP) to Contractor. Such request is for information only and is not an instruction to execute the changes, nor to stop work in progress. The RFP will typically include a detailed description of the change, supplementary or revised drawings and/or specifications, if required, a description of construction constraints, if any, and a time limit for submitting proposals in response to the RFP.
- B. Contractor may initiate changes by submitting a written notice to Engineer, followed by a written claim providing a description of the proposed change, a statement of the reason for making the proposed change, a detailed description and supporting documentation of the effects on the Contract Price and/or the Contract Time, and a description of any effects on the work by other contractors, as applicable.
 - 1. Contractor's written notices stating the general nature of each claim shall be delivered by Contractor to Engineer and Owner promptly (but in no event later than 7 days) after the start of the event giving rise to the claim. The responsibility to substantiate a claim shall rest with the Contractor.
 - 2. Contractor's written claim, with supporting data, shall be delivered to the Engineer and Owner within 7 days of the end of such event (unless Engineer allows additional time for Contractor to submit additional or more accurate data in support of such claim).
 - 3. Owner shall submit any response to the Engineer and Contractor within 7 days after receipt of Contractor's last claim submittal (unless Engineer allows additional time).
 - 4. All Contractor claims shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such claims.
- C. A Contractor's proposal or claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 38A of the General Conditions and Paragraph 1.09 of this Section.
- D. A Contractor's proposal or claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 14B of the General

Conditions and Paragraph 1.010 of this Section.

- E. Each Contractor's proposal or claim shall be accompanied by Contractor's written statement that the adjustment proposed or claimed is the entire adjustment to which the Contractor believes it is entitled as a result of the RFP giving rise to the proposal, or as a result of the event giving rise to the claim.
- F. Engineer will review each proposal and claim and, within 7 days after receipt of the last proposal or claim submittal from the Contractor or the last claim response from the Owner, if any, take one of the following actions in writing:
 - 1. Deny the proposal or claim in whole or in part;
 - 2. Approve the proposal or claim; or
 - 3. Notify the Owner and Contractor that the Engineer is unable to resolve the proposal or claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the proposal or claim, such notice shall be deemed a denial.
- G. In the event that Engineer does not take action on a proposal or claim within said 7 days, the proposal or claim shall be deemed denied (unless Owner or Contractor allows additional time).
- H. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or Subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

1.09 CHANGE OF CONTRACT PRICE

- A. The Contract Price may only be changed by a Change Order.
- B. The value of a Change Order, or proposal, or claim for an adjustment in the Contract Price will be determined in accordance with Article 38 of the General Conditions further clarified as follows:
 - 1. Labor costs (Paragraph 38A.3(a) of the General Conditions):
 - a. Shall only include payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, forepersons and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include Social Security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave,

vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

- b. Shall not include payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred in Paragraph 1.09B.1.a, all of which are to be considered administrative costs covered by the Contractor's 15% labor overhead fee specified in Paragraph 38A.3(a) of the General Conditions.
- c. Shall only include Contractor's profit as indicated in Paragraph 38A.3(e) of the General Conditions.

2. Material costs (Paragraph 38A.3(b) of the General Conditions):

- a. Shall only include cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
- b. Shall only include Contractor's profit as indicated in Paragraph 38A.3(e) of the General Conditions.

3. Special equipment and machinery costs (Paragraph 38A.3(c) of the General Conditions):

- a. Shall only include rentals of all construction equipment and machinery, except those listed as being covered by the 15% labor overhead in Paragraph 38A.3(a) of the General Conditions, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
- b. Shall only include Contractor's profit as indicated in Paragraph 38A.3(e) of the General Conditions.

4. Subcontractor costs:

- a. Shall only include payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain bids from Subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of the Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in Paragraph 38A.3 of the General Conditions and further clarified in this Paragraph 1.09B, with no additional mark-up by Contractor.
 - b. Shall only include Contractor's profit of five percent as indicated in Paragraph 38A.3(d) of the General Conditions.
 - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus fee, the intent is that the Subcontractor who actually performs the Work, at whatever tier, will be paid as provided in Paragraph 38A.3 of the General Conditions and further clarified in this Paragraph 1.09B, and that any higher tier Subcontractor and Contractor will each be paid a profit of five percent of the amount paid to the next lower tier Subcontractor.
5. Supplemental costs:
- a. Shall include costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work;
 - b. Shall include costs, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, utilities, and temporary facilities at the site, if and only if the Work requires an extension of the Contract Times, as determined by Paragraph 1.011 below, and only to the extent that the materials, supplies, equipment, machinery, appliances, office, utilities, and temporary facilities are specifically necessary for the Work and the extended Contract Times.
 - c. Shall include costs for sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - d. Shall include the costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.
 - e. Shall not include expenses of Contractor's principal and branch offices other than Contractor's office at the site.
 - f. Shall not include any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - g. Shall not include costs due to the negligence of Contractor, any

Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

- h. Shall not include other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 1.09B.
- i. Shall not include any mark-up for Contractor's overhead or profit.

1.10 CHANGE OF CONTRACT TIMES

- A. The Contract Times may only be changed by a Change Order.
- B. Any adjustment of the Contract Times covered by a Change Order, or proposal, or claim for an adjustment in the Contract Times will be determined in accordance with Articles 14, 18 and 19 of the General Conditions further clarified as follows:
 - 1. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of the Contractor, or due to extra Work added by written request from the Owner, the Contract Times will be extended only in the amount necessary to maintain the completion of the Work, including the time lost due to such delay, or including the time to complete such extra Work, within the Contract Times. Delays beyond the control of the Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect by utility owners or other contractors performing other work as contemplated by Article 43 of the General Conditions, and force majeure as defined by Article 19 of the General Conditions.
 - 2. If Contractor is delayed in the performance or progress of the Work by force majeure as defined by Article 19 of the General Conditions, or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond the control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 1.10B.2.

1.11 DOCUMENTATION OF PROPOSALS AND CLAIMS

- A. Support each quotation for proposals and claims with sufficient substantiating data to allow Engineer to evaluate the quotation.
- B. Support each request for adjustment of Contract Times with a critical path impact analysis using a baseline schedule mutually agreed by Engineer and Contractor with activities added to incorporate such delay or extra Work giving rise to the request for adjustment, and a written narrative describing how the impacts were incorporated in the schedule and providing sufficient detail to allow evaluation by the Engineer.
- C. 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.
- D. Support each claim for additional costs and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information.
1. Name of the Owner's authorized agent who ordered the work and date of the order.
 2. Dates and times work were performed and by whom.
 3. Time record, summary of hours worked, and hourly rates paid.
 4. Receipts and invoices for:
 - a. Equipment used, listing dates and times of use.
 - b. Products used, listing of quantities.
 - c. Subcontracts.
- E. Document requests for Substitutions for Products as specified in Section 01630.

1.12 PREPARATION OF CHANGE ORDERS

- A. Engineer will prepare each Change Orders.
- B. Change Orders will describe changes in the work, both additions and deletions, with the following attachments, as required:
 1. Revised Contract Documents to define details of the change;
 2. Supporting documents pertaining to Requests for Proposals including as

applicable:

- a. The RFP;
- b. Contractor's response proposal;
- c. Negotiated adjustments to Contract Price and Contract Times.

3. Supporting documents pertaining to claims including as applicable:

- a. Contractor's initial notice of claim;
- b. Contractor's claim and supporting documentation;
- c. Negotiated adjustments to Contract Price and Contract Times.

C. Change Orders will provide an accounting of the adjustment in the Contract Price and in the Contract Times.

1.13 CORRELATION WITH CONTRACTOR'S SUBMITTALS

- A. Periodically revise Schedule of Values and Request for Payment forms to record each change as a separate item of work, and to record the adjusted Contract Price.
- B. Periodically revise the Construction Schedule to reflect each change in Contract Times.
- 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 -

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SECTION 01200

PROJECT MEETINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Engineer shall schedule and administer pre-construction meeting, periodic progress meetings, and specially called meetings throughout progress of the Work. The Engineer shall:
 - 1. Prepare agenda for meetings;
 - 2. Make physical arrangements for meetings;
 - 3. Preside at meetings;
 - 4. Record the minutes; include significant proceedings and decisions;
 - 5. Reproduce and distribute copies of minutes within fifteen (15) working days after each meeting;
 - a. To participants in the meeting.
 - b. To parties affected by decisions made at the meeting.
- 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. For each meeting, the Contractor shall prepare an updated project schedule and written narrative addressing work completed the past 30 days, Subcontractors on site, and major deliveries, as well as a 30-day look-ahead addressing the same three subjects.

1.02 RELATED REQUIREMENTS

- A. Section 01300: Submittals.
- B. Section 01700: Project Closeout.

1.03 PRE-CONSTRUCTION MEETING

- A. Schedule a preconstruction meeting prior to the date of Notice to Proceed.
- B. Location: A central site, convenient for all parties, designated by the Owner.
- C. Attendance:
 - 1. Owner's Representative.
 - 2. Engineer.
 - 3. Engineer's Field Representative.
 - 4. Contractor's Superintendent.

5. Major Subcontractors.
6. Major suppliers.
7. Utilities
8. Others as appropriate.

D. Suggested Agenda:

1. Distribution and discussion of:
 - a. List of major Subcontractors and suppliers.
 - b. Projected Construction Schedules.
2. Critical work sequencing.
3. Major equipment deliveries and priorities.
4. Project Coordination.
 - a. Designation of responsible personnel.
5. Procedures and processing of:
 - a. Field decisions.
 - b. Proposal requests.
 - c. Submittals.
 - d. Change Orders.
 - e. Applications for Payment.
6. Adequacy of distribution of Contract Documents.
7. Procedures for maintaining Record Documents.
8. Use of premises:
 - a. Office, work and storage areas.
 - b. Owner's requirements.
9. Construction facilities, controls and construction aids.
10. Temporary utilities.
11. Housekeeping procedures.

1.04 PROGRESS MEETINGS

- A. Schedule regular periodic meetings. The progress meetings will be held every 30 days, unless otherwise established at the preconstruction meeting, with the first meeting 30 days after the preconstruction meeting or 30 days after the date of Notice to Proceed.
- B. Hold called meetings as required by progress of the Work.
- C. Location of the meetings: Project field office of Contractor or City of Boca Raton Water Treatment Plant office.
- D. Attendance:

1. Owner or his representative.
 2. Engineer, and his professional consultants as needed.
 3. Subcontractors as appropriate to the agenda.
 4. Suppliers as appropriate to the agenda.
 5. Others as appropriate.
- E. Suggested Agenda:
1. Review, approval of minutes of previous meeting.
 2. Review of work progress since previous meeting.
 3. Field observations, problems, conflicts.
 4. Problems which impede Construction Schedule.
 5. Review of off-site fabrication, delivery schedules.
 6. Corrective measures and procedures to regain projected schedule.
 7. Revisions to Construction Schedule.
 8. Progress, schedule, during succeeding work period.
 9. Coordination of schedules.
 10. Review submittal schedules; expedite as required.
 11. Maintenance of quality standards.
 12. Pending changes and substitutions.
 13. Review proposed changes for:
 - a. Effect on Construction Schedule and on completion date.
 - b. Effect on other contracts of the Project.
 14. Review of Record Drawings.
 15. Construction schedule.
 16. Critical/long lead items.
- F. The Contractor is to attend progress meetings and is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as deliveries of materials and equipment, progress of the Work, etc.
- G. The Contractor shall prepare and distribute at each progress meeting a progress narrative that provides a review of construction activities within the last 30 days, including major deliveries and Subcontractors on site, as well as a 30-day look-ahead description of construction activities planned for the next 30 days (including major deliveries and Subcontractors on site).
- H. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section 01300.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. This section specifies the means of all submittals. All submittals shall be submitted to the Engineer with a copy to the Owner. All submittals shall be electronic searchable pdf format. A general summary of the types of submittals required is as follows:
 - a. Subcontractors' and suppliers' qualifications: within 30 days of NTP
 - b. Preliminary baseline construction schedule: within 14 days of NTP
 - c. Schedule of shop drawings, samples and other submittals: within 30 days of NTP
 - d. Schedule of values: within 14 days of NTP
 - e. Warranties, operation and maintenance manuals, and manufacturer's check-out forms: in accordance with schedule of shop drawings and other submittals

1.02 SUBMITTAL PROCEDURES

- A. Transmit each submittal with a form acceptable to the Owner, clearly identifying the project and the Contractor, the enclosed material and other pertinent information specified in other parts of this section. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- B. Revise and resubmit submittals as required, identify all changes made since previous submittals. Resubmittals shall be noted as such.
- C. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.03 CONSTRUCTION SCHEDULE

- A. The construction schedule shall be prepared for all project work components in the form of a horizontal bar chart showing in detail the proposed sequence of the Work and identifying construction activities for each major component, structure or facility. The schedule shall be time scaled, identifying the first day of each week, with the estimated date of starting and completion of each stage of the Work in order to complete the project within the Contract time. Three copies of the schedule shall be submitted within 14 calendar days after the date of the Notice to Proceed.

- B. The construction schedule shall be revised to reflect comments by the Owner and updated monthly, depicting progress to the last day of the month. Three copies shall be submitted with each request for monthly progress payments.
- C. Changes to the schedule shall be accompanied by a letter of explanation with appropriate reference and revision date on the schedule.
- D. The following additional requirements shall apply to the schedule.
 - 1. The Contractor shall provide notification to the Owner by e-mail a minimum of 24 hours in advance of any schedule change.
 - 2. Toward the close of each working day, the Contractor shall deliver notification to the Owner as to the location at which the next day of Work will be conducted.
 - 3. At the completion of each task order, the Contractor shall notify the Owner of such fact.

1.04 SCHEDULE OF PAYMENT ITEMS

- A. The Contractor shall submit a Schedule of Payment Items for review within 14 calendar days after the date of the Notice to Proceed. The schedule shall contain the installed value of the component parts of Work for the purpose of making progress payments during the construction period.
- B. The schedule shall be given in sufficient detail for the proper identification of Work accomplished. Each item shall include its proportional share of all costs including the Contractor's overhead, contingencies and profit. The sum of all scheduled items shall equal the total value of the Contract.
- C. No payment will be made for materials stored on the project site.
- D. The Contractor shall expand or modify the above schedule as required by the Owner's initial or subsequent reviews.

1.05 PROGRESS ESTIMATES

- A. Progress estimates shall be submitted in accordance with the General Conditions and shall be accompanied by the revised Construction Schedule. Progress estimates shall include draft record documents in accordance with Section 01720.

1.06 SHOP DRAWINGS

- A. General: The Contractor shall submit for review shop drawings for concrete reinforcement, structural details, materials fabricated especially for this Contract, and materials for which such Drawings are specified or specifically requested by the Owner.
- B. Shop drawings shall show the principal dimensions, weight, structural and operating features, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the Drawings.
- C. When so specified, or if considered by the Owner to be acceptable, the manufacturer's specifications, catalog data, descriptive matter, illustrations, etc.,

may be submitted for review in place of shop drawings. In such case, the requirements shall be as specified for shop drawings, insofar as applicable.

- D. The Contractor shall be responsible for the prompt submittal of all shop drawings so that there shall be no delay to the Work due to the absence of such Drawings. The Engineer will review the shop drawings within 14 calendar days of receipt of such Drawings. Reviewed shop drawings will be returned to the Contractor by regular mail, posted no later than 14 days after receipt.
- E. Time delays caused by rejection of submittals are not cause for extra charges to the Owner or time extensions.
- F. Requirements: All shop drawings shall be submitted to the Engineer through the Contractor. The Contractor is responsible for obtaining shop drawings from his Subcontractors and returning reviewed Drawings to them. All shop drawings shall be prepared on standard size, 24-inch by 36-inch sheets, or smaller. All Drawings shall be clearly marked with the name of the project, Owner, Contractor, Bid number, and structure to which the drawing applies. Drawings shall be suitably numbered and stamped by the Contractor. Each shipment of Drawings shall be accompanied by a letter of transmittal giving a list of the drawing numbers and the names mentioned above.
- G. Product Data: Where manufacturer's publications in the form of catalogs, brochures, illustrations, or other data sheets are submitted in lieu of prepared shop drawings, such submission shall specifically indicate the particular item offered. Identification of such items and relative pertinent information shall be made with indelible ink. Submissions showing only general information will not be accepted.
- H. Product data shall include materials of construction, dimensions, performance characteristics and capacities, and other relevant details.
- I. Sample Warranties: When warranties are called for, a sample of the warranty shall be submitted with the shop drawings. The sample warranty shall be the same form that will be used for the actual warranty.
- J. Work Prior to Review: No material or equipment shall be purchased, fabricated especially for this Contract, or delivered to the project site until the required shop drawings have been submitted, processed and marked either "FURNISH AS SUBMITTED" or "FURNISH AS CORRECTED". All materials and Work involved in the construction shall be as represented by said Drawings.
- K. The Contractor shall not proceed with any portion of the Work for which the design and details are dependent upon the design and details of equipment for which submittal review has not been completed.
- L. Contractor's Review: Only submittals which have been checked and corrected should be submitted to the Contractor by his Subcontractors and vendors. Prior to submitting shop drawings to the Owner, the Contractor shall check thoroughly all such Drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. Drawings which are correct shall be marked with the date, checker's name and indications of the Contractor's approval,

and then shall be submitted to the Owner; other Drawings submitted to the Owner will be returned to the Contractor unreviewed.

- M. Contractor's Responsibility: The review of shop drawings will be general and shall not relieve the Contractor of the responsibility for details of design, dimensions, etc., necessary for proper fitting and construction of the Work required by the Contract and for achieving the specified performance.
- N. Contractor's Modifications: For submissions containing departures from the Contract Documents, the Contractor shall include proper explanation in his letter of transmittal. Should the Contractor submit for review equipment that requires modifications to the structures, piping, layout, etc. detailed on the Drawings, he shall also submit for review details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all Work necessary to make such modifications.
- O. Substitutions: Whenever a particular brand or make of material, equipment, or other item is specified, or is indicated on the Drawings, it is for the purpose of establishing a standard of quality, design, and type desired and to supplement the detailed specifications. Any other brand or make which, in the opinion of the Owner, is equivalent to that specified or indicated may be offered as a substitute subject to the following provisions:
 - 1. Contractor shall submit for each proposed substitution sufficient details, complete descriptive literature, and performance data together with samples of the materials, where feasible, to enable the Owner to determine if the proposed substitution is equal.
 - 2. Contractor shall submit certified tests, where applicable, by an independent laboratory attesting that the proposed substitution is equal.
 - 3. Contractor shall submit a list of installations where the proposed substitution is equal.
 - 4. Where the acceptance of a substitution requires revision or redesign of any part of the Work, all such revision and redesign, and all new Drawings and details required therefore, shall be provided by the Contractor at his own cost and expense, and shall be subject to review of the Owner.
 - 5. In all cases the Engineer shall be the sole judge as to whether a proposed substitution is to be accepted. The Contractor shall abide by the Owner's decision when proposed substitute items are judged to be unacceptable and shall in such instances furnish the item, or substitute, as specified. No substitute items shall be used in the Work without written acceptance of the Owner.
 - 6. Acceptance of any proposed substitution shall in no way release the Contractor from any of the provisions of the Contract Documents.
- P. Complete Submittals: Each submittal shall be complete in all aspects incorporating all information and data required to evaluate the products' compliance with the Contract Documents. Partial or incomplete submissions shall be returned to the Contractor without review.

Q. Electronic Data Submittal Format

1. Files shall be electronically searchable based on Owner established standard file naming convention.
2. Quality and Legibility: Electronic submittal files shall be made from the original and shall be clear and legible. Do not provide scans of faxed copies. Electronic file shall be made at the full size of the original paper documents. All pages shall be properly oriented for reading on a computer screen without rotating.
3. Organization and Content:
 - a. Each electronic submittal shall be one electronic file. Do not divide and submit individual submittals into multiple electronic files unless directed by Owner.
 - b. When submittal is large or contains multiple parts, provide PDF file with bookmark for each section of submittal.
 - c. Submittal content shall include Contractor's letter of transmittal and Contractor's review and stamp.
4. Electronic file format: PDF (Portable Document Format): .pdf, Adobe PDF documents; created through electronic conversion rather than optically scanned whenever possible.

1.07 PRODUCT SAMPLES

- A. Contractor shall furnish for review all product samples as required by the Contract Documents or requested by the Owner to determine compliance with the specifications.
- B. Samples shall be of sufficient size or quantity to clearly illustrate the quality, type, range of color, finish or texture and shall be properly labeled to show complete project identification, the nature of the material, trade name of manufacturer and location of the Work where the material represented by the sample will be used.
- C. Samples shall be checked by the Contractor for conformance to the Contract Documents before being submitted to the Owner and shall bear the Contractor's stamp certifying that they have been so checked. Transportation charges on samples submitted to the Owner shall be prepaid by the Contractor.
- D. Owner's review will be for compliance with the Contract Documents, and his comments will be transmitted to the Contractor with reasonable promptness.
- E. Acceptable samples will establish the standards by which the completed Work will be judged.

1.08 CERTIFICATES OF COMPLIANCE

- A. Copies of certificates of compliance and test reports shall be submitted for requested items to the Owner prior to request for payment.

1.09 WARRANTIES

- A. Original warranties, called for in the Contract Documents, shall be submitted to the Owner. When warranties are required for an item, warranty shall be submitted prior to request for payment of that item.
- B. When warranties are requested, a sample of the warranty to be provided shall be submitted with, and considered part of, the shop drawings.
- C. The Contractor shall warrant to the Owner that all material and labor used in the construction are covered by Contractor's warrantee for a minimum of a two-year period or as otherwise specified upon approval and acceptance by the Owner, including but not limited to all utility installations, roadway reconstruction, pavement restoration, sidewalk, and all other contract work as specified herein and on the Contract Documents unless otherwise noted. The Contractor shall replace or repair defects at no cost to the Owner during the warrantee period. No visible or potential leakage shall be allowed during the warrantee period.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 GENERAL

1.01 SUBMITTALS

A. Information Submittals:

1. Preliminary Progress Schedule: Submit within 14 days after Notice to Proceed.
2. Detailed Progress Schedule:
 - a. Submit initial Detailed Progress Schedule within 60 days after Notice to Proceed.
 - b. Submit an Updated Progress Schedule at each update, in accordance with Article 1.03 "Detailed Progress Schedule."
3. Submit with Each Progress Schedule Submission:
 - a. Contractor's certification that progress schedule submission is actual schedule being utilized for execution of the Work.
 - b. Progress Schedule: 4 legible color copies.
 - c. Narrative Progress Report: Same number of copies as specified for Progress Schedule.
4. Prior to final payment, submit a final Updated Progress Schedule.

1.02 PRELIMINARY PROGRESS SCHEDULE

- A. Submit a detailed schedule, beginning with Notice to Proceed, for minimum duration of 90 days, and a summary of balance of Project through Final Completion.
- B. Show activities including, but not limited to the following:
 1. Notice to Proceed.
 2. Permits.
 3. Submittals, with review time. Contractor may use schedule of Shop Drawings and Sample specified in Section 01300, Submittals.
 4. Early procurement activities for long lead equipment and materials.
 5. Initial site work.
 6. Earthwork.
 7. Specified Work sequences and construction constraints.
 8. Contract Milestone and Completion Dates.
 9. Owner – furnished products delivery dates or ranges of dates.

10. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.
 11. Systems startup summary.
 12. Project closeout summary.
 13. Demobilization summary.
- C. Preliminary Progress Schedule will be resource/cost loaded to facilitate progress payments by the Engineer. Cost loading will reflect cash flows and Schedule of Values.
- D. Update Preliminary Progress Schedule monthly; as part of progress payment process. Failure to do so may cause Owner to withhold all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to Engineer.
- E. Format: In accordance with Article "Progress Schedule - Critical Path Network."

1.03 DETAILED PROGRESS SCHEDULE

- A. Submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.
- B. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.
- C. Detailed Progress Schedule will be resource/cost loaded to facilitate progress payments by the Engineer. Cost loading will reflect cash flows and the Schedule of Values with the sum of all tasks equal to the Contract total.
- D. When accepted by Engineer, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Update Progress Schedules.
- E. Format: In accordance with Article "Progress Schedule-Critical Path Network."
- F. Update monthly to reflect actual progress and occurrences to date, including weather delays.

1.04 PROGRESS SCHEDULE – CRITICAL PATH NETWORK

- A. General: The Progress Schedule will be a comprehensive computer-generated schedule using CPM scheduling methodologies and techniques.
- B. Contents:
1. Schedule shall begin with the date of Notice to Proceed and conclude with the date of Final Completion.
 2. Identify Work calendar basis using days as a unit of measure.
 3. Show complete interdependence and sequence of construction and Project-related activities reasonably required to complete the Work.

4. Identify the Work of separate stages and other logically grouped activities, and clearly identify critical path activities.
 5. Reflect sequences of the Work, restraints, delivery windows, review times, Contract Times and Project Milestones set forth in the Contract and Section 01014, Construction Sequencing.
 6. Include applicable, at a minimum:
 - a. Obtaining permits, submittals for early product procurement, and long lead time items.
 - b. Mobilization and other preliminary activities.
 - c. Initial site work.
 - d. Specified Work sequences, constraints, and Milestones, including Substantial Completion date(s) Subcontract Work.
 - e. Major equipment design, fabrication, factory testing, and delivery dates.
 - f. Delivery dates for Owner-furnished products, as specified in Section 01010, Summary of Work, if applicable.
 - g. Sitework.
 - h. Concrete Work.
 - i. Structural steel Work.
 - j. Architectural features Work.
 - k. Conveying system Work.
 - l. Equipment Work.
 - m. Mechanical Work.
 - n. Electrical Work.
 - o. Instrumentation and control Work.
 - p. Interfaces with Owner-furnished equipment, if applicable.
 - q. Other important Work for each major facility.
 - r. Equipment and system startup and test activities.
 - s. Project closeout and cleanup.
 - t. Demobilization.
 7. No activity duration, exclusive of those for Submittals review and product fabrication/delivery, shall be less than 1 day nor more than 14 days, unless otherwise approved.
 8. Activity duration for Submittal review shall not be less than review time specified unless clearly identified and prior written acceptance has been obtained from Engineer.
 9. Constrained dates will not be utilized except for contractual start and complete dates, unless otherwise approved by the Engineer. All tasks will be logically tied, unless approved by the Engineer.
- C. Network Graphical Display:
1. Plot or print on paper not greater than 30 inches by 42 inches or smaller than 22 inches by 34 inches, unless otherwise approved.

2. Title Block: Show name of Project, Owner, date submitted, revision or update number, and the name of the scheduler. Update schedules shall indicate the current data date.
3. Identify horizontally across top of schedule the time frame by year, month, and day.
4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
5. Indicate the critical path.
6. Show, at a minimum, the controlling relationships between activities.
7. Plot activities on a time-scale basis, with the length of each activity proportional to the current estimate of the duration.
8. Plot activities on an early start basis unless otherwise requested by Engineer.
9. Plot to include current Early Bars as well as Target/Baseline bars.
10. Provide a legend to describe standard and special symbols used.

D. Schedule Report:

1. On 8-1/2-inch by 11-inch white paper, unless otherwise approved.
2. List information for each activity in tabular format, including, at a minimum:
 - a. Activity Identification Number.
 - b. Activity Description.
 - c. Original Duration.
 - d. Remaining Duration.
 - e. Early Start Date (Actual start on Updated Progress Schedules).
 - f. Early Finish Date (Actual finish on Updated Progress Schedules).
 - g. Late Start Date.
 - h. Late Finish Date.
 - i. Total Float.
3. Sort reports, in ascending order, as listed below:
 - a. Activity number sequence with predecessor and successor activity.

1.05 PROGRESS OF THE WORK

A. Updated Progress Schedule Shall Reflect:

1. Progress of Work to within 5 working days prior to submission.
2. Approved changes in Work scope and activities modified since submission.
3. Delays in Submittals or resubmittals, deliveries, or Work.
4. Adjusted or modified sequence of Work.
5. Other identifiable changes.
6. Revised projections of progress and completion.
7. Report of changed logic.

- B. Produce detailed subschedules during Project, upon request of Owner or Engineer, to further define critical portions of the Work such as facility shutdowns.
- C. Produce a highlighted 3-week Look Ahead Schedule for construction meetings on a weekly basis or as determined by the Owner or Engineer, with schedule information compiled from the latest DETAILED PROGRESS SCHEDULE.
- D. If Contractor fails to complete activity by its latest scheduled completion date and this failure is anticipated to extend Contract Times (or Milestones), Contractor shall, within 7 days of such failures, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current progress schedule. Actions by Contractor to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.
- E. Owner may order Contractor to increase plant, equipment, labor force or working hours if Contractor fails to:
 - 1. Complete a Milestone activity by its completion date.
 - 2. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

1.06 NARRATIVE PROGRESS REPORT

- A. Format:
 - 1. Organize same as Progress Schedule.
 - 2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.
- B. Contents:
 - 1. Number of days worked over the period, work force on hand, major equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).
 - 2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of Subcontractors, and major milestones achieved.
 - 3. Contractor's plan for management of site (e.g. lay down and staging areas, construction traffic), utilization of construction equipment, buildup of trade labor, and identification of potential Contract changes.
 - 4. Identification of new activities and sequences as a result of executed Contract changes.
 - 5. Documentation of weather conditions over the reporting period, and any resulting impacts to the Work.
 - 6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.

7. In the case that actual or potential delays have been identified, the Narrative Progress report should be accompanied by a proposed work around schedule to mitigate potential and or actual delays.
8. Changes to activity logic.
9. Changes to the critical path.
10. Identification of, and accompanying reason for, any activities added or deleted since the last report.
11. Steps taken to recover the schedule from Contractor-caused delays.

1.07 SCHEDULE ACCEPTANCE

A. Engineer's Acceptance will Demonstrate Agreement that:

1. Proposed schedule is accepted with respect to:
 - a. Contract Times, including Final Completion and all intermediate Milestones are within the specified times.
 - b. Specified Work sequence and constraints are shown as specified.
 - c. Specified Owner-furnished Equipment or Material arrival dates, or range of dates, are included.
 - d. Access restrictions are accurately reflected.
 - e. Start-up and testing times are as specified.
 - f. Submittal review times are as specified.
 - g. Start-up testing duration is as specified and timing is acceptable.
 - h. Resource/cost loading and schedule of values are equal to the total sum of the signed Contract.
2. In all other respects, Engineer's acceptance of Contractor's schedule indicates that, in Engineer's judgment, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. Engineer's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to Engineer's attention in submittal, Schedule remains Contractor's responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to complete Project in accordance with the Contract Documents.

B. Unacceptable Preliminary Progress Schedule:

1. Make requested corrections; resubmit within 10 days.
2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process, during which time Contractor shall update schedule on a monthly basis to reflect actual progress and occurrences to date.

C. Unacceptable Detailed Progress Schedule:

1. Make requested corrections; resubmit within 10 days.

2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process.
- D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to Engineer's acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

1.08 ADJUSTMENT OF CONTRACT TIMES

- A. Contract Conditions.
- B. Evaluation and reconciliation of Adjustment of Contract Times shall be based on the Updated Progress Schedule at the time of proposed adjustment or claimed delay.
- C. Float:
 1. Float time is a Project resource available to both parties to meet Contract Milestones and Contract Times.
 2. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times are prohibited, and use of float time disclosed or implied by use of alternate float-suppression techniques shall be shared to proportionate benefit of Owner and Contractor.
 3. Pursuant to above float-sharing requirement, no time extensions will be granted nor delay damages paid until a delay occurs which (i) impacts Project's critical path, (ii) consumes available float or contingency time, and (iii) extends Work beyond Contract completion date.
- D. Claims Based on Contract Times:
 1. Where Engineer has not yet rendered formal decision on Contractor's claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in progress schedule, Contractor shall reflect an interim adjustment in the progress schedule as acceptable to Engineer.
 2. It is understood and agreed that such interim acceptance will not be binding on either Contractor or Owner, and will be made only for the purpose of continuing to schedule Work until such time as formal decision has been rendered as to an adjustment, if any, of the Contract Times.
 3. Contractor shall revise progress schedule prepared thereafter in accordance with Engineer's formal decision.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01320

AUDIO VIDEO DOCUMENTATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Prior to commencing Work in each area of the project, the Contractor shall have a continuous color audio-video DVD recording taken of the entire work area and all structures and equipment within the project site to serve as a record of pre-construction conditions. Note that compliance with Paragraph 1.03, C below may require that the audio video documentation of the overall project area be conducted in multiple parts at different stages during the Contract Times to ensure that preconstruction conditions are accurately documented.

1.02 RELATED SECTIONS

- A. Section 01152: Applications for Payment
- B. Section 01300: Submittals
- C. Section 01720: Project Record Documents

1.03 QUALITY ASSURANCE

- A. The Contractor shall engage the services of a professional videographer. The color audio-video DVDs shall be prepared by a responsible commercial firm skilled and regularly engaged in the business of preconstruction color audio-video DVD documentation.
- B. The Owner's representative shall be present during audio-video documentation. Provide the Owner a minimum of five days' notice prior to documentation.
- C. DVD recordings shall be made not greater than 45 days prior to starting construction in any particular area of the project site.
- D. No construction may begin prior to review and approval of the preconstruction video. The Engineer shall have the authority to reject all or any portion of a video DVD not conforming to the specifications and order that it be redone at no additional charge.
- E. The Contractor shall reschedule unacceptable coverage within five days after being notified. The Engineer shall designate those areas, if any, to be omitted from or added to the audio-video coverage.

DVD recordings and written records shall become the property of the Owner.

PART 2 PRODUCTS

2.01 AUDIO-VIDEO DVDS

- A. Audio-video DVDs shall be new. Reprocessed DVDs shall not be acceptable.

PART 3 EXECUTION

3.01 EQUIPMENT

- A. All equipment, accessories, materials, and labor to perform this service shall be furnished by the Contractor.
- B. The complete audio-video system shall reproduce bright, sharp, clear pictures with accurate colors, and shall be free from distortion, tearing, rolls, or any other form of imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume, clarity, and be free from distortion and interruptions.
- C. If conventional wheeled vehicles are used, the distance from the camera lens to the ground shall not be more than ten (10) feet. In some instances, audio-video DVD coverage may be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance provided by the Contractor.
- D. The color video camera used in the recording system shall have a horizontal resolution of 350 lines at center, a luminance signal-to-noise ratio of 45 dB, and a minimum illumination requirement of one (1) foot-candle.

3.02 RECORDED INFORMATION – AUDIO

- A. Each DVD shall begin with the current date, project name and municipality, and be followed by the general location (i.e., viewing side and direction of progress). The audio track shall consist of an original live recording. The recording shall contain the narrative commentary of the videographer, recorded simultaneously with his fixed elevation video record of the zone of influence of construction.
- B. The Owner and Engineer reserve the right to supplement the audio portion of the taping as deemed necessary. A representative of the Owner or Engineer shall be selected to provide such narrative.

3.03 RECORDED INFORMATION – VIDEO

- A. All video recordings shall, by electronic means, display on the screen the correct time of day, the month, day, and year of the recording. This time and date information shall be continuously and simultaneously generated with the actual recording.
- B. Each video DVD shall have a log of that video DVD's contents. The log shall describe the various segments of coverage contained on that DVD in terms of the

names of buildings, structures, equipment, work areas, coverage beginning and end, directions of coverage, video unit counter numbers, times, etc.

3.04 LIGHTING

- A. All audio-video recording shall be done during time of good visibility. No recording shall be done during precipitation, mist, or fog. The recording shall be done when sufficient sunlight or ambient light is present to properly illuminate the subjects of recording and to produce bright, sharp video recordings of those subjects.

3.05 SPEED OF TRAVEL

- A. The rate of speed in the general direction of travel used during vehicle recording shall not exceed 44 feet per minute. Panning, zoom-in, and zoom-out rates shall be sufficiently controlled to maintain a clear view of the subjects.

3.06 AREA OF COVERAGE

- A. Coverage shall include all features located within the project area supported by appropriate audio coverage. Such coverage shall include, but not be limited to pavement, sodding and landscaping, sidewalks, curbs, fences, signs, headwalls, building structures, equipment, piping, electrical infrastructure, etc.

END OF SECTION

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SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
 - 1. Quality assurance and control of installation.
 - 2. References.
 - 3. Inspection and testing laboratory services.

1.02 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- G. Provide devices or utilize methods necessary for compliance with the "Trench Safety Act".
- H. Maintain site control points (benchmarks) and stake/markers for easements throughout the project.

1.03 REFERENCES

- A. Conform to reference standard as identified in each individual technical specification section.
- B. Should specified reference standards conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by any reference standard or document.

1.04 INSPECTION AND TESTING LABORATORY SERVICES

- A. The cost of all laboratory tests for concrete compressive strength testing, proctor testing, and subgrade/base density testing, shall be borne by the Owner. However, the CONTRACTOR shall be charged for the cost of any additional tests and investigation on work performed which does not meet specifications, for failing testing, cancelled/rescheduled testing services, and/or for lack of preparation / failure to properly prepare for scheduled testing.
- B. The testing firm will perform inspections, tests, and other services specified in individual specification Sections and as required by the ENGINEER. CONTRACTOR shall be responsible for scheduling and coordinating with OWNER's testing firm as necessary to complete testing in accordance with Contract specifications.
- D. Cooperate with Owner's testing firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 1. Notify ENGINEER and testing firm 24 hours prior to expected time for operations requiring services.
- E. Retesting required because of non-conformance to specified requirements shall be performed by the Owner's testing firm on instructions by the ENGINEER. The cost for retesting shall be the CONTRACTOR's responsibility.
- F. Owner Furnished Testing Lab services to be coordinated/arranged by the CONTRACTOR shall include, at a minimum:
 - 1. Soil Proctor and Density Testing – CONTRACTOR shall coordinate and facilitate proctor and density testing in accordance with and at intervals required in the Contract Documents and as directed by the Owner/Engineer.

2. Concrete Testing – CONTRACTOR shall coordinate and facilitate concrete sampling and testing in accordance with the Contract Specifications and as directed by the Owner/Engineer.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01505

MOBILIZATION AND DEMOBILIZATION

PART 1 GENERAL

1.01 GENERAL

- A. Mobilization shall include the obtaining of all permits and cost of permits excluding the reimbursable permit fees as specified in Section 01025; moving onto the site of all equipment; temporary buildings, and other construction facilities; and implementing security requirements; all as required for the proper performance and completion of the Work. Mobilization shall include the following principal items:
1. Moving on to the site of all Contractor's equipment required for first month operations.
 2. Installing temporary construction power, wiring, and lighting facilities.
 3. Developing construction water supply.
 4. Providing all on-site communication facilities, including telephones and radio pagers.
 5. Providing on-site sanitary facilities, potable water facilities, and solid waste disposal; including a Owner required waste management firm.
 6. Obtaining all required permits, bonds, and insurance.
 7. Having all OSHA required notices and establishment of safety programs.
 8. Audio-Visual preconstruction record.
 9. Providing field office trailers for the Contractor.
 10. Arranging for and erection of Contractor's work and storage yard.
 11. Having the Contractor's superintendent at the job site full time.
 12. Site Security / Site Maintenance.
 13. Furnish and install miscellaneous barriers and protective devices other than Maintenance of Traffic.
 14. Prepare, submit, implement & maintain necessary documents to comply with the National Pollution Discharge Elimination System permit program, including all permit fees. These documents include but are not limited to, Notice of Intent, Stormwater Pollution Prevention Plans, Notice of Termination, etc., in accordance with the requirements of Florida Department of Environmental Protection.
- B. Demobilization shall include removal of all temporary facilities, stored materials, equipment, and spoil materials, full restoration of all areas disturbed during the Work, close-out of all permits, MOTs, and other regulatory/jurisdictional provisions, and completion of all administrative activities precedent to project close-out.

1.02 PAYMENT FOR MOBILIZATION

- A. The Contractor's attention is directed to the condition that no payment for mobilization, or any part thereof will be approved for payment under the Contract until all mobilization items # 1 through 9 listed above have been completed as specified. The remaining items # 10 through 14 will be ongoing through the contract period.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01510

TEMPORARY UTILITIES

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. It shall be the Contractor's responsibility to provide equipment that is adequate for the performance of the Work under this Contract within the time specified. All equipment shall be kept in satisfactory operating condition, shall be capable of safely and efficiently performing the required Work, and shall be subject to inspection and review by the Owner's representative at any time within the duration of the Contract. All Work hereunder shall conform to the applicable requirements of the OSHA Standards for Construction.
- B. The Contractor shall provide for utilities and services for its own operations. The Contractor shall furnish, install and maintain all temporary utilities during the contract period including removal upon completion of the Work.

1.02 POWER AND LIGHTING

- A. Power: The Contractor shall provide all necessary power required for its operations under the Contract, and shall provide and maintain all temporary power lines required to perform the Work in a safe and satisfactory manner.
- B. Construction Lighting: All Work conducted at night or under conditions of deficient daylight shall be suitably lighted to insure proper Work and to afford adequate facilities for inspection and safe working conditions. Temporary lighting shall be maintained during nonworking periods if the area is subject to access by the public.
- C. Electrical Connections: All temporary connections for electricity shall be subject to review by the Owner and the power company representative, and shall be removed in like manner at the Contractor's expense prior to final acceptance of the Work.
- D. Separation of Circuits: Unless otherwise permitted by the Owner circuits separate from lighting circuits shall be used for all power purposes.
- E. Construction Wiring: All wiring for temporary electric light and power shall be properly installed and maintained and shall be securely fastened in place. All electrical facilities shall conform to the requirements of Subpart K of the OSHA Safety and Health Standards for Construction.

1.03 WATER SUPPLY

- A. General: The Contractor shall supply, and pay for all costs for all water used for construction, flushing and testing. The Contractor shall provide and maintain all meters, piping, fittings, adapters, and valving required.

- B. Potable Water: All drinking water on the site during construction shall be furnished by the Contractor and shall be bottled water or water furnished in suitable dispensers. Notices shall be posted conspicuously throughout the site warning the Contractor's personnel that piped water may be contaminated.
- C. Water Connections: The Contractor shall not make connection to, or draw water from, any fire hydrant prior to applying for and obtaining a fire hydrant meter rental/permit from the City. The City shall provide a meter and backflow preventer.
- D. Removal of Water Connections: Before final acceptance of the Work on the project, all temporary connections and piping installed by the Contractor shall be entirely removed, and all affected improvements shall be restored to their original condition, or better, to the satisfaction of the Owner and to the agency owning the affected utility.
- E. Fire Protection: The construction, and all other parts of the Work shall be adequately protected against damage by fire. Hose connections and hose, water casks, chemical equipment, or other sufficient means shall be provided for fighting fires in the temporary structures and other portions of the Work, and responsible persons shall be designated and instructed in the operation of such fire apparatus so as to prevent or minimize the hazard of fire. The Contractor's fire protection program shall conform to the requirements of Subpart F of the OSHA Standards for Construction.

1.04 SANITATION

- A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.
- B. Such facilities shall be made available when the first employees arrive on the Work, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required.
- C. The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all time and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of the Work, on the lands of the Owner, or an adjacent property.
- D. The Owner shall have the right to inspect any building or other facility erected, maintained, or used by the Contractor, to determine whether or not the sanitary regulations have been complied with.
- E. Sanitary and Other Organic Wastes: The Contractor shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Owner and in accordance with all laws and regulations pertaining thereto.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01530

PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.
- B. The Contractor shall verify the exact locations and depths of all utilities shown and the Contractor shall make exploratory excavations of all utilities that may interfere with the Work. All such exploratory excavations shall be performed as soon as practicable after Notice to Proceed, minimum one week prior to commencing field work, and in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor's Work. When such exploratory excavations show the utility location as shown to be in error, the Contractor shall so notify the Owner.
- C. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.

1.02 RIGHTS-OF-WAY

- A. The Contractor shall not do any Work that would affect any oil, gas, sewer, or water pipeline; any telephone, telegraph, or electric transmission line; any fence; or any other structure, nor shall the Contractor enter upon any rights-of-way involved until notified that the Owner has secured authority therefore from the proper party. After authority has been obtained, the Contractor shall give said party due notice of its intention to begin Work, and shall give said party convenient access and every opportunity for removing, shoring, supporting, or otherwise protecting such pipeline, transmission line, ditch, fence, or structure, and for replacing same. When two or more contracts are being executed at one time on the same or adjacent land in such manner that Work on one contract may interfere with that on another, the Owner shall determine the sequence and order of the Work. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the Owner to the Contractor so desiring, to the extent, amount, in the manner, and at the times permitted. No such decision as to the method or time of conducting the Work or the use of territory shall be made the basis of any claim for delay or damage.

1.03 PROTECTION OF STREET OR ROADWAY MARKERS

- A. The Contractor shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced for easy and accurate restoration. It shall be the Contractor's responsibility to notify the proper representatives of the Owner of the time and location that Work will be done. Such notification shall be sufficiently in advance of construction so that there will be no delay due to waiting for survey points to be satisfactorily referenced for restoration. All survey markers or points disturbed by the Contractor without proper authorization by the Owner, will be accurately restored by the Owner at the Contractor's expense after all street or roadway resurfacing has been completed.

1.04 RESTORATION OF FACILITIES

- A. General: All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the affected pavement owner. All pavements which are subject to partial removal shall be neatly saw cut in straight lines. Within five working days of the pipe installation, temporary restoration shall be completed. All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific restoration requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit.
- B. Temporary Restoration: Temporary restoration includes repair to all driveways, sidewalks and roadways. They shall be swept clean and be maintained free of dirt and dust. All areas disturbed by the construction activities shall be restored to proper grade, cleaned up, including the removal of debris, trash, and deleterious materials. All construction materials, supplies, or equipment, including piles of debris shall be removed from the area. All temporarily restored areas shall be maintained by the Contractor. These areas shall be kept clean and neat, free of dust and dirt, until final restoration operations are completed. The Contractor is responsible to utilize dust abatement operations in the temporarily restored areas as required, to the satisfaction of the Owner.
- C. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the Contractor shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.
- D. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the Contractor shall saw cut back and trim the edge so as to provide a

clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement, unless otherwise directed by the Owner.

- E. Temporary Restoration of Sidewalks or Private Driveways: Wherever sidewalks or private driveways have been removed for purposes of construction, the Contractor shall place suitable temporary sidewalks or driveways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the Contractor shall maintain said temporary sidewalks or driveways until the final restoration thereof has been made.
- F. Final Restoration: Final restoration shall include the completion of all required pavement replacement of roadways, driveways, curbs, gutters, sidewalks and other existing improvements disturbed by the construction: final grading, placement of sod, installation or replacement of any trees or shrubs, repair of irrigation systems, pavement marking, etc. All areas disturbed during the Work shall be restored to pre-construction conditions or better, as shown on the Drawings and specified herein, at the Owner's sole discretion.

1.05 EXISTING UTILITIES AND IMPROVEMENTS

- A. General: The Contractor shall protect all underground utilities and other improvements which may be impaired during construction operations. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.
- B. Utilities to be Moved: In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the Contractor, be notified by the Owner to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Owner a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.
- C. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is shown, the Contractor shall remove and temporarily replace or relocate such utility or improvement in a manner satisfactory to the Owner and the Owner of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace

the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

- D. Owner's Right of Access: The right is reserved to the Owner and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work of this Contract.
- E. Underground Utilities Shown or Indicated: Existing utility lines that are shown or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired by the Contractor.
- F. Underground Utilities Not Shown or Indicated: In the event that the Contractor damages any existing utility lines that are not shown or the locations of which are not made known to the Contractor prior to excavation, a written report thereof shall be made immediately to the Owner. If directed by the Owner, repairs shall be made by the Contractor under the provisions for changes and extra Work contained in the General Conditions.
- G. All costs of locating, repairing damage not due to failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the Work which was interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such Work will be paid for as extra Work in accordance with the provisions of the General Conditions. Compensation shall not include Contractor's costs for the coordination of his activities with the utility company affected. Contractor shall schedule his work in such a manner that he is not delayed by the utilities companies relocating or supporting their facilities. No compensation will be paid the Contractor for any loss of time or delay.
- H. Approval of Repairs: All repairs to a damaged improvement are subject to inspection and approval by an authorized representative of the improvement owner before being concealed by backfill or other Work.
- I. Maintaining in Service: All oil and gasoline pipelines, power, and telephone or other communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Owner are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The Contractor shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.
- J. The Contractor shall be solely and directly responsible to the Owner and operators of such properties for any damage, injury, expense, loss, inconvenience, delay,

suits, actions or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract.

- K. Neither the Owner nor its officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the Work.
- L. In the event of interruption to domestic water, sewer, storm drain or other utility services as a result of accidental breakage due to construction operations, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is granted.

1.06 TREES WITHIN STREET RIGHTS-OF-WAY AND PROJECT LIMITS

- A. General: The Contractor shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits, and shall not trim, relocate or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or Owner. All existing trees and shrubs which are damaged during construction shall be trimmed or replaced by the Contractor or a certified tree company under permit from the jurisdictional agency or Owner and to the satisfaction of said agency and/or the Owner. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs.
- B. Trimming: Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be made close to trunk or large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.
- C. Replacement: The Contractor shall immediately notify the jurisdictional agency and/or the Owner if any tree is damaged by the Contractor's operations. If, in the opinion of said agency or the Owner, the damage is such that replacement is necessary, the Contractor shall replace the tree at his own expense. The tree shall be of a like size and variety as the tree damaged, or, if of a smaller size, the Contractor shall pay to the Owner of said tree compensatory payment acceptable to the tree owner, subject to the approval of the jurisdictional agency or Owner.

1.07 NOTIFICATION BY THE CONTRACTOR

- A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way the Contractor shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than three days nor more than seven days prior to excavation, so that a representative of said owners or agencies can be present during such Work if they so desire. The Contractor shall also contact

Sunshine 811 at least two days, but no more than fourteen days prior to such excavation.

- B. The Contractor shall prepare a written notice to property owners adjacent to the project work site notifying them of the schedule of work affecting them and anticipated inconveniences they may expect. The notice shall meet the approval of the Owner and be delivered to property owners at least 72 hours prior to construction adjacent to their property.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01550

SITE ACCESS AND STORAGE

PART 1 - GENERAL

1.01 SITE ACCESS

- A. The Contractor shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the Work. It shall be the Contractor's responsibility to construct and maintain any haul roads required for its construction operations.

1.02 TEMPORARY CROSSINGS

- A. Street Use: Nothing herein shall be construed to entitle the Contractor to the exclusive use of any public street, alleyway, or parking area during the performance of the Work hereunder, and he shall so conduct his operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleys, ways, or parking areas. No street shall be closed to the public without first obtaining permission of the Owner and proper governmental authority having jurisdiction. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise provided or shown. Toe boards shall be provided to retain excavated material if required by the Owner or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the Contractor to assure the use of sidewalks and the proper functioning of all gutters, sewer inlets, and other drainage facilities.
- B. Traffic Control: For the protection of traffic in public or private streets and ways, the Contractor shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of the "Manual of Uniform Traffic Control Devices, Part VI - Traffic Controls for Street and Highway Construction and Maintenance Operations," published by U.S. Department of transportation, Federal Highway Administration (ANSI D6.1). Contractor shall prepare and submit Maintenance of Traffic plans to Owner/Engineer and/or to appropriate agency having jurisdiction over the roadway and shall obtain approval prior to starting work.
- C. The Contractor shall take all necessary precautions for the protection of the Work and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The Contractor shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.

- D. The Contractor shall remove traffic control devices when no longer needed, repair all damage caused by installation of the devices, and shall remove post settings and backfill the resulting holes to match grade.
- E. Temporary Street Closure: If closure of any street is required during construction, a formal application for a street closure shall be made to the authority having jurisdiction at least 30 days prior to the required street closure in order to determine necessary sign and detour requirements.
- F. Temporary Driveway Closure: The Contractor shall notify the Owner or occupant (if not owner-occupied) of the closure of the driveways to be closed more than one eight-hour work day, at least three working days prior to the closure. The Contractor shall minimize the inconvenience and minimize the time period that the driveways will be closed. The Contractor shall fully explain to the owner/occupant how long the Work will take and when closure is to start.
- G. Temporary Bridges: Wherever necessary or required for the convenience of the public or individual residents at street or highway crossings, private driveways, or elsewhere, the Contractor shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the Contractor shall secure the written consent of the individuals and authorities concerned to omit such temporary bridges or steel plates, which written consent shall be delivered to the Owner prior to excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the Contractor shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

1.03 STORAGE

- A. The Contractor shall store his equipment and materials at the Contractor's base of operations, or other facilities secured by the Contractor, in accordance with the manufacturer's recommendations and instructions regarding storage conditions. The Contractor is responsible for securing appropriate storage for all materials and equipment throughout the Work, and is responsible for maintaining security and appropriate storage conditions for all equipment and materials throughout the duration of the Work. No storage facilities or areas will be provided by the Owner.
- B. Responsibility for protection and safekeeping of equipment and materials will be solely that of the Contractor, and no claim shall be made against the Owner by reason of any act of an employee or trespasser. Should an occasion arise necessitating access to an area occupied by stored equipment and/or materials, the Contractor shall immediately move them.
- C. Upon completion of the Contract, the Contractor shall remove from the storage areas all of their equipment, temporary fencing, surplus materials, rubbish, etc., and restore the area to its original or better conditions.

- D. The Contractor's storage shall be limited to on-site storage only. Off-site storage of materials, if required, shall be arranged for by the Contractor and a copy of an agreement for use of other property shall be furnished to the Owner.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

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SECTION 01560

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 -- GENERAL

1.01 EXPLOSIVES AND BLASTING

- A. The use of explosives on the Work will not be permitted.

1.02 DUST ABATEMENT

- B. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for any damage resulting from any dust originating from its operations. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Owner. No separate payment will be allowed for dust abatement measures and all costs thereof shall be included in the Contractor's bid price.

1.03 RUBBISH CONTROL

- A. During the progress of the Work, the Contractor shall keep the site of the Work and other areas used in a neat and clean condition, and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Work site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.04 SANITATION

- A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.
- B. Such facilities shall be made available when the first employees arrive on the Work, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required.

- C. The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of the Work, on the lands of the Owner, or an adjacent property.
- D. The Owner shall have the right to inspect any building or other facility erected, maintained, or used by the Contractor, to determine whether or not the sanitary regulations have been complied with.
- E. Sanitary and Other Organic Wastes: The Contractor shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Owner and in accordance with all laws and regulations pertaining thereto.

1.05 CHEMICALS

- A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, paint, fuel, solvent or reactant of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. The handling, storage, use and disposal of all such chemicals and disposal of residues shall be in strict accordance with all applicable rules and regulations of Federal, State and local jurisdictional agencies and the printed instructions of the manufacturer and all regulatory requirements. Copies of antidote literature shall be kept at the storage site and at the Contractor's job site office. A supply of antidotes shall be kept at the Contractor's office.

1.06 NOISE CONTROL

- A. Noise resulting from the Contractor's work shall not exceed the noise levels and other requirements stated in local ordinances. The Contractor shall be responsible for curtailing noise resulting from his operation. He shall, upon written notification from the Owner or the noise control officers, make any repairs, replacements, adjustments, additions and furnish mufflers when necessary to fulfill requirements.

1.07 EROSION ABATEMENT AND WATER POLLUTION

- A. It is imperative that any Contractor dewatering operation should not contaminate or disturb the environment of the properties adjacent to the work. The Contractor shall, therefore, schedule and control his operations to confine all runoff water from disturbed surfaces, water from dewatering operations that becomes contaminated with lime silt, muck and other deleterious matter, fuels, oils, bitumens, calcium chloride, chemicals and other polluting materials.
- B. The Contractor shall construct temporary silting basin(s) of adequate size and provide all necessary temporary materials, operations and controls including, but not limited to, filters, coagulants, screens, and other means necessary to attain the required discharge water quality.

- C. The Contractor shall be responsible for providing, operating and maintaining materials and equipment used for conveying the clear water to the point of discharge. All pollution prevention procedures, materials, equipment and related items shall be operated and maintained until such time as the dewatering operation is discontinued. Upon the removal of the materials, equipment and related items, the Contractor shall restore the area to the condition prior to its commencing work.

1.08 PRECAUTIONS DURING ADVERSE WEATHER

- A. During adverse weather, and against the possibility thereof, the Contractor shall take all necessary precautions so that the work may be properly done and satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood and building paper shelters, or other acceptable means. The Contractor shall be responsible for all changes caused by adverse weather.
- B. The Owner may suspend construction operations at any time when, in his judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather conditions may be, in any season.

1.09 HURRICANE AND STORM WARNINGS

- A. During such periods of time as are designated by the United States Weather Bureau as being a hurricane alert, watch or warning, the Contractor shall perform all precautions as necessary to safeguard the work and property, including the removal of all small equipment and materials from the site, lashing all other equipment and materials to each other and to rigid construction, and any other safety measures as indicated below.
- B. The Contractor shall submit to the Owner, for review and approval, a Plan of Action describing the procedures to be followed by the Contractor in the event of a Hurricane Alert, Watch, or Warning.
- C. Upon Notification of a Hurricane Alert:
 - 1. Upon issuance of a Hurricane Alert by the CITY, all Contractors performing work within the right-of-way of a designated evacuation route shall immediately secure their work, backfill all excavations within the right-of-way and suitably prepare the roadway surface for full traffic flow. This work shall be completed within 24 hours of the issuance of the alert. Work shall not recommence until the "All Clear" is issued by the CITY.
 - 2. Contractors performing at all other locations shall remove all unnecessary debris, materials, and equipment from the job site. The Contractor shall also keep his crew on standby on weekends and holidays during the Hurricane Alert period.
- D. Upon Notification of a Hurricane Watch:
 - 1. Contractors shall implement their approved Plan of Action to protect the project and the public.
- E. Upon Notification of a Hurricane Warning
 - 1. Contractors shall implement their approved Plan of Action to protect the project

and the public.

2. For work within the public right-of-ways, the Contractor will be notified by the Owner to suspend his construction operations. The Contractor will backfill all open trenches, remove all construction equipment and materials from the right-of-way and secure operations pending further notice.

1.10 PERIODIC CLEANUP AND BASIC SITE RESTORATION

- A. During construction, the Contractor shall regularly remove from the site all accumulated debris and surplus materials of any kind which results from its operations. Unused equipment and tools shall be stored at the Contractor's yard or base of operations for the project.
- B. The Contractor shall perform the cleanup work on a regular basis and as frequently as ordered by the Owner. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore, such work shall also be accomplished, when ordered by the Owner, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.
- C. Upon failure of the Contractor to perform periodic clean-up and basic restoration of the site to the Owner's satisfaction, the Owner may, upon 3 days prior written notice to the Contractor, employ such labor and equipment as it deems necessary for the purpose, and all costs resulting therefrom shall be charged to the Contractor and deducted from amounts of money that it may be due.
- D. The Contractor's storage shall be limited to on-site storage only. Off-site storage of materials, if required, shall be arranged for by the Contractor and a copy of an agreement for use of other property shall be furnished to the Owner.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01570

TRAFFIC REGULATIONS AND MAINTENANCE OF TRAFFIC

PART 1 -- GENERAL

1.01 TRAFFIC CONTROL

- A. The Contractor shall obey all traffic laws and comply with all the requirements, rules, and regulations of the Florida Department of Transportation, Palm Beach County, and other local authorities having jurisdiction, to maintain adequate warning signs, lights, barriers, etc., for the protection of vehicular, bicycle and pedestrian traffic in public Rights of Way in the project areas.
- B. All traffic control devices, warning devices, safety devices and barriers shall meet the requirements of National Cooperative Highway Research Report 350 (NCHRP 350), current Manual of Uniform Traffic Control Devices and any current FHWA directives.
- C. The Contractor shall develop, or have developed, a Temporary Traffic Control Plan (TTCP) for implementation during the entirety of the project, and to be submitted to the authority having jurisdiction over the subject roadway / right-of-way for approval and to the Engineer/Owner for file/informational purposes. The TTCP shall meet the requirements of Index 600 of the latest edition of the Florida Department of Transportation Design Standards. The TTCP shall be on 11"x17" plan sheets and have separate sheets for each phase of construction (if applicable). The Contractor shall take responsibility for identifying and assessing any potential impacts to any utilities that may be caused by the TTCP; the Contractor shall be responsible for notifying the Owner in writing if any such potential impacts to utilities. The TTCP shall include stand-alone maintenance of traffic (MOT) plans developed and submitted for each project work area and phase of construction. The TTCP shall meet the following requirements:
 1. The TTCP shall developed to prioritize safety of workers, motorists, and pedestrians under all conditions, including working hours and non-working hours, from the time of Contractor's mobilization to the site until completion of the project.
 2. The TTCP shall be prepared and signed by the Work Site Traffic Supervisor (WTS) as certified by the American Traffic Safety Services Association (ATSSA), or a Florida-licensed Professional Engineer (traffic), and be in accordance with FDOT Standard Specifications, Section 102.
 3. The TTCP shall include certification(s) of the preparer(s), as well as contact information including a 24-hour-per-day contact phone number for the WTS.
 4. The TTCP shall include the following information: north arrow, type and location of all signs, lights, barricades, striping, barriers, traffic signals, and

identification of all side streets, change-overs, sidewalks, pavement markings, school zones, crosswalks, bus stops, and railroad crossings.

5. Drawings may be not to scale but must be accurately dimensioned.
 6. Portable Changeable Message Signs (PCMS) and/or Variable Message Signs (VMS) shall be used for messages and identified in the TTCP. A minimum of two message signs shall be placed within the right-of-way no later than two weeks prior to beginning construction activities. After construction activities commence the contractor may replace the PCMS with post mounted signs. No additional compensation will be provided for PCMS signs after the start of construction.
 7. The TTCP shall show the location and geometry of transitions, detours, and diversions.
 8. No change-overs shall be allowed on Monday or Friday, the day before a holiday, or during morning or evening peak traffic. Change-overs should not be located at signalized intersections.
 9. No full roadway closures shall be permitted without prior written approval from the OWNER. No lane closures shall be allowed during holidays.
 10. TTCP shall be submitted for approval to the agency(ies) having jurisdiction over the roadway and right-of-way.
 11. The Owner shall handle all related news releases and notification of public service departments (e.g., police, fire department, etc.).
 12. In no case may the Contractor begin work in an area until the TTCP for that area has been approved by the jurisdictional agency and a file copy has been provided to the Owner/Engineer for informational purposes. Field modifications may be made only with the approval of all three reviewing entities.
- D. The Contractor shall maintain traffic and protect the public from all damage to persons and property within the Contract Limits, in accordance with the Contract Documents and all applicable state, county, and local regulations. The Contractor shall install and maintain adequate traffic control devices, warning devices and barriers to protect the traveling public and workers, and to safeguard the work area. Erect the required traffic control devices, warning devices and barriers to prevent any hazardous conditions and in conjunction with any necessary traffic re-routing. Use only those devices that are included in 600 series in the latest edition of the Design Standards of Florida Department of Transportation. He shall conduct his operations so as to maintain and protect access for vehicular and pedestrian traffic, to and from all properties and business establishments adjoining or adjacent to those streets affected by his operations, and to subject the public to a minimum of delay and inconvenience. Suitable signs, barricades, railing, etc., shall be erected and the Work outlined by adequate lighting at night. Danger lights shall be provided as required. Watchmen and flagmen shall be provided as may be necessary for the protection of traffic.

- E. The Contractor shall notify the Engineer or Owner of any scheduled operation, which will affect traffic patterns or safety, sufficiently in advance of commencing such operation to permit review of the plan for the proposed installation of traffic control devices, warning devices or barriers in accordance with the agency approved plan.
- F. The Contractor shall have an employee assigned the responsibility of maintaining the position and condition of all traffic control devices, warning devices and barriers throughout the duration of the Contract. The Contractor shall keep the Engineer or Owner advised at all times of the identification and means of contacting this employee on a 24-hour basis.
- G. The Contractor shall keep control devices, warning devices, safety devices and barriers in the correct position, properly directed, clearly visible and clean, at all times. Immediately repair, replace or clean damaged, defaced or dirty devices or barriers.
- H. All dirt spilled from the Contractor's trucks onto existing pavements shall be removed by the Contractor whenever, in the opinion of the Owner, the accumulation is sufficient to cause the formation of mud, dust, or interference with traffic or create a traffic hazard.

1.02 PEDESTRIAN TRAFFIC

- A. The TTCP, provided by the Contractor, shall include provisions for pedestrian where applicable.
- B. It shall be the responsibility of the Contractor to install any necessary pavement, road rock, pavement marking and signage and/or any pedestrian signalization and/or signal modification to accommodate an existing or alternate walk route.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION (NOT USED)

END OF SECTION

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SECTION 01600

EQUIPMENT AND MATERIALS

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The word "Products", as used herein, is defined to include purchased items for incorporation into the Work, regardless of whether specifically purchased for the project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of Work. Definitions in this paragraph are not intended to negate the meaning of other terms used in Contract Documents, including "specialties", "systems", "structure", "finishes", "accessories", "furnishings", "special construction", and similar terms, which are self-explanatory and have recognized meanings in the construction industry.
- B. All equipment, materials, instruments or devices incorporated in this project shall be new and unused, unless indicated otherwise in the Contract Documents.
- C. Shop drawings shall be submitted to the Owner for all materials and equipment in accordance with Section 01300, Submittals. Any products submitted which in the opinion of the Owner are considered to be "or equal", shall comply with the requirements in Section 01300-1.06O.

1.02 PRODUCT DELIVERY-STORAGE-HANDLING

- A. The Contractor shall deliver, handle, and store products in accordance with supplier's written recommendations and as directed by the Owner, and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, the Contractor shall provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss.
- B. Equipment and materials to be incorporated in the Work shall be delivered sufficiently in advance of their installation and use to prevent delay in the execution of the Work, and they shall be delivered as nearly as feasible in the order required for executing the Work.
- C. The Contractor shall protect all equipment and materials from deterioration and damage. The equipment and materials shall be handled and stored by the manufacturer, fabricator supplier and Contractor before, during, and after shipment to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, damage or theft of any kind whatsoever. Any equipment exhibiting any of the above,

shall be removed and replaced at the Contractor's expense for both labor and materials.

- D. Products shall be transported by methods to avoid product damage and shall be delivered in undamaged condition in supplier's unopened containers or packaging, dry.
- E. The Contractor shall provide equipment and personnel to handle products and materials by methods to prevent soiling and damage.
- F. The Contractor shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.03 STORAGE AND PROTECTION

- A. General: Products shall be stored in accordance with supplier's written instructions, with seals and labels intact and legible. Sensitive products shall be stored in weather-tight enclosures and temperature and humidity ranges shall be maintained within tolerances required by supplier's written instructions.
- B. For exterior storage of fabricated products, they shall be placed on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering; ventilation shall be provided to avoid condensation.
- C. Loose granular materials shall be stored on solid surfaces in a well-drained area and shall be prevented from mixing with foreign matter.
- D. Storage shall be arranged to provide access for maintenance of stored items and for inspection. The Contractor shall periodically inspect to assure products are undamaged and are maintained under required conditions. The Contractor shall maintain a log of inspections and shall make said log available to the Owner on request.
- E. The Contractor shall verify that storage facilities comply with supplier's product storage requirements and verify that supplier-required environmental conditions are maintained continually.
- F. The Contractor shall verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes is acceptable under requirements of Contract Documents.
- G. Weather Conditions: Work that may be affected by inclement weather shall be suspended until proper conditions prevail. In the event of impending storms, the Contractor shall take necessary precautions to protect all work, materials and equipment from exposure.
- H. Fire Protection: The Contractor shall take all necessary precautions to prevent fires at or adjacent to the Work, including its own buildings and trailers. Adequate fire extinguisher and hose line stations shall be provided throughout the work area.

1.04 FASTENERS

- A. All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by the Contractor in accordance herewith. Bolts shall have suitable washers and, where so required, their nuts shall be hexagonal.
- B. All anchor bolts and other types of anchors embedded, drilled, inserted or driven in concrete, including nuts, washers, plates, and bolt sleeves, shall be Type 316 stainless steel unless otherwise specifically specified as another material.
- C. Unless otherwise specified, stud, tap, and machine bolts shall be of the best quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used.

1.05 SALVAGED AND EXCAVATED MATERIALS

- A. In the absence of special provisions in other Sections of the Specifications, salvaged materials, equipment or supplies that occur are the property of the Owner and shall be cleaned and stored as directed by the Owner. Materials/equipment which the Owner does not wish to retain shall be disposed by the Contractor at no additional cost.
- B. Materials needed for backfilling operations, including excavated materials, may be stored on site. Where additional area is needed for stockpiling, off-site storage of any materials shall be arranged for by the Contractor and a copy of an agreement for use of other property shall be furnished to the Owner. Backfill materials shall not be stored at one location for greater than five (5) calendar days.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

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SECTION 01630

SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish and install products specified, under options and conditions for substitutions stated in this Section.
- B. Whenever a product, material or item of equipment is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, followed by the phrase "or equal," the specific item mentioned shall be the basis upon which bids are to be prepared, and shall be understood as establishing the type, function, dimension, appearance and quality desired. Other manufacturer's or vendor's products not named will be considered as substitutions, provided the required information is submitted in the manner set forth in this Section and provided the substitution will not require substantial revision to the Contract Documents.

1.02 RELATED REQUIREMENTS

- A. Reference Contract Conditions.

1.03 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standard, select product meeting that standard, by any manufacturer.
- B. For products specified by naming several products or manufacturers, select any one of the products and manufacturers named which comply with Specifications.
- C. For products specified by naming one or more products or manufacturers and stating "or equal," submit a request as for substitutions, for any product or manufacturer which is not specifically named.

1.04 SUBSTITUTIONS

- A. In order for substitutions to be considered, the Contractor shall submit, within 30 days after the effective date of the Notice to Proceed, complete data as set forth herein to permit complete analysis of all proposed substitutions noted on his substitutions list. No substitution shall be considered unless the Contractor provides the required data in accordance with the requirements of this Section within the 30 day period.
- B. Submit separate request for each substitution. Support each request with:
 - 1. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:

- a. Product identification, including Manufacturer's name and address.
 - b. Manufacturer's literature; identify:
 - 1) Product description
 - 2) Reference standards
 - 3) Performance and test data
 - 4) Operation and maintenance data
 - c. Samples, as applicable.
 - d. Name and address of similar projects on which product has been used, and date of each installation.
2. Itemized comparison of the proposed substitution with product specified; List significant variations. Substitution shall not change design intent and shall perform equal to that specified.
 3. Data relating to impact on construction schedule occasioned by the proposed substitution.
 4. Any effect of substitution on separate contracts.
 5. List of changes required in other work of Products.
 6. Accurate cost data comparing proposed substitution with product specified.
 - a. Amount of any net change to Contract Sum.
 7. Designation of required license fees or royalties.
 8. Designation of availability of maintenance services, sources of replacement materials.
- C. Substitutions will not be considered for acceptance when:
1. They are indicated or implied on Shop Drawings or product data submittals without a formal request from Contractor.
 2. They are requested directly by a Subcontractor or supplier.
 3. Acceptance will require substantial revision of Contract Documents without compensation to the Owner for costs associated with revisions to the Contract Documents.
- D. Requests for substitutions submitted after Notice of Award will not be considered unless evidence is submitted to the Engineer that all of the following circumstances exist:
1. The specified product is unavailable for reasons beyond the control of the Contractor. Such reasons shall consist of strikes, bankruptcy, discontinuance of Manufacturer, or acts of God.
 2. The Contractor placed, or attempted to place, orders for the specified products within ten (10) days after Notice to Proceed.
 3. Request for substitution is made in writing to the Engineer within ten (10) days of the date on which the Contractor ascertains that he cannot obtain the item specified.

4. Complete data as set forth herein to permit complete analysis of the proposed substitution is submitted with the request.
- E. The Engineer's decision regarding evaluation of substitutions shall be considered final and binding. Requests for time extensions and additional costs based on submission of, acceptance of, or rejection of substitutions will not be allowed. All approved substitutions will be incorporated into the Contract Documents by Change Order.

1.05 CONTRACTOR'S REPRESENTATION

- A. In making formal request for substitution, Contractor represents that:
 1. He has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.
 2. He will provide same warranties or bonds for substitution as for product specified.
 3. He will coordinate installation of accepted substitution into the Work and will make such changes as may be required for the Work to be complete in all respects.
 4. He waives claims for additional cost caused by substitution which may subsequently become apparent.
 5. Cost data is complete and includes related costs under this Contract.
- B. Requests for substitutions submitted after Notice to Proceed will not be considered unless evidence is submitted to the Engineer that all of the following circumstances exist:
 1. The specified product is unavailable for reasons beyond the control of the Contractor. Such reasons shall consist of strikes, bankruptcy, discontinuance of Manufacturer, or acts of God.
 - a. Costs under separate contracts.
 - b. Engineer's costs for redesign or revision of Contract Documents.

1.06 ENGINEER DUTIES

- A. Review Contractor's requests for substitutions with reasonable promptness.
- B. Notify Contractor, in writing, of decision to accept or reject requested substitution.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01700

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 FINAL CLEANUP

- A. The Contractor shall promptly remove from the vicinity of the completed Work, all rubbish, unused materials, concrete forms, construction equipment, temporary structures and facilities, construction signs, tools, scaffolding, materials, supplies and equipment which may have been used in the performance of the Work. The Contractor shall broom clean paved surfaces and rake clean other surfaces of grounds. Final acceptance of the Work by the Owner will be withheld until the Contractor has satisfactorily complied with the foregoing requirements for final cleanup of the project site.
- B. The Contractor shall thoroughly clean all materials, equipment and structures; all marred surfaces shall be touched up to match adjacent surfaces.
- C. The Contractor shall remove spatter, grease, stains, fingerprints, dirt, dust, labels, tags, packing materials and other foreign items or substances from interior and exterior surfaces, equipment, signs and lettering.
- D. The Contractor shall remove paint, clean and restore all equipment and material nameplates, labels and other identification markings.
- E. The Contractor shall maintain cleaning until project, or portion thereof, is accepted by the Owner.
- F. The Contractor shall:
 - 1. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
 - 2. Use each type of cleaning material on only those surfaces recommended by the cleaning material manufacturer.
 - 3. Use only materials which will not create hazards to health or property.

1.02 CLOSEOUT TIMETABLE

- A. The Contractor shall establish dates for testing, acceptance periods, and on-site instructional periods (as required under the Contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow the Owner and its authorized representatives sufficient time to schedule attendance at such activities.

1.03 FINAL SUBMITTALS

- A. Before the final acceptance of the project, the Contractor shall submit to the Owner certain records, certifications, etc., which are specified elsewhere in the Contract Documents. Missing, incomplete or unacceptable items, as determined by the Owner, shall constitute grounds for withholding final payment to the Contractor. A partial list of such items appears below, but it shall be the Contractor's responsibility to submit any other items which are required in the Contract Documents:
 - 1. Written Test results of project components.
 - 2. Written guarantees, where required.
 - 3. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
 - 4. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

1.04 PUNCH LISTS

- A. Final cleaning shall be scheduled upon completion of the project.
- B. The Owner will make his final inspection whenever the Contractor has notified the Owner that the Work is ready for the inspection. Any Work not found acceptable and requiring cleaning, repair and/or replacement will be noted on the "Punch" list. Work that has been inspected and accepted by the Owner shall be maintained by the Contractor, until final acceptance of the entire project.
- C. Whenever the Contractor has completed the items on the punch list, he shall again notify the Owner that it is ready for final inspection. This procedure will continue until the entire project is accepted by the Owner. The "Final Payment" will not be processed until the entire project has been accepted by the Owner and all of the requirements in previous Article 1.03 "Final Submittals" have been satisfied.

1.05 TOUCH-UP AND REPAIR

- A. The Contractor shall touch-up and repair damage to all existing facilities and surfaces. If in the opinion of the Owner the touch-up Work is not satisfactory, the Contractor shall repeat the item.

1.06 MAINTENANCE AND GUARANTEE

- A. The Contractor shall comply with all maintenance and guarantee requirements of the Contract Documents.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the Contractor which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the Contractor shall have obtained a statement in writing from

the affected private Owner or public agency releasing the Owner from further responsibility in connection with such REPAIR OR RESURFACING. All restoration on private property shall be to the satisfaction of the property owner.

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 SCOPE OF WORK

- A. Execute cleaning, during progress of the Work and at completion of the Work, as required by the Conditions of the Contract.

1.02 RELATED WORK

- A. Each Section: Cleaning for specific products or work.

1.03 DISPOSAL AND CLEANING

- A. Conduct cleaning and disposal operations to comply with 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 accumulations of waste materials, rubbish and windblown 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.

Sufficient precautions shall be taken during construction to minimize run-off of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the State. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than 10 nephelometric turbidity units (NTU) or as otherwise required by the State or other controlling body, in water used for public water supply or fish unless limits have been

established for the particular water. In surface water used for other purposes, the turbidity must not exceed 25 NTU unless otherwise permitted. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.

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 SITE RESTORATION

- A. Lawn areas, irrigation systems, and/or existing sodded areas disturbed by Contractor's operations shall be repaired within three days with proper sod bed preparation, fertilizing, and resodding to match existing sod type. See section 02500 for additional requirements.

3.04 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Polish glossy surfaces to a clear shine.
- D. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- E. Prior to final completion, or Owner occupancy, conduct an inspection of sight-exposed interior and exterior surfaced 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. Maintain at the site for the Owner on record copy of:
 - 1. Drawings (Contract Drawings and updated Record Drawings).
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Engineer's Field Orders or written instructions.
 - 6. Approved Shop Drawings, Working Drawings and Samples.
 - 7. Field Test records.
 - 8. Construction photographs.
 - 9. Field engineering records for compliance with field engineering submittals.
 - 10. Updated Project Schedule.

1.02 SURVEYED RECORD DRAWINGS AND METER DATA

- A. The Contractor shall maintain a survey, prepared by a Florida-registered professional surveyor and mapper (PSM), of all installed utility components, including but not limited to the following:
 - 1. Survey reference points and control.
 - 2. Alignment and elevations of all new water/force mains, service laterals, and stormwater utilities.
 - 3. The location (northing and eastings), elevation, size, and type of all valves, fittings, hydrants, tie-ins to existing mains, air release valves, line stops, catch basins, and other appurtenances.
 - 4. The locations (northing and eastings) of all new meters and meter boxes.
 - 5. The locations (northing and eastings), where exposed during construction, of existing water and force mains to be abandoned including the extent and method of abandonment.
 - 6. Indicate the locations of existing Asbestos Cement pipe to be grout filled and/or abandoned in place including location (northing and eastings) of limits/extends of grout fill and abandonment.
 - 7. Indicate the locations of existing facilities removed and disposed of including location (northing and eastings) of limits/extends of removal.

8. Indicate the locations (northing and eastings) of existing water and force mains where they are cut and abandoned in place including pictures of cut and plugged existing water and force main.
 9. The locations (northing and eastings) and elevations of surface features (e.g., driveways, sidewalks, pavement, etc.) installed during construction.
 10. Water main, force main, and stormwater piping top of pipe elevations and locations (northing and eastings) at vertical deflection points and every fifty (50) linear feet.
 11. Crossing information between proposed water main and force main and existing and proposed sewer main, force main, drainage, water main, and franchise utilities.
 12. All test hole or soft dig information obtained on existing utilities providing precise horizontal and vertical locations.
 13. The locations (northing and eastings) and elevations of all installed City irrigation system components.
- B. Survey data and locations shall be collected and provided within record drawings using coordinates (northing and eastings) and elevation datum used in the Contract Drawings.
 - C. The certification and final surveyed computer generated record drawings shall be certified by the PSM for certification purposes through Authorities Having Jurisdiction and at the completion of construction (progress submittals shall be submitted with each Application for Payment, as noted below).
 - D. In addition to the surveyed record drawings, the Contractor shall collect all data listed in the form provided at the end of this section for existing and new water meters, air release valves, corporate stops, hydrants and underground isolation valves. The data shall be collected using the form provided. Completed forms shall be available for review by the Engineer monthly as a pre-condition to monthly progress payment.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store Documents and samples in Contractor's field office apart from Documents used for construction.
 1. Provide files and racks for storage of Documents.
 2. Provide locked cabinet or secure storage space for storage of samples.
- B. File Documents and samples in accordance with CSI/CSC format.
- C. Maintain Documents in a clean, dry, legible condition and in good order. Do not use Record Documents for construction purposes.
- D. Make Documents and samples available at all times for inspection by the Engineer.

- E. As a prerequisite for monthly progress payments, the Contractor is to make available the currently updated Record Documents for review by the Engineer and the Owner. This shall include a non-certified copy of the surveyed record drawings through the period closing date of the Application for Payment.

1.04 MARKING DEVICES

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

1.05 RECORDING

- A. Label each document "PROJECT RECORD" in neat large printed letters.
- B. Record information concurrently with construction progress.
 - 1. Do not conceal any work until required information is recorded.
- C. Record Drawings: Record drawings shall be prepared using the survey required under Paragraph 1.02.
- D. Specifications and Addenda: Legibly mark each Section to record:
 - 1. Manufacturer, trade name, catalog number, and Supplier of each Product and item of equipment actually installed.
 - 2. Changes made by Field Order or by Change Order.
- E. Shop Drawings (after final review and approval):
 - 1. Two (2) sets of Record Shop Drawings for each process equipment, piping, (including casings) electrical system and instrumentation system.

1.06 SUBMITTAL

- A. Submit initial Record Documents listed in Paragraph 1.01A to the Engineer with Request for Substantial Completion. Also deliver a CD containing the Record Drawings in an AutoCAD, latest version, file format.
- B. Submit final Record Documents to Engineer for the Owner with claim for Final Completion and Readiness for Final Payment.
- C. Accompany submittal with transmittal letter in duplicate, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Title and number of each Record Document.
 - 5. Signature of Contractor or his authorized representative.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

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Record Document for:
Boca Square Infrastructure Upgrades
Date:
Field Rep:



Item No.	Address	Old Meter				New Meter							GPS Coordinates	
		Number	Size	Reading	AMR #	Number	Size	Reading	Position	Date Installed	Location ID	AMR #	New Meter	
													Northing	Easting
1														
2														
3														
4														
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Notes:

Record Document for:
Boca Square Infrastructure Upgrades
Date:
Field Rep:



		GPS Coordinates													
Item No.	Address	Corp Stop		Fitting			ARV		Manhole		Hydrants		Valves		
		Northing	Easting	Type	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	
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Notes:

SECTION 01750

STARTUP PROCEDURES

PART 1 – GENERAL

1.1 DEFINITIONS

- A. Facility Startup: Includes putting Project in operating order, cleaning, adjusting and balancing equipment, initial operation (startup) of equipment item, operating equipment, starting systems, operation of systems, testing of equipment and systems, and demonstration and verification of the completed facility as a unit.
- B. Functional Test: A test or tests in the presence of the OWNER to demonstrate that the installed equipment or system meets manufacturer's installation and adjustment requirements and other requirements specified including, but not limited to, noise, vibration, alignment, speed, proper electrical and mechanical connections, thrust restraint, proper rotation, and initial servicing.
- C. Operation Period: The operation period begins when the facility has been successfully started up as defined under Paragraph Startup Test Period and has met all Substantial Completion requirements.
- D. Performance Test: A test performed in the presence of the OWNER and after any required functional test specified, to demonstrate and confirm that the equipment and/or system meets the specified performance requirements.
- E. Significant Interruption: May include any of the following events:
 - 1. Failure of CONTRACTOR to maintain qualified onsite startup personnel as scheduled.
 - 2. Failure to meet specified performance for more than 2 consecutive hours.
 - 3. Failure of any critical equipment unit, system, or subsystem that is not satisfactorily corrected within 5 hours after failure.
 - 4. Failure of noncritical unit, system, or subsystem that is not satisfactorily corrected within 8 hours after failure.
 - 5. As may be determined by OWNER.
- F. Startup Test Period:
 - 1. Startup of the entire facility or any portion thereof includes coordinated operation of the facilities by the CONTRACTOR, Subcontractors, OWNER operating personnel, and manufacturer's representatives for equipment items and systems after all required functional tests have been completed and those performance tests deemed necessary for the safe operation of the entire facility have been completed.
 - 2. Startup of each pump station or any portion thereof shall be considered complete when, in the opinion of the OWNER, each pump station or designated portion has operated in the manner intended for 5 continuous days without significant interruption. This period is in addition to any training, functional, or performance test periods specified elsewhere. A significant interruption will require the startup then in progress to be stopped and restarted after corrections are made.
- G. System: The overall process, or a portion thereof, that performs a specific function. A system

may consist of two or more subsystems as well as two or more types of equipment. Examples of systems on this Project are as follows: Pumps, motors, and controls.

1.2 SUBMITTALS

A. Administrative Submittals:

1. Functional and performance test schedules and plan for equipment, units, and systems at least 14 days prior to start of related testing. Include test plan, procedures, and log format.
2. Schedule and plan of facility startup activities at least 14 days prior to commencement.

B. Quality Control Submittals:

1. Manufacturer's Certificate of Proper Installation as required.
2. Test Reports: Functional and performance testing, in format acceptable to OWNER and certification of functional and performance test for each piece of equipment or system specified.
3. Certifications of Calibration: Testing equipment.

1.3 CONTRACTOR FACILITY STARTUP RESPONSIBILITIES

A. General:

1. Perform Work for tests specified.
2. Demonstrate proper installation, adjustment, function, performance, and operation of equipment, systems, control devices, and required interfaces individually and in conjunction with process instrumentation and control system.

1.4 OWNER FACILITY STARTUP RESPONSIBILITIES

A. General:

1. Review CONTRACTOR's test plan and schedule.
2. Witness each functional or performance test.
3. Coordinate other plant operations, if necessary, to facilitate CONTRACTOR's tests.
4. Provide water, power, chemicals, and other items as required for testing, unless otherwise indicated.

B. Startup Test Period:

1. Operate process units and devices, with support of CONTRACTOR.
2. Provide sampling, labor, and materials as required and provide laboratory analyses.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TESTING PREPARATION

A. General:

1. Complete Work associated with the unit and related processes before testing, including related manufacturer's representative services.
2. Furnish qualified manufacturer's representatives when required to assist in testing.
3. Furnish Manufacturer's Certificate of Proper Installation, supplemented as necessary, to document functional and performance procedures, results, problems, and conclusions.
4. Schedule and attend pretest (functional and performance) meetings related to test schedule, plan of test, materials, chemicals, and liquids required, facilities' operations interface, OWNER involvement.
5. Designate and furnish one or more persons to be responsible for coordinating and expediting CONTRACTOR's facility startup duties. The person or persons shall be present during facility startup meetings and shall be available at all times during the facility startup period.
6. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required to conduct testing.

B. Cleaning and Checking: Prior to starting functional testing:

1. Calibrate testing equipment for accurate results.
2. Inspect and clean equipment, devices, connected piping, and structures so they are free of foreign material.
3. Lubricate equipment in accordance with manufacturer's instructions.
4. Turn rotating equipment by hand and check motor-driven equipment for correct rotation.
5. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
6. Check power supply to electric-powered equipment for correct voltage.
7. Adjust clearances and torques.
8. Test piping for leaks.
9. Obtain completion of applicable portions of Manufacturer's Certificate of Proper Installation.

C. Ready-to-test determination will be by OWNER based at least on the following:

1. Notification by CONTRACTOR of equipment and system readiness for testing.
2. Acceptable testing plan.
3. Acceptable Operation and Maintenance Manuals.
4. Receipt of Manufacturer's Certificate of Proper Installation, if specified.
5. Adequate completion of Work adjacent to, or interfacing with, equipment to be tested.
6. Availability and acceptability of manufacturer's representative, when specified, to

assist in testing of respective equipment, and satisfactory fulfillment of other specified manufacturers' responsibilities.

7. Equipment and electrical tagging complete.
8. All spare parts and special tools delivered to OWNER.

3.2 FUNCTIONAL TESTING

A. General:

1. Begin testing at a time mutually agreed upon by the OWNER, manufacturer's representative(s), and CONTRACTOR.
2. Notify in writing OWNER and manufacturer's representative at least 14 days prior to scheduled date of functional tests.
3. Separate items of equipment demonstrated to function properly during subsystem testing may require no further functional test if documentation of subsystem testing is acceptable to OWNER.
4. Conduct functional test until each individual component item or system has achieved 2 continuous hours of satisfactory operation. Demonstrate all operational features and controls function during this period while in automatic modes.
5. If, in OWNER's opinion, each system meets the functional requirements specified, such system will be accepted as conforming for purposes of advancing to performance testing phase, if required. If, in OWNER's opinion, functional test results do not meet requirements specified, the systems will be considered as nonconforming.
6. Performance testing shall not commence until the equipment or system meets functional tests specified.

3.3 PERFORMANCE TESTING

A. General:

1. Begin testing at time mutually agreed upon by the OWNER, manufacturers' representative(s), and CONTRACTOR, as appropriate.
 - a. OWNER will be present during test.
 - b. Notify OWNER at least 14 days prior to scheduled date of test.
2. Follow approved testing plan and detailed procedures specified.
3. Unless otherwise indicated, furnish all labor, materials, and supplies for conducting the test and taking all samples and performance measurements.
4. Prepare performance test report summarizing test method. Include test logs, pertinent calculations, and certification of performance.

3.4 STARTUP TEST PERIOD

A. Test Reports: As applicable to the equipment furnished, certify in writing that:

1. Necessary hydraulic structures, piping systems, and valves have been successfully tested.

2. Equipment systems and subsystems have been checked for proper installation, started, and successfully tested to indicate that they are operational.
 3. Systems and subsystems can perform their intended functions.
 4. Facilities are ready for intended operation.
- B. Attend planning meetings and arrange for attendance by key major equipment manufacturer representatives as required by the Contract Documents.
 - C. Designate and furnish one or more persons to be responsible for coordinating and expediting CONTRACTOR's facility startup duties.
 - D. When facility startup has commenced, schedule remaining Work so as not to interfere with or delay the completion of facility startup. Support the facility startup activities with adequate staff to prevent delays and process upsets. This staff shall include, but not be limited to, major equipment and system manufacturers' representatives, Subcontractors, electricians, instrumentation personnel, millwrights, pipefitters, and plumbers.
 - E. Supply and coordinate specified manufacturer's facility startup services.
 - F. Make adjustments, repairs, and corrections necessary to complete facility startup.
 - G. After the facility is operating, complete the testing of those items of equipment, systems, and subsystems which could not be or were not adequately or successfully tested prior to startup test period.

3.5 PARTIAL UTILIZATION

- A. After successful performance testing of a particular equipment type or system, OWNER may elect to start up a portion of the equipment or system for continuous operation.

3.6 CONTINUOUS OPERATIONS

- A. OWNER will accept equipment and systems as substantially complete and ready for continuous operation only after successful facility startup is completed and documented, and reports submitted, and manufacturers' services completed for training of OWNER's personnel.

END OF SECTION

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MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER: Click or tap here to enter text. EQPT. SERIAL NO.: Click or tap here to enter text.
EQPT. TAG NO.: Click or tap here to enter text. EQPT/SYSTEM: Click or tap here to enter text.
PROJ. NO: Click or tap here to enter text. SPEC. SECTION: Click or tap here to enter text.

- ☐ I hereby certify that the above-referenced equipment/system has been: (Check Applicable)
- ☐ Installed in accordance with Manufacturer's recommendations. Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards. All applicable safety equipment has been properly installed
- ☐ System has been performance tested and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Comments:

Click or tap here to enter text.

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate his equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: Click or tap here to enter text.

Manufacturer: Click or tap here to enter text.

Manufacturer's Representative: _____
(Authorized Signature)

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SECTION 01780

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 DEFINITIONS

- A. Maintenance Operation: As used in the Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.
- B. System and Subsystem: Refer to Section 01750, STARTUPPROCEDURES.

1.2 QUALITY ASSURANCE

- A. Manuals for equipment and systems shall be prepared by equipment manufacturer or system Supplier.

1.3 SEQUENCING AND SCHEDULING

- A. Manuals for Equipment and Systems:
 - 1. Preliminary Manuals: Submit prior to shipment date for equipment, system, subsystem, or component. Include copy of warranties, Bonds, and service agreements if specified.
 - 2. Final Manuals: Submit not less than 30 days prior to equipment or system field testing or startup.

1.4 GENERAL

- A. Furnish for each item of equipment or system as specified in the individual Specification sections. Individual manuals shall be prepared and submitted by the CONTRACTOR for each lift station.
- B. Prepare data for use by OWNER's personnel in the form of an instructional manual.
- C. Manual Format:
 - 1. One .pdf file
 - 2. Text: Manufacturer's printed data, or neatly typewritten.
 - 3. Provide each manual with title page, and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.
 - 4. Cover: Identify each volume with typed or printed title "OPERATION AND MAINTENANCE MANUAL, VOLUME NO. OF , " if applicable, and list:

- a. Project title.
 - b. Identity of individual lift station.
 - c. Identity of general subject matter covered in manual. Identity of equipment number and Specification section.
- 5. Assemble and bind material in same order as specified, as much as possible.
- 6. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.
- 7. Binders:
 - a. Preliminary Manuals: Heavy paper covers.
 - b. Final Manuals: Commercial quality, substantial, permanent, three-ring binders with durable, cleanable, plastic binders.
- 8. Table of Contents Neatly Typewritten, Arranged in a Systematic Order:
 - a. CONTRACTOR, name of responsible principal, address, and telephone number.
 - b. List of each product required to be included, indexed to content of each volume.
 - c. List with Each Product: Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.
 - 1) Identify area of responsibility of each.
 - 2) Provide local source of supply for parts and replacement.
- D. Identify each product-by-product name and other identifying numbers or symbols as set forth in Contract Documents.
 - 1. Product Data:
 - a. Include only those sheets that are pertinent to specific product.
 - b. Clearly Annotate Each Sheet to:
 - 1) Identify specific product or part installed.
 - 2) Identify data applicable to installation.
 - 3) Delete references to inapplicable information.
 - 2. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams.
 - c. Coordinate drawings with Project record documents to assure correct

illustration of completed installation.

- d. Do not use Project record documents as maintenance manual drawings.
 - e. Provide reinforced punched binder tab, bind in with text.
 - f. Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
 - g. Where reduction is impractical, fold and place in 8-1/2 inch by 11-inch envelopes bound in text and electronic copy.
 - h. Identify Specification section and product on Drawings and envelopes.
3. Instructions and Procedures: Within text, as required to supplement product data.
- a. Handling, storage, maintenance during storage, assembly, erection, installation, adjusting, testing, operating, shutdown in emergency, troubleshooting, maintenance, interface, and as may otherwise be required.
 - b. Organize in a consistent format under separate heading for each different procedure.
 - c. Provide a logical sequence of instructions for each procedure.
 - d. Provide Information Sheet for OWNER's Personnel, Including:
 - 1) Proper procedures in the event of failure.
 - 2) Instances that might affect the validity of warranties or Bonds.
4. Warranties, Bonds, and Service Agreements: In accordance with Section 01700, CLOSEOUT PROCEDURES.

1.5 SUBMITTAL PROCEDURE

A. Preliminary Manuals:

- 1. Submit pdf file for OWNER's review.
- 2. Disposition: In accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
- 3. If Accepted:
 - a. PDF Stamped copy to CONTRACTOR.
 - b. PDF Stamped copy to OWNER's file.
- 4. If Rejected:
 - a. PDF will be returned to CONTRACTOR with OWNER's comments for revision.
 - b. Marked up PDF will be retained in OWNER's file.

- c. Resubmit revised PDF Preliminary copy for OWNER's review.

B. Final Manuals:

1. Submit one electronic copy of Final Manual.
2. If Final Manuals are acceptable, CONTRACTOR will be so notified.
3. If rejected, and at OWNER's Option:
 - a. Copy will be returned to CONTRACTOR for revision.
 - b. Copy will be retained by OWNER and the necessary revision data will be requested from CONTRACTOR.

1.6 MANUALS FOR EQUIPMENT AND SYSTEMS

A. Content for Each Unit (or Common Units) and System:

1. Description of unit and component parts, including controls, accessories, and appurtenances:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, operating data, nameplate data, and tests. Provide performance curve for actual tested installation at each station.
 - c. Complete nomenclature and commercial number of replaceable parts.
2. Operating Procedures:
 - a. Startup, break-in, routine, and normal operating instructions.
 - b. Test procedures and results of factory tests where required.
 - c. Regulation, control, stopping, and emergency instructions.
 - d. Description of operation sequence by control manufacturer.
 - e. Shutdown instructions for both short and extended durations.
 - f. Summer and winter operating instructions, as applicable.
 - g. Safety precautions.
 - h. Special operating instructions.
 - i. Installation instructions.
3. Maintenance and Overhaul Procedures:
 - a. Routine operations.
 - b. Guide to troubleshooting.
 - c. Disassembly, removal, repair, reinstallation, and reassembly.
4. Installation Instructions: Including alignment, adjusting, calibrating, and checking.

5. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
6. Spare parts ordering instructions.
7. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).
8. Manufacturer's printed operating and maintenance instructions.
9. As-installed, color-coded piping diagrams.
10. Charts of valve tag numbers, with the location and function of each valve.

B. Maintenance Summary:

1. Compile an individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or subunits.
2. Format:
 - a. Use Maintenance Summary Form bound with this Section, or an electronic facsimile of such.
 - b. Each Maintenance Summary may take as many pages as required.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
 - a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
 - b. "Unit" is the unit of measure for ordering the part.
 - c. "Quantity" is the number of units recommended.
 - d. "Unit Cost" is the current purchase price.

C. Content for Each Electric or Electronic Item or System:

1. Description of Unit and Component Parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, operating data, nameplate data, and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - d. Interconnection wiring diagrams, including all control and lighting systems.
2. Circuit Directories of Panelboards:
 - a. Electrical service.

- b. Controls.
 - c. Communications.
- 3. List of electrical relay settings, and control and alarm contact settings.
- 4. Electrical interconnection wiring diagram, including control and lighting systems.
- 5. As-installed control diagrams by control manufacturer.
- 6. Operating Procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Safety precautions.
 - d. Special operating instructions.
- 7. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to troubleshooting.
 - c. Adjustment and checking.
 - d. List of relay settings, control, and alarm contact settings.
- 8. Manufacturer's printed operating and maintenance instructions.
- 9. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

1.7 SUPPLEMENTS

A. The supplement listed below, following "END OF SECTION," are part of this Specification.

1. Maintenance Summary Form.

- a. Item (3) Equipment / Tag Number (s) must follow the following format:
LS###-XY-0000-0 where ### is the Lift Station Basin number

X - Discipline Code:	E	Electrical
	M	Mechanical
	N	Instrumentation
Y- Sheet Type:	C	Block, Control Logic Diagram
	D	Demolition
	E	Control Panel Elevation
	F	Fiber
	G	General

I	I/O List
L	Loop
P	Piping and Instrumentation
S	Special System Diagram
T	Schedule

0000- Sequence Number, in increments of 10

-0 Sheet number: Optional – used if multiple sheets are required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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MAINTENANCE SUMMARY FORM

PROJECT: _____ CONTRACT NO.: _____

1. EQUIPMENT ITEM _____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) LS###-XY-0000-0 _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER'S LOCAL REPRESENTATIVE

Name _____ Telephone No. _____

Address _____

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7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

[illegible]

NOTE: List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.

9. RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
List symbols used in No. 7. above.				

NOTE: Identify parts provided by this contract with two asterisks.

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SECTION 01781

WARRANTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties. Refer to the General Conditions for terms of the CONTRACTOR's period for correction of the Work.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the CONTRACTOR of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the CONTRACTOR.

1.02 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the OWNER.
- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the OWNER.

1.03 WARRANTY REQUIREMENTS

- A. All components, products, equipment, materials, structures, and other such installations furnished and installed by the Contractor under this project shall be replaced under warranty by the CONTRACTOR, at no additional cost to the OWNER, as necessary to restore the complete functionality of the project component or system for one (1) calendar year from the date of Final Completion, or greater as required for individual project components as specifically noted in separate sections, if component/material/system fails to function as designed and/or specified.
- B. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- C. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, CONTRACTOR shall reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

- D. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The CONTRACTOR is responsible for the cost of replacing or rebuilding defective Work regardless of whether the OWNER has benefited from use of the Work through a portion of its anticipated useful service life.
- E. OWNER's Recourse: Expressed warranties made to the OWNER are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the OWNER can enforce such other duties, obligations, rights, or remedies.
- F. Rejection of Warranties: The OWNER reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- G. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the OWNER reserves the right to refuse to accept the Work, until the CONTRACTOR presents evidence that entities required to countersign such commitments are willing to do so.

1.04 SUBMITTALS

- A. Submit written warranties to the OWNER prior to the date certified for Final Completion. The OWNER's Certificate of Final Completion designates a commencement date for warranties for the work. Submit written warranties upon request of the OWNER.
- B. When the Contract Documents require the CONTRACTOR, or the CONTRACTOR and a subcontractor, supplier, or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties.
- C. Form of Submittal: At Final Completion compile electronic copies each required warranty properly executed by the CONTRACTOR, or by the CONTRACTOR, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence.
- D. Bind warranties and bonds in .pdf file
- E. Identify each document on the front with the typed or printed title "WARRANTIES," Project title or name, and name of the CONTRACTOR.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

DIVISION 2

SITEWORK

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SECTION 02012
HANDLING AND DISPOSAL OF ASBESTOS CEMENT PIPE

PART 1 -GENERAL

1.01 GENERAL REQUIREMENT

- A. If the Contractor during the course of the Work observes, uncovers or otherwise becomes aware of the existence of any asbestos, hazardous waste, or toxic or radioactive material at the site which has not been rendered harmless to which the Contractor or any subcontractor, supplier or other person may be exposed, the Contractor shall immediately stop work in the affected area and notify the Owner and the Engineer and thereafter confirm any oral notice in writing. In addition, the Contractor shall take reasonable precautions to prevent or contain the movement, spread or disturbance of such materials and to protect persons and property. The Owner shall promptly consult with the Engineer concerning such condition and determine the necessity of Owner's retaining special consultants or qualified experts to deal therewith. The Contractor shall not perform any Work in connection therewith prior to receipt of special written instructions from the Owner through the Engineer.
- B. The Contractor shall provide electronic markup(s) of Sheets G-5 and G-6 indicating the locations and linear footages of grouted and abandoned asbestos cement pipe for the purpose of obtaining certification of completion to the Palm Beach County Health Department and for the use of the City of Boca Raton. Any asbestos cement pipe removed and disposed of in accordance with this specification and State and Federal requirements shall also be indicated on engineering Sheets G-5 and G-6.

1.02 PROCEDURES FOR DEMOLITION OF STRUCTURES

- A. Notification: Federal and state asbestos regulations require, prior to demolition of any structure:
 - 1. An inspection for asbestos-containing materials (ACM);
 - 2. Removal of specific ACM; and,
 - 3. An asbestos notification of demolition received at least ten (10) business days prior to demolition.

To meet requirement (3) above, the Contractor is responsible for submitting a complete and accurate asbestos notification of demolition form titled "Notice of Asbestos Removal Project" [i.e., NESHAP notification, 40 CFR Part 61.145(b)], for each separate address to be demolished to the below listed agencies at least ten (10) business days prior to demolition. The four (4) copy forms are available from the Department of Environmental Protection (FDEP) and Palm Beach County Risk Management/Loss Control.

SEND ORIGINAL TO:

State Asbestos Coordinator
FDEP
2600 Blair Stone Road
Tallahassee, FL 32399-5420

SEND YELLOW COPY TO:

Environmental Specialist
FDEP
P.O. Box 15425
West Palm Beach, FL 33416-5425

SEND PINK COPY OR FAX OF ORIGINAL TO:

P.B.C. Risk Management/Loss Control
Attn.: NESHAP
P.O. Box 21229
West Palm Beach, FL 33416-1229
Fax: (561) 233-5420

The Contractor must notify Loss Control (561-233-5430) immediately if the demolition start date changes. No demolition may begin before the start date on the NESHAP notification and no demolition may occur without a notice to proceed. It is the responsibility of the Contractor to call and submit revised NESHAP notifications to the above listed agencies, adhering to required NESHAP time frames.

The Contractor is responsible for physically checking the structure(s) before submitting the NESHAP notification to ensure that all RACM and Category II ACM, as identified in the pre-demolition asbestos inspection report, have been removed. If RACM or Category II ACM is discovered, immediately contact the Owner or Engineer.

B. Work Practices:

1. The Contractor will utilize wet methods to control airborne emissions during the demolition process and during loading onto transport vehicles, regardless whether Category I is present or not. The Contractor is responsible for supplying water meters, hoses, and adequate volume of water to the demolition site.
2. Recycling of substructure with either presumed or confirmed asbestos-containing Category I (e.g. floor tile, sheet vinyl, and/or roofing materials) is not permitted, unless written authorization is provided to the Contractor.

C. OSHA and Florida Statutes Compliance:

1. In accordance with OSHA (ref. 29 CFR 1926.1101) the Contractor must have a competent person on-site who:
 - a. Is capable of identifying existing asbestos hazards in the work place;
 - b. Is capable of selecting the appropriate control strategy for asbestos exposure;
 - c. Has the authority to take prompt corrective action to eliminate them.
 - d. This person must be trained in accordance with Chapter 469 Florida Statutes as an on-site supervisor.
 - e. Copies of training certificates of the on-site supervisor shall be made available to the Owner upon request.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

- A. Federal regulations (40 CFR Part 61, Sub-part M) classify asbestos-cement pipe (AC pipe) as Category II non-friable asbestos-containing material. AC pipe must be handled in a manner which will maintain this classification. Therefore, all cutting and disposal of AC pipe must be performed by a Florida Licensed Asbestos Contractor.
- B. The Owner will make every effort to identify and quantify the location of known AC pipe and material prior to onset of the Work.
- C. If during the course of the Work the Contractor observes, uncovers, or otherwise becomes aware of the existence of any AC pipe, pieces, or material at the site to which the Contractor or any subcontractor, supplier, or other person may be exposed, the Contractor shall immediately notify the Owner and confirm any verbal notice in writing. The Owner shall promptly consult with the Project Engineer concerning such conditions and determine the necessity of the Owner retaining special consultants or qualified experts. The Contractor shall not perform any Work near or in connection with the suspect material until receipt of special written instructions from the Owner.
- D. The Contractor will ensure that all subcontractors follow these procedures.

3.02 PRE-WORK SUBMITTALS

- A. The Contractor shall submit the name of the Asbestos Contractor and a copy of their Florida Asbestos Contractor License to the Owner and Engineer, prior to start of the Work.

3.03 WORKER PROTECTION

- A. Licensed asbestos contractors will comply with the requirements of OSHA 29 CFR 1926.1101 concerning worker protection.

3.04 EXECUTION OF WORK

- A. AC pipe will be kept wet during all phases of removal. No visible emissions are permitted. Wet the pipe using an airless sprayer or utilize available water.
- B. Apply drop cloth of 6-mil polyethylene to the area beneath and a minimum of three feet (3') beyond the section of pipe to be cut.
- C. Break, cut or snap pipe into sections suitable in size to the disposal facility. Abrasive disc saws are prohibited.
- D. Apply lockdown encapsulant to exposed edges of pipe. Pick up all pipe debris that may have fallen outside the drop cloth.
- E. Use of compressed air to clean AC pipes is prohibited.
- F. At no time should AC pipe or pieces be mixed in with fill material.

3.05 DISPOSAL

- A. Wrap pipe in existing drop cloth. Transfer pipe to a clean drop cloth outside the trench, and wrap and secure in a second layer of 6-mil polyethylene.
- B. Affix the following labels to the exterior of each separately wrapped section of pipe. Labels are to be waterproof, legible, and large enough in size to be readily visible:

First Label: CAUTION
Contains Asbestos Fibers
Avoid Opening or Breaking Container
Breathing Asbestos is Hazardous to Your Health

Second Label: DANGER
Contains Asbestos Fibers
Avoid Breathing Dust
Cancer and Lung Disease Hazard
Breathing Airborne Asbestos, Tremolite,
Anthophyllite or Actinolite Fibers
is Hazardous to Your Health

Third Label: RQ HAZARDOUS SUBSTANCE
Solid, NOS
ORM-E, NA9188
(Asbestos)

Fourth Label: Label each container with the name of the
generator (owner) and the location at which
the waste was generated.

- C. Properly dispose of all AC pipe generated each day. All wrapped sections may be stored in a secure, locked enclosure pending disposal, if authorized by the Owner. At no time are sections or pieces of AC pipe to be left on the project site unwrapped and unsecured at the end of the day.
- D. All vehicles and/or containers used to haul asbestos containing waste material shall be lined with a minimum of 6-mil polyethylene layer.
- E. Label trucks used to transport asbestos-containing waste material during loading and unloading as follows (refer to 29 CFR 1910.145 (d) (4) for sign format):

DANGER
Asbestos Dust Hazard
Cancer and Lung Disease Hazard
Authorized Personnel Only

3.06 POST WORK SUBMITTALS

- A. The Contractor, or Asbestos Contractor, as waste generator shall complete a Waste Shipment Record (WSR) for each shipment of asbestos-cement pipe disposed. Refer to 40 CFR Part 61, Revision Final Rule for an example of WSR or contact Palm Beach County Risk Management/Loss Control.
- B. The Contractor or its designated subcontractor will submit the following documents to the Owner and Engineer coordinating this project prior to payment:
 - 1. A copy of the WSR prior to shipment; and,
 - 2. A copy of the WSR signed by the disposal facility within thirty-five (35) days of shipment.

3.07 Regulations:

- A. Environmental Protection Agency: 40 CFR Part 61 National Emission Standards for Hazardous Pollutants; Asbestos NESHAP Revision Final Rule, November 20, 1990.
- B. Occupational Safety and Health Administration: 29 CFR 1926.1100 - Asbestos, Construction Industry Standard.
- C. Department of Business and Professional Regulation, Chapter 469 Florida Statutes, Licensure of Consultants and Contractors.

END OF SECTION

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SECTION 02222

EXCAVATION AND BACKFILL FOR UTILITIES

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. Excavate, grade and backfill as required for the site underground piping systems, as shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Division 15 – Mechanical Construction

1.03 QUALITY CONTROL

- A. An independent testing laboratory will be retained by the OWNER to do appropriate testing as described in Section entitled General Conditions Article 54 Testing. The CONTRACTOR shall schedule its Work so as to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory informed of its progress. City will only pay for passing test results.

1.04 GROUNDWATER

- A. The CONTRACTOR shall be responsible for anticipating groundwater conditions and shall provide positive control measures as required. Such measures shall ensure stability of excavations, groundwater pressure control, prevention of tanks, pipes, and other structures from being lifted by hydrostatic pressures, and avoiding the disturbance of subgrade bearing materials.

1.05 PROTECTION OF PROPERTY AND STRUCTURES

- A. The CONTRACTOR shall, at its own expense, sustain in place and protect from direct or indirect injury, all pipes, poles, conduits, walls, buildings, and all other structures, utilities, and property in the vicinity of its Work. Such sustaining shall be done by the CONTRACTOR. The CONTRACTOR shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, buildings, and all other structures, utilities, and its Work. It shall be responsible for all damage, and assume all expenses, for direct or indirect injury and damage, caused by its Work, to any such pipe, structures, etc., or to any person or property, by reason of injury to them, whether or not such structures, etc., are shown on the Drawings.
- B. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Barricades with flashing lights shall also be placed along excavation from sunset each day to sunrise of the next day until such excavation is entirely refilled, compacted, and paved. All excavations shall be barricaded where required to meet

OSHA, local and Federal Code requirements, in such a manner to prevent persons from falling or walking into any excavation within the site fenced property limits.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Materials shall be furnished as required from on-site excavations or from acceptable off-site sources as required. The CONTRACTOR shall notify the OWNER of the sources of each material at least ten calendar days prior to the anticipated use of the materials.

2.02 BEDDING

- A. Pipe Bedding: In general, clean sandy excavated materials, that is free from organics, clay and construction debris, can be used as pipe bedding when construction is in a dry condition and when the bedding is not sided by muck. If the trench is wet or if muck is present, pipe bedding material shall consist of washed and graded limerock (3/8"-7/8"). Separation of suitable material for pipe bedding from other material shall be made during the excavation.
- B. Sand shall be used for all copper and other service lines.
- C. Sand shall be used for PVC pipe.
- D. Precast concrete items shall use crushed stone.

2.03 BACKFILL

- A. Use excavated or borrowed soil materials that are free of rock or gravel larger than two (2) inches in diameter and free of twigs, roots, or other vegetation/foreign material and which are in conformance with FDOT Section 125.
- B. Use backfill soil that is also non-organic in nature (i.e. peat, muck, are unsatisfactory) and is no more than 20 percent by weight finer than No. 200 mesh sieve

2.04 CRUSHED STONE (3/4-INCH ROCK)

- A. Crushed stone shall consist of hard, durable, subangular particles of proper size and gradation, and shall be free from organic material, wood, trash, sand, loam, clay, excess fines, and other deleterious materials. Crushed stone shall conform to the requirements of ASTM C 33, Size Number 57, graded within the following limits:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
1 1/2 inch	100
1 inch	95 to 100
1/2 inch	25 to 60
No. 4	0 to 10
No. 8	0 to 5

PART 3 - EXECUTION

3.01 EXCAVATION

- A. The CONTRACTOR shall perform all excavation of every description and of whatever substance encountered, to the dimensions, grades and depths shown on the Drawings, or as directed. All excavations shall be made by open cut, except for service routings on private property from rear of properties to the front of properties where directional boring shall be used. All existing utilities such as pipes, poles and structures shall be carefully located, supported and protected from injury; in case of damage, they shall be restored at the CONTRACTOR's expense.
- B. Pipe trenches for piping shall be excavated to a width within the limits of the top of the pipe and the trench bottom so as to provide a clearance on each side of the pipe barrel, measured to the face of the excavation, or sheeting if used, of 8 inches to 12 inches. Where the pipe size exceeds 12 inches, the clearance shall be from 12 inches to 18 inches. All pipe trenches shall be excavated to a level where suitable material is reached, a minimum of 8 inches below the excavated depth, which will allow for a minimum of 36-inches of covering unless otherwise indicated on the Drawings. Excavation depths in other types of materials and conditions shall be made as hereinafter specified.
- C. In areas where trench widths are not limited by right-of-way and/or easement widths, property line restrictions, existing adjacent improvements, including pavements, structures and other utilities, and maintenance of traffic, the trench sides may be sloped to a stable angle of repose of the excavated material but only from a point one foot above the crown of the pipe. A substantially and safely constructed movable shield, "box" or "mule" may be used in place of sheeting when the trench is opened immediately ahead of the shield and closed immediately behind the shield as pipe laying proceeds inside the shield.
- D. Ladders or steps shall be provided for and used by workers to enter and leave trenches, in accordance with OSHA requirements.
- E. Excavation for appurtenances shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation or sheeting, if used, of not less than 12 inches.
- F. Excavated unsuitable material shall be removed from the site and disposed of by the CONTRACTOR. Materials removed from the trenches shall be stored and in such a manner that will not interfere unduly with any on-site operations, traffic on public roadways and sidewalks and shall not be placed on private property. In congested areas, such materials as cannot be stored adjacent to the trench or used immediately as backfill shall be removed to other convenient places of storage acceptable to the OWNER at the CONTRACTOR's expense.
- G. Excavated material that is suitable for use as backfill shall be used in areas where sufficient material is not available from the excavation. Suitable material in excess of

backfill requirements shall be either used on the site as directed by the OWNER or disposed of the CONTRACTOR.

H. Barriers shall be placed at excavations in accordance with OSHA requirements.

3.02 SHEETING AND BRACING

- A. The CONTRACTOR shall furnish, place and maintain sheeting and bracing to support sides of the excavation as necessary to provide safe Working conditions in accordance with OSHA requirements, and to protect pipes, structures and other Work from possible damage. Where wood sheeting or certain designs of steel sheeting are used, the sheeting shall be cut off at a level of 2 feet above the top of the installed pipe and that portion below the level shall be left in place. If interlocking steel sheeting is used, it may be removed providing removal can be accomplished without disturbing the bedding, pipe or alignment of the pipe. Any damage to the pipe bedding, pipe or alignment of the constructed utility caused by the removal of sheeting shall be cause for rejection of the affected portion of the Work. The OWNER may permit sheeting to be left in place at the request and expense of the CONTRACTOR.
- B. If the OWNER is of the opinion that at any point sufficient or proper supports, have not be provided, it may order additional supports put in at the CONTRACTOR's expense. The CONTRACTOR shall be responsible for the adequacy of all sheeting used and for all damage resulting from sheeting and bracing failure or from placing, maintaining and removing it.

3.03 REMOVAL OF WATER

- A. General: It is a basic requirement of these Specifications that excavations shall be free from water before pipe or structures are installed.
- B. The CONTRACTOR shall provide pumps, and other appurtenant equipment necessary to remove and maintain water at such a level as to permit construction in a dry condition. The CONTRACTOR shall continue dewatering operations until backfilling has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe in the trench or so that it is above the water table. If at any point during the dewatering operation it is determined that fine material is being removed from the excavation sidewalls, the dewatering operation shall be stopped if acceptable to the OWNER. If any of the subgrade or underlying material is disturbed by movement of groundwater, surface water, or any other reason, it shall be replaced at the CONTRACTOR's expense with crushed stone or gravel.
- C. The CONTRACTOR shall use dewatering systems that include automatic starting devices, and standby pumps that will ensure continuous dewatering in the event of an outage of one or more pumps.
- D. Disposal: Water from the trenches and excavation shall be disposed of in such a manner as will not cause injury to public health, to public or private property, to the Work completed or in progress, to the surface of the streets, cause any interference with the use of the same by the public, or cause pollution of any waterway or stream.

The CONTRACTOR shall submit its proposed methods of handling trench water and locations at which the water will be disposed of to the OWNER for review and shall receive acceptance before starting the excavation. Disposal to any surface water body will require silt screens to prevent any degradation in the water body. The CONTRACTOR shall have responsibility for acquiring all necessary permits for disposal.

- E. Sound attenuated pumps as manufactured by Thompson Pumps with "Silent Knight" canopy, or approved equal shall be used for all dewatering activities that require a pumping system. CONTRACTOR shall demonstrate, measure and record the dB levels at the time of initial set-up. The CONTRACTOR shall record the dB levels weekly.

3.04 TRENCH STABILIZATION

- A. No claim for extras, or additional payment will be considered for cost incurred in the stabilization of trench bottoms that are rendered soft or unstable as a result of construction methods, such as improper or inadequate sheeting, dewatering or other causes. In no event shall pipe be installed when such conditions exist and the CONTRACTOR shall correct such conditions so as to provide proper bedding or foundations for the proposed installation at no additional cost to the OWNER before placing the pipe or structures.

3.05 PIPE BEDDING

- A. Pipe trenches shall be excavated as described in Article 3.01. The resulting excavation shall be backfilled with acceptable pipe bedding material, up to the level of the centerline of the proposed pipe barrel. This backfill shall be tamped and compacted to provide a proper bedding for the pipe and shall then be shaped to receive the pipe. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting.
- B. Any excavation below the levels required for installation of the pipe bedding shall be backfilled with acceptable bedding material, tamped, compacted and shaped to provide proper support for the proposed pipe, at the CONTRACTOR's expense.

3.06 BACKFILL

- A. Pipeline trenches shall be backfilled to a level minimum 12 inches above the top of the pipe with select backfill (selected backfill) obtained from the excavation. Such material shall be placed in 6-inch layers, each compacted to the densities specified in Article 3.07. Only hand operated mechanical compacting equipment shall be used within six inches of the installed pipe. The Engineer may require that the material used for this backfill be obtained from a source entirely apart from the location of the work.
- B. After the initial portion of backfill has been placed as specified above, and after all excess water has completely drained from the trench, backfilling of the remainder of the trench may proceed. The remainder of the backfill shall be selected material obtained from the excavation, or suitable material as furnished by the Contractor at no

additional cost to the Owner, and shall be placed in horizontal layers, the depth of which shall not exceed the ability of the compaction equipment employed and which will ensure the design compaction is uniformly achieved throughout all installed backfill, or no greater than 8-inch layers. Each layer shall be moistened, tamped, puddled, rolled or compacted to the densities specified in Article 3.07.

3.07 COMPACTION AND DENSITIES

- A. Compaction of backfill shall be 98 percent of the maximum dry density. More thorough compaction may be required when Work is performed in other regulatory agencies jurisdictions, such as Palm Beach County Right-of-Way or the FDOT. Methods of control and testing of backfill construction are:
 - 1. Maximum density of the material in trenches shall be determined by ASTM D 1557.
 - 2. Field density of the backfill material in place shall be determined by ASTM D 1556 or D 2922.
- B. Testing: Laboratory and field density tests, which in the opinion of the OWNER are necessary to establish compliance with the compaction requirements of these Specifications, shall be ordered by the OWNER. The CONTRACTOR shall coordinate and cooperate with the testing laboratory. The testing program will be implemented by the OWNER establishing depths and locations of tests. Modifications to the program will be made as job conditions change. Density testing shall be performed for each successive lift, including both subgrade and road-base, as defined in the Contract Specifications and as detailed in the Contract Plans for each interval of testing. Density testing shall be performed at a min. of 100-ft intervals along open-cut utility installation, or at greater intervals as determined by the agency having jurisdiction.
- C. Trench backfill which does not comply with the specified densities, as indicated by such tests, shall be reworked and recompacted until the required compaction is secured, at no additional cost to the OWNER. The costs for retesting such Work shall be paid for by the CONTRACTOR.

3.08 ADDITIONAL EXCAVATION AND BACKFILL

- A. Where organic material, such as roots, muck, or other vegetable matter, or other material which, in the opinion of the OWNER, will result in unsatisfactory foundation conditions, is encountered below the level of the proposed pipe bedding material, it shall be removed to a depth of two feet below the outside bottom of the pipe or to a greater depths as directed by the OWNER and removed from the site. Sheet piling shall be installed if necessary, to maintain pipe trenches within the limits identified by the OWNER. The resulting excavation shall be backfilled with suitable backfill material, placed in 12-inch layers, tamped and compacted up to the level of the bottom of the proposed pipe bedding material. Sufficient compaction of this material shall be performed to protect the proposed pipe against settlement. Construction shall then proceed in accordance with the provisions of Article 3.05 "Pipe Bedding".

- B. Additional excavation (more than two feet below the pipe) as indicated on the trench detail shall be performed only when ordered by the OWNER. Where organic or other material is encountered in the excavation, the CONTRACTOR shall bring the condition to the attention of the OWNER and obtain his determination as to whether or not the material will require removal, prior to preparing the pipe bedding. The excavation of material up to a depth of two feet below the outside bottom incidental items of construction and the Work shall be done at the CONTRACTOR's expense.

3.09 FINE GRADING

- A. After piping trenches backfilled, the disturbed areas of the site shall be fine graded. Any lumber, undesirable materials, and rocks larger than the 3-inch size shall be removed from the surface. The completed surface shall be to the preconstruction elevation unless otherwise directed by the OWNER. Minor adjustments to line and grade may be required as the work progresses in order to satisfy field conditions.

3.10 EXCAVATION IN VICINITY OF TREES

- A. Except where trees are shown to be removed, trees shall be protected from injury during construction operations. No tree roots over 2 inches in diameter shall be cut without express permission of the CONSULTANT. Trees shall be supported during excavation by any means previously reviewed and approved by the CONSULTANT.

3.11 EXCAVATION IN ROCK

- A. Rock is defined as follows:
 - 1. Rock shall be classified as material having a blow count in excess of 30 blows per foot from a Standard Penetration Test (ASTM D-1586) and exceeding 1000 psi from an Unconfined Compression Strength Test (ASTM D-2938); and,
 - 2. General Excavation - Any material that cannot be excavated with a single-toothed ripper drawn by a crawler tractor having a minimum draw bar pull rated at not less than 71,000 lbs. (Caterpillar D9N or equivalent), and occupying an original volume of at least 2 cubic yards or more; and,
 - 3. Trench Excavation - Any material that cannot be excavated with a backhoe having a breakout force rated at not less than 44,000 lbs. (Caterpillar 235D or equivalent), and occupying an original volume of at least 2 cubic yards.

END OF SECTION

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SECTION 02320

TRENCHLESS INSTALLATION OF PRESSURE MAINS BY DIRECTIONAL BORING HORIZONTAL DIRECTIONAL DRILLING (HDD)

PART 1 GENERAL

1.01 SECTION DESCRIPTION

- A. This Section includes materials, performance and installation standards, and Contractor responsibilities associated with all labor, materials, equipment and incidentals required to install, complete, trenchless pressure mains via the horizontal directional drilling method, as shown on the Drawings and as specified herein.

1.02 EXPERIENCE

- A. The HDD Contractor shall demonstrate expertise in large diameter (20-inch diameter pipe and larger) trenchless pipe installation via horizontal directional drill methods by providing a listing of ten (10) projects (within 30 days after the Notice to Proceed for the project and before any directional drill work is to commence) where similar Work (large diameter HDD's) has been performed in the last eight (8) years, totaling a minimum of 10,000 linear feet. The listing shall include a reference for each project with correct contact name, phone number and address, the Contractor's project manager and supervisor involved with the project, a description of the project, project location, Owner's name and contact information, quantity, size, length, and type of pipe installed by HDD. Conventional trenching experience will not be considered applicable.
- B. HDD Contractor shall submit the names and resumes of all project managers and all field supervisors proposed to be involved with the project. All supervisory personnel must be adequately trained and shall have at least four (4) years of experience in large diameter (greater than 20-inches) directional boring.
- C. HDD Contractor shall submit an overview of the firm, including the number of offices, number of partners and professionals, number and type (city, county, district, private) of entities served by the Contractor, disciplinary actions or lawsuits proposed against the Contractor in the last three years and the current bonding capacity, name of surety company and telephone numbers.
- D. HDD Contractor shall demonstrate that the firm owns or has access to equipment capable to construct the project.
- E. Verify the HDD Contractor has never abandoned a project (even temporarily) during a dispute.
- F. Provide documentation of HDD Contractor's safety program and safety record.

1.03 SUBMITTALS

- A. Submit manufacturer's data for the pipe materials and pipe joining materials proposed for use.
- B. Submit an estimate of the anticipated pullback thrust and loads that will be required to install the new pipe. The estimate shall include the calculated buoyant force or weight of the pipe and any proposed method for counter-weighting the pipe during pullback.
- C. Submit the directional boring equipment including the thrust and torque capacities.
- D. Submit locating equipment proposed for use, the method of locating to be used, and the proposed sequence and method of construction for approval by the Engineer in accordance with the plans and specifications. Include information on how the bores are to be steered, the information recorded, and the as-built provided.
- E. Submit the proposed tunnel sizes, proposed drilling fluid mix designs and compositions and MSDS, proposed viscosity, fluid quantities, delivery volume and pressure, method of soil / slurry separation, and proposed pre-ream procedures.
- F. Submit drilling plans which shall include the planned drill bore paths, the method for monitoring and controlling speed, line, grade and rate of fluids delivered. Include sequence, size and description of each reamer and final swabbing of bore path prior to pullback.
- G. Submit signed and sealed scaled plan and profile of proposed bore for each location. The plan shall show finished grade, entry and exit angle, deflection and radiuses of the pilot bore, all existing utilities with minimum vertical and horizontal clearances. The plan shall also address the location dimensions and layout of the drill rig and tanks and all other necessary equipment at the rig side, the proposed staging location and area needed for the piping and other components at the pullback end, the lengths of each bore based on soil condition, equipment used, topography, etc. The proposed vertical and horizontal clearances between the bored pipe and any existing / proposed conflicting pipes, conduits or obstructions shall exceed the guidance system accuracy tolerance by a minimum 100%. Give an estimate of time proposed to complete each bore.
- H. Submit an environmental protection plan and contingency plan in case of problems such as fluid loss or frac-out.
- I. The Contractor is required to bring to the attention of the Engineer any known design discrepancies with actual tunneling methods that the Contractor will be performing. This shall be stated in writing to the Engineer no later than the pre-construction meeting.
- J. Submit method of storing, transporting, and disposing of cuttings and drilling fluid. Methods shall not impact waterways or wetlands and shall be in accordance with all regulatory agencies.

1.04 REFERENCED SECTIONS

- A. Section 02661 – High Density Polyethylene (HDPE) AWWA Pipe and Fittings
- B. Section 02660 – Fusible Polyvinyl Chloride (PVC) Pipe for Installation by Horizontal Directional Drilling (HDD)

PART 2 - PRODUCTS

2.01 GENERAL

- A. All pipes and fittings for the pipe installed via HDD method shall be as specified in the Contract Documents, as shown on the Construction Plans, and as approved by the Owner/Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Installation shall be in a trenchless manner producing continuous bores.
- B. Steering of the bore shall be conducted with a walkover locating system (for general work), or a wireline guidance system (for subaqueous bores, bores requiring certified as-builts, or for bores where walkover locating is not practical or desirable, such as heavily traveled high-speed roadways).
- C. The directional boring Contractor shall submit certification, by a Professional Engineer or Professional Surveyor and Mapper licensed in the State of Florida, that the directional boring has been performed in accordance to the construction drawings, and provide signed and sealed certified record drawings of the installation.
- D. The boring shall be controlled as to depth and angle. The depth between the top elevation of the bore tunnel and the surface must be as shown on the Contract Drawings. Variance from the depth shall be submitted in writing by the Contractor and approved by the Engineer.
- E. Boring shall be conducted using a mechanical boring head, assisted by and cooled by a bentonite clay drilling slurry of low pressure and volume. Liquid clay type colloidal drilling fluid shall consist of at least 10 percent of high-grade, carefully processed bentonite to consolidate cuttings of the soil, to seal the walls of the hole, and to furnish lubrication for subsequent removal of cuttings. In addition, the clay fluid must be totally inert and contain no environmental risk. Material Safety Data Sheets (MSDS) must be provided and approved for all drilling slurry compounds.
- F. Mechanical, pneumatic, or water-jetting methods will be considered unacceptable due to the possibility of surface subsidence.

- G. Backreaming shall be conducted to enlarge and prepare the bore tunnel for pipe installation. Final backreamed diameter of the tunnel shall be 1.5 times the outside diameter of the pipe or sleeve being installed, or as recommended by the pipe supplier. The number of prereams shall be appropriate to the fluid volume used, the carry ratio of the drilling fluid, and the makeup of the ground material.
- H. Contractor shall dispose of excess drilling slurry in a manner acceptable to the Owner and Engineer. Drilling slurry shall not be introduced into sewers, storm drains, canals, or bodies of water. It shall be transported offsite and to a disposal site. Pits and work areas are to be restored to equal or better condition than pre-construction condition. Location of pits and work areas shall be approved, in advance, by the Engineer. Disposal sites for drilling slurry shall be approved for disposal of this material. Contractor shall submit disposal location information to the Engineer for approval.
- I. The pilot hole shall be drilled on bore paths with no deviations greater than 5 percent of depth over the length of the bore unless previously agreed to by the Engineer. In the event that pilot does deviate from the bore path more than 5 percent of depth over the length of the bore, Contractor will notify the Engineer who may require the Contractor to pull-back and re-drill from the location along bore path before the deviation. Upon completion of pilot hole phase of the operation, a complete set of "as-built" records shall be submitted in duplicate to the Engineer. These records shall include copies of the pilot bore path plan and profile record drawing, as well as directional survey reports as recorded during the drilling operation. Upon approval of the pilot hole location by the Engineer the hole opening or enlarging phase of the installation shall begin.
- J. Pipe joints shall be welded per the manufacturer's recommendations by competent personnel.
- K. Two (2) #8 AWG Copperhead 845-EHS tracer wires shall be pulled with the pipeline for pipeline locating purposes. The wires shall be terminated in a wire access box at both ends, unless otherwise noted/indicated. The Contractor shall attach the wires to the pipe in such a way as to not break the wires during the pullback of the pipe.
- L. At the completion of the bore, the Contractor shall submit five (5) copies of the bore log to the Engineer for record keeping. The bore log shall be prepared by the subcontractor that performed the horizontal directional drill, unless the Contractor himself performed the Work.
- M. If any driveways or access roads are to be blocked by the pipe, the Contractor shall provide overhead roll-type pipe stands to elevate the pipe to such a height as to allow access into the driveways and/or access roads.
- N. A competent and experienced supervisor representing the Contractor and drilling Subcontractor shall be present at all times during the actual drilling and pull-back operations. A responsible representative who is thoroughly familiar with the equipment and type of work to be performed must be in direct charge and control of

the operation at all times. In all cases, the supervisor must be continually present at the job site during the actual directional drill and pull-back operations.

- O. Contractor shall place silt fence between all drilling operations and any drainage, wellfields, wetland, waterway or other area designated for such protection if required by documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations.

3.02 RESTORATION OF PAVED, IMPROVED AND UNIMPROVED AREAS

- A. The shoulders, ditches, banks and slopes of roads, waterways, and railroads crossed and paralleled shall be restored to their former condition and properly sodded so that they will not wash out before becoming consolidated. Restoration shall be as required by the jurisdictional authority and as specified within the Contract Documents. Road crossings and parallel installations are to be continuously maintained until completion of the Work.

3.03 SAFETY

- A. Utmost attention must be paid to all permit conditions and safety considerations, to protect lives and property. At a minimum, these things must be done:
 - 1. Provide crew with accurate cable avoidance equipment and training to detect and avoid damage to all existing utilities.
 - 2. Provide crew with safety equipment which will detect electrical current and voltage, with both visual and audible alarms, in the event of contact / close proximity with electrical and/or telecommunications lines. Provide and use properly grounded matting around the boring equipment. Provide insulated work boots and gloves. Provide OSHA safety equipment and signage for work in public right-of-ways.
 - 3. Provide an OSHA certified Health and Safety Officer to maintain all areas of the job site. The job site superintendent may be the OSHA Certified Health and Safety Officer. At the end of each workday, pits shall be barricaded using a safety fence.

END OF SECTION

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SECTION 02500

SURFACE RESTORATION

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. Items specified in this Section include repairs to landscaped, grassed areas and other areas that may be damaged by Contractor activities.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02510 - Asphaltic Concrete Pavement.
- B. Section 02526 - Concrete Pavement, Curb and Sidewalks.
- C. Section 02580 - Pavement Markings and Signs.

1.03 DEFINITIONS

- A. The phrase "DOT Specifications" shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition. The DOT Specifications are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.

1.04 PROTECTION OF EXISTINGIMPROVEMENTS

- A. The Contractor shall be responsible for the protection of all pavements and other improvements within the work area. All damage to such improvements, as a result of the Contractor's operations, beyond the limits of the work of pavement replacement shall be repaired by the Contractor at his expense.

1.05 GUARANTEE

- A. The Contractor shall guarantee all trees, ground cover or shrubs planted or replanted under this Contract for a period of one year beyond acceptance of the project. In the event that any new tree, plant or shrub dies within the guarantee period, the Contractor shall be responsible for replacement in kind. In the event that a transplanted (reused) tree dies within the guarantee period, the Contractor shall be responsible for replacement in kind, except that the maximum height of any new tree shall be eight feet as measured from the ground surface, once planted, to the top of the tree.

PART 2 -- PRODUCTS

2.01 SOD

- A. Sod shall match grass type to existing conditions or be Floratam Sod in irrigated areas and Bahia in non-irrigated areas.

2.02 REPLACEMENT TREES, GROUND COVER AND SHRUBS

- A. Replacement trees, ground cover and shrubs shall be of the same type and size and sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall have healthy, well developed root systems and shall be free of disease and insect pests, eggs or larvae. Replacement shall be in accordance with City Standards.

2.03 MULCH

- A. Mulch shall be windproof shredded eucalyptus, mulch shall be clean, fresh, free of branches and other foreign matter. Mulch shall be used around all shrubs, ground covers and tree trunks, and placed to a minimum depth of 2 inches extending from the tree trunk outward two feet.

PART 3 -- EXECUTION

3.01 GRADING AND SODDING

- A. The Contractor shall regrade the work areas disturbed by his construction activities to the existing grade prior to commencement of construction.
- B. The Contractor is required to mow all sodded areas immediately prior to final acceptance of the project by the City. Contractor shall mow and maintain the sod in a moist condition for a period of at least thirty (30) days after acceptance as well as payment for the water. Sod bedding shall be cleaned fill, free of rocks, gravel, roots/organics, weeds, etc... and shall include a 4" layer of topsoil, where necessary to promote healthy establishment and growth of installed sod.
 - I. The work consists of soil preparation, lawn bed preparation, and sodding complete, in strict accordance with the specifications and the applicable drawings to produce a grass lawn acceptable to the City and Engineer.
 - II. Soil Preparation: All areas that are to be sodded shall be cleared of any rough grass, weeds, and debris, and the ground brought to an even grade. The whole surface shall be rolled with a roller weighing not more than one hundred (100) pounds per foot of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional soil, and the surface shall be regraded and rolled until presenting a smooth and even finish that is up to the required grade.
 - III. Fertilizer: When necessary to promote and achieve healthy establishment of installed sod, prepare area to receive sod by loosening beds four (4) inches deep and apply fertilizer at rate of twenty (20) pounds per one thousand (1,000) square feet or per manufacturer's instructions. Application shall be uniform, utilizing approved mechanical spreaders. Mix fertilizer thoroughly with the soil to a depth of three (3) inches. Hand rake until all bumps and depressions are removed. Wet prepared area thoroughly.
 - IV. Sod (Restoration of sod shall be completed within 3 calendar days)
 - 1. The Contractor shall sod all areas that are not paved or planted as designated on the drawings within the contract limits, unless specifically noted otherwise.

2. The sod shall be certified to meet Florida State Plant Board Specifications, absolutely true to varietal type, and free from weeds, fungus, insects and disease of any kind.
 3. Sod panels shall be laid tightly together so as to make a solid sodded lawn area. Sod shall be laid uniformly against the edges of all buildings, paved and planted areas. Immediately following sod laying, the lawn areas shall be rolled with a lawn roller customarily used for such purposes, and then thoroughly watered immediately. If, in the opinion of the Engineer, top-dressing is necessary after rolling to fill the voids between the sod panels and to even out inconsistencies in the sod, clean sand as approved by the Engineer shall be uniformly spread over the entire surface of the sod and thoroughly watered in.
- V. During delivery, prior to and during the planting of the lawn areas, the sod panels shall at all times be protected from excessive drying and unnecessary exposure of the roots to the sun. All sod shall be stacked during construction and planting so as not to be damaged by sweating or excessive heat and moisture.
- VI. Lawn Maintenance:
1. Within the contract limits, the Contractor shall produce a dense, well-established lawn. The Contractor shall be responsible for the repair and re-sodding of all eroded, sunken or bare spots until Certification of Acceptability by the Engineer. Repaired sodding shall be accomplished as in the original work.
 2. Water every day for ten (10) successive days, then water three (3) times per week (at even intervals) for two (2) additional weeks. All watering shall be of sufficient quantity to wet or restore water to depth of four (4) inches.
- C. Sod shall be placed on all grassed areas disturbed by construction activities, unless otherwise indicated on the Drawings. Sodding shall be in accordance with Section 981 – Turf Materials of the DOT Specifications. See Section 981 below:

SECTION 981: TURF MATERIALS

981-1 General.

The types of seed and sod will be specified in the Contract Documents. All seed and sod shall meet the requirements of the Florida Department of Agriculture and Consumer Services and all applicable state laws, and shall be approved by the Engineer before installation. All seed, sod and mulch shall be free of noxious weeds and exotic pest plants, plant parts or seed listed in the current Category I “List of Invasive Species” from the Florida Exotic Pest Plant Council (FLEPPC, <http://www.fleppc.org>). Any plant officially listed as being noxious or undesirable by any Federal Agency, any agency of the State of Florida or any local jurisdiction in which the project is being constructed shall not be used. Any such noxious or invasive plant or plant part found to be delivered in seed, sod or mulch will be removed by the Contractor at his expense and in accordance with the law. All materials shall meet plant quarantine and certification entry requirements of Florida Department of Agriculture & Consumer Services, Division of Plant Industry Rules.

981-2 Seed. The seed shall have been harvested from the previous year’s crop. All seed bags shall have a label attached stating the date of harvest, LOT number, percent purity, percent germination, noxious weed certification and date of test. Each of the

species or varieties of seed shall be furnished and delivered in separate labeled bags. During handling and storing, the seed shall be cared for in such a manner that it will be protected from damage by heat, moisture, rodents and other causes. All permanent and temporary turf seed shall have been tested within a period of six months of the date of planting. All permanent and temporary turf seed shall have a minimum percent of purity and germination as follows:

1. All Bahia seed shall have a minimum pure live seed content of 95% with a minimum germination of 80%.
2. Bermuda seed shall be of common variety with a minimum pure live seed content of 95% with a minimum germination of 85%.
3. Annual Type Ryegrass seed shall have a minimum pure live seed content of 95% with a minimum germination of 90%.

981-3 Sod.

981-3.1 Types: The types of sod to be used or re-placed on private lawns and in those areas along the street frontages adjacent to private lawns shall match the existing type including but not limited to St. Augustine-Floritam, Bermuda, Zoysia, and Bahia subject to the approval of the Engineer or Landscape Architect. St. Augustine-Floritam shall be the type of sod material utilized in all other area scheduled to receive sod within irrigated areas.

981-3.2 Dimensions: The sod shall be taken up in commercial-size rectangles, or rolls, preferably 12 inches by 24 inches or larger, except where 6 inch strip sodding is called for, or as rolled sod at least 12 inches in width and length consistent with the equipment and methods used to handle the rolls and place the sod. Sod shall be a minimum of 1-1/4 inches thick including a 3/4 inch thick layer of roots and topsoil. Reducing the width of rolled sod is not permitted after the sod has been taken up from the initial growing location. Any netting contained within the sod shall be certified by the manufacturer to be bio-degradable within a period of three months from installation.

981-3.3 Condition: The sod shall be sufficiently thick to secure a dense stand of live turf. The sod shall be live, fresh and uninjured, at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be planted within 48 hours after being cut and kept moist from the time it is cut until it is planted. No sod which has been cut for more than 48 hours may be used unless specifically authorized by the Engineer. A letter of certification from the turf Contractor as to when the sod was cut, and what type, shall be provided to the Engineer upon delivery of the sod to the job site. The source of the sod may be inspected and approved by the Engineer prior to being cut for use in the work.

981-4 Mulch: The mulch material shall be compost meeting the requirements of Section 987, hardwood barks, shavings or chips; or inorganic mulch materials as approved by the Engineer; or hydraulically applied wood fiber mulch or bonded fiber matrix (BFM) for the establishment of turf material.

- D. Immediately following sod laying, sod shall be rolled with a lawn roller customarily used for such purpose and then thoroughly watered.

- E. Maintenance: Sufficient watering shall be done by the Contractor to maintain adequate moisture for optimum development of the sodded areas. Sodded areas shall receive no less than 1.5 inches of water per week.
- F. Repairs to Lawn Areas Disturbed by Contractor's Operations: Lawn areas damaged by Contractor's operations shall be repaired at once by proper sod bed preparation, fertilization and re-sodding, in accordance with these specifications. Regardless of the condition of the lawn area (weed content etc.) prior to the Contractor working in the area, all repairs shall be made with sod.
- G. Sprinkler System Repairs: The Contractor shall make repairs to existing private and public sprinkler systems within three days of damaging sprinkler system.

3.02 TREES, GROUND COVER AND SHRUBS

- A. Excavation and Plant Holes: Plant hole excavations shall be roughly cylindrical in shape, with the side approximately vertical. Plants shall be centered in the hole. Bottoms of the holes shall be loosened at least six inches deeper than the required depth of excavation.
- B. Holes for balled and burlapped plants shall be large enough to allow at least eight inches of backfill around the earth ball. For root balls over 18 inches in diameter, this dimension shall be increased to 12 inches. Where excess material has been excavated from the plant hole, the excavated material shall be disposed of as and where directed by the Owner.
- C. Setting of Plants: When lowered into the hole, the plant shall rest on a prepared hole bottom such that the roots are level with, or slightly above, the level of their previous growth and so oriented such as to present the best appearance. The Contractor, when setting plants in holes, shall make allowances for any anticipated setting of plants.
- D. Palms of the sabal species may be set deeper than the depth of their original growth, provided that the specified clear trunk height is attained.
- E. The backfill shall be made with planting mixture and shall be firmly rodded and watered-in, so that no air pockets remain. The quantity of water applied immediately upon planting shall be sufficient to thoroughly moisten all of the backfilled earth. Plants shall be kept in a moistened condition for the duration of the Contract.
- F. Staking and Guying: Plants shall be staked in accordance with the following provisions:
 - 1. Small Trees: For trees and shrubs of less than one-inch caliper, the size of stakes and the method of tying shall be such as to rigidly support the staked plant against damage caused by wind action or other effects. Trees larger than one inch and smaller than one and one-half inch caliper shall be staked with a two-inch stake, set at least 24 inches in the ground and extending to the crown of the plant. The plant shall be firmly fastened to the stake with two strands of 14 gauge soft wire, enclosed in rubber hose, or other approved covering. The wire shall then be nailed or stapled to the stake to prevent slippage.
 - 2. Medium Trees: All trees, other than palm trees, larger than one and one-half inch caliper and smaller than two and one-half inch caliper shall be staked with two or more, two-inch by two-inch stakes, eight feet long, set two feet in the ground. The

tree shall be midway between the stakes and held firmly in place by two strands of 12-gauge wire, applied as specified above for single stakes. The wires shall be tightened and kept tight by twisting.

3. Large Trees: All trees, other than palm trees, larger than two and one-half inch caliper, shall be braced with three or more two-inch by four-inch wood braces, toenailed to cleats which are securely banded at two points to the palm, at a point at least six feet above the ground. The trunk shall be padded with five layers of burlap under the cleats. Braces shall be approximately equidistantly spaced and secured underground with two-inch by four-inch by 24-inch stake pads. In firm rock soils, Number 4 steel reinforcing rods or one-half inch pipe is acceptable.
 4. Palm Trees: Palm trees shall be braced with three or more two-inch by four-inch wood braces, toenailed to cleats which are securely banded at two points to the palm, at a point at least six feet above the ground. The trunk shall be padded with five layers of burlap under the cleats. Braces shall be approximately equidistantly spaced and secured underground with two-inch by four-inch by 24-inch stake pads. In firm rock soils, Number 4 steel reinforcing rods or one-half inch pipe is acceptable.
- G. Pruning: All broken/damaged roots shall be cut off smoothly, and the tops of all trees shall be pruned in a manner complying with standard horticultural practice. At the time pruning is completed, all remaining wood shall be alive. All aboveground cut surfaces of one inch or more in diameter, shall be treated with an approved commercial tree paint.
- H. Maintenance: Maintenance shall begin immediately after each plant is planted and shall continue until all work under this Contract has been completed and accepted by the Owner. Plants shall be watered, mulched, weeded, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected. Settled plants shall be reset to proper grade position, planting saucer restored and dead material removed. Guys shall be tightened and repaired.
- I. Defective work shall be corrected as soon as possible after it becomes apparent. Upon completion of planting, the Contractor shall remove excess soil and debris, and repair any damage to structures, etc., resulting from planting operations.

3.03 BRICK PAVERS

- A. Prior to removing brick pavers, Contractor shall take photographs of the driveway so that the pattern can be matched when reinstalling the pavers. The Contractor shall carefully stack the pavers near the house at a location acceptable to the homeowner. The pavers cannot be stacked near the road as to avoid accidental disposal on bulk pickup days. Pavers shall be properly installed on a compacted sand bed in accordance with the manufacturer's directions. The pavers shall be seal coated following installation.

3.04 SITE RESTORATION

- A. Site restoration on Private Property including but not limited to pavement, driveways, paved areas, sidewalks, shrubbery, trees, fences, and walls shall be completed as soon as possible within 30 days after being disturbed and to the satisfaction of the Engineer and Owner.

B. Sod Restoration on Private Property shall be completed within 3 calendar days.

- END OF SECTION -

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SECTION 02510

ASPHALTIC CONCRETE PAVEMENT

PART 1 -- GENERAL

1.01 SCOPE

- A. Construct asphaltic concrete pavement in accordance with the lines, grades and typical sections as indicated on the Drawings, specified herein and as required for a complete installation.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. DOT Specifications: The phrase, "DOT Specification", shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The DOT Specifications, are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.

DOT 160	Stabilizing
DOT 210	Reworking Limerock Base
DOT 300	Prime and Tack Coats
DOT 320	Hot Mix Asphalt - Plant Methods and Equipment
DOT 330	Hot Mix Asphalt - General Construction Requirements
DOT 334	Superpave Asphalt Concrete
DOT 337	Asphaltic Concrete Friction Courses
DOT 902	Fine Aggregate
DOT 911	Base and Stabilized Base Materials
DOT 916	Bituminous Materials

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Limerock Base: The limerock base shall consist of either one or two courses of Miami Oolite limerock conforming to DOT Sections 210 and 911.
- B. Prime Coat: The material used for the prime coat shall be cut-back Asphalt Grade RC-70 conforming to DOT Sections 300 and 916 for prime to be used on Miami Oolite formation limerock.
- C. Tack Coat: The material used for the tack coat shall be Emulsified Asphalt Grade RS-2 conforming to DOT Sections 300 and 916.

- D. Asphaltic Concrete: Within City of Boca Raton rights-of-way the materials and construction of the asphaltic concrete patch, wearing and surface courses shall be Type S-III Asphaltic Concrete conforming to DOT Sections 330, 334, 337 and 916. The composition and physical test properties for all mixes including Type S Asphalt Concrete are shown in Tables 331-1 and 331-2. This Section establishes Acceptance Procedures for materials and work performed under Sections 280, 290, 331, 332, 333, 335, and 337.

Within FDOT and Palm Beach County (PBC) rights-of-way the materials and construction of the asphaltic concrete patch, wearing and surface courses shall be Superpave.

- E. Where Type S Asphalt Concrete is specified in the Contract, if approved by the Engineer, the equivalent fine Type SP Asphalt Concrete mixture (Traffic Level C) meeting the requirements of Section 334 may be selected as an alternate at no additional cost to the City. The equivalent mixes are as follows:

Type S-I Type SP-12.5

Type S-II Type SP-19.0

Type S-III Type SP-9.5

Meet the requirements for plant and equipment specified in Section 320. Meet the general construction requirements specified in Section 330.

Table 331-1 Bituminous Concrete Mixtures (Gradation Design Range)								
Type	Total Aggregate Passing Sieves ¹							
	3/4 inch [19.0 mm]	1/2 inch [12.5 mm]	3/8 inch [9.5 mm]	No. 4 [4.75 mm]	No. 10 [2.0 mm]	No. 40 [425 µm]	No. 80 [180 µm]	No. 200 [75 µm]
S-I ⁵	100	88-98	75-93	47-75	31-53	19-35	7-21	2-6
S-II ²	83-98	71-87	62-78	47-63	33-49	19-35	9-18	2-6
S-III ⁵		100	88-98	60-90	40-70	20-45	10-30	2-6
Type II		100	90-100	80-100	55-90			2-12
Type III		100	80-100	65-100	40-75	20-45	10-30	2-10
SAHM		100						0-12
ABC-1		100						0-12
ABC-2		100			55-90			0-12
ABC-3 ³	70-100			30-70	20-60	10-40		2-10
FC-2 ⁴		100	85-100	10-40	4-12			2-5
FC-3 ⁵		100	88-98	60-90	40-70	20-45	10-30	2-6
¹ In inches [mm] or sieves [µm]. ² 100% passing 1 1/4 inch [31.5 mm] sieve and 94 to 100% passing 1 inch [25.0 mm] sieve. ³ 100% passing 1 1/2 inch [37.5 mm] sieve. ⁴ The Engineer may increase the design range for the No. 10 [2.00 mm] sieve for lightweight aggregates. ⁵ The Engineer may retain up to 1% on the maximum sieve size.								

Table 331-2 Non SI Units Marshall Design Properties For Bituminous Concrete Mixes						
Mix Type	Minimum Marshall Stability (lbs.)	Flow** (0.01 in.)	Minimum VMA (%)	Air Voids (%)	Minimum Effective Asphalt Content (%)	VFA Voids Filled with Asphalt (%)
S-I	1,500*	8-13	14.5	4-5	***	65-75
S-II	1,500*	8-13	13.5	4-5	***	65-75
S-III	1,500*	8-13	15.5	4-6	***	65-75
Type II	500-750	7-15	18	5-16	6.0	-
Type III	750-1,000	7-15	15	5-12	5.5	-
SAHM	300-500	7-15	15	5-16	6.0	-
ABC-1	500	7-15	15	5-16	6.0	-
ABC-2	750	7-15	15	5-14	5.5	-
ABC-3	1,000	8-13	14	4-7	***	65-78
FC-2	-	-	-	-	-	-
FC-3	1,500	8-13	15.5	4-6	***	65-75

*The minimum Marshall Stability for Type S mixes used on limited access facilities (Interstate, Turnpike, and Expressways) shall be 1,800 lbs.

**The maximum Flow value during production shall not exceed one point more than shown in the Table.

***The ratio of the percentage by weight of total aggregate passing the No. 200 sieve to the effective asphalt content expressed as a percentage by weight of total mix shall be in the range of 0.6 to 1.2.

Table 331-2 SI Units Marshall Design Properties For Bituminous Concrete Mixes						
Mix Type	Minimum Marshall Stability (kN)	Flow** (mm)	Minimum VMA (%)	Air Voids (%)	Minimum Effective Asphalt Content (%)	VFA Voids Filled with Asphalt (%)
S-I	6.7*	2.0-3.3	14.5	4-5	***	65-75
S-II	6.7*	2.0-3.3	13.5	4-5	***	65-75
S-III	6.7*	2.0-3.3	15.5	4-6	***	65-75
Type II	2.2-3.3	1.8-3.8	18	5-16	6.0	-
Type III	3.3-4.4	1.8-3.8	15	5-12	5.5	-
SAHM	1.3-2.2	1.8-3.8	15	5-16	6.0	-
ABC-1	2.2	1.8-3.8	15	5-16	6.0	-
ABC-2	3.3	1.8-3.8	15	5-14	5.5	-
ABC-3	4.4	2.0-3.3	14	4-7	***	65-78
FC-2	-	-	-	-	-	-
FC-3	6.7	2.0-3.3	15.5	4-6	***	65-75

*The minimum Marshall Stability for Type S mixes used on limited access facilities (Interstate, Turnpike, and Expressways) shall be 8.0 kN.

**The maximum Flow value during production shall not exceed 0.25 mm more than shown in the Table.

***The ratio of the percentage by weight of total aggregate passing the 75µm sieve to the effective asphalt content expressed as a percentage by weight of total mix shall be in the range of 0.6 to 1.2.

331-1.2 Layer Thicknesses:

331-1.2.1 Structural Layers: The allowable layer thicknesses for Type S Asphalt Concrete mixtures used in structural and overbuild applications is as follows:

Type S-III3/4 - 1 1/4 inches [20 – 30 mm]
Type S-I1 1/4 - 2 1/2 inches [30 – 60 mm]
Type S-II2 - 2 3/4 inches [50 – 70 mm]

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on Type S mixtures when used as a structural course:

Type S-III - Limited to the final (top) structural layer, one layer only.

Type S-I - May not be used in the first layer of courses over 3 1/2 inches [90 mm] thick, nor in the first layer of courses over 2 3/4 inches [70 mm] thick on limited access facilities.

Type S-II – May not be used in the final (top) structural layer.

331-1.2.2 Additional Requirements: The following requirements also apply to Type S Asphalt Concrete mixtures:

1. A minimum 1 1/2 inch [40 mm] initial lift is required over an Asphalt Rubber Membrane Interlayer (ARMI).

2. When construction includes the paving of adjacent shoulders (#5 feet [#1.5 m] wide), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless shown differently in the plans.

3. All overbuild layers shall be Type S asphalt concrete. Use the minimum and maximum layer thicknesses as specified in 331-1.2.1 unless shown differently in the plans. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2 inch [13 mm], and the maximum allowable thickness may be increased 1/2 inch [13 mm], unless shown differently in the plans. Other variations from these thicknesses must be approved by the Engineer.

331-2 Materials.

331-2.1 General Requirements: Meet the material requirements specified in Division III. Specific references are as follows:

Superpave PG Asphalt Binder or Recycling Agent916-1, 916-2
Mineral Filler917-1, 917-2
Coarse Aggregate, Stone, Slag or Crushed Gravel.....Section 901
Fine AggregateSection 902

Asphalt concrete mixes containing crushed gravel as coarse aggregate component must show no potential for stripping during laboratory testing for mix design verification.

Crushed Reclaimed Portland Cement Concrete Pavement may be used as a coarse aggregate or screenings component subject to meeting all applicable specifications.

331-2.2 Specific Requirements:

331-2.2.1 Condition of Aggregate: Use clean aggregate containing no deleterious substances. Do not use coarse or fine aggregate which contains more than 0.5% of phosphate.

331-2.2.2 Fine Aggregate and Mineral Filler: In laboratory tests, and for the purpose of proportioning the paving mixture, consider all material passing the No. 10 [2.00 mm] sieve and retained on the No. 200 [75 µm] sieve as fine aggregate, and the material passing the No. 200 [75 µm] sieve as mineral filler.

331-2.2.3 Screenings: Do not use any screenings in the combination of aggregates containing more than 15% of material passing the No. 200 [75 µm] sieve. When two screenings are blended to produce the screening component of the aggregate, one of such screenings may contain up to 18% of material passing the No. 200 [75 µm] sieve, as long as the combination of the two does not contain over 15% material passing the No. 200 [75 µm] sieve. Screenings may be washed to meet these requirements.

331-3 Permissible Variation for the Coarse Aggregate.

Size and uniformly grade or combine the aggregate or aggregates shipped to the job in such proportions that the resulting mixture meets the grading requirements of the mix design.

331-4 General Composition of Mixture.

331-4.1 General: Use a bituminous mixture composed of a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and bituminous material. Ensure that not more than 20% by weight of the total aggregate used is silica sand or local materials as defined in Section 902. Consider the silica sand and local materials contained in any RAP material, if used in the mix, in this limitation. Size, grade and combine the several aggregate fractions in such proportions that the resulting mixture meets the grading and physical properties of the verified mix design.

RAP meeting the requirements of 331-2.2.4 may be approved as a substitution for a portion of the combination of aggregates, subject to all applicable specification requirements being met.

331-4.2 Grading Requirements: In all cases, use a mix design within the design ranges specified in Table 331-1.

331-4.3 Mix Design:

331-4.3.1 General: Prior to the production of any asphalt paving mixture, submit a mix design and representative samples of all component materials to the Engineer at least two weeks before the scheduled start of production. The Engineer will verify the mix design before use. Send a copy of the proposed mix design to the Engineer at the same time. (Open-graded mixes will be designed by the Engineer.) Furnish the following information:

1. The specific project on which the mixture will be used.
2. The source and description of the materials to be used.
3. The gradation and approximate proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use.
4. A single percentage of the combined mineral aggregate passing each

specified sieve. Degradation of the aggregate due to processing (particularly No. 200 [75 µm]) should be accounted for and identified for the applicable sieves.

5. A single percentage of asphalt by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%. For structural mixes (S-I, S-II and S-III) establish the optimum asphalt content at a level corresponding to a minimum of 4.5% air voids. For FC-3 mixes, establish optimum asphalt content at a level corresponding to a minimum of 5.0% air voids.

6. A single temperature at which the mixture is intended to be discharged from the plant.

7. The laboratory density of the asphalt mixture for all mixes except Open-Graded Friction Courses.

8. Evidence that the completed mixture will meet all specified physical requirements.

9. The name of the individual responsible for the Quality Control of the mixture during production.

331-4.3.2 Revision of Mix Design: Submit all requests for revisions to approved mix designs, along with supporting documentation, in writing to the Engineer. In order to expedite the revision process, a verbal revision request or discussion of the possibility of a revision request may be made, but must be followed up with a written request. The verified mix design will remain in effect until a change is authorized by the Engineer. In no case will the effective date of the revision be established earlier than the date of the first communication with the Engineer regarding the revision.

Provide a new mix design for any change in source of aggregate.

331-4.3.3 Resistance to Plastic Flow: Include with the submitted mix design test data showing that the material as produced will meet the requirements specified in Table 331-2 when tested in accordance with FM 1-T 245. Further, determine the bulk specific gravity of the laboratory compacted bituminous mixture in accordance with FM 1-T 166.

Determine the percent of unfilled voids and the percent of aggregate voids filled with asphalt using the maximum specific gravity of the bituminous mixture and on the asphalt content of each group of specimens prepared from the same sample. Determine maximum specific gravity of the bituminous mixture by FM 1-T 209.

331-4.3.4 Revocation of Mix Design: The Engineer will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and the Engineer will no longer allow the use of the mix design.

331-4.4 Contractor's Quality Control:

331-4.4.1 Personnel: In accordance with the requirements of 331-5.2 provide the necessary quality control personnel. Ensure that the Quality Control Technician is certified by the Department and possesses a valid certificate of qualification. When it becomes evident to the Department that the Quality Control Technician cannot perform as required by the position, the Department will revoke the certification and require replacement with a certified technician.

331-4.4.2 Extraction Gradation Analysis: Sample the bituminous mixture at the plant in accordance with FM 1-T 168. Determine the percent bitumen content of the mixture in accordance with FM 5-563, and determine the percent passing the standard sieves in accordance with FM 1-T 030. In the event the calibration factor for the mix exceeds 0.50%,

conduct the extraction and gradation analysis in accordance with FM 5-544 and FM 5-545, respectively. Show all test results to the nearest 0.01. Carry all calculations to the nearest 0.001 and rounded to the nearest 0.01, in accordance with the Department's rules of rounding.

Run a minimum of one extraction gradation analysis of the mixture for each day's or part of a day's production and immediately following any change in the production process. Take the quality control sample of mixture for the extraction gradation analysis each day as soon as the plant operations have stabilized. Obtain the results in a timely manner (no later than the end of the day) so that adjustments can be made if necessary.

On initial use of a Type S or FC-3 mix design at a particular plant, as a minimum, run an additional extraction gradation analysis if more than 500 tons [450 metric tons] of mixture are produced on the first day of production.

Extraction gradation analysis will not be required on the days when mix production is less than 100 tons [90 metric tons]. However, when mix production is less than 100 tons [90 metric tons] per day on successive days, run the test when the accumulative tonnage on such days exceeds 100 tons [90 metric tons].

Use the target gradation and asphalt content as shown on the mix design. Any changes in target will require a change in the mix design in accordance with 331-4.3.2.

If the percentage of bitumen deviates from the optimum asphalt content by more than 0.55% or the percentage passing any sieve falls outside the limits shown in Table 331-3, make the necessary correction. If the results for two consecutive tests deviate from the optimum asphalt content by more than 0.55% or exceeds the limits as shown in Table 331-3 for any sieve, stop the plant operations until the problem has been corrected. In addition, if the results of two consecutive tests show an amount greater than 99.0% passing the 1/2 inch [12.5 mm] sieve for Type S-I, an amount greater than 99.0% passing the 3/4 inch [19.0 mm] sieve for Type S-II, or an amount greater than 99.0% passing the 3/8 inch [9.5 mm] sieve for Types S-III or FC-3, stop the plant operation until the problem has been corrected.

Maintain control charts showing the results of the extraction gradation analysis (bitumen content and sieve analysis).

Table 331-3	
<i>Tolerances for Quality Control Tests (Extraction Gradation Analysis)</i>	
<i>Sieve Size</i>	<i>Percent Passing</i>
1 inch [25.0 mm]	7
3/4 inch [19.0 mm]	7
1/2 inch [12.5 mm]	7
3/8 inch [9.5 mm]	7
No. 4 [4.75 mm]	7
No. 10 [2.00 mm]	5.5
No. 40* [*425 µm]	4.5
No. 80* [*180 µm]	3
No. 200 [75 µm]	2

*Does not apply to SAHM, ABC-1 or Type II.

331-4.4.3 Plant Calibration: At or before the start of mix production, perform a wash gradation on a set of hot bin samples for batch or continuous mix plants or belt cut for drum mix plants to verify calibration of the plant. When approved by the Engineer, extraction gradation

analysis of the mix may be used to verify calibration of the plant. This extraction gradation analysis may also be used to fulfill the quality control requirements for the first day's production.

331-4.4.4 Viscosity of Asphalt in Mixes Containing RAP: When RAP is a component material, the viscosity of the asphalt material in the bituminous mixture, determined by the Engineer in accordance with ASTM D 2171, shall be $6,000 \pm 2,000$ poises [600 ± 200 Pa·s]. This determination will be made on samples obtained by the Department on a random basis at a frequency of approximately one per 2,000 tons [1,800 metric tons] of mix.

If the viscosity determined by the Engineer is out of the specified range, adjust the binder formulation or blend of RAP in the mix to bring the viscosity within tolerance.

331-5.2 Quality Control by the Contractor: Provide and maintain a quality control system that provides reasonable assurance that all materials, products and completed construction submitted for acceptance meet Contract requirements. Develop and maintain a quality control system in conformance with the following requirements:

CONTRACTOR QUALITY CONTROL SYSTEM

I. SCOPE:

These Specifications establish minimum requirements and activities for a Contractor quality control system. These requirements pertain to the inspections and tests necessary to substantiate material and product conformance to Contract requirements and to all inspections and tests required by the Contract.

II. FUNCTIONS AND RESPONSIBILITIES:

1. The Contractor. Submit in writing the proposed Quality Control Plan for each asphalt plant for the Engineer's approval. Maintain the approved Quality Control Plan in effect for the plant to which it is assigned until the Engineer rejects it in writing. Include in the plan the sampling, testing, inspection and the anticipated frequencies of each to maintain process control. A recommended series of sampling, testing and inspecting activities are shown in Table 331-4.

<i>Table 331-4</i>
RECOMMENDATIONS FOR A CONTRACTOR QUALITY CONTROL PLAN

A. All Types of Plants

1. Stockpiles
 - a. Place materials in the correct stockpile.
 - b. Use good stockpiling techniques.
 - c. Inspect stockpiles for separation, contamination, segregation, etc.
2. Incoming Aggregate
 - a. Obtain gradations and bulk specific gravity (BSG) values from the aggregate supplier.
 - b. Determine gradation of all component materials.

- c. Compare gradations and BSG to mix design.
- 3. Cold Bins
 - a. Calibrate the cold gate/feeder belt settings.
 - b. Observe operation of cold feed for uniformity.
- 4. Dryer
 - a. Observe pyrometer for aggregate temperature control.
 - b. Observe efficiency of the burner.
- 5. Hot Bins
 - a. Determine gradation of aggregates in each bin.
 - b. Determine theoretical combined grading.
- 6. Bituminous Mixture
 - a. Determine asphalt content.
 - b. Determine mix gradation.
 - c. Check mix temperature.
 - d. Verify modifier addition.
- B. Batch Plants
 - 1. For batch weights, determine percent used and weight to be pulled from each bin to ensure compliance with the mix design.
 - 2. Check mixing time.
 - 3. Check operations of weigh bucket and scales.
- C. Continuous Mix Plant
 - 1. Determine gate calibration chart for each bin.
 - 2. Determine gate settings for each bin to ensure compliance with the mix design.
 - 3. Determine gallons [cubic meters] per revolution or gallons [cubic meters] per minute to ensure compliance with the mix design.
- D. Drum Mixer Plant
 - 1. Calibrate the cold feed and prepare a calibration chart for each cold gate.
 - 2. Develop information for the synchronization of the aggregate feed, reclaimed asphalt pavement (RAP) feed and the bituminous material feed.
 - 3. Calibrate the weigh bridge on the changing conveyor.

The activities shown in Table 331-4 are the normal activities necessary to control the production of bituminous concrete at an acceptable quality level. The Department recognizes, however, that depending on the type of process or materials, some of the activities listed may not be necessary and, in other cases, additional activities may be required. The frequency of these activities will also vary with the process and the materials. When the process varies from the defined process average and variability targets, increase the frequency of these activities until the proper conditions are restored. Take one sample and test for every 1,000 tons [900 metric tons] of incoming aggregate (including RAP) as it is stockpiled. Test RAP material for

extracted gradation and asphalt content.

Plot and keep up-to-date control charts for all quality control sampling and testing. Provide control charts for the following:

- a. gradation of incoming aggregates
- b. gradation and asphalt content of RAP
- c. combined gradations of hot bins
- d. extracted asphalt content
- e. mix gradation
- f. gradation of cold feed (drum mixers)

Post all current control charts in the asphalt lab where they can be seen.

Formulate all design mixes with the exception of open-graded friction mixes (FC-2 and FC-5). Submit design mixes to the Engineer for verification prior to their use. Provide process control of all materials during handling, blending, mixing and placing operations.

III. QUALITY CONTROL SYSTEM:

1. General Requirements. Furnish and maintain a quality control system that provides reasonable assurance that all materials and products submitted to the Engineer for acceptance meet the Contract requirements. Perform, or have performed, the inspection and tests required to substantiate product conformance to Contract requirements, and also perform, or have performed, all inspections and tests otherwise required by the Contract. Keep a quality control technician, who has been certified by the Department as a Qualified Asphalt Plant Technician (Plant Level II), available at the asphalt plant at all times when producing asphalt mix for the Department. Place a person in responsible charge of the paving operations who is qualified by the Department as a Qualified Asphalt Paving Technician (Paving Level II). Document the quality control procedures, inspection and tests, and make that information available for review by the Engineer throughout the life of the Contract.

2. Documentation. Maintain adequate records of all inspections and tests. Record the nature and number of tests made, the number and type of deficiencies found, the quantities approved and rejected, and the nature of corrective action taken, as appropriate. The Department may review and approve all documentation procedures prior to the start of the work. The Department will take ownership of all charts and records documenting the Contractor's quality control tests and inspections upon completion of the work.

3. Charts and Forms. Record all conforming and nonconforming inspections and test results on approved forms and charts, and keep them up to date and complete and make them available at all times to the Engineer during the performance of the work. Prepare charts of test properties for the various materials and mixtures on forms that are in accordance with the applicable requirements of the Department. The Engineer will furnish a copy of each applicable chart and form. Provide a supply of the charts and forms from the copy furnished. Obtain the Engineer's approval of non-standard forms and charts prior to using them.

4. Corrective Actions. Take prompt action to correct any errors, equipment malfunctions, process changes or other problems that result or could result in the submission of materials, products or completed construction that do not meet the requirements of these Specifications. When it becomes evident to the Department that the Contractor is not controlling his process and is making no effort to take corrective actions, the Department will require the Contractor to cease plant operations until such time as the Contractor can demonstrate that he can and is willing to control the process.

5. Laboratories with Measuring and Testing Equipment. Furnish a fully equipped asphalt laboratory (permanent or portable) at the production site, and meeting the following requirements:

- a. Area - Provide an effective working area for the laboratory that is a minimum of 180 ft² [17 m²]. This area does not include the space for desks, chairs and file cabinets.
- b. Lighting - Provide lighting in the lab adequate to illuminate all areas of work.
- c. Temperature Control - Equip the lab with heating and air conditioning units that provide a satisfactory working environment.
- d. Ventilation - Equip the lab with fume hoods and exhaust fans that will remove all hazardous fumes from within the laboratory in accordance with OSHA requirements.
- e. Equipment and Supplies - Furnish the lab with the necessary sampling and testing equipment, and supplies, for performing Contractor quality control and Department acceptance sampling and testing. A detailed list of equipment and supplies required for each test is included in the Field Sampling and Testing Manual.

When running plants at a high production rate, furnish additional testing equipment as necessary to allow the completion of the Contractor's quality control tests and the Department's Acceptance tests within the specified time frame.

6. Sampling and Testing. Use the sampling and testing methods and procedures that the Department provides to determine quality conformance of the materials and products. The Department will use these same methods and procedures for its acceptance tests. Include the sampling for other material characteristics on a random basis and the plotting of the test results on control charts in the Quality Control Plan.

7. Alternative Procedures. The Contractor may use alternative sampling methods, procedures and inspection equipment when such procedures and equipment provide, as a minimum, the quality assurance required by the Contract Documents. Prior to applying such alternative procedures, describe them in a written proposal and demonstrate for the Engineer's approval that their effectiveness is equal to or better than the Contract requirements. In case of dispute as to whether certain proposed procedures provide equal assurance, use the procedures stipulated by the Contract Documents.

8. Nonconforming Materials. Establish and maintain an effective and positive system for controlling nonconforming materials, including procedures for identification, isolation and disposition. Reclaim or rework nonconforming materials in accordance with procedures acceptable to the Engineer. Discuss the details of this system at the preconstruction conference, and make these details a part of the record of the conference.

9. Department Inspection at Subcontractor or Supplier Facilities. The Department reserves the right to inspect materials not manufactured within the Contractor's facility. The Department's inspection does not constitute acceptance and does not, in any way, replace the Contractor's inspection or otherwise relieve the Contractor of his responsibility to furnish an acceptable material or product. When the Department inspects the subcontractor's or supplier's product, such inspection does not replace the Contractor's responsibility to inspect such subcontractor's or supplier's product.

Inspect subcontracted or purchased materials when received, as necessary, to ensure conformance to Contract requirements. Report to the Engineer any nonconformance found on Department source-inspected material, and require the supplier to take necessary corrective action.

PART 3 -- EXECUTION

3.01 PAVEMENT REMOVAL AND REPLACEMENT

- A. General: All existing utility castings, including valves boxes, junction boxes, manholes, handholes, pull boxes, inlets and similar structures in the areas of trench restoration and pavement replacement shall be adjusted by the CONTRACTOR to bring them flush with the surface of the finished work, at no additional cost to the OWNER. Includes all necessary saw-cutting and preparing roadway adjacent to ornate residential driveways. Minimum of one lane of traffic flow in each direction to be maintained during operation. Milling operation cannot progress more than 2,000 feet beyond the pavement restoration operation. Also includes disposal without stockpiling on site.
- B. The CONTRACTOR shall be responsible for the protection from damage from his construction operations, all pavements, including all limerock base courses and asphaltic surface courses, within the work area. Any base course or surface course, damaged as a result of the CONTRACTOR's operation, shall be restored in accordance with the applicable requirements of these Contract Documents, to the satisfaction of the OWNER, and to the satisfaction of the governing authority having jurisdiction over the work area at no additional cost to the OWNER. In order to protect himself from being held liable for any existing damaged pavement, including detour routes, the CONTRACTOR is advised to notify, in writing, the authority having jurisdiction over the street where such defective pavement exists prior to proceeding with any work in the vicinity. A copy of all such notices shall be forwarded to the OWNER.
- C. Wherever the line of the nominal repaving for trenches extends to within two feet of the edge of the existing paving, the CONTRACTOR shall repave to this edge.
- D. Permanent pavement repair shall be in accordance with the details shown on the Drawings, with edges straight and parallel and patches rectangular in plan. Any paving replacement required beyond the limits shown in the details, and as called for in the Specifications, shall be at the CONTRACTOR's expense.
- E. Pavement markings removed or obliterated by the CONTRACTOR's operations shall be promptly replaced in kind by him at his expense, to the satisfaction of the authority having jurisdiction over the work area.
- F. Asphaltic concrete mixtures shall be obtained only from plants which comply with the requirements of DOT Section 320 as applicable, using materials specified herein, and producing the specified mixture. General construction requirements for all hot bituminous mixtures specified herein shall conform to DOT Section 330, as applicable.
- G. No mixture shall be spread when the air temperature is less than 40 degrees F, nor when the spreading cannot be finished and compacted during daylight hours.
- H. Any mixture caught in transit by a sudden rain may be laid at the CONTRACTOR's risk, if the base is in suitable condition. Under no circumstances shall asphalt material be placed while rain is falling or when there is water on the area to be covered.

- I. Traffic Loops: Traffic loops removed or damaged during construction, or rendered inoperative because of cutting the traffic loop home run, shall be replaced. New traffic loops shall be provided; splicing will not be allowed.
- J. Temporary Paving: Prior to commencing excavation, the asphalt surface shall be sawcut within the limits of the allowable trench width. Temporary paving will be required along the entire route where the original paved surface is removed. Temporary paving shall be placed as soon as possible after the trench has been backfilled and compacted per the Specifications. The trench should be backfilled and compacted up to a level 1 inch below the existing pavement surface, and a temporary, cold mixed sand/asphalt pavement shall be constructed up to the level of the existing pavement surface. The liquid asphalt shall be Grade RC-70, conforming to the requirements of DOT Section 916-2. The sand shall conform to the requirements of DOT Section 902 for fine aggregate.
- K. The cold mix is to be installed on a continual basis, not crossing any intersections. Backfill, compaction and temporary paving is to keep pace with the pipe installation.
- L. The temporary pavement shall be maintained by the CONTRACTOR in a condition satisfactory to the OWNER until its removal. Removal shall include any surplus backfill material. The removed temporary pavement and surplus backfill material shall be properly disposed of by the CONTRACTOR, at his expense.
- M. No payment shall be made for temporary paving work. The cost for such work shall be considered incidental to pipeline construction and included in the bid prices for the respective pipe payment items.
- N. Sand seal on the limerock base course will not be permitted in lieu of temporary paving.

3.02 PAVEMENT REPAIR

- A. All damage to pavement as a result of work under this Contract shall be repaired in a manner satisfactory to the OWNER and at no additional cost to the OWNER. The repair shall include the preparation of the subgrade, the placing and compacting of the limerock base, the priming of the base, the placing and maintaining of the surface treatment, all as specified herein.
- B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage. The edge of the pavement to be left in place shall be cut to a true edge with a saw or other method acceptable to the OWNER so as to provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities.
- C. When a pipeline is installed in the middle of the road, or the trench is partially on two road lanes, pavement shall be milled and asphalt shall be placed for the width of the two traffic lanes that have been disturbed.

3.03 FINAL PAVING

- A. General: The CONTRACTOR shall remove the temporary pavement and any surplus backfill and shall replace it with the specified compacted limerock base course to the extent required by the Contract Documents.

- B. When a pipeline is installed in a lane parallel to the roadway, the lane shall be milled and asphalt shall be placed for the width of one full traffic lane.
- C. When a pipeline is installed parallel to the road and the edge of the asphalt is damaged, a minimum of two feet of asphalt shall be removed and replaced.
- D. All paving work shall be completed according to the Contract Documents and DOT Standards. Where the two are not in agreement, the more stringent requirement shall prevail.
- E. Subgrade: The backfill previously placed and compacted shall be excavated to the required depth below the existing road surface, and the existing paving shall be cut back to a width of one full lane, using an abrasive disc saw to trim the edges to straight and true lines. The subbase material shall be stabilized to have a minimum LBR of 40. The minimum acceptable density at any location in the top twelve inches of the subgrade shall be 98 % of maximum dry density as determined by AASHTO T-180.
- F. Limerock Base: The limerock base shall be constructed in accordance with DOT Section 210, to the thickness and width indicated on the Drawings. The limerock base shall have a minimum LBR of 100. The maximum depth of each lift shall be 6 inches. Pavement base shall be constructed in minimum two lifts.
- G. After spreading of the base material is completed, the entire surface shall be scarified and shaped so as to produce the exact grade and cross section after compaction. For double course base, this scarifying shall extend to a depth sufficient to penetrate slightly the surface of the first course.
- H. When the material does not have the proper moisture content to ensure the required density, wetting or drying shall be required. If the material is deficient in moisture, water will be added and uniformly mixed in by disking the base course to its full depth. If the material contains an excess of moisture, it shall be allowed to dry before being compacted. Wetting and drying operations shall involve manipulation of the entire width and depth of the base as a unit. As soon as proper conditions of moisture are attained, the material shall be compacted to an average density not less than 98 percent maximum density as determined in more than one course, the density shall be obtained in each lift of the base.
- I. During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density determinations on the finished base.
- J. Unless otherwise directed by the OWNER, the surface shall be "hand-planed" with a blade grader immediately prior to the application of the prime coat to remove the thin glaze or cemented surface and to allow free penetration of the prime material. The materials planed from the base shall be removed from the base area.
- K. If cracks or checks appear in the base, either before or after priming, which in the opinion of the OWNER, would impair the structural efficiency of the base course, the CONTRACTOR shall remove such cracks or checks by rescarifying, reshaping, adding base material where necessary and recompacting, at no additional cost to the OWNER.

- L. Mixing Base and Subgrade: If at any time the subgrade material shall become mixed with the base course material, the CONTRACTOR shall, reshape and compact the subgrade and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.
- M. Prime Coat: After the limerock base course has been properly prepared and is clean, dry and ready to receive the wearing surface, a prime coat shall be uniformly applied at a rate of 0.15 gallon per square yard, immediately followed by the asphaltic concrete. The work shall be performed in accordance with Section 300 of the DOT Specifications. The prime coat shall be applied to the entire limerock base course uniformly, and shall thoroughly coat all surfaces. Care shall be taken to apply the prime coat and bond the edges of surrounding pavement. The prime coat shall not advance ahead of the paving by more than 300 feet in business or residential areas, unless otherwise authorized by the OWNER. All work associated with prime coats shall comply with DOT Section 300.
- N. Permanent Asphaltic Concrete Patch: The spreading, compacting and jointing of the permanent asphaltic concrete patch shall be in accordance with DOT Sections 330 and 334 to the thickness indicated on the Drawings.
- O. Where the width of the repair permits, the material shall be placed by means of an acceptable mechanical spreader and finisher. The mixture shall be compacted to true grade and cross section by means of a tandem roller weighing not less than eight tons. The compacted asphaltic concrete mixture shall not be, in any case, less than one inch in thickness. Rolling shall proceed as closely behind the spreader as possible, and all material shall be completely compacted the same day it is placed.
- P. Tack Coat: After the asphaltic concrete patch has been properly prepared and is clean, dry and ready to receive the asphaltic concrete overlay, a tack coat shall be uniformly applied at a rate of 0.10 gallon per square yard, immediately followed by the asphaltic concrete overlay. The tack coat shall be applied to the entire asphaltic concrete patch uniformly, and shall thoroughly coat all surfaces. Care shall be taken to apply the tack coat and bond the edges of surrounding pavement. The tack coat shall not advance ahead of the paving by more than 300 feet in business or residential areas, unless otherwise authorized by the OWNER. All work associated with tack coats shall comply with DOT Section 300.

- END OF SECTION -

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SECTION 02526

CONCRETE PAVEMENT, CURB, AND SIDEWALKS

PART 1 -- GENERAL

1.01 SCOPE

- A. Damaged concrete pavement, curbs and sidewalks, and other improvements shall be reconstructed as new to existing lines and grades and dimensions. Where pavement, curbs, and sidewalks are partially damaged on private property, the CONTRACTOR shall fully reconstruct the structure in-kind to provide an entirely new structure.

1.02 SUBMITTALS

- A. Shop drawings for reinforcing, joint material and mix designs shall be submitted for review in accordance with the Section entitled "Submittals".

PART 2 -- PRODUCTS

2.01 CONCRETE

- A. Concrete shall be Class B as specified in Division 3, unless noted or specified otherwise.

2.02 REINFORCING AND WELDED WIRE FABRIC

- A. Joint reinforcing and welded wire fabric shall conform to the requirements of Division 3.

2.03 PREFORMED JOINT FILLER

- A. Preformed joint filler shall be sponge rubber or cork and conform to the requirements of AASHTO Designated M153, Type I or II.

2.04 CURING COMPOUND

- A. Curing Compound shall conform to the requirements of AASHTO M148, Type I.

PART 3 -- EXECUTION

3.01 SUBGRADE CONDITION

- A. The finished subgrade shall be maintained in a smooth, compact condition and any areas which are disturbed prior to placing of the concrete shall be restored at no additional cost to the OWNER.
- B. The subgrade shall be moist at the time the concrete is placed. Water shall be uniformly applied ahead of the paving operations as directed by the OWNER. If the CONTRACTOR does not maintain the subgrade in the required moist condition, a polyethylene sheet vapor barrier will be required between the subgrade and the concrete.
- C. The subgrade shall be accurately trimmed to the required elevation with a 1/4-inch

tolerance. High areas shall be trimmed to proper elevation. Low areas may be filled with suitable material and compacted to the specified density or filled with concrete integrally with the placing of the pavement.

- D. Boulders, rocks or obstructions larger than 1-inch diameter shall be removed to a minimum depth of 6 inches below finished subgrade. The subgrade shall be compacted at optimum moisture content to 98 percent of maximum dry density in accordance with ASTM D1557 method D.

3.02 SETTING FORMS

- A. The forms shall be accurately set to line and grade and such that they rest firmly, throughout their entire length upon the compacted subgrade surface. Forms shall be joined neatly and tightly and braced to test the pressure of the concrete and the finishing operations. The alignment and grade of all forms shall be approved before and immediately prior to the placing of concrete.

3.03 MIXING CONCRETE

- A. Concrete shall be mixed in accordance with Division 3.

3.04 PLACING CONCRETE

- A. The concrete shall be distributed on the subgrade to such depth, that, when it is consolidated and finished, the slab thickness required by the Drawings will be obtained at all points and the surface will at no point be below the grade specified for the finished surface, after application of the allowable tolerance. The concrete shall be deposited on the subgrade in a manner which will require as little re-handling as possible.
- B. Fabric reinforcement shall be placed at mid slab depth, and the fabric shall be maintained at this location during the placing and finishing operations.
- C. Concrete shall be thoroughly consolidated against and along the faces of all forms, by means of hand-operated, spud-type vibrators. Vibration at any one location shall not continue so long as to produce puddling or the accumulation of excessive grout on the surface. In no case shall the vibrator be operated longer than 15 seconds in any one location.

3.05 STRIKING-OFF, CONSOLIDATING AND FINISHING CONCRETE

- A. Immediately after the placing, the concrete shall be struck off, consolidated and finished, to produce a finished pavement conforming to the cross section, width and surface sequence of operations shall be as follows: strike-off; vibratory consolidation; screening; floating; removal of laitance; straight edging; and final surface finish.

3.06 STRAIGHTEDGING AND SURFACE CORRECTIONS

- A. After floating has been completed and the excess water removed, but while the concrete is still in a plastic state, the surface of the concrete shall be tested for trueness with an accurate 10-foot straightedge. The straightedge shall be furnished by the CONTRACTOR. The straightedge shall be held in successive positions parallel to the road center line, in contact with the surface, and the whole area tested from one side of the slab to the other

as necessary. Any depressions shall be immediately filled with freshly mixed concrete and struck-off; consolidated and refinished. High areas shall be cut down and refinished. Straightedge testing and surface correction shall continue until the entire surface appears to conform to the required grade and cross section.

3.07 FINAL FINISH

- A. As soon as the water sheen has disappeared from the surface of the pavement and just before the concrete becomes non-plastic, a light broom finish shall be given to the surface.

3.08 EDGING

- A. After the final finish has been applied, but before the concrete has become non-plastic, the edges of the pavement along each side of the strip being placed, on each side of construction joints and along any structure extending into the pavement, shall be carefully rounded to a 1/4-inch radius except as otherwise indicated. A well-defined and continuous radius shall be produced and a smoother, dense mortar finish obtained. All concrete shall be completely removed from the top of the joint filler.
- B. All joints shall be checked with a straightedge before the concrete has become non-plastic and, if one side of the joint is higher than the other or the entire joint is higher or lower than the adjacent slabs, corrections shall be made as necessary.

3.09 JOINTS

- A. Construction Joints: Construction joints shall be located as shown on the Drawings.
- B. Expansion Joints Around Structures: Expansion joints shall be formed by placing pre-molded expansion joint material about all structures and features projecting through, into or against the pavement. Unless otherwise indicated, such joints shall be 1/2 inch in width. Expansion joints shall be sealed with a joint sealer. Sealant application procedures shall be as recommended by the manufacturer.
- C. Transverse Expansion Joints: Open type transverse expansion joints shall be provided at all sidewalk returns and at 50 feet intervals. Open type joints shall be formed by staking a 1/4-inch-thick metal bulkhead in place and placing concrete on both sides. After the concrete has set sufficiently to preserve the width and shape of the joint, the bulkhead shall be removed. After the sidewalk has been finished over the joint, the slot shall be opened and edged with a tool having a 1/2-inch radius. Transverse expansion joints shall be cleaned and filled with joint filler strips 1/4-inch-thick conforming to the requirements of AASHTO M-153 and sealed with a joint sealer. Sealant application procedures shall be as recommended by the manufacturer.
- D. Scored Joints: Scored joints shall be either formed or sawed at 5-foot intervals and shall extend to a depth of at least one fourth of the sidewalk slab thickness.

3.10 CURING

- A. After the finishing operations have been completed and as soon as the concrete has hardened sufficiently that marring of the surface will not occur, the entire surface and the edges of the newly placed concrete shall be covered and cured with membrane curing compound.

- B. Curing compound shall be uniformly applied to the surfaces to be cured, in a single coat, continuous film, at the rate of one gallon to not more than 200 square feet, by a mechanical sprayer.
- C. Curing compound shall not be applied during periods of rainfall. Curing compound shall not be applied to the inside faces of joints to be sealed. Should the film become damaged from any cause within the required curing period, the damaged portions shall be repaired immediately with additional compound. Upon removal of side forms the sides of the slabs exposed shall immediately be coated to provide a curing treatment equal to that provided for the surface.

3.11 SIDEWALK CONSTRUCTION

- A. The CONTRACTOR shall furnish a template and shall thoroughly check the subgrade prior to depositing concrete. Sidewalks shall be given a light broom finish.

3.12 CURBS

- A. Curbs shall be constructed in uniform sections ten feet in length except where shorter sections are necessary for closures or arcs. The sections shall be separated by sheet metal templates set perpendicular to the face and tip of the curve and not less than 2 inches longer than the depth of the curb. The templates shall be held firmly during the placing of the concrete and shall be allowed to remain in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place.
- B. After the concrete has sufficiently set for a minimum of 12 hours, the CONTRACTOR shall remove the forms and backfill the spaces on each side. The earth shall be compacted in satisfactory manner without damage to the concrete work. Minor defects shall be filled with a mortar composed of one-part portland cement and two parts fine aggregate.

3.13 PAVEMENT, CURB AND SIDEWALK REPAIR

- A. All damage to pavement, curb or sidewalk as a result of work under this Contract shall be repaired in a manner satisfactory to the OWNER and at no additional cost to the OWNER. The repair shall include all work as specified herein.
- B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage. The edge of the pavement curb or sidewalk to be left in place shall be cut to a true edge with a saw or other approved method so as to provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities.

3.14 FALSEWORK

- A. Falsework shall be stored at the contractor's staging area at all times when not in use. The Contractor shall maintain control of the site and at the completion of each day remove any unused falsework and equipment. After the herein stated curing times, falsework is to be removed in its entirety from the project site and no remnants shall be left. The work shall be kept neat and the site kept tidy to the Owner's satisfaction.

- END OF SECTION -

SECTION 02580

PAVEMENT MARKING AND SIGNS

PART 1 -- GENERAL

1.01 SCOPE

- A. This Section consists of reflective pavement markers, traffic stripes and markings and traffic signs as specified herein, and as required for a complete installation.

1.02 QUALITY CONTROL

- A. The phrase "DOT Specifications" shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition. The DOT Specifications, are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.

1.03 CERTIFICATION

- A. The CONTRACTOR shall furnish the manufacturer's certification that all signs furnished conform to these specifications and shall replace or repair at his expense all signs that fail to meet this requirement.

PART 2 -- PRODUCTS

2.01 PAVEMENT MARKING

- A. CONTRACTOR shall replace any existing reflective pavement markers, traffic stripes and markings damaged during construction.
- B. Paint for traffic stripes and markings shall be in conformance with DOT specification "Thermoplastic Pavement Markings" 711, latest edition. The colors of the paint shall be yellow or white as existed before the repair.
- C. Reflective pavement markers shall be in conformance with DOT specification Section 706-2, latest edition.

2.02 TRAFFIC SIGNS

- A. General: CONTRACTOR shall replace signs damaged during construction per Manual on Uniform Traffic Control Devices (MUTCD) and Florida Department of Transportation (FDOT) Standard Plans Index 700. Traffic regulating signs shall conform to the colors, dimensions and requirements of the MUTCD and FDOT.
- B. Sign Panels and Support Members: Sign panels and support members shall conform to Aluminum Association Alloy 6061-T6.

- C. Bolts: Bolts shall conform to Aluminum Association Alloy 2024-T4 with an anodic coating 0.0002-inches thick minimum and chromate sealed.
- D. Nuts: Nuts shall conform to Aluminum Association Alloy 6269-T9.
- E. Reflective Sheeting: Reflective Prismatic (High Intensity) sheeting shall conform to FDOT standards.
- F. Construction Warning Signs: The CONTRACTOR shall install traffic and warning signs during construction in accordance with OSHA, DOT and County requirements.

PART 3 -- EXECUTION

3.01 PAVEMENT MARKING

- A. The surface which is to be painted shall be cleaned, by compressed air or other effective means, immediately before the start of painting, and shall be clean and dry when the paint is applied. Any vegetation or soil shall be removed from the pavement before edge striping is begun.
- B. The traffic stripe shall be of the specified width, with clean, true edges and without sharp breaks in the alignment. A uniform coating of paint shall be obtained and the finished stripe shall contain no light spots or paint skips. Any stripes which do not have a uniform, satisfactory appearance, both day and night, shall be corrected.
- C. All newly painted stripes, including edge stripes, shall be protected until the paint is sufficiently dry to permit vehicles to cross the stripe without damage from the tires. While the center line stripes are being painted, all traffic shall be routed away from the painting operations and the newly painted stripe. When necessary, a pilot car shall be used to protect the painting operations from traffic interference.
- D. Any portions of the stripes damaged during construction shall be repainted at the CONTRACTOR's expense.
- E. Thermoplastic Traffic Stripes and Markings: Thermoplastic pavement markings, including stripes, pavement messages, stop bars, directional arrows, reflective pavement markers and other miscellaneous items, will be replaced as existed before the repair was made. Thermoplastic pavement markings may be placed 18 days after final asphalt lift. The thermoplastic compound shall be as specified in Section 711 of the DOT Specifications, latest edition. The thermoplastic compound shall be extruded or sprayed onto the pavement surface in a molten state by mechanical means, with surface application of glass spheres, when required, and upon cooling to ambient pavement temperature shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation.
- F. The portion of the pavement surface or thermoplastic marking to which the marker is attached by the adhesive shall be cleaned of dirt, curing compound, grease, oil, moisture, loose or unsound pavement and any other material which would adversely affect the adhesive. Reflective markers shall be installed in such a manner that the

reflective face of the marker is perpendicular to a line parallel to the roadway centerline. No markers shall be installed over longitudinal or transverse joints of the pavement surface. The adhesive shall be spread on the bonding surface (not the marker) so that 100 percent of the bonding area of the marker will be covered. The adhesive application shall be of sufficient thickness so that when the marker is pressed into the adhesive, excess adhesive shall be forced out around the entire perimeter of the marker. All excessive adhesive shall be removed from in front of the reflective faces. If any adhesive or foreign matter adheres to the reflective face of the marker, the marker shall be replaced. The OWNER shall determine the minimum time necessary to cure the adhesive for sufficient set to bear traffic.

- G. Reflective pavement markings shall be placed at locations of fire hydrants and watermain valves as required by City standards.

3.02 PAINTING TRAFFIC STRIPES

- A. All areas having traffic stripes prior to paving shall be repainted. Temporary traffic painting shall be applied immediately after asphalt pavement has been placed. Permanent traffic painting may be applied only after the proper curing time for the asphalt. Painting traffic stripes (temporary and permanent) shall meet the requirements of Section 710 of the Standard Specifications, latest edition.

3.03 INSTALLATION OF RAISED REFLECTIVE PAVEMENT MARKERS

- A. All areas having raised reflective pavement markers prior to paving shall have those markers replaced. Temporary pavement markers shall be applied immediately after asphalt pavement has been placed. Permanent pavement markers may be applied only after the proper curing time for the asphalt. Pavement markers and adhesive (temporary and permanent) shall meet the requirements of Section 706 of the Standard Specifications, latest edition.
- B. Spacing: As shown in the Roadway and Traffic Design Standards for Design, Construction, Maintenance and Utility operations on the State Highway System by the State of Florida, Department of Transportation, current edition.

3.04 SIGN FABRICATION

- A. Preparation of sign blanks and fabrication of reflectorized faces shall conform to the applicable requirements of DOT Section 700.

3.05 INSTALLATION

- A. Sign and supports shall be erected in conformance to DOT requirements and as specified herein.
- B. All damaged signs and reflective pavement markers and traffic stripes and markings shall be replaced in conformance with this Section and DOT requirements, latest edition.

- END OF SECTION -

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SECTION 02605
PRECAST CONCRETE MANHOLES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDES

- A. Furnish all labor, materials and equipment required and install precast gravity sewer structure and appurtenances as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

- A. Submit to the ENGINEER, in accordance with Section 01300 – Submittals, shop drawings, product data. Materials of construction and details of installation. Submittals shall include at least the following:
 - 1. Base Sections, riser sections, eccentric and concentric conical top sections, flat slab tops, grade rings.
 - 2. Pipe connection details.
 - 3. Ring and cover.
 - 4. Sectional plans and elevations showing dimensions and reinforcing steel placement.
 - 5. Structural calculations including assumptions.
 - 6. Concrete design mix.
 - 7. Manhole liner information.
 - 8. Concrete cylinder test reports from an approved testing laboratory certifying conformance with this Section.
 - 9. All materials shall be per CITY Approved Utility Product List.

1.03 QUALITY ASSURANCE

- A. All material shall be new and unused.
- B. Materials' quality, manufacturing process and finished sections are subject to inspection and approval by the ENGINEER and OWNER. Inspection may be made at place of manufacture, at work site following delivery, or both.

- C. Materials shall be rejected for failure to meet any requirements specified herein. Rejection may occur at place of manufacture, at work site, or following installation. Mark for identification rejected materials and remove from the site immediately. Rejected materials shall be replaced at no additional cost to the OWNER.
- D. Repair minor damage to precast concrete sections by approved method, if repair is authorized by the ENGINEER and/or the OWNER.

PART 2 - PRODUCTS

2.01 PRECAST CONCRETE STRUCTURES

- A. Refer to FDOT standards for inside dimensions, headroom requirements and minimum thickness of concrete.
- B. Structural design calculations and drawings shall be prepared and sealed by a professional engineer registered in Florida.
- C. Manufacturer:
 - 1. Manhole structure shall be manufactured by U.S. Precast Corporation, or approved equal.
- D. Design criteria:
 - 1. Precast Concrete
 - a. Minimum compressive strength shall be 5,000 psi at 28 days.
 - b. Maximum water-to-cement ratio shall be 0.40 by weight.
 - c. Minimum cement content shall be 600 pounds of cement per cubic yard of concrete.
 - d. Reinforced Concrete Bases
 - 1. Pre-cast reinforced concrete bases shall normally be used in lieu of cast-in-place concrete bases.
 - 2. The base, for either type, shall extend six (6) inches beyond the outside face of the manhole wall and shall be at least eight (8) inches thick.
 - 3. Bottom section walls shall be monolithically cast with the base section to a minimum height of three feet (36") from the bottom of the base slab.

- 4. Pre-poured flow lines in base are generally not accepted and will be approved only after inspection of a completed example.
- e. Precast Manholes shall be cast with Xypex C-500 NF Red Admixture dosed at a rate of 2% by weight of cementitious content and per manufacturer's instructions.

2. Manufactured Products

- a. Conform to all FDOT standards, ACI 318 and ACI 350R.
- b. Analyze walls and slabs using accepted engineering principals.
- c. When "fy" exceeds 40,000 psi, "z" (ACI 318) shall not exceed 95,000 psi. "fs" shall not exceed 50 percent of "fy."
- d. Design products to support their own weight, weight of soil at 120 pcf, and a live load equal to AASHTO HS-20 applied to top slab.
- e. Cast base slab and walls together to form a monolithic base section.
- f. Design structure walls for a water pressure of 90 psf. Originate pressure diagram at finished ground surface. Include lateral pressure from vehicles in accordance with AASHTO.
- g. Consider discontinuities in structure produced by openings and joints. Provide additional reinforcing around openings. Frame openings to carry full design loads to support walls.
- h. All precast concrete manholes placed below grade shall have adequate safety factors against uplift (excluding weight of soil and associated skin friction) as follows:
 - 1. High Water Level (H.W.L.):
 - a. Water Elevation: 3.0 feet NGVD
 - b. Safety Factor: 1.5
 - 2. 100-Year Flood:
 - a. Water Elevation: 7.0 feet NGVD
 - b. Safety Factor: 1.2
- i. Locate horizontal wall joints 18-inches minimum from horizontal centerline of wall openings.
- j. Design structure with a minimum number of joints. Maximum number of structure sections including top slab shall be four.
- k. Provide lifting hooks for top slab.

- l. Wall sleeves shall be provided by the precast concrete manufacturer. Box out for wall pipes shall conform accurately to the sizes and elevations of the adjoining pipes.
- m. Precast sections shall be watertight and conform to the requirements of ASTM C478 with reinforcement of ASTM A615, Grade 60 bars and the following modifications there to:
 - 1. The minimum wall thickness shall be 8 inches.
 - 2. Cement to be used in precast manholes and grout shall be ASTM C 150, Type II.
 - 3. The date and name of manufacturer shall be marked inside each precast sections.
 - 4. No more than 2 lift holes may be cast or drilled in each section.
- n. Walls of manholes shall be constructed of reinforced concrete ring sections with a minimum inside diameter of forty-eight (48) inches. Riser sections shall have tongue and groove ends (tongue on top of section). Top sections shall be of eccentric cone or flat slab top design as required by the Drawings. Eccentric cones shall have the same minimum wall thickness and area of circumferential steel reinforcement as the round riser sections. Flat slab tops shall have a minimum thickness of eight (8) inches and shall be reinforced with steel in accordance with the design requirements specified in ASTM C-478. Top sections shall have a top width of such design and dimensions as to properly support the required manhole frame and cover and the lower joint shall be of tongue and groove design.
- o. Top sections of cones or flat tops shall have an opening of thirty (30) inches.
- p. Precast Concrete Grade Rings
 - 1. Grade rings shall be precast; reinforced concrete in solid rings a minimum of 8" wide from 1" to 4" thick.
 - 2. Precast concrete rings shall be manufactured in accordance with ASTM C-478
 - 3. Rings shall have dimensions matching inside diameter of cone or flat top sections and be of adequate outside diameter to support full manhole frame.
 - 4. Field molding of grade rings is prohibited.

5. Grade rings shall be installed using modified polymer sealant/adhesive between each sealing face, Evergrip 990 Series or equal with approved submittal.

2.02 JOINING PRECAST MANHOLE SECTIONS AND STRUCTURES

- A. Seal watertight tongue and groove joints of precast manhole and structure sections with Ram-Nek, Lockstop, or approved equal.
- B. Finish for outside of new concrete manhole sections shall be Kop-Coat 300M Coal Tar Epoxy or approved equal.

2.03 PIPE OPENINGS

- A. Adapter couplings are required on all pipe connections to the structure, sized for respective pipe.
- B. Pipe opening shall be fitted with seals cast integrally with manhole section, sized to fit pipe specified, and set at correct elevation and location, or,
- C. Pipe openings shall be pre-cast four inches (4") larger than the pipe with a keyway all around the opening.
- D. Approved pipe seal manufacturers:
 1. Dura Tech, Inc. – Dual Seal II-III
 2. Press Seal Gasket Corporation – Press Seal
 3. A-Lok Products Corporation – A-Lok MH Pipe Seal
 4. Equal with approved submittals

2.04 PIPE-TO-MANHOLE SLEEVE

- A. Sewer pipe shall be connected to new manhole by using a flexible manhole sleeve made from ethylene propylene rubber and conformed to ASTM C-923. The sleeve shall be secured to the pipe by a clamp and grouted.
- B. The sleeve shall be manufactured by Chardon Rubber Company, (440) 285-2161, or approved equal.

2.05 MANHOLE / WET WELL LINING SYSTEMS

- A. The interior of all new manholes shall be lined per latest CITY Approved Products List as seen in **Appendix C** of Contract Documents and shall be installed in strict accordance with manufacturer's instructions. CONTRACTOR shall report interior diameter of manholes prior to installation of coating and following installation of coating to confirm minimum thickness requirement has

been met. CONTRACTOR shall record quantities of lining material applied, including field count and purchase receipt, to confirm installed quantities. All linings shall have a minimum five (5) year labor and materials warranty including all costs necessary and related to the repair or replacement of the defective application.

1. The surface area of all non-cementitious linings/coatings shall be checked for pinholes with a high voltage holiday detector and shall have notations on the liner indicating the date of spark test and person performing the tests. The lining shall be free of any pinholes. A test report for each manhole shall be submitted to the CITY prior to acceptance. The report shall include date of testing, equipment used, manhole location, pass or fail, project name, certified tester's name and number along with tester address and contact information. If failed, what corrective measures were taken.
- B. Existing Manholes or Lift Stations shall have the interior surface properly prepared to remove existing deterioration and debris and coated with Sewper Coat Calcium Aluminate per manufacturer instructions. The structure shall be cleaned and fully saturated prior to coating. The coating shall be of the minimum thickness as recommended by the manufacturer.

2.06 FRAMES AND COVERS

- A. All workmanship and materials shall be of the highest quality. The manhole ring and cover shall be the product of a manufacturer actively engaged in research, development, and manufacturing of watertight manhole rings and covers.
- B. Castings for frames and covers for manholes shall be composed of best quality, tough, gray iron, free from cold shuts, blow holes, and other imperfections, and shall meet the requirements of ASTM A-48 for Class No. 30, designed for AASHTO Highway Loading Class H-20.
- C. All bearing surfaces shall be machined to fit true and shall be watertight. No plugging or filling will be allowed.
- D. The combined weight of the frame and cover shall not be less than 530 pounds and cover shall weigh a minimum of 160 pounds.
- E. All manhole covers shall contain two non-penetrating pick holes.
- F. Frame and cover shall be set to grade. Lid adapters or adjustment rings shall not be used on new construction.
- G. Frames and covers shall be U.S. Foundry 310-DX-BWT or approved equal, bolted and watertight.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Traffic Control: The CONTRACTOR is required to obtain all permits, use appropriate traffic regulating devices, notify all appropriate governmental agencies and conform to all the requirements listed in Section 01570 - Traffic Regulation and Maintenance of Traffic.
- B. Flow Control: Flow control shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the manhole under construction.
 - 1. Plugging and Blocking of Flow. A sewer line plug shall be inserted into the line at a manhole upstream from the section to be inspected. The plug shall be so designed that all or any portion of the sewage flows can be released. During the inspection, testing and replacement portion of the construction, flows shall be shut off or substantially reduced as indicated by the OWNER. The upstream manholes shall be constantly monitored for degree of surcharging. After the testing, inspection, and/or repair is complete, flows shall be restored to normal level.
 - 2. Pumping and Bypassing of Flow: Wherever lines are blocked off and the possibility of backing up the sewage and causing harm to public and private property is foreseen, it shall be the CONTRACTOR's responsibility to bypass flow from manhole to manhole.
 - 3. Bypassing shall be accomplished using sewer plugs with pump connections, via bypass pumping equipment, by pumping down surcharged manholes, or by other methods acceptable to the OWNER. All bypassed flow must be discharged to a downstream sanitary sewer. Bypassed flow shall not be allowed to enter any storm line, drainage ditch or street gutter. CONTRACTOR shall submit Sewer Bypass Plan to ENGINEER for review and acceptance prior to disrupting normal flows.
 - 4. During a bypass operation, the pump shall be manned continuously. The CONTRACTOR shall maintain the pump and bypass equipment and shall be responsible for any damages to public or private property due to the malfunction of same.
 - 5. Sound attenuated pumps as manufactured by Thompson Pumps with "Silent Knight" canopy, or approved equal shall be used for all bypass/dewatering activities that require a pumping system. CONTRACTOR shall demonstrate pumping system at time of initial set-up including measuring and recording the dB levels. The CONTRACTOR shall record the dB levels weekly.

3.02 INSTALLATION

A. Manhole and Structure Installation

1. Manhole and structure shall be constructed to the dimensions shown on the Drawings. Protect all work against flooding and flotation. Place manhole on a bed of 12-inch screened gravel. Set manhole base grade so that a maximum grade adjustment of 8-inches is required to bring the manhole frame and cover to final grade.
2. Use precast concrete grade rings or brick and non-shrink mortar to adjust manhole frame and grate to final grade.
3. Plug holes in the concrete sections required for handling with a non-shrinking grout or non-shrinking grout in combination with concrete plugs. Finish flush on the inside.
4. Backfill carefully and evenly around manhole sections.

B. Pipe Connections

1. Construct pipe connections, including pipe stubs, as specified above. Close and seal pipe stubs for future connections with a gasketed watertight plug.

C. Setting Manhole Frame and Grate

1. Set manhole grates and frames in a full mortar bed. Utilize bricks or precast concrete grade rings, a maximum of 8-inches thick, to assure frame and cover are set to the finished grade. Set manhole frame and grate to final grade prior to placement of paving or sodding.

3.03 CLEANING

- #### A.
1. Thoroughly clean all new manholes of all silt, debris and foreign matter of any kind prior to final inspections.

3.04 COATING

- A. The inside surfaces of precast concrete structures for sanitary sewer and force main air release valve manhole assemblies shall be coated with Madewell Mainstay ML-72 and top-coated with Madewell Mainstay DS-5, or approved equal. ML-72 system shall be applied at min. 0.5" thickness. Concrete surfaces shall receive min. 100-mil DFT of DS-5. Ductile Iron shall receive min. 25-mils DFT of DS-5. All angled surfaces shall be stripe coated using DS-5 prior to application of top-coat. Metallic surfaces shall be degreased prior to abrasive blast cleaning. Pipe surfaces shall be abrasive blast or power-tool cleaned per SSPC SP-10 or SSPC SP-3, respectively, with a 2-4 mil anchor pattern depth. All paint applications shall be done in strict accordance with the manufacturer's recommendations.

END OF SECTION

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SECTION 02630

STORM DRAINAGE FACILITIES

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall furnish and install storm drainage pipe and all appurtenant Work, complete in place, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02222 - Excavation and Backfilling for Utilities.
- B. Section 02500 - Surface Restoration.
- C. Section 02631 – Exfiltration Trench Drains.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. American Society For Testing and Materials (ASTM)
 - 1. A185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
 - 2. A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
 - 3. A760 - Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
 - 4. A798 - Installation of Corrugated-Steel Pipe for Sewers and Other Applications
 - 5. A929 - Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe
 - 6. C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
 - 7. C478 - Precast Reinforced Concrete Manhole Sections
 - 8. C1479 - Installation of Reinforced Concrete Pipe
 - 9. C990-01A - Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
 - 10. D2321 - Installation of Thermoplastic Pipe for Sewer/Gravity-Flow Applications
 - 11. D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
 - 12. D3212 - Joints for Drain and Sewer Plastic Pipes Using Elastomeric Seals
 - 13. F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe
 - 14. F794 - Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

15. F949 - Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings

B. American Association of State Highway and Transportation Officials (AASHTO)

1. M198 - Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets
2. M252 - Corrugated Polyethylene Drainage Tubing
3. M274 - Aluminum-Coated (Type 2), for Corrugated Steel Pipe
4. M294 - Corrugated Polyethylene Pipe. 12 to 14 inch Diameter
5. M36 - Metallic Coated Corrugated Steel Culverts and Underdrains
6. M190 - Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches
7. M199 - Standard Specification for Precast Reinforced Concrete Manhole Sections

C. American Water Works Association (AWWA)

1. C110 - Ductile-Iron and Gray-Iron Fittings, 3 in through 48 in (75 mm through 1200 mm), for Water and Other Liquids (revision of ANSI/AWWA C110/A21.10-93)
2. C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
3. C151 - Ductile-Iron Pipe, Centrifugally Cast, for Water

D. American Concrete Institute (ACI)

1. 301 - Structural Concrete for Buildings, Specifications for
2. 318 - Building Code Requirements for Structural Plain Concrete

1.04 CLEARING

- A. Clearing or installation of pipe and all drainage structures shall be confined within the working limits of the trenches. Trees, utility poles, survey monuments, underground and overhead utilities shall be suitably protected and preserved.

1.05 EXISTING UTILITIES

- A. Furnish temporary support, adequate protection and maintenance of all underground and surface utility structures, drains, sewers, cables, etc., and other obstructions encountered in the progress of the work.
- B. When the grade of alignment of the pipe is obstructed by existing utility structures, such as conduits, ducts, pipes, branch connections to water or sewer mains, and other obstructions, the obstructions shall be permanently supported, relocated, removed or reconstructed by the Contractor in cooperation with the owners of such structures,

unless otherwise instructed. No deviation shall be made from the required line or grade except as directed in writing by the Engineer.

- C. It shall be the responsibility of the Contractor to notify the owners of existing utilities in the area of construction a minimum of 48 hours prior to any excavation adjacent of such utilities, so that field locations of said utilities may be established.
- D. Temporary relocation of existing utilities (to be removed) to accommodate installation of storm drain pipe shall be the responsibility of the Contractor and approved by the Engineer. No additional payment shall be made for temporary relocation of existing utilities and shall be considered part of the bid item for the pipe.

1.06 PROJECT RECORD DOCUMENTS

- A. Accurately record as-built locations of pipe runs, connections, catch basins, cleanouts, top elevations, rim elevations and invert elevations.
- B. Identify and describe unexpected variations of subsurface conditions and location of any utilities encountered.

PART 2 - PRODUCTS

2.01 PIPE

A. REINFORCED CONCRETE CULVERT PIPE:

- 1. Concrete pipe shall be produced by a reputable manufacturer engaged in the full time business of manufacturing concrete pipe. Pipe manufacturer shall produce the pipe from an approved, permanent plant acceptable to the Engineer.
- 2. All concrete pipe shall be reinforced and shall conform to the requirements of ASTM C-76. "Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe". All pipe shall be a minimum of Class III. Pipe shall have an interior surface which is smooth, uniform and free from rough spots, irregularities and projections. Nominal pipe lengths shall be 8' unless authorized otherwise by the Engineer. Lifting holes will be permitted, one hole per length.
- 3. Concrete pipe may be either bell and spigot, tongue and groove or modified tongue and groove.
- 4. Internal rubber gasket joints shall be used. The internal rubber gasket joint shall be supplied by the pipe manufacturer and shall be completely compatible in every respect with the pipe furnished. The rubber gasket on the inside of the bell or groove shall be installed on the pipe at the plant by the pipe manufacturer. All materials and accessories for the rubber gasket joint and the methods of jointing shall be in strict conformance with the pipe manufacturer's direction and recommendation. Joint must be completely water-tight.
- 5. Cement grout joints shall be completely water-tight and acceptable to the Engineer. A full bed of mortar shall be placed in the bell and/or groove and on the tongue and/or spigot. The annular space in the pipe joint shall be wiped with cement mortar to insure the joint is filled and to present a smooth surface. The

complete exterior periphery of the joint shall have a standard cement grout diaper joint. Diaper shall be installed with the aid of an approved cloth ring. Cement mortar joints shall be made in the dry. Mortar and grout shall be one-part Portland Cement to two parts by weight of sand. Mortar shall have enough water to make a stiff mixture that can be molded and worked. Cement mortar joints shall not be covered until inspected and approved by the Engineer.

PART 3 – EXECUTION

3.01 GENERAL

- A. Contractor shall only use the pipe material as specified on the plans. Alternate materials will not be allowed unless approved by the Engineer in writing.
- B. The Contractor shall install all drainage structures and pipe in the locations shown on the drawings and/or as approved by the Owner. Pipe shall be of the type and sizes specified on the drawings and shall be laid accurately to line and grade. Structures shall be accurately located and properly oriented.
- C. Excavation and Backfilling for Utilities - The provisions in Section 02222, Excavation and Backfilling for Utilities shall govern all work under this Section.
- D. Storage and Handling of Pipe – All pipe shall be protected against impact, shock and free fall, and only equipment of sufficient capacity and proper design shall be used in the handling of the pipe. Storage of pipe on the job shall be in accordance with the pipe manufacturer's recommendations.
- E. Damage to Pipe
 - 1. Pipe which is defective from any cause, including damage caused by handling, and determined by the Owner as un-repairable, shall be unacceptable for installation and shall be replaced at no cost to the Owner and as directed by the Owner; and,
 - 2. Pipe that is damaged or disturbed through any cause prior to acceptance of the work, shall be repaired realigned or replaced as directed by the Owner, at the Contractor's expense.
- F. Manholes, catch basins and drain inlets shall be constructed as soon as the pipe laying reaches the location of the structures. Should the Contractor continue his pipe laying without making provisions for completion of the structures, the Owner shall have the authority to stop the pipe laying operations until the structure is completed.
- G. Any structure, which is mis-located or oriented improperly, shall be removed and re-built in its proper location, alignment and orientation at the Contractor's expense.

3.02 EXCAVATIONS

- A. Trenches shall be kept as nearly vertical as possible and, if required, shall be properly sheeted and braced. Where, in the opinion of the Engineer, damage could result from withdrawing sheeting, the sheeting shall be left in place. Not more than 100 feet of trench shall be opened at any one time or in advance of pipe laying unless permitted by the Engineer.
 - 1. Except in rock, water-bearing earth or where a granular or concrete base is to be used, mechanical excavation of trenches shall be stopped above the final grade elevation so that the pipe may be laid on a firm, undisturbed native earth bed. If over-digging occurs, all loosened earth shall be removed and the trench bottom brought back to grade with granular material.
 - 2. Excavations and trenches in rock shall be carried to a depth of not less than 8 inches below the pipe bottom. This space shall be filled with granular material or washed rock.
 - 3. Width of trenches shall be such as to provide adequate space for placing and jointing pipe properly, but in every case the trench shall be kept to a minimum width.
 - 4. Any unstable soil encountered shall be removed and replaced with gravel, crushed rock or rock and sand suitably compacted.

3.03 PREPARATION OF TRENCH BOTTOM

- A. Water shall not be allowed in the trenches while the trench bottom is being prepared or while pipe is being installed, unless directed by the Engineer.
- B. A continuous trough shall be shaped to receive the bottom quadrant of the pipe barrel. Bell holes shall be excavated so that after placement, only the barrel of the pipe receives bearing pressure from the trench bottom.

3.04 PIPE INSTALLATION

- A. Comply with Section 02222, Excavation and Backfilling for Utilities
- B. Laying Pipe
 - 1. Unloading and Handling: All pipes shall be unloaded and handled with reasonable care. Pipes shall not be rolled or dragged over gravel or rock during handling. The Contractor shall take necessary precautions to ensure the method used in lifting or placing the pipe does not induce stress fatigue in the pipe and the lifting device used uniformly distributes the weight of the pipe along its axis or circumference.
 - 2. Each length of pipe shall be inspected for defects and cracks before carefully lowered into the trench. Any damaged or any pipe that has had its grade disturbed after laying shall be removed and replaced.
 - 3. Lay pipe on prepared foundation starting at the downgrade end according to line and grade with the necessary drainage structures, fittings, bends and

appurtenances as shown on the drawings. Rigid pipes shall be laid with the bell or groove ends upgrade with the spigot or tongue fully inserted.

4. Pipe sections shall be firmly joined together with appropriate gaskets or bands.
5. Pipe shall be protected during handling against impact shocks and free falls. Pipe shall be kept clean at all times and no pipe shall be used that does not conform to the Specifications.
6. Pipe joints shall be completely wrapped in filter fabric.
7. The laying of the pipe shall be commenced at the lowest point with spigot ends pointing in the direction of flow. All pipe shall be laid with ends abutting and true to line and grade. They shall be laid in accordance with manufacturer's requirements as approved by the Engineer.
8. Pipe shall be laid accurately to the line and grade as designated on the plans. Preparatory to making pipe joints, all surfaces of the portions of the pipe to be joined, or of the factory made jointing material, shall be clean and dry. Lubricant, primers, adhesive, etc., shall be used as recommended by the pipe or joint manufacturer's specifications. The jointing materials or factory fabricated joints shall then be placed, fitted, joined and adjusted in such a manner as to obtain a water tight line. As soon as possible after the joint is made, sufficient backfill material shall be placed along each side of the pipe to prevent movement of pipe off line and grade.
9. The exposed ends of all pipe shall be suitably plugged to prevent earth, water, or other substances from entering the pipe when construction is not in progress.

3.05 CONCRETE ENCASEMENT OF DRAINAGE PIPE

- A. Trenches in which encasement for pipe are to be placed may be excavated completely with mechanical equipment. Prior to formation of the encasement, temporary supports consisting of timber wedges or masonry shall be used to support the pipe in place. Temporary supports shall have minimum dimensions and shall support the pipe at no more than two places, one at the bottom of the barrel of the pipe adjacent to the shoulder of the socket and the other near the spigot end.

3.06 DRAINAGE STRUCTURES

- A. All structures shall be built to the line and grade shown on drawings. All reinforced concrete work shall be in strict conformance with the concrete specifications contained herein. After the drainage structure installation, the Contractor must have inspection and approval from the Engineer before backfilling. No defects of any kind in the pipe section will be accepted. All pipe stubs shall be made of the same type of pipe. Pipe stubs shall be sealed with a concrete plug, water tight. The ends of the pipes which enter masonry shall be neatly cut to fit the inner face of the masonry. Cutting shall be done before the pipes are built in.

3.07 INFILTRATION AND EXFILTRATION TESTS

- A. Tests for water tightness shall be made by the Contractor. Leakage of completed storm sewer system shall not exceed 500 U.S. gallons per day per inch diameter per mile of

pipe under minimum hydrostatic pressure of 2 feet. Test shall be conducted in a manner satisfactory to the Engineer. Any portion of the project not conforming to the above requirements shall be corrected by the Contractor, at his own expense, prior to acceptance by the Engineer.

3.08 PROTECTION AND CLEANING

- A. The Contractor shall maintain all pipe installations and drainage structures in a condition such that they will function continuously and shall be kept clean of silt, debris and other foreign matter from the pipe and drainage structure is installed until the project is accepted.

3.09 FINAL INSPECTION

- A. All storm sewers shall be lapped by the Engineer prior to acceptance of the work. Repairs or misalignment shown necessary by the tests shall be corrected at the Contractor's expense. All sewers shall be thoroughly cleaned before being placed into use and shall be kept clean until final acceptance by the Engineer.
- B. Upon completion of the work and before final acceptance by the Owner, the entire drainage system shall be subject to a final inspection in the presence of the Owner and/or Engineer. The work shall not be considered as complete until all requirements for line, grade, cleanliness, and workmanship have been completed.

- END OF SECTION -

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SECTION 02631

EXFILTRATION TRENCH DRAINS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. All applicable provisions of the Bidding and Contract Requirements, and Division 1 - General Requirements shall govern the work under this section.

1.02 WORK INCLUDED

- A. Provide all labor, materials, necessary equipment and services to complete the Exfiltration Trench System work, as indicated on the Drawings, as specified herein or both, except as for items specifically indicated as "NIC ITEMS".

1.03 RELATED WORK

- A. Section 02222 - Excavation and Backfilling for Utilities.
- B. Section 02605 – Precast Concrete Structures
- C. Section 02630 - Storm Drainage Facilities.

1.04 EXISTING UTILITIES

- A. Locate and stake all existing underground utilities that may be in the area of the drainage system.

1.05 SUBMITTALS

- A. Submit Plan Drawings showing the locations of all piping and underground utilities that may be in conflict with the Drainage System.
- B. Submit samples of the 3/4" washed rock for approval.
- C. Submit samples and product data of filter fabric.

PART 2 - PRODUCTS

2.01 DRAINAGE PIPE AND BALLAST ROCK

- A. Drainage pipe shall be in conformance with material as specified in Section 02630 and have the maximum number of perforations allowable per the manufacturer's recommendations.
- B. Ballast rock shall be from fresh water and washed free of deleterious matter.
- C. Trench liner shall be Propex "Geotex NW-351" soil filtration fabric or approved equal.

2.02 FILTER FABRIC

- A. Filter fabric shall be a non woven fabric consisting of polypropylene fibers treated to resist biological degradation.
- B. Manufacturers or Equal:
 - 1. Propex Geotex NW-351
 - 2. Trevira 1115
 - 3. Mirafi 140 NC

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Lay out Exfiltration Trench System as shown on the Plans.
- B. The bottom of the trench shall provide a minimum of 12 inches of ballast rock below the drain pipe.
- C. Drain pipes shall terminate a minimum of 2 feet beyond the end of the trench or connect to a catch basin as required.
- D. Cover temporary pipe ends with No. 10 galvanized or aluminum screen with openings no larger than 1/2" x 1/2".
- E. Bottom, sides and top of trench to be lined with trench lining material with a minimum of 2 feet of overlap at the top of the trench.
- F. A minimum of 4 feet of solid drain pipe shall be installed between drainage structures and the beginning of the trench.
- G. Concrete pipe shall be placed with the slots on the sides of the pipe equal distance from the plumb line.

3.02 CLEANUP

- A. Remove all excess rock, liner and pipe from the site.

3.03 PROTECTION AND CLEANING

- A. The CONTRACTOR shall maintain all pipe installations and drainage structures in a condition such that they will function continuously. The pipe and drainage structure shall be kept clean of silt, debris and other foreign matter until the project is accepted.

- END OF SECTION -

SECTION 02661

HIGH DENSITY POLYETHYLENE (HDPE) AWWA PIPE AND FITTINGS

PART 1 - GENERAL

1.01 SECTION DESCRIPTION

- A. This specification covers high-density polyethylene (PE 4710) pressure pipe primarily intended for the transportation of sewage, raw water, or potable water either buried or above grade.

1.02 QUALITY CONTROL

- A. The pipe and fitting Manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials. Incoming polyethylene materials shall be inspected for density, melt flow rate, and contamination. The cell classification properties of the material shall be certified by the supplier. Incoming materials shall be approved by Quality Control before processing into finished goods. Outgoing products shall be tested in accordance with AWWA C901 or C906. All HDPE Pipe and fittings shall be National Sanitation Foundation listed and approved for use with potable water.
- B. The Manufacturer shall maintain permanent Quality Control (QC) and Quality Assurance (QA) records. Certification or copy of these records shall be made available to the purchaser on request.

1.03 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
 - 1. Detailed procedures to be used in jointing and installing piping system, including manufacturer's recommendations.
 - 2. Bill of materials indicating material composition of pipe, pressure rating, nominal size and its location on the piping installation drawings.
 - 3. The Manufacturer shall supply an Installation Manual to the Owner which outlines guidelines for handling, joining, installing, embedding and testing of polyethylene pipeline.
 - 4. The Pipe Manufacturer shall provide visual guidelines for inspecting the butt, saddle, and socket fusion joints.
 - 5. Proposed bore profile and pilot bore "as-built".

1.04 RELATED SECTIONS

- A. Section 02320 - Trenchless Installation of Pressure Mains by Directional Boring.

1.05 REFERENCES

<u>Reference</u>	<u>Title</u>
AWWA C901	Polyethylene (PE) Pressure Pipe and Tubing, ½ in. through 3 in. for Water Service
AWWA C906	Polyethylene (PE) Pressure Pipe and Fittings, 4 in. through 63 in. for Water Distribution
ASTM D2863	Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
ASTM D3261	Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
PPI TR-3	Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials
PPI TR-4	Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds
NSF Standard #14	Plastic Piping Components and Related Materials

PART 2 - PRODUCTS

2.01 QUALIFICATION OF MANUFACTURERS

- A. The Manufacturer shall have manufacturing and quality control facilities capable of producing and assuring the quality of the pipe and fittings required by these specifications. Given reasonable notice, the Manufacturer's production facilities shall be open for inspection by the Owner or his/her Authorized Representative. The Engineer shall approve qualified manufacturers.

2.02 MATERIAL

- A. Water and Force Main HDPE carrier pipe shall be DR-11 manufactured to ductile iron pipe outside dimensions (DIPS) and in compliance with C906, latest revision and ASTM F714. Water main shall be blue in color. Force main shall be green in color.
- B. Fiberoptic conduit HDPE carrier pipe shall be DR-7 for portions installed via horizontal directional drill methods manufactured to ductile iron pipe size outside dimensions (DIPS) and in compliance with C906, latest revision and ASTM F714. Fiberoptic conduit shall be orange in color. In addition, all fiber-optic conduits shall have a 2-inch 3-cell Maxcell fabric innerduct installed within it.
- C. Materials used for the manufacturing of polyethylene pipe and fittings shall be PE 4710 High Density Polyethylene (HDPE) meeting the ASTM D3350 cell classification of 445474C.

- D. The material shall have a minimum Hydrostatic Design Basis (HDB) of 1600 psi at 73 degrees Fahrenheit when tested in accordance with PPI TR-3 and shall be listed in the name of the pipe and fitting manufacturer in PPI TR-4.
- E. The material used in the production of potable water pipe shall be approved by the National Sanitation Foundation (NSF).
- F. The Manufacturer will certify that the materials used to manufacture pipe and fittings meet the requirements of this specification.

2.03 PIPE

- A. Polyethylene pipe shall be manufactured in accordance with AWWA C901 for sizes ½ inch through three (3) inches and in accordance with AWWA C906 for sizes four (4) inches through 54 inches.
- B. Permanent identification of piping service shall be provided by co-extruding identifiable colored markings into the pipe's outer surface. The marking material shall be the same material as the pipe material except for color. Type of piping service shall be identified by color according to the following table:

1.	Blue	- Potable and Raw
2.	Green	- Sanitary
3.	Lavender	- IQ cover all
4.	Orange	- Fiberoptic

However, refer to local regulatory rules for the required color of the piping if the piping service color is not defined above. Identification markers printed or painted on the pipe's outer surface shall not be acceptable.

2.04 FITTINGS

- A. Polyethylene fittings shall be made from material meeting the same requirements as the pipe. Polyethylene fittings shall be molded or fabricated by the manufacturer of the pipe.
- B. Unless otherwise noted, fittings shall meet the requirements of AWWA C906.
- C. Molded fittings shall be manufactured in accordance with ASTM D3261 (butt fused) and shall be so marked.
- D. Mechanical Fittings used with polyethylene pipe shall be specifically designed for, or tested and found to be acceptable for use with polyethylene pipe. Mechanical Fittings designed for other materials shall not be used unless authorized by the Mechanical Fitting Manufacturer/Supplier. Special precautions may exist with certain mechanical fitting or additional components may be required - consult the manufacturer of the fitting prior to its use.
- E. Mechanical joint adapters shall meet the requirements of AWWA C906 and shall be Pressure Class 160, DR-11 with extended 316SS tee bolts, ductile iron glands and gasket. MJ adapter shall be manufactured by Performance Pipe/ Chevron Chemical Company or approved equal. HDPE MJ Adapters shall include 316 SS stiffeners.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. HDPE pipe shall have a minimum cover as required by the Owner and as required by the Contract drawings.
- B. The Manufacturer shall supply an Installation Manual to the Owner which outlines guidelines for handling, joining, installing, embedding and testing of polyethylene pipeline. These guidelines shall be used as reference material for the Contractor in his determination of the required procedures.
- C. Joints between plain ends of polyethylene pipe shall be made by butt fusion when possible. The Pipe Manufacturer's fusion procedures shall be followed at all times as well as the recommendations of the Fusion Machine Manufacturer. The wall thickness of the adjoining pipes shall have the same DR at the point of fusion.
- D. When saddle connections are fusion welded the Manufacturer's recommended saddle fusion procedures shall be used.
- E. If mechanical fittings (which are designed for or tested and found acceptable for use with polyethylene pipe) are utilized for transitions between pipe materials, repairs, joining pipe sections, saddle connections, or at other locations; the recommendations of the Mechanical Fitting Manufacturer must be followed. These procedures may differ from other pipe materials.
- F. Two #8 AWG Copperhead 845-EHS tracer wires shall be pulled with the pipeline for pipeline locating purposes. The wire shall be terminated in a wire access box at both ends, unless otherwise noted/indicated. The Contractor shall attach the wire to the HDPE pipe in such a way as to not break the wire during the pullback of the pipe. Tracer wire insulation shall be per Item 2.03.B of this section.
- G. The maximum allowable depth of any gouge on the carrier or casing pipe shall not exceed 5 percent of the wall thickness.
- H. At the end of the bore, the Contractor shall submit five (5) copies of the bore log to the Engineer for record keeping. The bore log shall be prepared by the Subcontractor that performed the horizontal directional drill, unless the Contractor himself performed the Work.
- I. If any driveways or access roads are to be blocked by the pipe, the Contractor shall provide overhead roll-type pipe stands to elevate the pipe to such a height as to allow access into the driveways and/or access roads.
- J. The handling of the assembled pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp or cutting objects. Slings for handling the pipeline shall not be positioned at pipe joints. Sections of the pipes with cuts and gouges or excessive deformations shall be removed and replaced.

3.02 TESTING

A. Air Pressure Test

1. Following fusing but prior to installation, all HDPE pipe shall be pressurized with air to a minimum of 5 psi. Piping shall be shut in and pressure shall be monitored at five (5) minute intervals for one (1) hour. Zero pressure loss over the course of the one-hour test will be considered a successful test. Piping shall not be installed prior to passing pre-installation pressure test and receiving acceptance from ENGINEER/OWNER. Testing shall be scheduled a min. 48-hours in advance of proposed testing date/time.

B. HYDROSTATIC TESTING AND LEAKAGE TESTING FOR HDPE PRESSURE PIPING

1. Hydrostatic and leakage testing shall be conducted in accordance with the requirements of AWWA C605.
2. Unless agreed to or otherwise designated by the OWNER or ENGINEER, for a simultaneous hydrostatic and leakage test following installation, a pressure equal to 150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation shall be applied. Unless otherwise agreed to, the duration of the pressure test shall be for two (2) hours.
3. If hydrostatic testing and leakage testing are performed at separate times, follow procedures as outlined in AWWA C605.
4. In preparation for pressure testing the following parameters must be followed:
 - a. All air must be vented from the pipeline prior to pressurization. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points. Venting may also be accomplished by 'flushing' the pipeline in accordance with the parameters and procedures as described in AWWA C605.
 - b. The pipeline must be fully restrained prior to pressurization. This includes complete installation of all mechanical restraints per the restraint manufacturer's guidelines, whether permanent or temporary to the final installation. This also includes the installation and curing of all required thrust blocking. All appurtenances included in the pressure test, including valves, blow-offs, and air-relief valves shall be checked for proper installation and restraint prior to beginning the test.
 - c. Temporary pipeline alignments that are being tested, such as those that are partially installed in their permanent location shall be configured to provide for the removal of trapped air in the pipeline.

C. INTERMEDIATE TESTING

1. Segments of the pipe may be tested separately in accordance with standard testing procedure, as approved by the OWNER and ENGINEER. Testing of each HDD installation prior to connection to the system or other piping is preferred.

END OF SECTION

SECTION 02734
FLOW BYPASS PUMPING SYSTEM

PART 1 - GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Society for Testing and Materials (ASTM): D3350-84, Polyethylene Plastics, Pipe and Fittings Materials.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements:

1. It is essential to the operation of the existing sewerage system that there be no interruption in the flow of sewage throughout the duration of the Project. Provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and backup units as required), conduits, and all necessary power to intercept the sewage flow before it reaches the point where it would interfere with the Work, carry it past the Work, and return it to the existing sewer downstream of the Work.
2. Design, install, and operate the temporary pumping system. Temporary pumping systems shall be provided for the following work:
 - LS No. 27 Reconstruction as detailed in the Contract Plans.
 - LS No. 53 Submersible Pump Replacement and Electrical Improvements as detailed in the Contract Plans. LS No. 53 pump replacement and improvements shall be performed after proposed force main improvements have been completed and cleared for placement into service. Temporary bypassing shall be performed as necessary through proposed replacement force main along NW 10th Ct. Temporary bypassing equipment shall be configured as necessary during any/all improvements within the LS No. 53 wetwell requiring work in clean/dry conditions (base plate/elbow improvements, guide rail improvements, and/or coating restoration as necessary) such that no sewage shall enter the wetwell.
3. Convey the sewage safely past this Work area. Do not stop or impede the main flows under any circumstances.
4. Maintain sewer flow around the Work area in a manner that will not cause surcharging of sewers, damage to sewers, and that will protect public and private property from damage and flooding.
5. Protect water resources, wetlands, and other natural resources.

6. Provide 24 hour/day, 7 days/week monitoring of the bypass pumping system with immediate notification to the CONTRACTOR of any pumping system problems, and field response by CONTRACTOR to correct issues within 1 hour of notification of a problem.

B. Design Requirements:

1. Provide all pipeline plugs, pumps of adequate size to handle peak flow and temporary discharge piping, to ensure that the total flow of the sewer and service connections can be safely diverted around the section to be replaced and/or tie-in locations. Bypass pumping system will be required to be operated 24 hours per day 7 days per week, including holidays during bypass pumping operation. The system operating pressure shall be as required to pump into the system.
2. **Install one bypass pump at each pump station, manhole, or force main section to be bypassed. There shall be one back-up, in-line pump ready for immediate use in the event of an emergency or breakdown of any of the pumps.** Each pumping location shall have provisions for immediate installation of a redundant pump without shutting the system down.
3. Single discharge piping shall be provided for all bypass pumping operations. Each individual discharge pipeline shall be of adequate size to convey the required flow for the system's normal operating pumps.
4. Provide adequate enclosure around all bypass pumping equipment.
5. To minimize odors, install the discharge piping to within 2 feet of the manhole bottom and provide lockable security covers with an inspection door over all suction and discharge manholes. Covers can be made of 3/4-inch plywood, securely fastened over the manholes, w/ prior written approval from the City. Suction / Discharge Manholes w/in pavement and/or traffic areas shall remain covered with existing traffic-rated covers at all times.
6. Maintain onsite portable lights for emergency use only.
7. Discharge must have an isolation valve and a check valve.
8. Pump station cleanouts shall not be used for bypass pumping.

1.03 SUBMITTALS

- A. Shop Drawings: Detailed plans and descriptions outlining all provisions and precautions regarding the handling of existing wastewater flows. This plan must be specific and complete including such items as schedules, locations, elevations, capacities of equipment, materials and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of public and private property from damage and flooding by surcharging of sewers. The plan shall include, but not be limited to, details of the following:

1. Staging areas for pumps.
2. Sewer plugging method and types of plugs.

3. Size, material, location and method of installation of suction piping.
4. Size, material, method of installation and location of installation of discharge piping.
5. Bypass pump sizes, capacity, and power requirements.
6. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).
7. Standby power generator size, location.
8. Downstream discharge plan.
9. Method of protecting discharge manholes or structures from surface water infiltration, erosion, and damage.
10. Thrust and restraint block sizes and locations.
11. Sections showing any suction and discharge pipe depth, embedment, select fill and special backfill where required.
12. Method of noise control for each pump and/or generator.
13. Any temporary pipe supports and anchoring required.
14. Plans for access to bypass pumping locations.
15. Calculations for selection of bypass pumping pipe size.
16. Schedule for installation of and maintenance of bypass pumping lines.
17. Plan indicating selected location of bypass pumping line and air valve locations.
18. Inventory of disinfection materials in case of spillage.
19. Description of 24 hr/day, 7 days/week monitoring system and immediate notification to CONTRACTOR of any pumping system problems.
20. Description of procedures to be used for field response by CONTRACTOR to correct issues within 1 hr of notification of a problem. Required corrective actions include immediate/timely notification of any issue to the City, and all accidental sewer spills shall be cleaned up and disinfected by the Contractor to the City's sole satisfaction.

B. Quality Control Submittals:

1. Certification of vendor's compliance with qualifications included in Article QUALITY ASSURANCE.
2. Weekly maintenance and inspection logs.

1.04 QUALITY ASSURANCE

A. System operators to be full-time employees or specialized vendor with minimum 1 year experience in operating and maintaining bypass systems.

1. Provide five references from projects of similar size performed in the past 3 years.

- B. Be responsible for any spillage of raw sewage that results in civil or criminal charge from any local, state, or federal agency. Bear all costs for these charges and any required restoration.

1.05 MAINTENANCE

- A. Maintenance Service: Ensure that the temporary pumping system is properly maintained and that a responsible operator is on call at all times when pumps are operating.
- B. Extra Materials: Spare parts for pumps and piping shall be kept onsite as necessary. Spare parts shall include, but not be limited to, the following: Extra pipe for each size and repair clamps for each bypass discharge line installed.
- C. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

PART 2 - PRODUCTS

2.01 BYPASS PIPING MATERIALS

- A. Header Piping: Header piping shall be used to connect the pumps to the discharge piping. The header shall be constructed of rigid pipe with positive, restrained joints, with a total maximum length of 50 feet. Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed. Header piping will only be allowed in short sections and by specific permission from the ENGINEER or CITY.
- B. Discharge Piping: Discharge piping shall be used from the connection at the header piping to the discharge point. At the beginning of the Project, all discharge piping shall be new high density polyethylene pressure piping conforming to ASTM D3350 with a minimum SDR of 21. Discharge piping may be reused for subsequent flow bypass pumping system placements, however, the CITY or ENGINEER at their sole discretion shall have the right to reject sections of discharge piping deemed by either of them to be unserviceable. Joints shall be butt fusion welded. Discharge piping shall be as manufactured by Phillips Driscopipe, Inc., or equal.

2.02 EQUIPMENT

- A. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The primary pumps must be electric with diesel powered backup. Pumps can be trailer mounted. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.
- B. Provide the necessary stop/start controls and a visual alarm indicating a pump malfunction for each pump.
- C. The back-up pumps shall be online, isolated from the primary system by a valve.

- D. Incorporate noise prevention measures for any and all equipment being used to ensure minimum noise impact on the surrounding areas.
 - 1. Include: hospital grade silencers or mufflers, equipment modifications, and special equipment or sound barrier walls as necessary to limit noise levels below 55 decibels at a distance of 25 feet in the direction of any residential home for all diesel powered back-up pumps.
 - 2. In the event the CONTRACTOR fails to comply with maximum permissible noise level decibels in the operation of the flow bypass pumping system, the CITY or ENGINEER may order the CONTRACTOR to stop operation of the flow bypass pumping system until such time as specified noise levels are achieved. The termination of the flow bypass pumping system for such reason shall not be the basis for any extension of Contract time nor for any claim for additional compensation.
- E. Repair clamps shall be full circle, stainless steel clamps, Style FS2 or FS3 as manufactured by the Ford Meter Box Company, Inc., or equal.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Precautions:
 - 1. Locate any existing utilities in the area selected to locate the bypass pipelines. Locate bypass pipelines to minimize any disturbance to existing utilities and obtain approval of the pipeline locations from CITY, property owners, all utilities, and the ENGINEER prior to installation.
 - 2. Bypass pump all wastewater flows during all phases of the Work and coordinate all bypass pumping operations with the ENGINEER or CITY.

3.02 INSTALLATION

- A. Plugging or blocking of sewage flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance of Work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.
- B. When working inside manholes, exercise caution and comply with combustible or oxygen-deficient atmospheres, and confined spaces.
- C. The bypass pipeline must be located off streets, sidewalks, and shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, place the bypass pipelines in trenches and cover with temporary pavement or

other approved methods. Obtain approvals for placement of the temporary pipeline within public rights-of-ways.

- D. Protect the bypass discharge line from damage in the areas of heavy equipment operations. Protection shall be by either concrete jersey barriers or wood timbers.
- E. Confine the bypass discharge pipeline to the area within the temporary construction area and permanent easement, for in-place or during relocation of the pipeline. Concrete barriers or timber deadman posts can be used to confine the movement of the discharge pipeline during relocation.
- F. Furnish/Install security fencing (chainlink or as otherwise approved by the OWNER) as necessary to protect bypass pumping equipment/facilities.

3.03 FIELD QUALITY CONTROL

- A. Test: Perform a hydrostatic pressure test for each section of discharge piping with a maximum pressure equal to 1.5 times the maximum operation pressure of the system (Test pressure = 75 psi). The ENGINEER or CITY shall witness the test to ensure that there are no leaks in the discharge piping prior to actual operation.
- B. The Operator shall inspect the bypass pumping system every hour, or on a schedule approved by the ENGINEER or CITY.
 - 1. An inspection log shall be kept at each pumping location. Each inspection log shall be marked with a time clock stamp to ensure the required maintenance and inspections are being performed.

3.04 CLEANING

- A. Sewage remaining in the bypass discharge pipeline and/or pumping equipment shall be flushed with CITY water and discharged to a working sewer before the bypass pumping system is broken down and moved to the next section. CITY water service must be protected by use of a backflow preventor.
- B. Disturbed Areas: Upon completion of the bypass pumping operation, the Contractor shall clean up all areas disturbed by these operations, restoring same to a condition, including pavement restoration, at least equal to that which existed prior to the start of the Work.

END OF SECTION

SECTION 02955
EPOXY LINING FOR CONCRETE WET WELLS

PART 1 - GENERAL

1.01 SCOPE

- A. Furnish all labor, surface preparation and coating material, tools, rigging, harness, lighting, ventilation, gas monitor and other related items of equipment and materials necessary to clean, prepare, cure, coat, and cleanup a complete coating system on all structures and/or equipment as specified or shown on the drawings.
- B. The work includes coating (application of corrosion barrier system) the interior surface of existing and/or new lift station wet-wells. These areas are located within confined space areas. All workers must be confined space certified prior to starting all work. All workers shall abide by OSHA 1910.146.
- C. Clean, prepare, and coat all surfaces in strict accordance with the manufacturer's published recommendations and specifications.
- D. Perform all work using skilled work persons in a safe and productive manner using equipment and procedures consistent with good coating practices.

1.02 RELATED SECTIONS

- A. Section 01300 SUBMITTALS

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Prior to preconstruction meeting submit a certification stating the applicator is:
 - 1. Currently approved by the Manufacturer of the specified products.
 - 2. Licensed and qualified in the application of the specified products.

2.02 QUALITY ASSURANCE

- A. Preconstruction meeting: A preconstruction meeting shall be held prior to start of any application of restoration and corrosion barrier system. The OWNER is responsible for scheduling the meeting. The attendance of the Applicator, Underground Contractor and OWNER Construction Coordinator is required. During the meeting, the process of preparation, application, curing, field inspection and coordination with other work shall be reviewed.
- B. The approved specified products shall be applied in accordance with the Manufacturer's recommendations unless noted otherwise in this specification.

- C. Material delivered to the site shall be in Manufacturer's original, unopened containers and packaging, with label clearly identifying product name and Manufacturer, batch and lot number, and expiration date as applicable. The material shall be protected during storage, handling, and application to prevent damage.
- D. The liner manufacturer shall warrant the corrosion barrier system for five (5) years from the time of:
 - 1. First permanent service activation discharging wastewater into the new structure.
- E. The liner manufacturer shall warrant the corrosion barrier system for all labor and materials cost necessary to repair or replace the failed application, including related work (permits, bypass piping, pumps, flow monitoring, restoration, and record information).

2.03 ENVIRONMENTAL CONDITIONS

- A. Do not apply materials under the following conditions:
 - 1. Temperature exceeding the Manufacturer's recommended maximum or minimum allowable.
 - 2. Overflowing water condition

2.04 APPROVED PRODUCTS

- A. Manufacturer must be listed on OWNER's approved materials list in these Specifications.
- B. Restoration and Corrosion Barrier System
 - 1. 100% Solids Epoxy System
 - a. Penetrating Epoxy Primer/Sealer
 - 1) Compatible with Corrosion Barrier Topcoat
 - 2) Composition: 100% solids epoxy
 - 3) Number of components: 2
 - b. Corrosion Barrier Topcoat
 - 1) Composition: 100 percent solids, modified epoxy sprayable coating
 - 2) Thickness: min. of 100 mils in 1 or 2 coats (dry film thickness)
 - 3) Number of components: 2
 - 4) Finish: Gloss
 - 5) Color: White or Gray

- c. Approved products for corrosion barrier systems are Mainstay or equal. Mainstay (DS-5 Epoxy Coating) is manufactured by Madewell Products Corporations, Inc.

Madewell Products Corporation

P.O. Box 902

Roswell, Georgia 30077

(770)-475-8199 | (770)-475-8167 Fax

2. Cementitious Corrosion Barrier System

a. General:

- 1) Materials for the cementitious corrosion barrier system shall be supplied from a single Manufacturer.
- 2) The cementitious corrosion barrier system shall be a pre-packaged ready to use, fiber reinforced, high strength (min. 6,000 psi compressive strength) gunite material.
- 3) The cementitious corrosion barrier system shall be comprised of 100% pure calcium aluminate with an aggregate size passing a #8 mesh dry sieve or finer.
- 4) The product shall contain no calcium sulfate, calcium chloride, tricalcium aluminate, lime hydrates or aggressive agents which can attack reinforcing steel. The product shall not release calcium hydroxide as a hydration product.
- 5) The cementitious coating system shall be applied using dry gunite or low pressure, wet shotcrete equipment. The hand application or finish troweling of the product will not be permitted.
- 6) The total thickness of the cementitious corrosion barrier system shall be a minimum of ½-inch for new structures or minimum 1- inch for existing structures to be rehabilitated.
- 7) Approved products for corrosion barrier systems are SEWPERCOAT PG, no substitutions. SEWPERCOAT PG is manufactured by Kerneos, Inc.

Kerneos, Inc

1316 Priority Lane

Chesapeake, VA 23324

(757) 284-3200 | (757) 284-3300 Fax

- b. Water: Any water used for the preparation and/or application of the specified corrosion barrier systems shall be potable and clean. All mix proportions shall be in strict accordance with the Manufacturer's preparation requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Inspect surfaces to receive restoration and corrosion barrier system for leaks, deteriorated concrete, cracks, and voids. Notify the OWNER Construction Coordinator in writing if surfaces do not meet the minimum conditions as set by the coating Manufacturer. Do not begin surface preparation or application until unacceptable conditions have been corrected. New structures to be inspected and visibly marked by the OWNER Construction Coordinator prior to system application.
- B. Give the OWNER Construction Coordinator a minimum of two days advance notice of completion of surface preparation and start of application.
- C. Before application of each material, surfaces to be sprayed or coated will be inspected by the OWNER Construction Coordinator. Correct defects or deficiencies before application of subsequent material.
- D. Inspection or the waiver of inspection by the OWNER Construction Coordinator of any portion of the work shall not relieve the CONTRACTOR of responsibility to perform the work as specified.

3.02 SURFACE PREPARATION

- A. Place covers over inverts to isolate the structure receiving the surface restoration.
- B. Place masking tape to protect equipment not intended for spraying/coating.
- C. Prepare surfaces in accordance with manufacturer's instructions.
- D. Cleaning: Clean surfaces by water (minimum 3500 psi) or abrasive blasting, or hand or power tools as required to remove all previously applied coatings, unsound concrete, contaminants, dirt, debris, and deteriorated reinforcing steel, laitance, efflorescence, form oils and spoiled concrete.

3.03 HYDROSTATIC LEAKS

- A. Stop visible hydrostatic leaks by application of hydraulic cement mortar, after completion of surface preparation.
 - 1. Mix only 1 to 2 pounds of mortar at a time.
 - 2. Add water to form a viscous mass with consistency of modeling clay.
 - 3. Apply by hand or trowel.
 - 4. Press mixed material firmly into place, starting at top of leak and working downward.
 - 5. Inject flowing leaks using a suitable polymer gel or foam. Be sure to remove any excess or spilled material and clean/saturate the concrete surface with water prior to application of the restoration mortar
 - 6. Prepare surfaces to have a minimum profile of 1/16 inch, with aggregate exposed, then remove the water and any loose material.

7. Inspect surfaces for soundness.
8. Saturate all surfaces thoroughly with clean water.
9. Apply mortar as soon as water sheen is no longer visible (saturated surfacedry).

3.04 APPLICATION OF CORROSION BARRIER TOPCOAT

- A. Provide mixing and application equipment designed for mixing and spraying epoxy coating.
- B. Apply penetrating Epoxy primer/sealer and corrosion barrier topcoat epoxy to all prepared surfaces in accordance with manufacturer's instructions.
- C. Apply topcoat as soon as possible after application of penetrating Epoxy primer/sealer.
- D. Do not allow surface contamination to the finished primer/sealer before application of topcoat.
- E. Topcoat Thickness: Spray apply a minimum thickness of 100 mils DFT.
- F. Curing of Corrosion Barrier Topcoat
 1. Allow a minimum cure time of 24 hours at 70 degrees F.
 2. Curing Conditions:
 - a. Shelter system from direct impingement of water until 1 to 3 hours after application of topcoat, depending on substrate temperatures, after which cure sufficiently to be undamaged by water impingement or immersion at ordinary velocities.
 - b. Sanitary Sewer Systems: It may be necessary to plug services or main lines temporarily in order to achieve these environmental conditions.
 3. Immersion Service: Reach a tack-free condition before being immersed.
 4. Remove any loose debris, plugs, covers and masking prior to inspection.

3.05 FIELD QUALITY CONTROL:

- A. The CONTRACTOR shall hire an independent testing laboratory to perform and certify Check the application for minimum thickness of coatings (minimum ½" of restoration mortar, minimum 100 mils MDFT of epoxy topcoat). The test for the topcoat shall consist of five separate spot measurements (average of three readings each), spaced evenly over each 100 square feet of the area to be tested. The average of five spot measurements for each such 100 square foot area shall not be less than 100 mils MDFT. No single spot measurement in any 100 square foot area shall be less than 80 mils MDFT. Any one of three readings which are averaged to produce each spot measurement may not underrun by a greater amount. The five spot measurement shall be made for each 100 square feet of area as follows:
 1. Perform minimum 1 set of tests for every manhole, and minimum of three (3) 100 square foot areas shall be randomly selected and measured for every wet well.

2. If the dry film thickness for any 100 square foot area is not in compliance with the average of 100 mils MDFT, then each 100 square foot area shall be tested. Check the application for holidays using recognized testing procedures and equipment, such as "high voltage holiday detector test."
- B. Coated Surfaces will be rejected by OWNER if they fail:
1. To meet the MDFT requirements, or
 2. To stop inflow, infiltration, exfiltration, or
- C. Rejected Coated Surfaces: Coated and rejected areas must be identified and marked. To repair and recoat: sand or grind down to substrate, clean, spray with approved primer/sealer, and recoat with specified corrosion barrier topcoat. Re- inspection will be required.
1. The certified laboratory performing the testing shall issue a written statement to the Department confirming the compliance of each structure.
 2. The Department may require that additional testing of the liner be performed at the manufacturer's expense any time during the five-year warranty period. Any deficiencies in performance shall be corrected without delay by the manufacturer's contractor at no cost to the Department.

PART 4 - SAFETY

4.01 GENERAL

- A. Make all necessary provisions regarding materials, confined space entry, equipment, personnel, procedures, and practices, to assure that the work is done safely, and that the working area is maintained free of all health and safety hazards.
- B. Observe manufacturer's health and safety precautions when storing,
- C. Direct personnel's attention to all product warnings and information given on the labels of all products.
- D. Post warning signs outside of the work to appraise personnel of the hazards in the work area.
- E. Remove waste coating materials and contaminated disposable items from the job site and dispose of them at the completion of work each a day.

END OF SECTION

DIVISION 3

CONCRETE

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SECTION 03305

CONCRETE AND GROUT

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall furnish all materials for concrete in accordance with the provisions of this Section and shall form, mix, place, cure, repair, finish, and do all other work as required to produce finished concrete, all in accordance with the requirements of the Contract Documents.
- B. The following types of concrete shall be covered in this Section:
 - 1. Structure Concrete: Concrete to be used in all cases except where noted otherwise in Contract Documents.
 - 2. Sitework Concrete: Concrete to be used for curbs, gutters, catch basins, sidewalks, cart paths, fence and guard post embedment, and all other concrete appurtenant to electrical facilities unless otherwise shown or noted on the Drawings.
- C. The following types of grout are covered in this Section:
 - 1. Non-Shrink Grout: This type of grout shall be used wherever grout is called for in the Contract Documents, unless another type is specifically referenced.
 - 2. Epoxy Grout: This type of grout shall be used for grouting reinforcement steel into existing concrete.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of other requirements of these specifications, all work specified herein shall conform to or exceed the requirements of the Florida Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.
 - 1. ACI 318 - Building Code Requirements of Reinforced Concrete.
 - 2. CRSI - Manual of Standard Practice.

1.03 DELIVERY TICKETS

- A. Where ready-mix concrete is used, the CONTRACTOR shall provide weighmaster delivery tickets at the time of delivery of each load of concrete. Each certificate shall show the public weighmaster's signature, and the total quantities, by weight of cement, sand, each class of aggregate, admixtures, and the amounts of water in the aggregate and added at the batching plant as well as the amount of water allowed to be added at the site for the specific design mix. Each certificate shall, in addition, state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to when

the batch was dispatched, when it left the plant, when it arrived at the job, the time that unloading began, and the time that unloading was finished.

1.04 QUALITY ASSURANCE

- A. Tests on component materials and for compressive strength and shrinkage of concrete will be performed as specified herein. Test for determining slump will be in accordance with the requirements of ASTM C 143.
- B. The cost of all laboratory tests on cement, aggregates, and concrete, will be borne by the Owner. However, the CONTRACTOR shall be charged for the cost of any additional tests and investigation on work performed which does not meet the specifications.
- C. Concrete for testing shall be supplied by the CONTRACTOR at no cost to the Owner, and the CONTRACTOR shall provide assistance to the Owner in obtaining samples. The CONTRACTOR shall dispose of and clean up all excess material.
- D. Field Compression Tests
 - 1. Compression test specimens shall be taken during construction from the first placement of each class of concrete specified herein and at intervals thereafter as selected by the Owner to ensure continued compliance with these specifications. At least one set of test specimens shall be made for each 50 cubic yards of concrete placed and for each date of placement, for which temperature and slump shall also be determined at time of collection. Each set of test specimens shall be a minimum of 4 cylinders.
 - 2. Compression test specimens for concrete shall be made in accordance with ASTM C 31. Specimens shall be 6-inch diameter by 12-inch high cylinders.
 - 3. Compression tests shall be performed in accordance with ASTM C 39. One test cylinder will be tested at 7 days and 2 at 28 days. The remaining cylinder will be held to verify test results, if needed.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Only one brand of cement shall be used. Cement reclaimed from cleaning bags or leaking containers shall not be used. All cement shall be used in the sequence of receipt of shipments.
- B. All materials furnished for the work shall comply with the requirements of ACI 301, as applicable.
- C. Storage of materials shall conform to the requirements of ACI 301.
- D. Materials for concrete shall conform to the following requirements:
 - 1. Cement shall be standard brand portland cement conforming to ASTM C 150. Type II.
 - 2. Water shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts and other impurities.

3. Aggregates shall be obtained from pits acceptable to the Owner, shall be non-reactive, and shall conform to the SFBC and ASTM C 33. Maximum size of coarse aggregate shall be as specified in Paragraph 2.05B.
4. Ready-mix concrete shall conform to the requirements of ASTM C 94.
5. Air-entraining agent meeting the requirements of ASTM C 260, shall be used. Sufficient air-entraining agent shall be used to provide a total air content of 3 to 5 percent. The Owner reserves the right, at any time, to sample and test the air-entraining agent received on the job by the CONTRACTOR. The air-entraining agent shall be added to the batch in a portion of the mixing water. The solution shall be batched by means of a mechanical batcher capable of accurate measurement.
6. Admixtures: Water reducing and retarding admixture shall be added and measured as recommended by the manufacturer. The addition of the admixture shall be separate from the air entraining admixture. The addition of the admixture shall be completed within one minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first. Water reducing and set retarding admixtures shall be in conformance with ASTM C 494, Type D.

2.02 CURING MATERIALS

- A. Materials for curing concrete as specified herein shall be MB 429 as manufactured by Masterbuilders or approved equal. The curing compound shall contain a fugitive dye so that areas of application will be readily distinguishable.

2.03 NON-WATERSTOP JOINT MATERIALS

- A. Materials for non-waterstop joints in concrete shall conform to the following requirements:
 1. Preformed joint filler shall be a non-extruding, resilient, bituminous type conforming to the requirements of ASTM D 1751.
 2. Elastomeric joint sealer shall be a single component, pour grade, polyurethane sealant meeting FS TT-S-230A, Type 1 Materials shall attain Shore A Hardness of 40-45.
- B. Joint Cleaner: Joint cleaner shall be as recommended by sealant caulking compound manufacturer.
- C. Joint Primer: Joint primer shall be as recommended by sealant manufacturer.

2.04 REINFORCING STEEL

- A. All reinforcing steel for all reinforced concrete construction shall conform to the following requirements:
 1. Bar reinforcement shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel Reinforcement with supplementary requirement S-1, and shall be manufactured in the United States.

2. Welded wire fabric reinforcement shall conform to the requirements of ASTM A 185. All welded wire fabric reinforcement shall be galvanized.

2.05 CONCRETE DESIGN REQUIREMENTS

- A. General: Concrete shall be composed of cement, admixtures, aggregates and water. These materials shall be of the quantities specified. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface. All changes shall be subject to review by the Owner.
- B. Water-Cement Ratio and Compressive Strength: The minimum compressive strength and cement content shall be not less than specified in the following tabulation:

Aggregate Type of Work	Min. 28-Day Compressive Strength (psi)	Max. Aggregate Size (in.)	Min. Cement (sacks)	Max. W/C (by wt).
Structural Concrete:				
All reinforced concrete unless noted otherwise below	4,000 (Class A)	3/4	6.0	0.45
Sitework Concrete:				
Concrete fill, pavement, curbs and sidewalks.	3,000 (Class B)	1	5.5	0.50

Note: One sack of cement equals 94 lbs.

2.06 CONSISTENCY

- A. The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143. The slumps shall be as 3 inches, plus or minus 1 inch.

2.07 READY-MIXED CONCRETE

- A. Ready-mixed concrete shall conform to meeting the requirements as to materials, batching, mixing, transporting, and placing as specified herein and in accordance with ASTM C 94.
- B. Ready-mixed concrete shall be delivered to the site of the work, and discharge shall be completed within one and one half hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever is first. In hot weather, or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 degrees F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 60 minutes.

2.08 NON-SHRINK GROUT

- A. Non-shrink grout shall be a prepackaged, inorganic, non-gas-liberating, nonmetallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout specified herein shall be that recommended by the manufacturer for the particular application.
- B. Non-shrink grouts shall have a minimum 28-day compressive strength of 5000 psi and shall meet the requirements of CRD C 621.

2.09 EPOXY GROUT

- A. Epoxy grout shall be a pourable, non-shrink, 100 percent solids system. The epoxy grout system shall have three components: resin, hardener, and specially blended aggregate, all premeasured and prepackaged. The resin component shall not contain any nonreactive diluents. Resins contained butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Manufacturer's instructions shall be printed on each container in which the materials are packaged.
- B. The chemical formulation of the epoxy grout shall be that recommended by the manufacturer for the particular application.
- C. The mixed epoxy grout system shall have a minimum working life of 45 minutes at 75 degrees F.
- D. The epoxy grout shall develop a compressive strength of 5000 psi in 24 hours and 10,000 psi in seven days when tested in accordance with ASTM C 579, Method B. There shall be no shrinkage (0.0 percent) and a maximum 4.0 percent expansion when tested in accordance with ASTM C 827.

2.10 FLOWABLE FILL

- A. Flowable fill shall be lean concrete proportioned without the use of coarse aggregate primarily for use as fill for abandoned utilities. Flowable fill shall be utilized only at locations indicated on the Drawings.
- B. Flowable fill shall meet the following requirements:
 - 1. Minimum cementitious materials content, per cubic yard 100 lbs.
 - 2. Maximum water-cementitious materials ratio, by weight 5.0
 - 3. Slump, maximum 30 ± 5
 - 4. Compressive strength lbs. per sq. inch at 28 days - F'c 50-150 psi
 - 5. Coarse aggregate none
 - 6. Fine aggregate limestone screenings

PART 3 - EXECUTION

3.01 PROPORTIONING AND MIXING

- A. Proportioning: Proportioning of the concrete mix shall conform to the requirements of Chapter 3 "Proportioning" of ACI 301.
- B. Mixing: Mixing of concrete shall conform to the requirements of Chapter 7 of said ACI 301 Specifications.
- C. Slump: Maximum slumps shall be 4 inches, plus or minus 1 inch.
- D. Retempering: Retempering of concrete or mortar which has partially hardened will not be permitted.

3.02 PREPARATION OF SURFACES FOR CONCRETING

- A. General: Earth surfaces shall be thoroughly wetted by sprinkling, prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing cement.
- B. No concrete shall be placed until the reinforcement steel and formwork have been erected in a manner acceptable to the OWNER. The CONTRACTOR shall notify the OWNER not less than 2 working days prior to concrete placement, allowing for inspection and any corrective measures which are required.
- C. Existing concrete surfaces upon or against which concrete is to be placed shall be given a roughened surface for good bond. Joint surfaces shall be cleaned of all laitance, loose or defective concrete, and foreign material. Such cleaning shall be accomplished by sandblasting followed by thorough washing. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.
- D. Corrosion Protection: Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2 inches clearance between said items and any part of the concrete reinforcement will not be permitted.
- E. Cleaning: The surfaces of all metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

3.03 HANDLING, TRANSPORTATION, AND PLACING

- A. General: Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section.
- B. Non-Conforming Work or Materials: Concrete which upon or before placing is found not to conform to the requirements specified herein shall be rejected and immediately removed from the Work. Concrete which is not placed in accordance with these Specifications, or which is of inferior quality, shall be removed and replaced by and at the expense of the CONTRACTOR.

- C. Unauthorized Placement: No concrete shall be placed except in the presence of duly authorized representative of the OWNER. The CONTRACTOR shall notify the OWNER in writing at least 24 hours in advance of placement of any concrete.
- D. Placement in Slabs: Concrete placed in sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the pour. As the work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screeded in an up-slope direction.

3.04 FINISHING CONCRETE SURFACES

- A. General: Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions shown on the Drawings are defined as tolerances and are specified herein. These tolerances are to be distinguished from irregularities in finish as described herein.
- B. Unformed Surfaces: After proper and adequate vibration and tamping, all unformed top surfaces of slabs and curbs shall be brought to a uniform surface with suitable tools.
- C. Slabs shall receive a steel trowel finish without local depressions or high points. In addition, the surface shall be given a light hairbroom finish with brooming perpendicular to drainage unless otherwise shown. The resulting surface shall be rough enough to provide a nonskid finish.

3.05 CURING AND DAMPPROOFING

- A. All concrete shall be cured for not less than 14 days after placing, in accordance with the methods specified herein for the different parts of the work, and described in detail in the following paragraphs.
- B. The surface shall be sprayed with a liquid curing compound. It shall be applied in accordance with the manufacturer's printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film which will seal thoroughly.
- C. Care shall be exercised to avoid damage to the seal during the curing period. Should the seal be damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the application of additional curing compound over the damaged portion.
- D. Wherever curing compound may have been applied by mistake to faces against which concrete subsequently is to be placed and to which it is to adhere, said compound shall be entirely removed by wet sandblasting just prior to the placing of new concrete.
- E. Curing compound shall be applied as soon as the concrete has hardened enough to prevent marring on unformed surfaces, and within 2 hours after removal of forms from contact with formed surfaces. Repairs required to be made to formed surfaces shall be made within the said 2-hour period; provided, however, that any such repairs which cannot be made within the said 2-hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing

compound has been applied, the area involved shall first be wet-sandblasted to remove the curing compound, following which repairs shall be made as provided herein.

3.06 PROTECTION

- A. The CONTRACTOR shall protect all concrete against injury until final acceptance by the OWNER. Fresh concrete shall be protected from damage due to rain. The CONTRACTOR shall provide such protection while the concrete is still plastic and whenever such precipitation is imminent or occurring.

3.07 TREATMENT OF SURFACE DEFECTS

- A. As soon as forms are removed, all exposed surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plaster or coat surfaces to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the OWNER. In no case will extensive patching of honeycombed concrete be permitted. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall have them repaired as specified herein. Concrete containing extensive voids, holes, honeycombing, or similar depression defects, shall be completely removed and replaced. All repairs and replacements herein specified shall be promptly executed by the CONTRACTOR at its own expense.

3.08 CARE AND REPAIR OF CONCRETE

- A. The CONTRACTOR shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the OWNER. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with the acceptable concrete at the CONTRACTOR's expense.

3.09 FABRICATION OF REINFORCING STEEL

- A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings, and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.

3.10 PLACING REINFORCING STEEL

- A. Reinforcing steel shall be accurately positioned as shown on the Drawings, and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. All concrete blocks used to support reinforcing steel shall be tied to the steel with wire ties which are

embedded in the blocks. For concrete over formwork, the CONTRACTOR shall furnish concrete, metal, plastic, or other acceptable bar chairs and spacers.

3.11 CLEANING AND PROTECTION OF REINFORCING STEEL

- A. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.
- B. The surfaces of all reinforcing steel and other metalwork to be contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed. Where there is a delay in depositing concrete, reinforcing shall be re-inspected and, if necessary recleaned.

3.12 GENERAL

- A. All surface preparation, curing, and protection of cement grout shall be as specified herein. The finish of the grout surface shall match that of the adjacent concrete.
- B. The CONTRACTOR through the manufacturer of non-shrink grout and epoxy grout shall provide on-site technical assistance upon request, at no additional cost to the OWNER.
- C. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.
- D. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

END OF SECTION

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SECTION 03400

PRECAST CONCRETE

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall construct all precast items as required in the Contract Documents, including all appurtenances necessary to make a complete installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03305 - Concrete and Grout

1.03 REFERENCED SPECIFICATIONS, CODES, AND STANDARDS

- A. Codes: Without limiting the generality of other requirements of these Specifications, all work specified herein shall conform to or exceed the requirements of the Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.
- B. Commercial Standards:

ASTM A 48	Specifications for Gray Iron Castings
ASTM A 615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
ASTM C 478	Specifications for Precast Reinforced Concrete Manhole Sections
ACI 318	Building Code Requirements for Reinforced Concrete

1.04 DEFINITIONS

- A. In these Specifications, where the term "Precast Concrete" shall mean precast manholes, handholes, vaults, meter boxes, pull boxes, inlets, catch basins, and similar structures.

PART 2 -- PRODUCTS

2.01 CONCRETE

- A. Concrete materials shall have a 28-day strength of 4,000 psi, unless otherwise noted on the plans or as specified herein.
- B. For prestressed concrete items, minimum compressive strength of concrete at 28 days shall be 5,000 psi unless otherwise specified. Minimum compressive strength of concrete at transfer of pre-stressing force shall be 4,000 psi.
- C. For non-prestressed concrete items, minimum compressive strength of concrete at 28 days shall be 4000 psi unless otherwise specified.

2.02 GROUT

- A. Grout for joints between panels shall be a non-shrink, non-metallic grout in conformance with the Section entitled "Concrete and Grout".
- B. Minimum compressive strength of grout at 7 days shall be 3,000 psi.

2.03 REINFORCING STEEL

- A. Reinforcing steel used for precast concrete construction shall conform to ASTM A615, Grade 60.

2.04 PRESTRESSING STRANDS

- A. Pre-stressing strands shall be 7-wire, stress-relieved, high-strength strands Grade 250K or 270K.

2.05 WELDING

- A. Welding shall conform to applicable standards.

2.06 NEOPRENE

- A. Neoprene bearing pads shall conform to applicable standards.

PART 3 – EXECUTION

3.01 FABRICATION AND CASTING

- A. All precast members shall be fabricated and cast to the shapes, dimensions and lengths shown on the Drawings and in compliance with PCI MNL-116. Precast members shall be straight, true, and free from dimensional distortions, except for camber and tolerances permitted later in this clause. All integral appurtenances, reinforcing, openings, etc., shall be accurately located and secured in position with the form work system. Form materials shall be steel and the systems free from leakage during the casting operation.
- B. The CONTRACTOR shall coordinate the communication of all necessary information concerning openings, sleeves, or inserts to the manufacturer of the precast members.
- C. The manufacturer shall provide lifting inserts.
- D. Precast Manholes shall be cast with Xypex C-500 NF Red Admixture dosed at a rate of 2% by weight of cementitious content and per manufacturer's instructions.

3.02 HANDLING, TRANSPORTING AND STORING

- A. Precast structures shall not be transported from the casting yard until the concrete has reached the minimum required 28-day compressive strength and a period of at least 5 days has elapsed since casting.
- B. During handling, transporting, and storing, precast concrete structures shall be lifted and supported only at the lifting or supporting points.

- C. Precast concrete structures shall not be used as storage areas for other materials or equipment.

3.03 ERECTION

- A. Erection shall be carried out using labor, equipment, tools and materials required for proper execution of the work.
- B. No CONTRACTOR, Subcontractor or any of its employees shall arbitrarily cut, drill or otherwise tamper with precast structures.

3.04 FINISHES

- A. The inside surfaces of precast concrete structures for sanitary sewer applications shall be coated with Madewell Mainstay ML-72 and top-coated with Madewell Mainstay DS-5, or approved equal. ML-72 system shall be applied at min. 0.5" thickness. Concrete surfaces shall receive min. 100-mil DFT of DS-5. Ductile Iron shall receive min. 25-mils DFT of DS-5. All angled surfaces shall be stripe coated using DS-5 prior to application of top-coat. Metallic surfaces shall be degreased prior to abrasive blast cleaning. Pipe surfaces shall be abrasive blast or power-tool cleaned per SSPC SP-10 or SSPC SP-3, respectively, with a 2-4 mil anchor pattern depth. All paint applications shall be done in strict accordance with the manufacturer's recommendations.

END OF SECTION

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DIVISION 8

OPENINGS

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SECTION 08310
ACCESS
HATCHES

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall furnish, fabricate, and install access hatches and appurtenances, complete, all-in accordance with the requirements of the Contract Documents.

1.02 SUBMITTALS

- A. Shop drawings of all miscellaneous metalwork shall be submitted to the OWNER for review in accordance with Section 01300 SUBMITTALS.

PART 2 – PRODUCTS

2.01 ACCESS HATCHES

A. General

1. Door opening sizes, number, and direction of swing of door leaves, and locations shall be as shown on the Drawings. The Drawings show the clear opening requirements.
2. All doors shall be aluminum (mill finish) unless otherwise noted.
3. Openings larger than 42 inches in either direction shall have double leaf doors with spring-loaded hinges.
4. Doors shall be designed for flush mounting and easy opening from both inside and outside.
5. All doors shall be provided with an automatic hold-open arm with release handle.
6. Double leaf doors shall be provided with Type 316 stainless steel safety chains to go across the open sides of the door, when in the open position. Brackets shall be provided on the underside of the doors to hold the safety bars when not in use.
7. All hardware, including but not limited to, all parts of the latch and lifting mechanism assemblies, hold open arms and guides, brackets, hinges, springs, pins, and fasteners shall be Type 316 stainless steel.
8. Cylinder locks with keyway protected by a cover plug shall be provided with all hatches.
9. Door leafs shall be minimum 1/4-inch aluminum diamond plate, stiffened and designed for H-20 live loads at areas that could receive traffic wheel loads.
10. Door frames shall be water-tight, gas-type equipped with a built-in neoprene cushion / O- ring gasket.

11. Access hatches shall be Model W-AHS by US Fabrications, or equal, unless otherwise noted on the Drawings.

12. Hatches shall be guaranteed against defects for a period of five years.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes and dimensional tolerances are acceptable.

B. Verify that supports and anchors are correctly positioned.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions.

B. Place frames in correct Position, plumb and level.

C. Set perimeter closure flush with top of grating and surrounding construction.

D. Secure to prevent movement.

END OF SECTION

DIVISION 11

EQUIPMENT

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SECTION 11315

SUBMERSIBLE SEWER PUMPS

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. This section covers the work necessary to furnish and install submersible centrifugal pumps as specified herein and as shown on the drawings.
- B. The CONTRACTOR shall provide all equipment and appurtenances necessary for a complete and fully operational submersible duplex lift station. Items include, but are not limited to, pumps, guide rails, floats, hangers, access hatch, control panel, etc., as specified herein and as shown on the drawings.
- C. Any electrical equipment supplied shall comply with the U.S. labeling requirements of Division 16.

1.02 RELATED WORK

- A. Section 01640 OWNER FURNISHED PRODUCTS
- B. Division 05 – METALS
- C. Division 16 – ELECTRICAL

1.03 MANUFACTURERS

- A. The pumps shall be as manufactured by Wilo-EMU, Flygt or HOMA, or OWNER approved equal, unless otherwise noted.

1.04 SUBMITTALS

- A. The CONTRACTOR shall submit to the OWNER complete shop drawings showing details of fabrication, materials of construction, wiring diagrams, installation and leveling data of all items furnished under this Section. The OWNER shall provide copies of approved shop drawings to the CONTRACTOR for installation and startup of OFE.
- B. The CONTRACTOR shall submit the following shop drawings and information for the OWNER's review and approval:
 - 1. Manufacturer's/suppliers literature, illustrations, specifications, and bill of materials for each component of the system.
 - 2. Dimensions (including anchor bolt layout), materials, size, weight, and performance data including confirmation of fit w/in proposed stations / access hatches.
 - 3. Drawings showing fabrication, assembly, installation, and wiring diagrams.
 - 4. Drawings showing electrical motor data and control drawings/data.
 - 5. Shop Drawings illustrating installation plans and sections with construction dimensions and requirements, and all other pertinent data necessary for installation and operation.

- C. The Equipment Supplier shall submit the following shop drawings and information for the OWNER's review and approval:
 - 1. Data on the characteristics and performance of the pumps. Data shall include guaranteed performance curves, based on actual shop tests of duplicate units, which show that they meet the specified requirements for head, capacity, efficiency, allowable NPSH, allowable suction lift and horsepower. Curves shall be submitted on 8 ½ by 11" sheets.
 - 2. A list of the Manufacturer's recommended spare parts. Include gaskets, packing, etc. on the list. List bearings by the bearing manufacturer's numbers only.
 - 3. A complete description of surface preparation and shop primepainting.
- D. The Equipment Supplier shall submit the Operation and Maintenance Manuals for each equipment supplied under this project for the OWNER's review and approval. Operation and Maintenance manuals shall include the following information:
 - 1. A list of each product included, indexed to content of the volume.
 - 2. List, with each product, name, address, and telephone number of:
 - a. Maintenance CONTRACTOR, as appropriate.
 - b. Local source of supply for parts and replacement.
 - 3. Identify each product-by-product name and other identifying symbols as set forth in Contract Documents.
 - 4. Product Data:
 - a. Include only those sheets which are pertinent to the specific product.
 - b. Annotate each sheet to:
 - 1) Clearly identify specific product or part installed.
 - 2) Clearly identify data applicable to installation.
 - 3) Delete references to inapplicable information.
 - 5. Drawings
 - a. Supplement product data with drawings as necessary to clearly illustrate:
 - 1) Relations of component parts of equipment and systems.
 - 2) Control of flow diagrams.
 - 6. Written text, as required to supplement product data for the particular installation:
 - a. Organize in consistent format under separate headings for different procedures.
 - b. Provide logical sequence of instruction for each procedure.
 - 7. Copy of each warranty, bond and service contract issued.
 - 8. Content, for each unit of equipment and system, as appropriate:
 - a. Description of unit and component parts.
 - b. Function, normal operating characteristics, and limiting conditions.

- c. Performance curves, engineering data and tests.
 - d. Complete nomenclature and commercial number of replaceable parts.
- 9. Operating procedures.
 - a. Start-up, break-in, routine, and normal operating instructions.
 - b. Regulation, control, stopping, shutdown, and emergency instructions.
 - c. Special operating instructions.
- 10. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "Troubleshooting.
 - c. Disassembly, repair, and reassembly.
 - d. Alignment, adjusting, and checking.
- 11. Servicing and list of lubricants required.
- 12. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as parts.
- 13. Content, for each electric and electronic system, as appropriate:
 - a. Description of system and component parts.
 - b. Function, normal operating characteristics, and limiting conditions.
 - c. Performance curves, engineering data and tests.
 - d. Complete nomenclature and commercial number of replaceable parts.
- 14. As-installed color-coded wiring diagrams.

1.05 GUARANTEES AND WARRANTIES

- A. After completion, the Equipment Supplier shall furnish to the OWNER the manufacturer's written guarantees, that the pumping equipment will operate with the published efficiencies, heads, and flow ranges and meet these specifications. The CONTRACTOR shall also furnish the manufacturer's warranties as published in its literature and as specified. Municipal-use pumps and motors shall be covered by a five (5) year warranty that shall comprise the following terms: The initial year from start-up of the equipment shall be covered 100% for parts and labor. The following years 2 through 5 shall be covered 100% for parts. This warranty shall not be limited by hours of running time nor operation from variable speed drives.

1.06 HARDWARE

- A. All machine bolts, nuts and capscrews shall be of the hex head type and shall be furnished in 316 stainless steel. Hardware requiring special tools or wrenches shall not be used.

1.07 TOOLS, SUPPLIES, AND SPARE PARTS

- A. All standard tools, supplies and spare parts required shall be supplied as OFE. Parts shall be completely identified with a numerical system to facilitate parts inventory,

control and stocking. Each part shall be properly identified by a separate number, and those parts which are identical for more than one size unit shall have the same number. The following shall be supplied for each pumping system:

1. Two (2) sets of all special tools required for normal operation and maintenance shall be provided. All such tools shall be furnished in a suitable steel tool chest complete with lock and duplicate keys.
 2. One (1) complete set of gaskets, "O"-Rings, etc. for each pump station.
- B. Spare parts lists, included with the shop drawings submittal shall indicate specific sizes, quantities, and part numbers of the items to be furnished. Terms such as "1 lot of packing material" are not acceptable.
- C. All spare parts shall be properly protected for long periods of storage and packed in containers which are clearly identified with indelible markings as to the contents.

1.08 SHOP PAINTING

- A. Pumps and motor assemblies provided as OFE by the Equipment Supplier shall be delivered to the site pre-painted in accordance with the following criteria: before exposure to weather and prior to shop painting, all surfaces shall be thoroughly cleaned, dry and free from all mill/scale, rust, grease, dirt and other foreign matter.
- B. All pumps and motors shall have an epoxy coating finish.
- C. 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 periods of storage and erection and shall be satisfactory to the OWNER up to the time of the final acceptance.

PART 2 - PRODUCTS

2.01 PUMPS AND CONTROL PANELS

A. Lift Station No. 27

1. The pumps and control panel shall be furnished and installed by the CONTRACTOR. Furnish and install two (2) submersible wastewater grinder pumps. Each pump shall be equipped with a 0.75 HP min. submersible electric motor, rated for continuous duty and connected for operation on 230 volts, 1 phase, 60 hertz, with 75 feet of submersible cable suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and shall also meet/have P-MSHA Approval.
2. The pump shall be supplied with a mating cast iron 2-inch discharge connection and shall be capable of delivering 30 GPM at 9.17 feet TDH. Pumps shall be Model CK 2437-1750-J (0.75 HP min.) as manufactured by Weil/Wilo. No alternate will be considered. Pump shall have 316 SS hardware. Rotating Cutter and Shredder Ring shall be 440C Stainless Steel Rockwell 58C. Pump shall include optional high-temp motor and double seals.
3. The pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a watertight contact. No portion of the pump shall bear

directly on the sump floor. Each pump shall be fitted with 35-feet of stainless-steel cable. The working load of the lifting system shall be 50% greater than the pump unit weight.

B. Lift Station No. 53

1. The pumps and replacement control panel components shall be furnished and installed by the CONTRACTOR. Furnish and install two (2) submersible wastewater pumps. Each pump shall be equipped with no greater than a 12 HP submersible electric motor, rated for continuous duty and connected for operation on 240 / 480 volts, 3 phase, 60 hertz, with 75 feet of submersible cable suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and shall also meet/have P-MSHA Approval.
2. The pump shall be supplied with a mating cast iron 4-inch discharge connection and shall be capable of delivering 225 GPM at 65 feet TDH. Pump performance shall be as outlined in Table 11315-1 at the end of this section.
3. The pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. No portion of the pump shall bear directly on the sump floor. Each pump shall be fitted with 35-feet of stainless-steel cable. The working load of the lifting system shall be 50% greater than the pump unit weight.

C. Pump Construction

1. Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. All exposed nuts or bolts shall be AISI type 304 stainless steel construction. Lifting handle shall be of stainless steel. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.
2. Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.

D. Cooling System

1. Each unit shall be provided with an adequately designed cooling system. The stainless steel cooling jacket shall encircle the stator housing; thus, providing heat dissipation for the motor regardless of the type of installation. An impeller, integral to the cooling system and driven by the pump shaft, shall provide the necessary circulation of the cooling liquid through the jacket. The cooling liquid shall pass about the stator housing in the closed loop system and shall have fill/drain ports integral to the cooling jacket. Provisions for external cooling and seal flushing shall also be provided. The cooling system shall provide for continuous pump operation in liquid temperature of up to 104 degrees F.

Cooling systems requiring a separate, clean water source or that circulate pumped sewage through a cooling jacket shall not be accepted, unless otherwise noted.

E. Cable Entry Seal

1. The cable entry seal design shall preclude specific torque requirements to ensure a watertight and submersible seal. The cable entry shall consist of cylindrical elastomer grommet(s), flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary, using the same entry seal.

F. Motor

1. The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in a watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation and epoxy resin and shall be rated for 180°C (356°F). Cable ties shall not be used for restraining of windings. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of no less than 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Rotor bars shall be statically and dynamically balanced after fabrication. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables using threaded compression type terminals. The use of wire nuts or crimp-type connectors is not acceptable.
2. The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.
3. The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.
4. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.
5. Motors shall have provisions for temperature and moisture detection to be wired to the control panel.

6. Motors shall be rated for Class 1, Division I hazardous locations and shall bear the Factory Mutual (FM) explosion-proof label.

G. Bearings

1. The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated and sealed. The upper bearing shall be a single roller bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces in normal and reverse directions. The minimum L_{10} bearing life shall be 50,000 hours at any usable portion of the pump curve.

H. Mechanical Seal

1. Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydrodynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, corrosion resistant tungsten-carbide ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating, corrosion resistant tungsten-carbide seal ring. Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor depend on direction of rotation for sealing. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. Seal springs shall be isolated from the pumped media to prevent materials from packing around them, limiting their performance. For special applications, other seal face materials shall be available.
2. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. The motor shall be able to operate dry without damage while pumping under load.
3. Seal lubricant shall be FDA approved, nontoxic.

I. Pump Shaft

1. Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The shaft shall be stainless steel – ASTM A479 S43100-T.

J. Impeller

1. The impeller shall be of gray cast iron, min. Class 40B, statically and dynamically balanced, double shrouded non-clogging design having a long throughlet without acute turns. The impeller(s) shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in wastewater. Impeller(s) shall be keyed to the shaft, retained with an Allen head bolt and shall be capable of passing a minimum three-inch diameter solid. All impellers shall be coated with an acrylic dispersion zinc phosphate primer.

K. Wear Rings

1. A wear ring system shall be used to provide efficient sealing between the volute and suction inlet of the impeller. Each pump shall be equipped with a 304 stainless steel ring insert that is drive fitted to the volute inlet.
2. The pump shall also have a duplex stainless steel impeller wear ring heat-shrink fitted onto the suction inlet of the impeller.

L. Volute

1. Pump volute(s) shall be single-piece grey cast iron, Class 35B, non-concentric design with smooth passages large enough to pass any solids that may enter the impeller. Suction and discharge flanges shall be 125# and meet ANSI standard B16.1.

M. Protection

1. All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. The thermal switches shall open at 125°C (260°F), stop the motor and activate an alarm.

N. Guide Rails

1. Pumps shall be provided with a complete guide rail assembly including all guide rail supports, anchor brackets, electrode device holder, Type 316 stainless steel lifting bale, and grip eye cable system as necessary to provide a complete and functioning system.
2. All guide rails, guide rail assemblies, and hardware shall be Type 316 stainless steel.
3. CONTRACTOR shall retrofit and/or replace existing guide rail system at Lift Station No. 53 as necessary to accommodate proposed replacement pumps.

O. Anchor Bolts

2. Anchor bolts shall be Type 316 stainless steel and shall be appropriately sized to accommodate all loads and forces introduced upon them.

2.02 INSTRUMENTATION EQUIPMENT

A. Pressure Gauge:

1. General:
 - a. Function: Pressure indication.
 - b. Type:
 - 1) Direct reading bellows for ranges below 10 psig.
 - 2) Bourdon tube actuated for ranges 10 psig and above.
2. Performance:
 - a. Range: As noted. Compound scale when noted.
 - b. Accuracy: Plus or minus 0.5 percent of span.
3. Features:
 - a. Mounting: Lower stem, unless otherwise noted.

- b. Dial: 4-1/2 inch diameter, unless otherwise noted.
 - c. Case Material: Phenolic plastic, unless otherwise noted.
 - d. Element Material: Phosphor-bronze, unless otherwise noted.
 - e. Dampening: Pulsation dampener (piston type) with multiple choice of piston placement to vary the desired amount of dampening.
 - f. Case Type: Solid front design with solid wall between window and element. Rear of case, gasketed pressure relief.
 - g. Pointer: Micrometer pointer with self-locking adjustment.
 - h. Movement: Stainless steel, rotary geared.
 - i. Liquid Filled Face: Required.
- 4. Process Connection:
 - a. Line Size: 1/2 inch.
 - b. Connection Type: Threaded.
- 5. Manufacturers:
 - a. Bellows Type:
 - 1) Ashcroft General Service Series 1180.
 - 2) Robert Shaw Acragage.
 - b. Bourdon Tube Type:
 - 1) Ashcroft Duragauge Model 1279/1379.
 - 2) Robert Shaw Acragage.
 - 3) Marsh Mastergauge.
- B. Pressure Seal, Diaphragm:
 - 1. General:
 - a. Function: Isolate sensing element from process fluid.
 - b. Type: Fluid filled, corrosion resistant.
 - 2. Service:
 - a. Pressure: Same as associated sensor.
 - b. Temperature: As noted.
 - 3. Features:
 - a. Materials:
 - 1) Lower Housing: Type 316 stainless steel, unless otherwise noted.
 - 2) Diaphragm Material: Type 316 stainless steel, unless otherwise noted.
 - b. Bleed screw in upper housing.
 - c. Fill Fluid: As noted. Factory filled and assembled when possible.
 - 4. Process Connections:
 - a. Instrument: 1/2-inch female NPT, unless otherwise noted.

- b. Process: 1/2-inch female NPT, unless otherwise noted.
 - c. Connection Material: As noted.
 - 5. Manufacturers:
 - a. Ametek, Mansfield and Green Division, Type SG.
 - b. Ashcroft, Type 101.
 - C. High Level
 - 1. Roto Float – Normally Open
- 2.03 ODOR GAS SCRUBBER ASSEMBLY
- A. There shall be supplied and installed at each sewage pump station vent, (1) odor and gas scrubber assembly. Each scrubber shall have an ANSI standard flange of 4" or 6" size. The odor and gas scrubber assembly sizes are as follows:
 - 4" EZ Vent Biovent Package with 12-inch Biovent Cartridge (Model 4"BVC412F)
 - 6" EZ Vent Biovent Package with 12-inch Biovent Cartridge (Model 6"BVC612F)
- 2.04 SOURCE QUALITY CONTROL
- A. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.
 - B. Factory Tests and Adjustments: Test all equipment and control panels actually furnished.
 - C. Factory Test Report: Include test data sheets, curve test results, performance test logs.
 - D. Functional Test: Perform manufacturer's standard.
 - E. Performance Test:
 - 1. Conduct on each pump.
 - 2. Perform under actual or approved simulated operating conditions.
 - 3. Test for a continuous 3-hour period without malfunction.
 - 4. Test Log: Record the following:
 - a. Total head.
 - b. Capacity.
 - c. Horsepower requirements.
 - d. Driving motor voltage and amperage measured for each phase.
 - e. Throttle discharge valve to obtain pump data points on curve at 2/3, 1/3, and shutoff conditions.
 - F. Test cables and conductors in accordance with Section 16080 Electrical Testing.

2.05 CONTROL PANEL

- A. The pump motor control panel and all related components shall be the responsibility of the pump supplier. Provide a complete control panel and components as shown on the electrical drawings and as specified in Division 26, ELECTRICAL. The panel shall be manufactured with all the specified components, no exceptions. This Section shall have complete responsibility for the supply, manufacturing, coordination with electrical and RTU CONTRACTORS and all test and startup as specified elsewhere in these Documents.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Pumping equipment shall be installed by the CONTRACTOR in accordance with accepted procedures submitted with the shop drawings and as shown on the Drawings.
- B. General installation requirements shall be as specified by the manufacturer's recommendations.

3.02 STARTUP AND TESTING

- A. CONTRACTOR shall verify that structures, equipment, pumps and motors are compatible for an efficient and properly operating system.
- B. CONTRACTOR shall make equipment adjustments required to place each system in proper operating condition.
- C. CONTRACTOR shall furnish the services of a qualified factory trained field service engineer from the equipment manufacturer (or approved representative) for 8-hour working days at the site to inspect the installation and instruct the OWNER's personnel on the operation and maintenance of the pumping units. After the pumps have been completely installed and wired, the CONTRACTOR shall have the manufacturer check the following:
 - 1. Megger stator and power cables.
 - 2. Check seal lubrication.
 - 3. Check for proper rotation.
 - 4. Check power supply voltage.
 - 5. Measure motor operating load and no load current.
 - 6. Check level control operation and sequence.

*During the operation trip the CONTRACTOR, through the manufacturer, shall instruct OWNER's personnel as specified in Section 01750 – Startup Procedures

- 7. Any additional time required to achieve successful installation and operation shall be at the expense of the CONTRACTOR.
- D. CONTRACTOR shall coordinate the following Performance Testing which shall be performed by the Manufacturer's representative. The operational test shall consist of checking the unit at its rated speed, head, capacity, efficiency and brake horsepower, and at such other conditions of head and capacity to properly

establish the performance curve (min. of four points). Signed copies of test curves shall be submitted to the OWNER. The OWNER shall have access to the raw test data and calculations and shall witness the tests. CONTRACTOR shall provide 2-week notice to OWNER before testing is performed.

- E. CONTRACTOR shall coordinate the following electrical integrity tests which shall be performed by the Manufacturer's representative. The tests shall consist of the following procedures:
1. Impeller, motor rating, and electrical connections shall be checked for compliance with this specification.
 2. All motor and cable insulation shall be tested for moisture content and insulation defects prior to pump submergence. A meggar test of each motor shall also be performed.
 3. Prior to submergence, the pump shall run dry to establish correct rotation and mechanical integrity.
 4. After operational test is completed, the insulation shall be retested. A written report stating the foregoing tests that have been conducted shall be submitted to the OWNER with each pump.
 5. Operate each pump for five (5) consecutive hours, during which time no repairs or adjustments shall be required. Demonstrate that each pump starts and stops in response to their level switches or controls. Add clean water to fill each wet well four times each hour to activate the level controls. Repair or adjust equipment until the system functions as installed for the duration of the fire hose test period.

Table 11315-1
Duty Pumping Unit Design Requirements for LS 53

Item/Design Conditions	Criteria
COS1	
Flow (gpm)	225
Total Dynamic Head (ft)	65
Minimum Efficiency (%)	45.5
COS2	
Flow (gpm)	450
Total Dynamic Head (ft)	51
Minimum Efficiency (%)	58
COS3	
Flow (gpm)	600
Total Dynamic Head (ft)	40
Minimum Efficiency (%)	58

END OF SECTION

DIVISION 15

MECHANICAL

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SECTION 15000

PIPING AND FITTINGS, GENERAL

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall furnish and install all piping systems shown and specified, in accordance with the requirements of the Contract Documents. Each system shall be complete with all necessary fittings, supports, anchors, expansion joints, flexible connectors, valves, accessories, lining and coating, testing, excavation, backfill and encasement, to provide a functional installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02222 - Excavation and Backfill for Utilities.
- B. Section 15995 - Pipeline Testing and Disinfection.

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit complete shop drawings and certificates, test reports, Affidavits of Compliance, of all piping systems, in accordance with the requirements in the Section 01300- "Submittals", and as specified in the individual piping sections.
- B. Each shop drawing submittal shall be complete in all aspects, incorporating all information and data listed herein and all additional information required to evaluate the proposed piping material's compliance with the Contract Documents. Partial or incomplete submissions will be returned to the CONTRACTOR without review.
- C. Data to be submitted shall include, but not be limited to:
 - 1. Catalog Data consisting of specifications, service, pipe size, working pressure, wall thickness, lining, coating, illustrations and a parts schedule that identifies the materials to be used for the various piping components and accessories. The illustrations shall be in sufficient detail to serve as a guide for assembly and disassembly.
 - 2. Weight of all component parts.
 - 3. Design calculations where specified.
- D. Certifications: Prior to installation, the CONTRACTOR shall furnish an Affidavit of Compliance certified by the pipe manufacturer that the pipe, fittings, and specials furnished under this Contract comply with all applicable provisions of AWWA and these specifications. No pipe or fittings will be accepted for use in the Work on this project until the affidavits have been submitted and accepted in accordance with the Section entitled "Submittals".

1.04 All expenses incurred in making samples for certification of tests shall be borne by the CONTRACTOR.

1.05 QUALITY ASSURANCE

- A. General: All pipe shall be subject to review at the place of manufacture. During the manufacture of the pipe, the OWNER shall be given access to all areas where manufacturing is in progress and shall be permitted to make all inspections necessary to confirm compliance with the Specifications.
- B. Tests: Except where otherwise specified, all materials used in the manufacture of the pipe shall be tested in accordance with the applicable Specifications and Standards.
- C. Welding Requirements: All welding procedures used to fabricate pipe shall be prequalified under the provisions of ANSI/AWS D1.1. Welding procedures shall be required for, but not necessarily limited to, longitudinal and girth or spiral welds for pipe cylinders, spigot and bell ring attachments, reinforcing plates and ring flange welds, and plates for lug connections.

1.06 MANUFACTURER'S SERVICE REPRESENTATIVE

- A. Where the assistance of a manufacturer's service representative is advisable, in order to obtain correct pipe joints, supports, or special connections, the CONTRACTOR shall furnish such assistance at no additional cost to the OWNER.

1.07 SHIPPING, HANDLING AND STORAGE

- A. Special care in handling shall be exercised during delivery, distribution and storage of pipe to avoid damage and setting up stresses. Damaged pipe will be rejected and shall be replaced at the CONTRACTOR's expense. Pipe and specials stored prior to use shall be stored in such a manner as to keep the interior free from dirt and foreign matter.
- B. No pipe shall be dropped from cars or trucks to the ground. All pipe shall be carefully lowered to the ground by mechanical means. In shipping, pipe and fittings shall be blocked in such manner as to prevent damage to castings or lining. Any broken or chipped lining shall be carefully patched. Where it is impossible to repair broken or damaged lining in pipe because of its size, the pipe shall be rejected as unfit for use.
- C. All mechanical joint pipe shall be laid with 1/8-inch space between the spigot and shoulder of pocket.

1.08 CLEANUP

- A. After completion of the work, all remaining pipe cuttings, joining and wrapping materials, and other scattered debris, shall be removed from the site. The entire piping system shall be handed over in a clean and functional condition.

PART 2 -- PRODUCTS

2.01 GENERAL

- A. All pipes, fittings, and appurtenances shall be installed in accordance with the requirements of the applicable Sections of Division 2 and City of Boca Raton Shop Drawing Submittals & Approved Utility Product List.

- B. Pressure Rating: All piping systems shall have pressure ratings as identified in the individual piping sections of the Specifications.

2.02 SLEEVE-TYPE COUPLINGS

- A. Solid Sleeves: Solid sleeves shall be ductile iron, have a pressure rating of 250 psi and conform to ANSI/AWWA C110/A21.10. Solid sleeves shall be used as required to join two plain end pieces of pipe.

2.03 PIPE THREADS

- A. All pipe threads shall be in accordance with ANSI/ASME B1.20.

2.04 SOLDER

- A. Solder for joining copper pipe shall be lead free.

PART 3 -- EXECUTION

3.01 GENERAL

- A. The CONTRACTOR shall furnish all labor, tools, materials, and equipment necessary for installation and jointing of the pipe. All piping shall be installed in accordance with the Drawings in a neat workmanlike manner and shall be set for accurate line and elevation. All piping shall be thoroughly cleaned before installation, and care shall be taken to keep the piping clean throughout the installation.
- B. Piping shall be attached to valves, etc., in accordance with the respective manufacturers' recommendations.

3.02 COATINGS

- A. The exterior of all above grade fittings and ductile iron piping shall be coated in the following manner:
 - i) Sandblast and remove all paint and any loose material in accordance with SSPC SP-10 (steel surfaces) or NAPF 500-03 (ductile iron surfaces). Sandblasting shall be performed using non-silica media. The firm applying the coating must be a licensed painting CONTRACTOR certified to installed the approved coating system. The CONTRACTOR shall use the following paint system:

- | | | |
|----|--------------------|---|
| 1) | Primer: | TNEMEC-Chembuild #135
(3.0 to 5.0 mils DFT), aluminum color |
| 2) | Intermediate Coat: | TNEMEC-Chembuild #135
(3.0 to 5.0 mils DFT), off-white color |
| 3) | Finish Coat: | TNEMEC-Endura-Shield II #1094
(with UV Blocker)
(2.0 to 3.0 mils DFT)
Color: Light Gray (32GR) |

Or approved equal.

Inspections are required after sandblasting and prior to application of the primer, after primer and after intermediate coat applications.

- B. All flanged pipe shall be caulked between each flange and threads with Sika 1A urethane caulk.
- C. Portions of the ductile iron piping in contact with the concrete pad shall be coated with coal-tar epoxy.
- D. All Stainless Steel nuts, bolts, and hardware shall be 316 Stainless Steel. Anti-galling compound, anti-seize lubricant shall be applied to the threads of all Stainless Steel bolts prior to installation. Anti-seize lubricant shall be graphite 50 anti-seize by Loctite Corporation, 1000 anti-seize paste by Dow Corning, or 3M lube and anti-seize.

3.03 LAYING PIPE

- A. Proper and suitable tools and appliances for the safe convenient handling and laying of pipe shall be used and shall, in general, agree with manufacturer's recommendations. At the time of laying, the pipe shall be examined carefully for defects, and should any pipe be discovered to be defective after being laid, it shall be removed and replaced with sound pipe by the CONTRACTOR at his expense.
- B. The CONTRACTOR shall perform all earthwork including excavation, backfill, bedding, compaction, sheeting, shoring and bracing, dewatering and grading in accordance with Division 2 "Sitework."
- C. Upon satisfactory excavation of the pipe trench and completion of the pipe bedding, a continuous trough for the pipe barrel and recesses for the pipe bells, or couplings, shall be excavated by hand digging. When the pipe is laid in the prepared trench, true to line and grade, the pipe barrel shall receive continuous, uniform support and no pressure shall be exerted on the pipe joints from the trench bottom.
- D. Pipe shall be installed in accordance with the manufacturer's recommendation. Before being lowered into the trench, the pipes and accessories shall be carefully examined, and the interior of the pipes shall be thoroughly cleaned of all foreign matter and other acceptable methods. At the close of each work day and during suspension of work for any reason at any time, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other foreign material from entering the pipe.
- E. Lines shall be laid straight and depth of cover shall be maintained uniform with respect to finish grade, whether grading is completed or proposed at time of pipe installation. Where a grade or slope is shown on the Drawings, the CONTRACTOR shall use laser-based surveying instruments to maintain alignment and grade. At least one elevation shot shall be taken on each length of pipe and recorded. No abrupt changes in direction or grade will be allowed.
- F. All underground piping shall be properly restrained at all fittings where the pipeline changes direction, changes size, or ends, using restrained joint pipe.

3.04 THREADED JOINTS

- A. All threads shall be clean, machine cut and all pipe shall be reamed before erection. Taps and dies shall be cleaned, sharpened and in good condition. All threaded joints shall be made tight with Teflon tape.
- B. After having been set up, a joint shall not be backed off unless the joint is broken, the threads cleaned and new tape is applied.

3.05 THRUST/ PIPE RESTRAINT

- A. All joints shall be restrained per City Standard Detail "Mechanical Thrust Restraint minimum Pipe Lengths".

3.06 TESTING

- A. Field testing of pipelines shall conform to the requirements of the Section 15995- "Pipeline Testing and Disinfection".

END OF SECTION

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SECTION 15006
DUCTILE IRON PIPE

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall furnish and install ductile iron pipe and all appurtenant Work, complete in place, all in accordance with the requirements of the Contract Documents. All pipe and fittings shall be push-on or restrained joint pipe.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15000 - Piping, General.
- B. Section 15995 - Pipeline Testing and Disinfection

1.03 REFERENCED SPECIFICATIONS, CODES AND STANDARDS

- A. Commercial Standards:

ANSI/AWWA C104/A21.5	Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
ANSI/AWWA C110/A21.10	Ductile-Iron and Gray-Iron Fittings 3-inch through 48-inches For Water and Other Liquids
ANSI/AWWA C111/A21.11	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
ANSI/AWWA C150/A21.50	Thickness Design of Ductile Iron Pipe
ANSI/AWWA C151/A21.51	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or other Liquids
ANSI/AWWA C153/A21.53	Mechanical Joint, Compact Body Ductile Iron Fittings.
ANSI/AWWA C600	Installation of Ductile-Iron Water Mains and Appurtenances
ASTM A716/A746	Ceramic Epoxy lining for Ductile Iron Pipe and Fittings for Sanitary Sewer
SSPC - PA2	Measurement of Dry Paint Thickness with Magnetic Gages

PART 2 -- PRODUCTS

2.01 PIPE

- A. All ductile iron pipe for potable water mains shall conform to the requirements of ANSI/AWWA Standard C151/A21.51. The wall thickness and outside diameter of the pipe shall conform to ANSI/AWWA C150/A21.50 and the following:
 - Pressure Class 350 for 12" and smaller
 - Pressure Class 250 for pipes larger than 12"
- B. All ductile iron pipe for force mains shall conform to ASTM A716/A746 Ceramic Epoxy Lined – Protecto 401 (40 mils); asphalt coated on the outside.
 - Pressure Class 350 for 4" through 24"
- C. Each pipe shall be cast with the year of manufacture, the class and the letters "DI" for ductile iron.
- D. Pipe Brand and Model Types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.02 FITTINGS

- A. Fittings for use with the ductile iron pipe specified herein, shall be ductile iron. Cast ductile-iron fittings shall be pressure rated at 250 psi, minimum. All fittings with mechanical joints, flange joints and push-on joints shall conform to AWWA/ANSI Standard C110/A21.10. In addition, fittings with mechanical joints and push-on joints shall conform to ANSI/AWWA Standard C111/A21.11.
- B. Fittings for use with ductile iron pipe for sanitary sewer service, shall be ductile iron. Cast ductile iron fittings shall be mechanical joint, compact body per ANSI/AWWA C153/A21.53. All ductile iron fittings for force mains shall conform to ASTM A716/A746 Ceramic Epoxy Lined – Protecto 401 (40 mils); asphalt coated on the outside.
- C. Fittings Brand and Model Types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.03 JOINTS

- A. General: All pressurized ductile iron pipe and fittings for use below grade shall have restrained joints.
- B. All ductile iron pipe and fittings shall have rubber gaskets in conformance with ANSI/AWWA Standard C111/A21.11.
- C. Restrained Push-On Joint (Bell and 2nd MJ Restraint): Joints for ductile iron pipe shall be per the City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal. The restraining components, when not cast integrally with the pipe shall be ductile iron or a high strength noncorrosive alloy steel. Tee head bolts and hexagonal nuts for all restrained joints in pipe and fittings shall be of high strength cast iron with composition, dimensions and threading as specified in ANSI/AWWA Standard

C111/A21.11, except that the length of the bolts shall meet the requirements for the restrained joint design.

- D. The gasket and joint accessories shall be shipped in suitable protective containers. Each restrained joint and the pipe and fitting of which it is a part, shall be designed to withstand the axial thrust from an internal pipeline pressure of at least 250 psi at bulkhead conditions without reduction because of its position in the pipeline nor from support by external thrust blocks. Restrained joint pipe and fittings shall be capable of being deflected after assembly.
- E. Restrained Mechanical Joint Pipe: Mechanical joints for fittings and valves shall be restrained with Brand and Model Types per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.
- F. Gaskets: All ductile iron pipe and fittings shall use gaskets appropriate for the type of service. Gaskets shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. For potable watermains and reclaimed water mains, gaskets shall be EPDM. Restraining Gaskets for sanitary sewer force main pipe restraints shall be of the Brand and Model Types per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.04 PIPE LINING

- A. Water and Reuse: All ductile iron pipe and fittings for potable water service and reclaimed water service shall be smooth cement-lined followed by a bituminous seal coat in accordance with AWWA C104/ANSI A21.4.
- B. Sanitary Sewer: All ductile iron pipes and fittings for sanitary sewer service shall conform to ASTM A716/A746 Ceramic Epoxy Lined – Protecto 401 (40 mils).
- C. Special attention shall be given to the lining of fittings. Linings shall be applied to bare metal. All lining shall extend to the faces of flanges, to the end of spigots, or to the shoulder of hubs, as the case may be.

2.05 EXTERIOR COATING

- A. An asphaltic coating shall be applied to the exterior of all ductile iron pipe and fittings intended for buried service and shall conform to ANSI A21.51. Exterior coatings damaged in the field shall be repaired with a bituminous or coal tar repair coating.

2.06 PIPE IDENTIFICATION PAINT

- A. All pipe shall have continuous identification paint stripe painted on the pipe to indicate service of the pipe; blue for water, green for sewer and purple for reclaimed water. For pipe striped during manufacturing, the stripes shall be applied parallel to the pipe centerline at 90-degree intervals. If paint is applied as the pipe is laid, a blue stripe shall be located along the top of the pipe. Pipe shall be color coded per FAC 62-555.320.

2.07 LOCATION TAPE

- A. All pipe shall have continuous identification location tape 2" wide.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Unless otherwise directed, ductile iron pipe shall be laid with the bell ends in the direction of laying.
- B. Thrust restrained and mechanical joints shall be made in accordance with the Manufacturer's standards except as otherwise specified herein. Joints between mechanical joint pipe and/or fittings shall be made in accordance with ANSI/AWWA Standard C600, except that deflection at joints shall not exceed one-half of the Manufacturer's recommended allowable deflection, or one-half of the allowable deflection specified in ANSI/AWWA C600, whichever is the lesser amount.
- C. Before laying thrust restrained and mechanical joint pipe and fittings, all lumps, blisters and excess bituminous coating shall be removed from the bell and spigot ends. The outside of each spigot and the inside of each bell shall be wire brushed, and wiped clean and dry. The entire gasket groove area shall be free of bumps or any foreign matter that might displace the gasket. The cleaned spigot and gasket shall not be allowed to touch the trench walls or trench bottom at any time. Vegetable soap lubricant shall be applied in accordance with the pipe Manufacturer's recommendations, to aid in making the joint. The workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Deflections shall only be made after the joint has been assembled.
- D. Prior to making up flanged joints in ductile iron pipe and fittings, the back of each flange under the bolt heads and the face of each flange shall have all lumps, blisters and excess bituminous coating removed and shall be wire brushed and wiped clean and dry. Flange faces shall be kept clean and dry when making up the joint, and the workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Bolts and nuts shall be tightened by opposites in order to keep flange faces square with each other, and to insure that bolt stresses are evenly distributed.
- E. Bolts and nuts in thrust restrained, mechanical and flanged joints shall be tightened in accordance with the recommendations of the pipe Manufacturer for a leak-free joint. The mechanics shall exercise caution to prevent overstress. Torque wrenches shall be used until, in the opinion of the OWNER, the mechanics have become accustomed to the proper amount of pressure to apply on standard wrenches.
- F. Cutting of the ductile iron pipe for inserting valves, fittings, etc., shall be done by the CONTRACTOR in a neat and workmanlike manner without damage to the pipe, the lining, or the coating. After cutting the pipe, the plain end shall be beveled with a heavy file or grinder to remove all sharp edges. Interior damaged coatings for potable water mains shall be repaired with an NSF 61 approved coating. Interior damaged coatings for sanitary sewer mains shall be repaired using a coating repair kit approved by the pipe and coating manufacturer for use on Protecto 401 lined piping.

- G. Areas of loose or damaged lining associated with field cutting shall be repaired or replaced as recommended by the pipe Manufacturer and required by the OWNER. Repair methods shall be as recommended by the Manufacturer and shall be submitted to the OWNER for review.
- H. Any work within the pipe shall be performed with care to prevent damage to the lining. No cable, lifting arms or other devices shall be inserted into the pipe. All lifting, pulling or pushing mechanisms shall be applied to the exterior of the pipe barrel.
- I. Homing the pipe shall be accomplished by the use of a hydraulic or mechanical pulling device, unless otherwise accepted by the OWNER. No pipe shall be driven or struck in order to seat it home.
- J. Cleaning methods shall be acceptable to the OWNER, and must be sufficient to remove silt, rocks, or other debris that may have entered the pipeline during its installation and shall also follow the requirements of the Section entitled "Pipeline Testing and Disinfection".
- K. All tapping for service connection shall be provided with service saddles as specified in the Section entitled "Miscellaneous Valves".

END OF SECTION

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SECTION 15100
VALVES, GENERAL

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall provide all tools, supplies, materials, equipment, and labor necessary for furnishing, epoxy coating, installing, adjusting, and testing of all valves and appurtenant work, complete and operable, in accordance with the requirements of the Contract Documents. Where buried valves are shown, the CONTRACTOR shall furnish and install valve boxes to grade, with covers, extensions, and position indicators.
- B. The provisions of this Section shall apply to all valves and valve operators specified in the various Sections of these Specifications except where otherwise specified in the Contract Documents. Valves and operators in particular locations may require a combination of units, sensors, limit switches, and controls specified in other sections of these Specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15000 – Piping and Fittings, General

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Commercial Standards:

ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.
ANSI B16.5	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys.
ANSI B16.21	Nonmetallic Flat Gaskets for Pipe Flanges
ANSI B18.21	Square and Hex Bolts and Screws - Inch Series
ASTM A 126	Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
ASTM B 62	Specification for Composition Bronze or Ounce Metal Castings.
ASTM B 584	Specification for Copper Alloy Sand Castings for General Applications.
AWWA C509	Specification for Sanitary Sewer Force Main Gate Valves.
AWWA C515	Specification for Sanitary Sewer Force Main Gate Valves.
AWWA C550	Protective Interior Coatings for Valves and Hydrants.

1.04 QUALITY ASSURANCE

- A. Valve Testing: Unless otherwise specified, each valve body shall be tested under a test pressure equal to twice its design water-working pressure.
- B. Bronze Parts: Unless otherwise specified, all interior bronze parts of valves shall conform to the requirements of ASTM B 62, or, where not subject to dezincification, to ASTM B 584.

PART 2 -- PRODUCTS

2.01 VALVES

- A. The CONTRACTOR shall furnish all valves, stem extensions, and other accessories as shown or specified. All valves shall be new and of current manufacture. All valves shall have a minimum design pressure rating of 150 psi and capable of a test pressure of 300 psi. For service applications with pressures in excess of 150 psi, valves shall have a minimum pressure rating in excess of the service application working pressure.
- B. Cast iron parts of valves shall meet the requirements of ASTM A 126, "Standard Specifications for Grey Iron Castings for Valves, Flanges and Pipe Fittings, Class 'B'". Flanged ends shall be flat-faced and have bolt circle and bolt patterns conforming to ANSI B16.1 Class 125 unless otherwise specified hereinafter.
- C. All castings shall be clean and sound, without defects of any kind and no plugging, welding or repairing of defects will be permitted. All bolt heads and nuts shall be hexagonal conforming to ANSI B18.21. Gaskets shall be full face and made of natural or synthetic elastomers in conformance with ANSI B16.21 suitable for the service characteristics, especially chemical compatibility and temperature. Nonferrous alloys of various types shall be used for parts of valves as specified. Where no definite specification is given, the material shall be the recognized acceptable standard for that particular application.
- D. All buried valves shall be provided with cast-iron valve boxes unless otherwise indicated. The boxes shall be asphalt varnished, or enameled cast iron, adjustable to grade, and installed perpendicularly, centered around and covering the upper portions of the valve or valve operator, or the pipe. The top of each valve box shall be placed flush with finish grade. Valve boxes shall be as specified elsewhere in this Section.

2.02 PROTECTIVE COATING

- A. Except where otherwise specified, ferrous surfaces, exclusive of stainless steel surfaces, in the water passages of all valves 4 inch and larger, as well as the exterior surfaces of all submerged valves, shall receive a fusion-bonded epoxy coating in accordance with AWWA C550. Flange faces of valves shall not be epoxy coated. The CONTRACTOR, through the valve Manufacturer, shall certify in writing that such coating has been applied and tested in the manufacturing plant prior to shipment, in accordance with these Specifications.

2.03 VALVE OPERATORS

- A. All operators, unless otherwise specified, shall turn counter-clockwise to open. Buried valves shall have extensions with square nuts unless otherwise shown or specified, valves of sizes 4 inch and larger shall have gear-assisted operators.

2.04 VALVE BOXES

- A. Valve boxes shall be of the adjustable screw type, cast iron, suitable to withstand heavy traffic. Brand and Model types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal. The covers shall be marked "WATER", "RAW WATER", "SEWER" or "REUSE" as appropriate. Bases shall be the round type. Boxes shall be coated with asphalt. Boxes shall be set in 24" x 24" x 4" thick concrete pad at each valve box with one (1) No. 3 continuous and have a 3" bronze valve identification disc anchored in the concrete in accordance with City standard details.

PART 3 -- EXECUTION

3.01 VALVE INSTALLATION

- A. All valves, stem extensions, valve boxes, and accessories shall be installed in accordance with the Manufacturer's written instructions and as shown and specified.

END OF SECTION

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SECTION 15101

PIPE TAPPING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. Furnish and install tapping sleeves, tapping valves, line stops, insertion valves and accessories. Tapping sleeves tapping valves, line stops and insertion valves shall be furnished through the tapping and line stop service provider for unit responsibility.
- B. All fittings, equipment, and work shall be accomplished only by those specialty contractors that can demonstrate at least a ten year history of successful application of these methods and in the sizes as specified

PART 2 – PRODUCTS

2.01 TAPPING SLEEVES - DUCTILE IRON

- A. Tapping sleeves shall meet ASTM A536 Grade 65-45-12.
- B. Side flange seals shall be o-ring type with round, oval, or rectangular cross section.
- C. CONTRACTOR shall inspect and/or verify diameter of the pipe to be tapped and order the correct sleeve.
- D. Sleeves shall be coated in accordance with the provisions of this specification.
- E. Tapping sleeve and tapping valve shall be of the same or compatible manufacturer to assure proper fit of the aligning ring on the valve and the recess on the sleeve. No post factory modifications to either the sleeve or valve will be permitted.
- F. Tapping sleeve Brand and Model type shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.
- G. Tapping machine and cutter shall provide the full-size of the tapped connection.
- H. The coupon removed from the pipe shall be given to the OWNER.

2.02 TAPPING SLEEVES - STAINLESS STEEL

- A. Steel tapping sleeves are acceptable for use where ductile iron sleeves are not practical and as approved by the OWNER.
- B. Tapping sleeve composed of two halves of heavy welded steel, bolting together on the pipe and sealing against a concave Buna-N wedge gasket around the nozzle opening. Both halves of the sleeve are fabricated to accurately conform to the outside diameter of the ductile iron host pipe and to provide reinforcement without the use of shims or pads.
- C. The sleeve half opposite the nozzle shall be solid and shall not consist of straps or U-bolts. Sleeve and nozzle shall be fabricated from ASTM 285, Grade C, carbon steel.

Branch leg flange shall conform to AWWA, Class D, Schedule C-207, 150-pound drilling to match tapping valve. The flange face shall be recessed to accommodate the tapping valve in accordance with MSS-SP60. All steel shall meet the requirements of ASTM A36, as a minimum. All weldments shall be braced and stress relieved.

- D. Nuts and Bolts shall be Stainless Steel 18-8 Type 304.
- E. The ferrous metal parts of the fitting shall receive a factory applied fusion-bonded, epoxy coating, 12-mil minimum dry film thickness in accordance with AWWA C213.
- F. Minimum wall thickness of the sleeve shall be 0.375 inch.
- G. Tapping sleeve shall be pressure rated to 150 psi, minimum.
- H. Flanged Outlet Steel Tapping Sleeves: For outlets 4-inches and larger, furnish flanged outlet tapping sleeves. Flanged outlet tapping sleeves shall be Mueller H615, Dresser Style 630, JCM Series 412/422, or approved equal.
- I. Threaded Outlet Steel Tapping Sleeves: For outlets 3/4-inches to 3-inches, furnish IPS threaded outlet tapping sleeves. Threaded outlet tapping sleeves shall be JCM Series 418; or approved equal.
- J. Tapping machine and cutter shall provide the full-size of the tapped connection.
- K. The coupon removed from the pipe shall be given to the OWNER.

2.03 TAPPING VALVES

- A. The tapping valves shall conform to the applicable requirements of ANSI/AWWA C509.
- B. The outlets shall be a mechanical joint by flange end.
- C. Iron body with nominal 10 mils fusion epoxy coated interior and exterior surfaces.
- D. Epoxy coating shall meet or exceeds all applicable requirements of ANSI/AWWA C550 Standard and is certified to NSF 61.
- E. Non-rising stem (NRS) for underground service.
- F. Tapping valve shall be furnished with a bypass valve.
- G. The tapping valve shall be as manufactured per the brands and models listed on the City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.04 TAPPING AND LINE STOP SERVICE PROVIDER

- A. Line stopping shall consist of a mechanical plug inserted into an existing pipe through a hole in the pipe created by a tapping machine without a shutdown of the pipeline. The plug shall temporarily isolate the flow in the line to allow cutting into the existing pipeline and permanent capping of the existing pipe.
- B. Valve insertion shall consist of a resilient seat gate style valve inserted into an existing pipe through a hole in the pipe created by a tapping machine without a shutdown of the

pipeline. The valve shall be fusion bonded epoxy and be capable of handling working pressures of 150 psi in the existing pipeline.

C. Prestressed Concrete Cylinder Pipe (PCCP)

1. Work requiring cutting, capping, tapping, and/or modification of existing prestressed concrete cylinder pipe (PCCP) in any manner shall be performed by specialty contractors with a minimum of ten (10) years experience performing work on PCCP type utilities and shall be capable of providing a reference list for recent projects involving PCCP type utilities including a minimum of fifteen (15) projects.
2. Summary Overview:
 - a. It will be required prior to placing material order for this scope of the project, that the Contractor expose the primary pipe system at the point where the scope of work is to take place as indicated on the latest set of approved plans. The pipe O.D.(outside diameter) will need to be measured and at the center of proposed tap the outer concrete shell will need to be chipped away in order to expose inner steel casing. CAUTION must be taken not to puncture steel casing. The depth of the outer concrete shell and the O.D. of the main will be submitted to the subcontractor/manufacture for a proper build to fit design.
3. Basic Design Description
 - a. The fitting utilized for both wet tapping and line-stopping will be manufactured in three sections. Multiple straps for the back half radiuses to the outside pipe diameter will bolt to a radius top half. The top half will be provided with foam outer seals, grout outlet horns and a nozzle-flange assembly. The third component shall consist of a nozzle gland assembly
 - b. Body: The top saddle plate shall be manufactured from ASTM A-285, grade C Steel as a minimum. The back portion of the saddle shall use support straps that draw the saddle plate to the pipe surface in a uniform manner. Straps will be manufactured from rolled steel, also ASTM A-285, grade C steel. The use of a "full back half" that is properly grouted internally in the field, for attaching the front half of the saddle plate to the concrete pipe is "optional".
 - c. Body Nozzle Outlet and Draw Flange: The body outlet nozzle, connected to the upper saddle plate, shall be fabricated from ASTM A-285 grade C steel as a minimum. The draw flange shall be in accordance with AWWA C-207-B thickness, as a minimum, and shall mate to the inlet draw flanged of the gland nozzle outlet. Flange material shall be ASTM A-285 grade C or ASTM A-36.
 - d. Gland – Nozzle Outlet and Flange: The nozzle outlet assembly will be manufactured from ASTM A 285 grade C steel as a minimum. The gland nozzle outlet shall be fabricated having two (2) flanges; the Inlet flange will mate to the body nozzle outlet draw flange. The tapping flange used for connecting the temporary control valve will be fitted at the factory with a completion plug flange as specified below.
 - e. Gland – Nozzle Seal Gasket: EPDM Concave Wedge Gasket compounded to resist--oil, acids, alkalis, most (aliphatic) hydrocarbon fluids, water and many chemicals. Temperatures up to 180°F.
 - f. Gland – Nozzle Completion Plug Flange: The gland outlet flange will be provided, from the factory, with an internal locking mechanism that permits recovery of the temporary control valve used in the line-stopping process upon project completion.

- g. Flanges used for Line Plugging: shall be manufactured in accordance with ASME B16.5 in sizes up to 24" and in accordance with MSS-SP 44 for sizes 30" and above. Locking mechanisms shall consist of set screws evenly spaced around the flange. All access ports for locking rings or pins shall have a pipe thread machine into flange outer periphery and shall be designed to accept a mating threaded face bushing or plug for each port.
- h. Completion Plugs: Shall be manufactured from steel plate, ASTM A-36 grade material as a minimum. Recommended materials for completion plugs shall be ASTM 516 Grade 50 or 70.
- i. Blind Flange Gasket: All gaskets will be of non-asbestos composition and will be designed to mate to the inner bore and inner bolt circle diameter of the line plugging flange. All gaskets will be at least 0.125" in thickness. Gaskets shall be EPDM.
- j. Bolts: All external bolting, studs and nuts that should become a permanent part of the Fitting installation shall be Corrosion resistant, high strength, low alloy Stainless Steel 18-8 type 304.
- k. Finish: After completion of fabrication, fittings shall be shop-coated internally and externally with fusion bonded epoxy coating (per AWWA specification C-213) Coating can be applied to 10-20 mil. dry film thickness.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. All accessories and appurtenances shall be installed in accordance with the manufacturer's printed instructions.
1. Fitting Installation Procedure for Concrete Cylinder Pipe: The top half and straps shall be placed around the pipe at the location where the plans indicate and the exploratory investigation was performed. The straps will be tightened with the nuts provided. The top portion of the saddle plate, after tightening and compression of the foam gasket, a thin grout mixture will be poured into the grout horns. The outer concrete surface coating contained within the tapping nozzle will then be removed down to the wire across the entire area to be wet tapped in a manor which will not damage any portion of the PCCP adjacent to the location of the chipping/work.
 2. Fitting Gland Installation:
 - a. Wire Cutting: The removing of re-enforcing or pre-stressing wires shall be performed with care. Cutting shall be accomplished by using an electric rotary tool or other appropriate means necessary. Care will be taken as not to nick or damage the cylinder. Should a set of wire be adjacent to the steel cylinder, extreme care will be used to prevent damaging the steel cylinder during removal.
 - b. Steel Cylinder Irregularities: Should the area to be wet tapped include the longitudinal seam in the cylinder, the seam will be very carefully inspected to determine if the "O" ring on the gland assembly will compress sufficiently to effect a seal.
 - c. Gland Installation: The gland assembly will have the contoured elastomeric ring seal securely attached to the gland body recess. The gland will be carefully placed into the neck of the saddle plate nozzle and secured to the draw flange with the draw bolts provided for that purpose. The gland is to be

uniformly pulled down to the surface of the steel cylinder and checked with a feeler gauge to insure sufficient gasket compression. Load bearing set screws should be activated through the top draw flange after compression of the seal.

- d. Pressure Testing: A blind flange should now be attached to the completion plug outlet flange and pressure test will be held in accordance with specifications.
- e. Gland Grouting: The void between the saddle plate nozzle and the gland shall be grouted with the concrete mixture and allowed to set.
- f. Equipment: Final tapping equipment shall be designed and intended for the uses and purposes of tapping PCCP style infrastructure.

- B. All sleeves and valves shall be installed in accordance with the Standard Detail Drawings and in accordance with AWWA C600, "Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances".

3.02 TAPPING VALVE AND TEE TEST

- A. The assembly shall be tested at 150 psi for 30 minutes with zero loss. The valve shall have a cap installed and shall be open during the test. After 30 minutes, the valve shall be closed and the valve seat shall be checked for leaks. Caution - do not pour thrust block before assembly has been tested and accepted by the OWNER.

3.03 THRUST BLOCKING

- A. Concrete thrust blocks or "kickers" shall be installed behind all tapping sleeves. Thrust blocks shall be installed 48 hours prior to tapping.

END OF SECTION

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SECTION 15102
INSERTION VALVES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall provide insert valves and appurtenances, complete and operable, in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15100 – Valves, General

1.03 SUBMITTALS

- A. For all potable water applications, provide a signed certification statement indicating all interior components and linings that come into contact with the conveyed product shall comply with the requirements of NSF/ANSI 61.
- B. The Contractor shall furnish submittals in accordance with the Section entitled "Submittals".

PART 2 -- PRODUCTS

2.01 GENERAL

- A. Insert valves shall be designed for use in potable, raw water, reclaimed water, irrigation and backflow control systems. Insert valves used for working pressures up to 250 psi shall conform to ANSI/AWWA C515 – Resilient Gate Valves, subject to the following requirements. Valves shall be of the size and class indicated. The design shall allow the valve to be installed into an existing pressurized pipeline while maintaining constant pressure and service. The internal passage of the insert valve shall not contain any obstructions or stops.
- B. The resilient wedge shall seat on the valve body and shall be independent from the carrier pipe. The wedge shall be symmetrical and seal equally well regardless of flow direction. The resilient wedge must ride inside the body channels to maintain wedge alignment throughout its travel to achieve maximum fluid control regardless of high or low flow pressure or velocity.
- C. For all potable water applications, all interior components and linings of the insert valve that come into contact with the conveyed product shall comply with the requirements of NSF/ANSI 61.

2.02 MATERIALS

- A. All primary parts and components to be exclusively and completely assembled, manufactured, machined and coated in the USA.
- B. Insert valve body shall be ductile iron, conforming to ASTM A536 Grade 65-45-12.
- C. The ductile iron wedge shall comply with AWWA C509 and shall be fully encapsulated with EPDM rubber by a high pressure and high temperature compression or injection mold process.
- D. The insert valve shall feature triple O-Ring stem seals; two located above the thrust collar and one located below. Side flange seals shall be of the O-Ring type of either round, oval or rectangular cross-sectional shape.
- E. The gate valve stem and wedge nut shall be copper alloy in accordance with AWWA C515 Section 4.4.5.1.
- F. Bolting materials shall be carbon steel in accordance with ASTM A307 with dimensions conforming to ANSI B18.2.1.
- G. Split restraints devices shall consist of multiple gripping wedges incorporated into a follower gland conforming to ANSI/AWWA C110/A21.10. Gland body wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron in accordance with ASTM A536.
- H. Insert valves 12" and smaller shall be capable of work on Cast/Grey Iron or Ductile Iron Class A, B, C and D, IPS PVC, C900 and C909 PVC, Steel and AC pipe diameters without changing top or bottom portion of split valve body.
- I. Actuators shall conform to the Section entitled "Valves, General" subject to the following requirements. Unless otherwise indicated, all manually-actuated insert valves shall be equipped with a 2-inch square wrench nut in accordance with ASTM A126 CL.B capable of opening counter-clockwise to open.

2.03 ACCEPTABLE MANUFACTURERS

- A. Insert valves shall be of the resilient wedge gate valve type and shall be InsertValve as manufactured by Team Industrial Services.
- B. Team InsertValve shall be installed by companies trained and authorized by Team. All such installers shall have written certificates and shall provide documentation validating their certification.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Mechanical joint restraints shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.
- B. Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts. Set screw pressure point type hardware shall not be used.
- C. Valves shall be installed in accordance with the manufacturer's recommendations.

3.02 TESTING

- A. Subsequent to valve installation, a pressure test shall be performed for 15 minutes at a pressure of 150 psi. The insert valve must not be moved or repositioned once the pressure test is achieved. If valve is moved or repositioned, the pressure test must be completed again.

3.03 PAINTING

- A. Insert valve interior and exterior shall be fully epoxy coated. Coating shall be applied prior to assembly to ensure bolt holes and body-to-bonnet flange surfaces are fully coated.
- B. Valve shall be coated with a minimum of 10 mils epoxy in accordance with AWWA C550 and certified to ANSI/NSF-61.

END OF SECTION

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SECTION 15103

LINE STOPS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall provide line stops, bypass piping, equipment supports, pipe supports, restraint and appurtenances, complete and operable and in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15100 – Valves, General

1.03 SUBMITTALS

- A. For all potable water applications, provide a signed certification statement indicating all interior components and linings that come into contact with the conveyed product shall comply with the requirements of NSF/ANSI 61.
- B. The Contractor shall furnish submittals in accordance with the Section entitled “Submittals”.

PART 2 -- PRODUCTS

2.01 GENERAL

- A. Line stopping shall consist of a mechanical plug inserted into an existing pipe through a penetration created by a tapping machine. Line stopping requiring shutdowns of the pipeline are not acceptable.
- B. The plug shall temporarily isolate the flow in the line to allow cutting into the existing pipeline and permanent capping of the existing pipe.
- C. For all potable water applications, all interior components and linings of the insert valve that come into contact with the conveyed product shall comply with the requirements of NSF/ANSI 61.
- D. Prestressed Concrete Cylinder Pipe
 - 1. Work requiring cutting, capping, tapping, and/or modification of existing prestressed concrete cylinder pipe (PCCP) in any manner shall be performed by specialty contractors with a minimum of ten (10) years experience performing work on PCCP type utilities and shall be capable of providing a reference list for recent projects involving PCCP type utilities including a minimum of fifteen (15) projects. See Section 15101 for additional details and requirements.

2.02 MATERIALS

- A. The fitting shall be a full encirclement, pressure retention type slit tee consisting of two steel weldments: an upper flanged outlet saddle plate and a lower saddle plate. The saddle plates shall be matched and marked with some method of identification to ensure proper alignment of the two-part fitting in the field.
- B. The upper flanged outlet saddle plate shall consist of a saddle plate with a minimum thickness of 0.375-inches, outlet nozzle and flange. The interior of the saddle plate shall be grooved to retain a gasket which shall seal the saddle plate to the exterior of the existing potable water main. The lower saddle plate shall be a minimum 0.375-inch thickness.
- C. The nozzle of the fitting shall be fabricated from steel pipe (ASTM A234). The nozzle shall be bored to accommodate the plugging head. A circular shoulder shall be machined into the nozzle to seal the circumferential gasket carried on the plugging head.
- D. The outlet of each fitting shall be machined from a 150 lb. forged steel flange (ASTM A181 or A105) or from pressure vessel steel plate (ASTM A285, Grade C); flat faced and drilled per ANSI B16.5. Suitable independently operated locking devices shall be provided in the periphery of the flange to secure the completion plug.
- E. Facing and drilling of the blind flange shall be compatible with the outlet flange. Minimum blind flange thickness shall be that of AWWA Specification 207, Class D.
- F. The completion plug shall be machined and shall contain circumferential grooves to receive the locking device from the flanged outlet and to contain a compressible O-ring to seal pressure tight against the bore of the flanged outlet.
- G. Gaskets shall be molded from elastomer compounds resistant to compression settings and compatible within a temperature range of 32 to 140 degrees Fahrenheit.
- H. Bolting materials shall be carbon steel in accordance with ASTM A307 with dimensions conforming to ANSI B18.2.1.
- I. Line stop machinery shall consist of a cylindrical plugging head that contains a flat, expandable elastomer sealing element. The plugging head is advanced into and retracted from the main by means of a linear actuator. When retracted, the plugging head and carrier are housed in an adapter, bolted tightly between the tapping valve and the actuator.
- J. The sealing element shall be monolithically molded from a suitable polyurethane compound. The element shall be flat in a plane perpendicular to the flow in the main. The minimum thickness of the element shall be 4-inches. The bottom of the element shall be semi-circular to conform to the bore of the existing water main.
- K. The diameter of the plugging head shall be slightly smaller than the flanged nozzle of the fitting. The plugging head shall have a circumferential gasket seal against the shoulder in the flanged nozzle. The gasket shall also seal against the sealing element to prevent bypass around the plugging head.

2.03 ACCEPTABLE MANUFACTURERS

- A. Tapping Services and line stopping services shall be provided by the following service providers, or approved equal:
 - 1. Rangeline
 - 2. EA Tapping
 - 3. T.D. Williamson, Inc.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Contractor shall clean (through the use of power wire brush, grinding tools or other non- destructive methods) the exterior of the potable water main to ensure any debris, corrosion deposits, or other surface irregularities that could interfere with proper seating and sealing of the fitting to the water main are removed.
- B. Contractor shall provide thrust and support blocking for the tapping machinery and the existing water main prior to proceeding with installation of the line stopping equipment.
- C. Contractor shall furnish and install bypass piping (up to 50 feet in length total) between installed line stop units to maintain water main functionality. The bypass piping shall be allowed to be one pipe diameter size smaller than the existing water main that the line stop is being performed on. Contractor shall furnish and install adequate support, bracing and restraint on the bypass piping.

END OF SECTION

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SECTION 15108

GATE VALVES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall furnish and install gate valves, complete and operable, as shown and specified herein, including manual, electric, hydraulic, and pneumatic operators, epoxy coating, control units, and appurtenant work, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15100 - Valves, General.

1.03 SUBMITTALS

- A. For all potable water applications, provide a signed certification statement indicating all interior components and linings that come into contact with the conveyed product shall comply with the requirements of NSF/ANSI 61.
- B. The Contractor shall furnish submittals in accordance with the Section entitled "Submittals".

PART 2 -- PRODUCTS

2.01 GENERAL

- A. All buried valves shall be of the inside screw type. Valves shall be capable of being repacked under line pressure and shall have two-inch square nut operators. All ferrous surfaces of the valves, 4-inch and larger, which will be in contact with water shall receive a fusion-bonded epoxy coating conforming to AWWA C550.
- B. Valve Brand and Model Types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.
- C. For all potable water applications, all interior components and linings of the gate valve that come into contact with the conveyed product shall comply with the requirements of NSF/ANSI 61.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. All gate valves shall be installed in accordance with AWWA Standards and the Supplier's printed recommendations, and in accordance with the applicable provisions of Section entitled "Valves, General."

- END OF SECTION -

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SECTION 15109

PLUG VALVES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. Eccentric Plug valves, 3-60", of rectangular port construction with resilient faced cylindrical plugs eccentrically offset from the seat, for the purpose of providing isolation or throttling control as indicated.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15100 - Valves, General.

1.03 SUBMITTALS

- A. For all potable water applications, provide a signed certification statement indicating all interior components and linings that come into contact with the conveyed product shall comply with the requirements of NSF/ANSI 61.
- B. The Contractor shall furnish submittals in accordance with the Section entitled "Submittals".

PART 2 -- PRODUCTS

2.01 GENERAL

- A. Plugs shall be solid one piece, Cast Iron ASTM A126 Class B or Ductile Iron ASTM A536 Grade 65-45-12. The plug shall have a cylindrical seating surface eccentrically offset from the center of the shaft. Plug shall not contact the seat until at least 90% closed. Resilient plug facing shall be Chloroprene (CR). Spherical shaped plugs are not acceptable.
- B. Bodies and covers shall be Cast Iron ASTM A126 Class B or ASTM A536 Grade 65-45-12. Ports shall be rectangular and 100% Port. The valve port area shall meet or exceed standard pipe area per ASME/ANSI B36.10M. Round ports are not acceptable. Bearings shall be sleeve type and made of sintered, oil impregnated permanently lubricated type 316 stainless steel for sizes 4-18" and ASTM A743 Grade CF8M for sizes 20-36". In valves larger than 36", the upper and lower plug journals shall be fitted with ASTM A240 type 316 stainless sleeves with body bearings of ASTM B30, Alloy C95400 aluminum bronze.
- C. Seats on shall be 1/8" thick welded overlay of not less than 95% pure nickel. Seat shall be at least 1/2" wide, 1/8" thick through entire width and raised. The raised surface shall be completely covered with nickel to insure that the resilient plug face contacts only the nickel seat.

- D. Adjustable packing shall be Acrylonitrile-Butadiene (NBR) multiple V-ring type, with a packing gland follower. Packing gland shall permit inspection, adjustment or complete replacement of packing without disturbing any part of the valve or actuator assembly, except the gland follower. Non-adjustable packing or packing requiring actuator removal to replace the packing, is not acceptable.
- E. Pressure ratings shall be 175 psi (1210 kPa) on valve sizes through 12" and 150 psi (1035 kPa) for 14" and larger. Every valve shall be given a certified hydrostatic shell test and seat test, with test reports being available upon request.
- F. All valves larger than 6" shall be installed with worm gear actuators. All gearing shall be enclosed in a cast iron housing, with outboard seals to protect the bearings and other internal components. The actuator shaft and gear quadrant shall be supported on permanently lubricated bronze bearings.
- G. Buried actuators shall be 90% grease filled. Input shaft and fasteners shall be stainless steel. Actuator mounting brackets shall be totally enclosed. Other actuators to be installed according to drawings or customer specifications.
- H. End connections shall meet or exceed the latest revisions of AWWA C517 and other applicable standards. End Connections shall be Flanged drilled per ASME B16.1 and/or Mechanical Joint per AWWA C111.
- I. Valve Brand and Model Types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.
- J. For all potable water applications, all interior components and linings of the plug valve that come into contact with the conveyed product shall comply with the requirements of NSF/ANSI 61.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. In applications of liquids with suspended solids or dirty gases:
 - a. For valves installed in a vertical pipeline, or where the possibility of overhead drain-back exists, install the valve with the seat at the top to prevent drain-back solids from settling into the valve body.
 - b. For valves installed in a horizontal pipeline, install the valve so the plug rotates up when opened. Where drain-back does not exist, install the valve with the higher pressure, when closed, against the end opposite the seat.
- B. In applications of clean liquids and gases for eccentric plug valves installed in a horizontal or vertical pipeline, it is recommended that the valve be installed with the higher pressure against the end opposite the seat.

END OF SECTION

SECTION 15110

BUTTERFLY VALVES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and install and test, complete and ready for operation, butterfly valves as shown on the Drawings and as specified herein.

1.02 RELATED WORK

- A. Piping is included in Division 15.

1.03 DESCRIPTION OF SYSTEMS

- A. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of raw water, product water, finished water, wastewater, chemicals, etc., depending on the applications.

1.04 QUALIFICATIONS

- A. All valves and appurtenances shall be products of well-established reputable firms who are fully experienced and qualified in the manufacturing of the particular equipment to be furnished. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

1.05 SUBMITTALS

- A. For all potable water applications, provide a signed certification statement indicating all interior components and linings that come into contact with the conveyed product shall comply with the requirements of NSF/ANSI 61.
- B. The Contractor shall furnish submittals in accordance with the Section entitled "Submittals".

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT - GENERAL

- A. Reference is made to Division 1 for additional requirements, including nameplates, provisions for temporary pressure gages, protection against electrolysis and anchor bolts.
- B. The use of a Manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

- C. Valves and appurtenances shall be installed in any and all locations shown on the Drawings or specified herein and shall be of the size shown on the Drawings or as noted. As far as possible, equipment of the same type shall be identical and from one Manufacturer.
- D. Valves and appurtenances shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.
- E. Unless otherwise noted, items shall have a minimum working pressure of 150 psi or be of the same working pressure as the pipe they connect to, whichever is higher and suitable for the pressures noted where they are installed.
- F. Joints, size, and material - unless otherwise noted or required by the Engineer:
 - 1. Except where noted, all joints referred to herein shall be of the same type, nominal diameter, and material and with a minimum rating equal to the pipe or fittings they are connected to.
 - 2. Valves and appurtenances shall be of the same nominal diameter as the pipe or fittings they are connected to.
 - 3. Butterfly valves:
 - a. Cast Iron - all sizes
- G. Provide all special adaptors as required to ensure compatibility between valves, appurtenances, and adjacent pipe.
- H. Valves and actuators located outdoors but not within a building shall be as a minimum weather tight.

2.02 BUTTERFLY VALVES

- A. Butterfly valves and operators shall conform to the AWWA Standard Specifications for Rubber Seated Butterfly Valves unless otherwise indicated in the Drawings. Designation C504, except as hereinafter specified. Valves shall be Class 150B for all pressure pipelines and Class 250B for all gravity pipelines, as manufactured by Henry Pratt Co., DeZurik, Mueller or approved equal. The valve discs shall be constructed of alloy cast iron ASTM A 436, Type I stainless steel (NiChrom), or if solid disc is used, of cast iron conforming to ASTM A 48, Class 40 or ductile iron conforming to ASTM A536, Grade 65 45 12 for Class 150 or less.
- B. The valves shall be either flange or mechanical joint type as indicated on the Drawings. The face to face dimensions of flanged end valves shall be in accordance with Table 2 of above mentioned AWWA Specification for short body valve. Adequate two way thrust bearings shall be provided. Flange drilling shall be in accordance with ANSI B16.1. Wafer or spool type valves will not be accepted.
- C. Valve seats shall be a natural rubber or synthetic rubber compound. Valve seats 30 inches and larger shall be field adjustable and replaceable without dismounting

operator disc or shaft and without removing the valve from the line. All retaining segments and adjusting devices shall be of corrosion resistant material with stainless Nylock screws and be capable of a 1/8-inch adjustment. Valves 24 inches and smaller shall have bonded or mechanically restrained seats as outlined in AWWA C 504. Where rubber seat is mounted on the valve body, the mating edge of the valve disc shall be 18-8 stainless steel. Where rubber seat is mounted on the valve disc, the valve body shall be fitted with an 18-8 stainless steel seat offset from the shaft, mechanically restrained, and covering 360 degrees of the peripheral opening or seating surface.

- D. The interior and exterior surfaces of the valve body and the disc shall be factory coated with an epoxy coating meeting the requirements of AWWA C550.
- E. The valve shaft shall be turned, ground, and polished constructed of 18-8 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 a one-piece unit extending full size through the valve disc and valve bearing on valves 20" and smaller. Stub shaft design in which the shaft extends 1.5 times the shaft diameter into the valve disc is acceptable on valves 24" and larger.
- F. In general, the butterfly valve operators shall conform to the requirements of Section 3.8 of the AWWA Standard Specifications for Rubber Seated Butterfly Valves, Designation C504, insofar as applicable and as herein specified.
- G. 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.
- H. Operators 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. Operators shall be rigidly attached to the valve body.
- I. All valve operators shall conform to Section 3.8 of the AWWA Standard Specification and shall be manual unless otherwise shown or specified and shall have permanently lubricated, totally enclosed gearing with gear ratio sized on the basis of line pressure and velocities of 10 feet per second. Operators 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 counterclockwise to open valves. Manual operators shall be of the traveling nut or link lever self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Operators shall be fully enclosed and designed to produce the specified torque with a maximum input torque of 50-foot pounds. Operator components shall withstand an input of 450-foot pounds at extreme operator position without damage. Valves located above grade shall have handwheel operators, and valves located below grade shall be equipped with a two-inch (2") square AWWA operating nut located at ground level and cast-iron extension type valve box. Valve operators shall conform to AWWA C504, latest revision.

- J. Where valves are submerged, an extended torque tube and operator shaft shall be supplied. A valve operator meeting the requirements of this Section shall be mounted above the water level. The torque tube and operator shaft shall be manufactured of Type 316 stainless steel. Appropriate supports and guides shall be provided as necessary.
- K. 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 the Specification and the AWWA standard.
- L. Where indicated on the Drawings extension stems, floor stands, couplings, stem guides, and floor boxes as required shall be furnished and installed.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Butterfly valves shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Engineer before they are installed.
- B. After installation, butterfly valves shall be tested at least 2 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 Engineer.

3.02 SHOP PAINTING

- A. Ferrous surfaces of valves and appurtenances shall receive an exterior coating of rust-inhibitive primer. Interior coatings shall be the Manufacturer's standard except that valves on raw and potable water lines shall be coated with paints approved by both EPA and AWWA for potable water service. All pipe connection openings shall be capped after shop painting to prevent the entry of foreign matter prior to installation.

3.04 INSPECTION AND TESTING

- A. Butterfly valves shall be tested in accordance with ANSI/AWWA C504, "AWWA Standard for Rubber-Seated Butterfly Valves", Section 5, Subsection 5.2. The performance test (Subsection 5.2.1) and hydrostatic test (Subsection 5.2.3) shall be performed as stated. The manufacturer shall furnish a certified test report with every valve stating that the valve has met the requirements of the tests.

END OF SECTION

SECTION 15115

MISCELLANEOUS VALVES AND WATER SERVICE CONNECTIONS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall furnish and install miscellaneous valves as shown and as specified herein, complete and operable including accessories and, where designated, operators, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15100 - Valves, General.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Commercial Standards:

ANSI/AWWA C500	Standard for Gate Valves for Water and Sewage Systems
ANSI/AWWA C509	Standard for Resilient Seated Gate Valves for Water Supply Service
AWWA C600	Standard for Installation of Ductile-Iron Water Mains and their appurtenances
ASTM A 123	Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel products
ASTM A 385	Practice for providing High-Quality Zinc Coatings (Hot-Dip)
ASTM A 395	Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures ASTM A 536 Specification for Ductile Iron Castings

PART 2 -- PRODUCTS

2.01 SERVICE SADDLES

- A. Double strap service saddles shall be constructed of ductile iron bodies conforming to ASTM-A-536 with nitrile rubber gaskets compounded for water and sewer service. The straps shall be Type 304 stainless steel with curvature accurately designed to fit pipe and shall have 2-inch iron thread as manufactured by Romac (Model 202NS), Smith-Blair (Model 313), or approved equal. Casting shall be coated with fusion bonded black nylon. Gaskets shall be self-sealing Buna-N. Tapping saddles shall be per Smith Blair 317, Total Pipe Solution, Inc., Triple Tap Model T3 or approved equal.

2.02 CORPORATION STOPS

- A. Corporation stops shall be brass ball valve type conforming to ANSI/AWWA C800. Iron pipe threads shall be by PJ/110 Compression.
- B. Corporation Stops brand and model types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.03 WATER SERVICE PIPING

- A. Water Service piping shall be polyethylene tubing (P.E.3408/4710-DR-9) meeting the requirements AWWA C-901 and ASTM D2737.
- B. Water Service piping brand and model types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.04 WATER SERVICE CASING PIPE

- A. Water Service casing pipe shall be Schedule 40 PVC meeting the requirements ASTM D1785/D2665.
- B. Water Service casing pipe brand and model types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.05 CURB STOPS

- A. Curb stops shall be brass conforming to ANSI/AWWA C800 with optional padlock wing.
- B. Curb Stops brand and model types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.06 SERVICE FITTINGS, COUPLINGS, CLAMPS AND HARDWARE

- A. Compression couplings for polyethylene tubing. Not allowed to be used to extend tubing lengths.
- B. Service fittings, couplings, clamps, and hardware brand and model types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.07 WATER METER BOX

- A. Water meter boxes brand and model types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

2.08 AIR RELIEF VALVES

- A. Air relief valve brand and model types shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.
- B. Air relief valves shall be installed as shown on the drawings and shall use threaded fittings unless otherwise noted.

- C. Potable Water Combination Air Relief Valves shall be APCO Model 145C, or OWNER approved equal, with 2-inch threaded inlet and 316 stainless steel hardware/trim.
- D. Waste Water Combination Air Relief Valves shall be 2-inch ARI D-025 w/ reinforced nylon polymer body, 316 SS internal/external hardware, and non-slam discharge valve/elbow.

2.09 FIRE HYDRANTS

- A. All fire hydrants shall comply with AWWA Standards C502 thereof and the following design standards.
- B. Fire hydrants shall be of the compression type, opening against the pressure and closing with the line pressure with a 5 1/4-inch minimum valve opening. The hydrant shall be equipped with two 2 1/2-inch hose and one 4 1/2-inch steamer nozzles to meet the American National Standard hose thread.
- C. Hydrants shall be furnished with a sealed oil or grease reservoir located in the bonnet so that all threaded and bearing surfaces are automatically lubricated when the hydrant is operated. The hydrant will be designed for disassembly by use of a short disassembly wrench or the hydrant shoe having integral cast tieback lugs on the main valve to permit the main valve assembly and valve seat to be removed without digging earth or disassembling the hydrant barrel.
- D. Hydrants shall be furnished with a breakable feature that will break cleanly upon impact. This shall consist of a two-part breakable safety flange with a breakable stem coupling. The upper and lower barrels shall be fluted and ribbed above and below the safety flange or have an extra strength lower barrel.
- E. The hydrant internal valve shall be 5 1/4-inch minimum. The pentagonal operating nuts and the cap nuts shall be 1 1/2-inch point to flat. No drain vents or plugs allowed. The hydrants shall open counterclockwise and the direction of opening shall be cast on the top.
- F. The bury length measured from the bottom of the connecting pipe to the ground line at the hydrant, shall be 3 feet bury (Minimum).
- G. The hydrant shall be equipped with a 6-inch mechanical joint base inlet unless otherwise specified by the OWNER.
- H. Raised reflective pavement marker in blue shall be used to identify the fire hydrant location. The placement of the reflector to be at the centerline of the outside roadway lane unless otherwise directed by the Fire Marshal.
- I. All the above grade portions shall be painted with **Factory Silver**.
- J. Chains are to be removed.
- K. Hydrants shall have a 250-psi working pressure.
- L. Hydrants brand and model shall be per City of Boca Raton Shop Drawing Submittals & Approved Utility Product List or approved equal.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. All valves shall be installed in accordance with the manufacturer's printed recommendations.

3.02 HYDRANT INSTALLATION

- A. All fire hydrants shall be installed in strict accordance with the manufacturer's published recommendations, AWWA Standards, and all applicable codes, and the applicable provisions of Section entitled, "Valves, General." All installations shall be to the satisfaction of the local fire and building department.
- B. All hydrant isolating valves with slip joints, friction type, or caulked joint connections shall be harnessed to the main pipe by means of welded steel harness sets, or clamps and steel rods, designed for this purpose. Dry barrel fire hydrants shall be set on a bed of pea gravel not less than 18 inches deep and 3 feet square, for drainage, or as required by local regulations and conditions.

END OF SECTION

SECTION 15995

PIPELINE TESTING AND DISINFECTION

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The CONTRACTOR shall perform flushing and testing of all pipelines and appurtenant piping, complete, including conveyance of test water to point of use and all disposal thereof, all in accordance with the requirements of the Contract Documents. The cost of all testing, including the water shall be borne by the CONTRACTOR.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Commercial Standards

ANSI/AWWA	C600	Standard for installation of Ductile-Iron Water Mains and their appurtenances.
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ANSI/AWWA	C651	Standard for Disinfecting Water Mains
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1.03 PRE-TEST PROCEDURES

- A. Testing shall be conducted in the presence of, but not limited to, the OWNER, the CONTRACTOR, and the OWNER.
- B. All persons required to be present for testing shall be notified by the CONTRACTOR a minimum of forty-eight hours prior to the commencement of the test. Should any of the required persons not be properly informed, the test shall be rescheduled.
- C. The CONTRACTOR shall, at own expense, furnish all the necessary labor, water, material, and/or any other items necessary to complete the required testing. Should any test fail, the test shall be repeated until such time that all test requirements have been successfully met.
- D. The CONTRACTOR shall insure, in advance of the actual testing, that all equipment such as pumps, gauges, air release valves, and main valves are in good working order. The lines being tested must be ready for use.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

- A. All DIP pressure pipelines and PVC pressure pipelines shall be tested in accordance with ANSI/AWWA C600 and ANSI/AWWA C900, respectively. All testing operations shall be performed in the presence of the OWNER.
- B. All test equipment, temporary valves or bulkheads, or other water control equipment and materials shall be determined and furnished by the CONTRACTOR subject to the

OWNER's review. No materials shall be used which would be injurious to the construction or its future function.

- C. The CONTRACTOR shall furnish a calibrated Type "A" oil filled gauge for measuring pressure used during hydrostatic test with a three-inch diameter minimum. Calibration shall be within 60 days. The OWNER shall approve the gauge to be used with increments not more than two psi. The CONTRACTOR will supply water, pumps, temporary plugs, fill connections and all appurtenances required for pressurizing the line.

3.02 HYDROSTATIC TESTING AND DISINFECTION OF PIPELINES

- A. Prior to hydrostatic testing, all pipelines shall be cleaned with a polly pig cleaning system. The CONTRACTOR shall test all pipelines either in sections or as a unit. The test shall be made by closing valves when available, or by placing temporary bulkheads in the pipe and filling the line slowly with water. The CONTRACTOR shall be responsible for ascertaining that all test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to, or movement of, the adjacent pipe. No section of the pipeline shall be tested until all field-placed concrete or mortar has attained an age of 14 days. Care shall be taken to see that all air vents are open during filling.
- B. The pipeline shall be filled at a rate which will not cause any surges or exceed the rate at which the air can be released through the air valves at a reasonable velocity and all the air within the pipeline shall be properly purged. After the pipeline or section thereof has been filled, it shall be allowed to stand under a slight pressure for at least 24 hours to allow the concrete or mortar lining, as applicable, to absorb what water it will and to allow the escape of air from any air pockets. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures satisfactory to the OWNER shall be taken.
- C. The hydrostatic test shall consist of holding the test pressure on the pipeline for a period of two hours. The pipeline can be tested in 1,000 foot sections maximum. The test pressure for watermains shall be at 150 psi and 150 psi for force mains, measured at the lowest point of the pipeline section being tested. All visible leaks shall be repaired in a manner acceptable to the OWNER.
- D. The maximum allowable leakage for pipelines shall be 20 U.S. gallons per inch of diameter per mile of pipe per 24 hours and shall be based upon the following formula:

$$L = \frac{(S) (D) [(P)]^{1/2}}{148,000}$$

In which,

L = Allowable Leakage, Gallons per Hour

S = Total Length of Pipe Being Tested, In Feet D = Nominal Inside Pipe Diameter,

In Inches P = Average Test Pressure, In PSI Gauge

- E. In the case of pipelines that fail to pass the prescribed leakage test, the CONTRACTOR shall determine the cause of the leakage, shall take corrective measures necessary to repair the leaks, and shall again test the pipelines.
- F. Disinfection of Potable Water Lines: Before being placed in service, all new watermain and repaired portions of, or extension to existing mains shall be disinfected. Disinfection shall be done in accordance with the provisions of AWWA Standard C651.
- G. The basic disinfection procedure consists of:
 - 1. Preliminary flushing according to Section 5.2.2 of AWWA C600.
 - 2. Chlorine application.
 - 3. Final flushing.
 - 4. Bacteriological testing according to Standard Methods for Examination of Water and Wastewater.
 - 5. Repeat procedure (if necessary).
- H. Should the initial treatment result in an unsatisfactory bacterial test, the original chlorination procedure shall be repeated by the CONTRACTOR until satisfactory results are obtained. Failure by the CONTRACTOR to get a satisfactory test shall be considered as failure of the CONTRACTOR to keep the pipe clean during construction, or to properly chlorinate the main, and no additional payment will be made for reflushing and rechlorinating until a satisfactory test is made.

3.03 CONNECTIONS TO EXISTING POTABLE WATER SYSTEM

- A. Where connections are to be made to an existing potable water system, the interior surfaces of all pipe and fittings used in making the connections shall be swabbed or sprayed with a one percent hypochlorite solution before they are installed. Thorough flushing shall be started as soon as the connection is completed and shall be continued until discolored water is eliminated.
- B. Prior to actual connections to the existing potable water system, record drawings, hydrostatic pressure test results, and bacterial test results shall be submitted to the OWNER. Upon approval from the Health Department, the connection can be constructed.

END OF SECTION

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DIVISION 16

ELECTRICAL

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SECTION 16000

ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General Conditions, apply to all work specified.

1.02 LAWS, PERMITS, FEES, AND NOTICES

- A. Secure and pay all permits, fees, and licenses necessary for the proper execution of the work. Submit all notices and comply with all laws, ordinances, rules, and regulations of any public agency bearing on the work. Contractor shall be licensed Electrical Contractor in the county of construction.

1.03 DEPARTURES

- A. If any departures from the Contract Documents or Specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted to the Engineer for advance written approval, prior to departure.
- B. Drawings showing equipment plans were not derived from a survey, instead some field measurements were taken to develop approximate plans that depict the existing as well as the proposed equipment, The Contractor shall be responsible to meet NEC and NFPA 820 clearance requirements.
- C. Coordinate all demo and installation work with the City of Boca Raton sewage department, and FPL, the Contractor shall refer to other specifications and provide bypass pumping as required during the demo and rehabilitation time that the existing lift station is down. See the drawings on demo and installation also.

1.04 GUARANTEES

- A. Furnish written guarantee covering all materials, workmanship, labor, and equipment for a period of one (1) year from the date of acceptance as described in the Contract General Conditions.
- A. The Owner reserves the right to operate and use all materials and equipment failing to meet the requirements of the Contract Documents until such unacceptable materials and equipment are replaced or repaired to the satisfaction of the Engineer.

1.05 AS-BUILT INFORMATION

- A. A set of “red-lined” electrical drawings shall be carefully maintained at the job site. Actual conditions are to be put on the drawings in red on a daily basis so the drawings will continuously show locations and routes of cable trays, conduits, pull-boxes, circuit numbers, and other information required by the Engineer.

1.06 JOB SITE VISIT

- A. Visit the project site before submitting a bid. Verify all dimensions shown and determine the characteristics of existing facilities which will affect performance of the work, but which may not be shown on drawings or described within these Specifications.

1.07 CLEANUP

- A. Maintain a continuous cleanup during the progress of the work and use appointed storage areas for supplies. The premises shall be kept free from accumulations of waste materials and rubbish.

1.08 CUTTING AND PATCHING

- A. Cut and prepare all openings, chases and trenches required for the installation of equipment and materials. Repair, remodel and finish in strict conformance with the quality of workmanship and materials in the surroundings. Obtain written permission from the Engineer for any alternations to structural members before proceeding.

1.09 MAINTENANCE

- A. Render all necessary measures to ensure complete protection and maintenance of all systems, materials, and equipment prior to final acceptance. Any materials or equipment not properly maintained or protected to assure a factory new condition at the time of final acceptance shall be replaced immediately at no additional cost to the Owner.

1.10 WATERPROOFING

- A. Whenever any work penetrates any waterproofing, seal and render the work waterproof. All work shall be accomplished so as not to void or diminish any waterproofing bond or guarantee.

1.11 TESTS

- A. Conduct an operating test of equipment prior to the Engineer's approval. The equipment shall be demonstrated to operate in accordance with the

requirements of these Specifications. The tests shall be performed in the presence of the Engineer or an authorized representative. The Electrical Contractor shall furnish all instruments, electricity and personnel required for the tests.

1.12 SUMMARY OF ELECTRICAL WORK

A. Provide all labor, materials, tools, supplies, equipment, and temporary utilities to complete the work shown on the drawings and specified herein. All systems are to be completely installed and fully operational. Specifically, the work includes, but is not necessarily limited to:

1. Coordinate with FPL for the disconnect of the former electrical service and re-connect of the proposed new underground service to new LS 27 equipment and meter. The Contractor may reuse portion of the existing raceway along the pole (riser), provide new conduit and service wires as indicated on the plans. New service to come down existing transformer pole (reuse existing single phase service aerial transformer). For lift station 27 minimize down time by installing as much of the new service, rack with meter, main disconnect, lift station new control panel and RTU panel before demolition of existing service and equipment. Provide new 120/240V single phase underground service as indicated on drawings.

At lift station 53, the work pertains to installing new larger rated horse power submersible pumps, and replace existing control panel components with new control panel internal components; including larger ampacity motor protector breakers, size 2 NEMA starters, and properly sized overloads, along with new wiring and conduit as called out on the drawings to remove and replace former equipment with proposed equipment. All Control panel equipment modifications shall be carried out by the UL 508 listed I&C Contractor.

2. Any lift station shut down shall be properly scheduled and coordinated ahead of time with City of Boca Raton sewage personnel and the Contractor shall provide bypass pumping equipment as required whenever the station is getting rehabilitated – this shall apply to LS 27, and it also applies to the rehabilitation work at lift station 53 (depending on total time needed for the replacement of internal components may dictate how long to provide bypass pumping and shut downs).
3. All electrical work associated with the sewage pump station as called out in the drawings. Demolition and installation work of all new raceways, equipment including explosion proof terminal jboxes, RTU equipment, Lift Station Control Panel, new equipment rack, meter and main disconnect, antenna tower, generator receptacle, wetwell level transmitter/sensor, and wetwell floats along with new pumps, see the drawings and other specifications. New pumps are single phase with internal capacitors built-in.

4. Power and control raceways and wiring to pump station equipment, including Grounding per NEC 250 and as indicated on the drawings.
5. Provide equipment rack, and Unistrut along with equipment mounting hardware as indicated on the drawings and details. Provide other equipment as indicated on the drawings.
6. Provide signal and equipment conduits and wires to lift station wetwell and valve vault. Provide new floats and wetwell level transmitter as indicated on the drawings. Provide Pump controller transducer equipment as required into the controls and an LED display for the level mounted onto the dead front – as indicated on the drawings.
7. Provide new RTU equipment within its own enclosure, PLC, I/O cards, relays, power supply, radio, terminals TVSS for power and signal, and RF surge suppression.
8. Provide new field instruments and new raceways and discrete signal and twisted shield pairs for analog instruments. All raceways entering a Jbox, disconnect, control panels, RTU, terminal box, and the like shall have duct seal putty. The Conduits going to lift station control panel shall be leaving explosion proof terminal j-box through explosion proof fittings/sealing hub using Chico cement, see the drawings.
9. Temporary power service as required for bypass operation of lift station during the power outage is required during installation of the new lift station equipment and service wires. Coordinate with the City and FPL, provide bypass pumps to provide for temporary power or bypass pumping to lift station as required during rehabilitation, see the drawings.
10. Provide grounding to all equipment, including rebar and bonding to station Equipment, see the drawings.
11. Start-up testing, programming of the new PLC and radio RTU, including the new control panel, field instruments and equipment, and provide documentation and City of Boca Raton personnel training.
12. Provide as-built based on redlines, and O&M manuals, and spare parts as Indicated in the specifications and drawings.

1.13 ELECTRICAL POWER SERVICE REQUIREMENTS

- A. The Contractor shall coordinate with FPL all power service requirements for the lift station listed in these contract documents and include in the bid cost any FPL related costs for the disconnect of the existing electrical service, and costs of new service to the rehabilitated lift station meter and equipment and rack. The Contractor shall install as much of the new equipment shown on

the drawings as possible in order to limit the down time, until the time when bypass pumping will be required for the duration of the rehabilitation.

- B. Coordinate with FPL, the Contractor shall replace the existing service conductors from the service transformer pole to the new meter; proposed routing is shown on the plans, Contractor to obtain permits, easements, and other approvals to install the service conduit, see the drawings.
- C. The Contractor shall visit the project site before submitting the bid and shall verify all field conditions and characteristics which will affect the work, but which may not be indicated on the drawings or specifications.

1.14 CODES AND STANDARDS

- A. General applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical work (in addition to specific applications specified by individual work sections of these specifications.
 - 1. U.L.: Electrical materials shall be approved by Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
 - 2. National Electrical Code
 - 3. OSHA: Standards of the Occupational Safety and Health Administration are to be complied with.
 - 4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers and fuses.
 - 5. ANSI: America National Standards Institute
 - 6. NESC: National Electrical Safety Code

1.15 ELECTRICAL TEMPORARY FACILITIES

- A. The Electrical Contractor shall include in his bid the cost of furnishing, installing, maintaining, and removing all materials and equipment required to provide temporary light and power to perform his work during construction and until work is completed.
- B. The Electrical Contractor shall include in his bid the cost of furnishing, installing, maintaining, and removing temporary emergency generator(s) or

bypass pumping to provide by pass pumping during power outage conditions at existing lift station.

1.16 EXCAVATING FOR ELECTRICAL WORK

A. General

1. Excavation or drilling, backfill and repair of paving and grassing is to be in the bid of the Electrical Contractor. The actual work need not be performed by electrical trades. However, the Electrical Contractor is responsible for all excavation, drilling, dewatering, backfilling, tamping and repair of pavements and grassing required in support of electrical work. All areas disturbed by electrical work shall be repaired to their original condition, or as indicated on the drawings.

B. Coordination

1. The Electrical Contractor must check for existing utilities before commencing any excavation or drilling.
2. Contract drawings and other trades are to be consulted to avoid interferences with other utilities on this project.
3. In the event of damage to existing utilities, the Engineer shall be immediately notified, and damage shall be immediately repaired.
4. The Owner is to be consulted to ascertain locations of existing interferences by referring to "As Built" drawings and Owner's experience. The excavations are to be scheduled at the Owner's convenience.

C. Precautions

1. The Electrical Contractor must take every reasonable precaution to avoid interferences. In the vicinity of a suspected interference, excavations shall be dug by hand.

1.17 ELECTRICAL SUBMITTAL

A. Submittals for Approval

1. Refer to Contract General Conditions for additional instructions on the General Conditions and this Section, the more stringent requirements shall apply.
2. Shop Drawings and manufacturer's data sheets are required for all electrical materials.

3. Submittals will not be accepted for partial systems. Submit all materials for each specification section at one time. Submittals must be arranged, correlated, indexed, and bound in orderly sets for ease of review.
4. Samples are to be supplied for any substitute as requested by the Engineer.
5. The following numbers of copies are required:

Shop drawings	5 sets
Samples	1 each
Manufacturer's data	5 sets
Certifications	5 sets
Test reports	5 sets
Warranties/Guarantees	5 sets
6. Submit shop drawings, manufacturer's data, and certifications on all items of electrical work prior to the time such equipment and materials are to be ordered. Order no equipment or materials without approval from the Engineer. Submittals will not be accepted for partial system submittals; submit all data at one time. Submittals will be promptly returned, approved, approved as noted, or not approved. Items "approved as noted" must be changed to comply with the Engineer's comments and need not be resubmitted for "approved" status. Items "not approved" are not suitable, requiring complete new submittals.
7. Time delays caused by rejection of submittals are not cause for extra charges to Owner or time extensions. Contractor shall be responsible for investigating existing systems or shop drawings in order to fully integrate the new equipment into the system. Adequate shop drawings may or may not exist for all existing systems.

B. Operation and Maintenance Manuals

1. Submit to the Engineer five (5) copies of all manufacturer's service installation and operation manuals, instructions, and bulletins. These manuals shall be subject to review of the Engineer. If acceptable they shall be forwarded to the Owner. If not acceptable they shall be returned to the Contractor for revision and resubmittal. Manuals shall contain, but not be limited to, the following:
 - a. Brief description of system and basic features.
 - b. Manufacturer's name and model number for all components in the system.
 - c. List of local factory authorized service companies.

- d. Operating instructions.
- e. Maintenance instructions
- f. Trouble shooting instructions
- g. Manufacturer's literature describing each piece of equipment.
- h. Power and control wiring diagrams
- i. Parts lists

1.18 ELECTRICAL PRODUCTS

A. Standards Products

- 1. Unless otherwise indicated in writing by the Engineer, the products to be furnished under this Specification shall be the manufacturer's latest design. Units of equipment and components of the same purpose and rating shall be interchangeable throughout the project. All products shall be newly manufactured. Defective equipment or equipment damaged in the course of installation or test, shall be replaced or repaired in a manner meeting with the approval of the Engineer at no additional expense to the Owner.

B. Delivery, Storage and Handling

- 1. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels and similar information needed for distinct identification; adequately packaged or protected to prevent deterioration during shipment, storage, and handling. Store in a dry, well ventilated, indoor space, except where prepared and protected by the manufacturer specifically for exterior instructions for storage locations.

C. Substitutions

- 1. Comply with instructions in the Contract General Conditions and Special Conditions and obtain pre-approval of the Engineer regarding substitutions.

1.19 ELECTRICAL IDENTIFICATION

- A. Color Coding Conductor colors shall be in accordance with the N.E.C. and NFPA requirements. Refer also to applicable sections of these specifications. Three phase feeder and branch circuits shall be identified as indicated by NFPA 70.

B. Nameplates

1. The following items shall be equipped with nameplates: All motors, motor starters, motor control centers, pushbutton stations, control panels, time switches, disconnect or relays in separate enclosures, receptacles, wall switches, high voltage boxes and cabinets. All light switches and outlets shall carry a phenolic plate with the supply identified. Special Electrical systems shall be identified at junction and pull boxes, terminal cabinets, and equipment racks.
2. Nameplates shall adequately describe the function of the particular equipment involved. Nameplates for panelboards and switchboards shall include the panel designation, voltage, and phase of the supply. For example, "Panel A, 208/120V, 3-phase, 4-wire". The name of the machine on the motor nameplates for a particular machine shall be the same as the one used on all motor starters, disconnect and P.B. station nameplates for that machine. Normal power nameplates shall be laminated phenolic plastic, white front and back with black core, with lettering etched through the outer covering; black engraved letters on white background. Lettering shall be 3/16 inch high at pushbutton stations, thermal overload switches, receptacles, wall switches and similar devices, where the nameplate is attached to the device plate. At all other locations, lettering shall be 1/4 inch high, unless otherwise detailed on the Drawings. Nameplates shall be securely fastened to the equipment with No. 4 Phillips, round-head, cadmium plated, steel self-tapping screws or nickel-plated brass bolts. Motor nameplates may be non-ferrous metal not less than 0.003 inch thick, die stamped. In lieu of separate plastic nameplates, engraving directly on device plates is acceptable. Engraved lettering shall be filled with contrasting enamel. Equipment nameplate schedule for all equipment shall be submitted with shop drawing submittal for Engineer's approval.
3. All junction and splice boxes shall be labeled using permanent shipping tags attached to boxes; not covers.

C. Wire and Cable Identification

1. All wire and cable shall be identified at each termination point and at each pull box, splice box, junction box, or manhole. Provide permanent, waterproof, non-metallic (paper unacceptable) tags indicating the circuit number in 3/16 inch letters.
2. Individual wires within equipment enclosures shall be identified using the equipment manufacturer's shop drawing wire numbers. Panel wire numbers and terminal numbers shall agree. Wire markers shall be T&B shrink-kon HVM marker heat shrink system or an approved equal.

D. Signs

1. Warning signs shall comply with OSHA requirements and reasonable safety precautions.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 16001

ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. CONTRACTOR shall take precautionary and safety measures to assure the safety of his personnel. All wires shall be identified and disconnected from power sources before removal.
- B. CONTRACTOR shall coordinate with the OWNER, ENGINEER, and FPL
- C. The general demolition scope shall also include the following minimum requirements whether indicated on drawings or not.
 - 1. Before demolition, CONTRACTOR shall verify that the equipment is no longer needed or that the demolition will not adversely effect plant operation.
 - 2. Removal of all exposed conduit. Removal of all wire within raceways, cabinets, outlet boxes, trenches and the like associated with equipment shown to be removed on plans.
 - 3. Removal of all hangers and support systems which are not needed as a result of the demolition.
 - 4. Coordinate with the City of Boca Raton Staff and provide bypass pumping as required, see other specifications and drawings.
 - 4. CONTRACTOR shall cover all openings as a result of demolition and removals including but not limited to the following:
 - a. Cabinets and enclosures
 - b. Wall and masonry openings.
 - c. Cut conduit, instrumentation line, etc. flush with slab, fill with concrete, patch, and paint holes in walls.
- D. Operational Systems
 - 1. To the fullest extent possible, all required systems shall remain operational. CONTRACTOR shall replace and/or repair existing facilities which may be damaged due to equipment removals.
 - 2. Where required wiring passes through or uses enclosures or raceways shown for demolition. CONTRACTOR shall provide raceways and wire as required to keep those systems operational.

3. CONTRACTOR shall remove existing equipment in an orderly, planned and coordinated fashion. All replacement equipment shall be on site and ready to install immediately after the removal of existing equipment.
 4. Where demolition interrupts the normal automatic control of the station, CONTRACTOR shall provide full time manual control until automatic control is restored unless otherwise directed by the OWNER. CONTRACTOR shall obtain permission of the OWNER before removing automatic control.
- E. CONTRACTOR shall be required to visit the site before bid to ascertain the magnitude of the Work. The drawings indicate the minimal effort. Any electrical raceway associated with any equipment shall be demolished. The drawings do not call out every item of Work. All the building electrical equipment shall be replaced with new, unless otherwise indicated by the drawings or noted elsewhere by the specifications.
- F. The OWNER shall select equipment to be salvaged to the OWNER. Salvaged equipment shall be provided to the OWNER onsite.
- G. Provide demolition in support of any civil or mechanical Work as may be required. See civil and mechanical documents.

1.02 INCLUDED WORK

- A. Contractor shall coordinate with the Owner and demolish the existing pump station electrical equipment as indicated on the drawings and other specification sections. Provide bypass pumping as required and coordinate the shut downs of LS 27 and LS 53 as required.
- B. Contractor shall demo the existing service wires and replace these with new, provide new service conduit as indicated on the drawings.
- C. At lift station 27 demo all existing raceways, wiring, grounding, existing meter, main disconnect, control panel, existing electrical equipment in existing below ground can, existing service raceway and service conductors, wetwell equipment rack, see the drawings. At lift station 53, demo the internal components, like motor breakers, existing size 1 NEMA starters, and related wiring, and replace this removed components with new larger rating components as called out on the drawings.
- E. Contractor shall coordinate with FPL for the replacement of the existing service conductors, demo the existing underground service raceway in place after removing the former service conductors.
- F. During the rehabilitation of each of the lift stations, the Contractor shall provide bypass pumping until the station's new equipment has been tested and accepted by the engineer and owner.

1.03 DISPOSITION OF EQUIPMENT

- A. Provide removed equipment and/or materials to OWNER as may be requested by Owner, such equipment may be electrical components from the former control panel, and other equipment, coordinate before disposing of all equipment.
- B. Except as otherwise indicated, all removed or demolished electrical equipment shall become the property of the CONTRACTOR. All rubble shall be disposed of by the CONTRACTOR.
- C. CONTRACTOR shall load, transport, pay all disposal fees, and dispose of all or demolished equipment including all enclosed gear, panels, jboxes, disconnects, raceways, wire and cable, supports, step-down transformers, control panels, light fixtures, equipment racks and the like.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 16050

BASIC MATERIALS AND METHODS

PART 1 GENERAL

1.01 SUBMITTALS

- A. Submit data sheets on all items per Section 16000.

1.02 CODES AND STANDARDS

- A. General applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical work (in addition to specific applications specified by individual work sections of these specifications):
 - 1. U.L.: Electrical materials shall be approved by the Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
 - 2. National Electrical Code
 - 3. OSHA: Standard of the Occupational Safety and Health Administration are to be complied with.
 - 4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency, and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers, and fuses.
 - 5. ANSI: American National Standards Institute
 - 6. NESC: National Electrical Safety Code

PART 2 PRODUCTS

2.01 GROUNDING MATERIALS

- A. All ground rods shall be 10 foot 5/8" copperclad, unless otherwise indicated.
- B. Around wires shall be soft drawn copper sized per National Electrical Code, unless otherwise indicated.

2.02 CONDUIT

A. Galvanized Rigid Conduit (ANSI C80.1)

1. Rigid galvanized steel conduit "RGS" shall be U.L. approved, Schedule 40, mild steel pipe, zinc-coated on the inside and outside. Fittings shall be zinc-coated, U.L. approved. Comply with ANSI Spec C80.1 and Federal Spec WW-C-581.

B. PVC Conduit

1. PVC conduit shall be Schedule 80 unless otherwise noted and shall be U.L. approved. Comply with Federal Spec WC-1094 and NEMA TC-1.

C. Flexible Conduit

1. All flexible conduits shall be liquid tight, made of corrosion resistant plated steel with extruded polyvinyl covering and watertight connectors.

D. PVC Coated RGS

1. PVC coated Rigid galvanized steel conduit system shall be coated inside and outside; provided by Permacoat or Robroy or equal. All fittings used on PVC coated RGS conduits shall also be PVC coated fittings.
2. PVC coated RGS conduits shall be used between the wetwell and the terminal jbox, including fittings, similarly for the conduits from the terminal jbox to the valve vault.

E. Conduit Sealing Hubs

1. Conduit sealing hubs shall be Crouse Hinds ESSG-iron alloy with Chico X Fiber and Chico A sealing compound. Armored gaskets and locknuts shall be provided. Standard finish.

2.03 CABLE, WIRE AND CONNECTORS

A. 600 Volt Power Wiring

1. Cable shall be rated for 600 volts and shall meet the requirements below:
 - a. Conductors shall be stranded.

- b. All wire shall be brought to the job in unbroken packages and shall bear the date of manufacturing; not older than 12 months.
- c. Type of wire shall be THWN except where required otherwise by the contract drawings.
- d. No wire smaller than No. 12 gauge shall be used unless specifically indicated.
- e. Conductor metal shall be copper.
- f. All conductors shall be meggered after installation. Resistance shall exceed 50 mega ohms.

B. Instrumentation and Control Cable

- 1. Process instrumentation wire shall be 16 gauge twisted pair, 600 V., aluminum tape shielded, polyvinyl chloride jacketed, as manufactured by the American Insulated Wire Co., Eaton Corp., or equal. Multiconductor cables with individually shielded twisted pairs shall be installed where indicated.
- 2. Multiconductor control cable shall be stranded 14 gauge, 600 V. THWN insulated with PVC jacket, as manufactured by the American Insulated Wire Co., Eaton Corp., or equal.

2.04 TERMINATIONS AND SPLICES (600 VOLTS AND LESS)

- A. Terminations of power cable shall be by means of U.L. approved connectors. All connectors shall meet U.L. 486B and shall be compatible with the conductor material.
- B. Terminate all control and instrumentation cable with fork type compression lugs.
- C. Splicing of power, control, or instrumentation wiring will not be allowed except by written approval of the Engineer. Where splicing is allowed, splices shall be made with approved compression connectors, and splices shall be made waterproof regardless of location.

2.05 BOXES

- A. Boxes for wiring devices, (switches and receptacles) installed outdoors shall be weatherproof fiberglass with polycarbonate cover plates. Junction boxes shall be fiberglass with gasketed covers. All boxes shall be securely mounted plumb and level in readily accessible locations. Indoor boxes shall have stainless steel cover plates.

- B. The terminal boxes for the lift station pump cables/raceways, the level sensor and float cable/raceways shall be NEMA 7, class 1 and 2, divisions 1 and 2 explosion proof boxes, water proof like 4X rated enclosures. These shall have see-through threaded covers (no bolts). Refer to the details on the drawings and other specifications.
- B. All outdoor junction boxes and pull boxes shall be NEMA 4X stainless steel or fiberglass.

2.06 AUXILIARY GUTTERS

- A. Gutters shall be provided per NEC Article 374.
- B. Provide fiberglass units. Gutters shall be painted with one prime coat and two finish coats. Final coats shall match other electrical enclosures.
- C. Submit shop drawing for all gutters.

2.07 MOUNTING AND SUPPORTING ELECTRICAL EQUIPMENT

- A. Furnish and install all supports, hangers, and inserts required to mount fixtures, conduits, cables, pull boxes, and other equipment.
- B. Perforated straps and wires are not permitted for supporting electrical devices. Anchors shall be of approved types.
- C. All supports, hangers, hardware, etc. used outdoors, in corrosive atmosphere or in hazardous areas shall be non-ferrous, corrosion resistant or stainless steel. Supports shall be selected to avoid galvanic reactions. Support devices shall be submitted for approval.

2.08 SAFETY DISCONNECT SWITCH

- A. Fusible and non-fusible disconnect switches shall be heavy-duty, NEMA type H, quick-make, quick-break, visible blades, 480 volt (where applicable) and 240 volt, 3 pole with full cover interlock. Outside switches shall have copper lugs.
- B. Unless otherwise indicated, disconnects shall be 3-pole, no fusible switch in a NEMA 4x, stainless steel enclosure.
- C. Switches shall be horsepower rated, heavy duty as manufactured by the Square D Co., or equal.
- D. Units provided as main service disconnects, shall be fused and labeled for service equipment.

PART 3 EXECUTION

3.01 GROUNDING

- A. Provide ground system as indicated on the drawings and as required by the National Electrical Code.
- B. All raceways require grounding conductors. Metallic raceways are not adequate grounding paths. Bonding conductors through the raceway systems shall be continuous from main switch ground buses to panel ground bars of the panelboards, and from panel grounding bars of panelboards and motor control centers to branch circuit outlets, motors, lights, etc. THESE GROUND CONDUCTORS ARE REQUIRED THROUGHOUT THE PROJECT REGARDLESS OF WHETHER CONDUIT RUNS SHOW GROUND CONDUCTORS ON THE DRAWINGS.
- C. All connections made below grade shall be of the exothermic type.

3.02 CONDUIT

- A. Locations: Conduit location shall be installed as called out in the schedule of materials, see drawings.
- B. Installation
 - 1. Conduits subjected to rough handling or usage shall be removed from the premises.
 - 2. Conduits must be kept dry and free of water or debris with approved pipe plugs or caps. Care shall be given that plugs or caps be installed before pouring of concrete.
 - 3. Where conduits pass through exterior concrete walls or fittings below grade, the entrances shall be made watertight. This shall be done by providing pipe sleeves in the concrete with one half inch minimum clearance around the conduits and caulking with askum and sealant, or by means of conduit entrance seals.
 - 4. Conduits entering panelboards, pull boxes, or outlet boxes shall be secured in place by galvanized locknuts and bushings, one (1) locknut outside and one (1) locknut inside of box with bushing on conduit end. The locknuts shall be tightened against the box without deforming the box. Bushings shall be of the insulating type.
 - 5. Field conduit bends shall be made with standard tools and equipment manufactured especially for conduit bending.

6. Where embedded conduits cross expansion joints, furnish and install offset expansion joints or sliding expansion joints. Sliding expansion joints shall be made with straps and clamps.
7. Exposed runs of conduits shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of symmetrical bends or pull boxes as indicated on the drawings. Bends and offsets shall be avoided where possible.
8. Conduits in structural slabs shall be placed between the upper and the lower layers of reinforcing steel, requiring careful bending of conduits. Conduits embedded in concrete slabs shall be spaced not less than eight (8) inches on centers or as widely spaced as possible where they converge at panels or junction boxes. Conduits running parallel to slab supports, such as beams, columns and structural walls shall be installed not less than 12 inches from such supporting elements. To prevent displacement during concrete pour, saddle supports for conduit, outlet boxes, junction boxes, inserts, etc., shall be secured.
9. Conduit runs shall always be concealed except where indicated on plans.
10. Pull lines shall be installed in all empty conduits. All pull wires shall be identified with conduit number at each end.
11. The use of running threads is prohibited and where some such device is necessary, split couplings, Erickson couplings, or equal shall be used. Where watertight conduit installations are required, watertight conduit unions shall be used.
12. Where conduits are run individually, they shall be supported by approved pipe straps secured by means of toggle bolts or tapcons on hollow masonry; tapcons on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood construction. The use of perforated straps or wires will not be permitted.
13. Concrete inserts and pipe straps shall be galvanized. Steel bolts, galvanized or cadmium-plated. Individual hangers, trapeze hangers and rods shall be prime-coated and painted.
14. Wire shall not be installed until all work of any nature that may cause damage is completed, including pouring of concrete. Mechanical means shall not be used in pulling in wires No. 8 or smaller.
15. Underground conduits not under concrete slabs are to be buried at least two (2) feet below finished grade for circuits rated 600 volts or less, except under traffic areas where motor vehicles may cross. Under

traffic areas, conduits are to be buried at least three (3) feet below finished grade.

16. All conduits shall be cleaned by pulling a brush swab through before installing cables.
17. All conduits shall be sealed at each end with electrical putty. Special care shall be taken at all equipment where entrance of moisture could be detrimental to equipment.
18. Where steel conduit penetrates ground or concrete, the conduit shall be painted with two (2) coats of asphaltic base paint one (1) foot on each side of penetration.
19. No more than two (2) feet of flexible conduit shall be used at connections of all motors, transformers, motor operated valve and gates, instruments, and other items of equipment where vibration is present. It shall be supported where required with stainless steel bands.

3.03 WIRES, CABLES, AND CONNECTIONS

- A. Cables pulled into conduits shall be pulled using pulling eyes attached to conductors.
- B. Where exposed in manholes and pull boxes, cables shall be wrapped using 3M 77 Scotch electrical fireproofing tape or approved equal. Wrapping shall be made using 50 percent lap.
- C. Shields shall be grounded at only one termination point.
- D. A loop of each conductor shall be provided in each manhole to facilitate the addition of future tee splices.

3.04 BOXES

- A. Installation of boxes shall be in accordance with the National Electrical Code requirements.
- B. Boxes shall be mounted plumb and level in accessible locations and mounting shall be secure, vibration resistant and galvanically compatible. Hardware shall be used that is specifically intended for the purpose. When mounted in corrosive, damp or wet locations, stainless steel hardware shall be utilized.

3.05 WIRING DEVICES

- A. Wiring devices shall be installed in device boxes approved for the application. All connections shall be made with screw terminals.

3.06 SUPPORTING DEVICES

- A. All items shall be supported from the structural portion of the building and studs, except standard ceiling mounted lighting fixtures and small devices may be supported from ceiling system were permitted by the Engineer. However, no sagging of the ceiling will be permitted. Supports and hangers shall be types approved by Underwriters' Laboratories.
- B. All floor-mounted devices (switchboards, motor control centers, transformers, etc.) shall be securely anchored to the floors. Where recommendations are made by manufacturer, these recommendations shall be followed.

END OF SECTION

SECTION 16900
CONTROL PANEL

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Furnish all engineering, labor, material, and equipment to furnish, install, adjust, test, document, and start-up all process instrumentation and controls as shown on the Drawings and specified herein, complete.
- B. The process instrumentation and control system specified herein shall be a complete system.
- C. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, operation and maintenance.
- D. See Contract for Construction and Division 1, GENERAL REQUIREMENTS, which contain information and requirements which apply to the work specified herein and are mandatory for this project.
- E. Provide a new sewage duplex pump station control panel with NEMA FVNR staters, control instrument transducer and LCD display for level and other control panel equipment as indicated on the drawings, including field instruments as indicated. Such equipment shall be connected to a new radio telemetry RTU based with an Allen Bradley PLC, and an MDS Orbit Cellular based modem compatible with the City of Boca Raton RTU telemetry standards, refer to the drawings, and other specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 16050 – Electrical General Provisions.
- B. Section 16912 – RTU Equipment
- C. Section 16960 – SCADA Improvements

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. ISA Standards and Practices for Instrumentation – Current Edition.
- B. Control panels shall meet U.L. 508A and 698A specification and must be built by a U.L. approved shop.
- C. NFPA 820.

1.04 DEFINITION

- A. The instrumentation and control (I&C) subcontractor shall be a single firm, under the direct contract and direction of the Contractor. The I&C subcontractor shall assume complete responsibility for the engineering, furnishing, technical advice on, certification as to correctness of installation, final connections to, adjusting, documenting, testing and startup of the process instrumentation and control system shown and described in these Contract Documents. The I&C subcontractor may have the electrical subcontractor make final connections of the I&C system, but the I&C subcontractor shall be fully responsible for these connections.
- B. Contractor, as distinct from the I&C subcontractor, shall provide all additional materials and labor necessary to supplement the materials and labor provided by the I&C subcontractor as necessary to satisfy the requirements of this project.
- C. System acceptance shall be defined as the point in time when:
 - 1. All submittals and documentation have been submitted, reviewed, and accepted.
 - 2. The complete system of instrumentation and controls has successfully completed all testing requirements specified herein.
 - 3. All city's staff personnel training has been completed.

1.05 SYSTEM INSTALLATION RESPONSIBILITY

- A. The Contractor shall be ultimately responsible for the complete and proper installation of the process instrumentation and control system. The General Contractor shall either include installation within the scope of the I&C subcontractor's contract or shall provide for the installation by an experienced I&C installer, acceptable to Engineer. The RTU equipment shall be provided by the I&C Contractor. Programming of the RTU and the City's existing SCADA system shall be provided by City staff.

- B. The Contractor shall coordinate with the City of Boca Raton staff, and include providing a new PLC and RTU system that meets the city's latest standards. RTU system shall provide I/O points with PLC discrete input card, and analog input I/O cards, PLC system based on the Allen Bradley Micrologic 1400 and shall be housed in the RTU enclosure along with power supplies, SPD power and signal protection devices, MDS Orbit cellular based radio, and auxiliary relays, breakers, UPS/battery and other RTU components. The proposed I/O points are called out on the drawings.
- C. The configuration of the rehabilitated LS#27 RTU-PLC, shall be carried out by the I&C Contractor also providing all field instruments and control panels, no equal. The I&C Contractor shall coordinate with the city staff to provide all configuration and programming of the new PLC and RTU cellular system equipment, and the City's existing SCADA system to include all the I/O points from the lift station 27 Duplex sewage pump station equipment and field instruments, including alarm points, the pump motor starter running and fault status, field instrument levels, control panel status like intrusion and utility power available; refer to drawings and other specification sections. The new service and new equipment provided shall remain single phase 120/240V, see the drawings.
- D. At existing lift station 53, the I&C Contractor shall be the one in charge of replacing the existing components called out on the drawings, like the motor protector breakers, the FVNR NEMA rated starters, the starter overloads, and the wiring in between this equipment, and as indicated on the drawings. The existing power company 3 phase 240v, the existing meter existing main disconnect, existing control panel, existing RTU and explosion proof jboxes shall remain and be reused, refer to the drawings for the equipment and components called out to be replaced.

1.06 SUBMITTALS

- A. Submittals shall be in accordance with Section 01300 – Submittals.
- B. Catalog information, descriptive literature, wiring diagrams, and shop drawings on all controllers, recorders, indicators, transmitters, primary elements, flow measuring equipment and appurtenances, floats, pressure regulating valves, gauges and all other components of the system shall be provided.
- C. Individual data (or specification) sheets shall be provided under this section. The purpose of these data sheets is to supplement the generalized catalog information provided by citing all specific features for each specific component (e.g.: scale range, materials of construction, special options included, etc.). Each component data sheet shall bear the component name

and instrument tag number designation shown on the Drawings and Specifications.

- D. Catalog information on all electrical devices furnished under this section.
- E. Shop Drawings and catalog material for all control panels and enclosures.
- F. Panel elementary diagrams of prewired control panel(s). Diagrams shall be similar to those diagrams shown on the Drawings, but with the addition of all switched analog signals and all auxiliary devices such as relays, alarms, fuses, lights, fans, heaters, etc. Drawings shall include all terminal numbers.
- G. Interconnecting wiring diagrams, showing all component and panel terminal board identification numbers and external wire numbers. This diagram shall include all intermediate terminations between field elements and panels (e.g., terminal junction boxes, motor control centers, etc.). This diagram shall be coordinated with the Electrical Subcontractor and shall bear his mark showing that this has been done. Diagrams, device designations, and symbols shall be in accordance with NEMA ICA 1-101.
- H. A tabulation of steady state air consumption of each pneumatic instrument (as applicable).
- I. Loop diagrams, which shall consist of an individual wiring and/or plumbing diagram for each analog loop showing all terminal numbers, the location of the dc power supply, the location of any booster relays or common dropping resistors, etc. The loop diagrams shall meet the minimum requirements of ISA S5.4 plus the following requirements: each loop diagram shall be divided into three areas for identification of element locations: panel face, back-of-panel, and field, respectively. On each diagram present a tabular summary of: (a) the output capability of the transmitting instruments, (b) the input impedance of each receiving instrument, (c) an estimate of the loop wiring impedance based on the wire sizes and lengths shown, (d) the total loop impedance, and (e) reserve output capacity. Loop diagrams shall be on individual 8-1/2-inch by 11-inch or 11-inch by 17-inch drawings.
- J. Systems testing, calibration and adjustment procedures along with the proposed calibration, adjustment, and check-out forms for this project.
- K. Operation and maintenance manual including operating and maintenance information and specifications for all components specified under this Section. Submitted literature shall be of sufficient detail so as to facilitate the operation, removal, installation, adjustment, calibration and maintenance of each component specified in this Section. O&M Manuals shall include internal wiring diagrams for all panels. Wiring diagrams shall show all terminal block number designations and wire numbers.

- L. The I&C subcontractor shall submit one set of as-built Drawings on reproducible mylars of all process and instrumentation diagrams. P&ID's shall be same format as in Contract Documents.
- M. All test results, system calibration and adjustment settings shall be submitted to ENGINEER for review prior to the introduction of current to the system of individual components.

1.07 QUALITY ASSURANCE

- A. The Contractor's attention is directed to the fact that the instrumentation and control functions result in an integrated system. Therefore, it is the intention of this specification that all controls and instruments including panel assemblies, telemetry systems, computer hardware and computer software will be provided, furnished, assembled and shipped, along with installation supervision, inspection and start-up by one Instrumentation Subcontractor which has a minimum of five (5) years of experience on installations of similar complexity even though individual control and instrumentation components may be the standard products of separate manufacturing companies.
- B. Since many control items and instrumentation devices involve the assembly and interlocking functions of many individual parts, like solenoids, float switches, timing relays, interposing and output relays, intrusion and limit switches, push buttons, contacts, dials, etc., the functional system descriptions contained herein are given to allow the Instrumentation Subcontractor to choose the proper components and to assemble them so as to provide a rugged, low maintenance, easy cleaning, reliable mechanism suitable for the temperature, salt spray and humidity conditions of the Southeast Florida coastal area and which will perform the described function(s). the chosen components shall adhere whenever possible to the Owner's lift station equipment standards.
- C. All of the equipment furnished by the Instrumentation Subcontractor shall be the latest and proven design. Specifications and Drawings call attention to certain features, but do not assume to cover all details entering into the design of the instrumentation system. The completed system shall be compatible with the functions required and the equipment furnished by the Contractor.

1.08 SEQUENCING AND SCHEDULING

- A. Every effort shall be made to minimize interference with the Owner's existing plant operation. Should any shutdown, total or partial, be required, it shall be scheduled and coordinated with the Owner and his approval must be obtained prior to the shutdown.

- B. The I&C subcontractor shall obtain from the Contractor the required information on those primary elements, valves, valve actuators and other control equipment or devices that are required to be interfaced with, but are not provided within the context of this section.
- C. The I&C subcontractor shall coordinate his work with the Contractor to ensure that all components provided under this section are properly installed; the proper type, size and number of control wires and conduits are provided and installed; the proper type, size, and number of pneumatic tubes with their conduits are provided and installed and proper electrical circuits are provided for all components and systems.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Proper shipping, storage and handling procedures shall be followed as recommended by the equipment Manufacturer and as specified herein.
- B. All parts shall be properly protected so that no damage or deterioration will occur during shipment, normal unloading, storage, and installation.
- C. All equipment and parts must be properly protected against any damage during a prolonged storage period at the site. Proper job site storage is the responsibility of the Contractor.
- D. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer. This provision shall not apply if the items are too large to be shipped in a completely assembled condition.
- E. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.
- F. Each box or package shall be properly marked to show its net weight in addition to its contents.

1.10 WARRANTY

- A. The Manufacturer and Contractor shall warrant the equipment being supplied to the Owner against all defects in workmanship and materials for a period of one (1) year. Warranty period shall commence on Substantial Completion date as outlined in the General Conditions. Warranties for all equipment installed under this contract shall run concurrently.
- B. The Manufacturer's warranty period shall run concurrently with the Contractor's warranty period. No exception to this provision shall be allowed. The Contractor shall be responsible for proper storage of the equipment so

as to remain in an "as shipped" condition. If the equipment remains in storage at the job site for longer than six (6) months, before installation, the Contractor shall provide factory service personnel for a complete inspection of the equipment. Any work necessary to restore the equipment to an "as shipped" condition will be the responsibility of the Contractor.

1.11 SPARE PARTS

- A. Furnish the manufacturer's recommended spare parts including at least the following:
 - 1. One (1) plug-in relay of each type provided.
 - 2. One (1) time delay relay of each type provided.
 - 3. One (1) carton of indicator lights of each color provided.
 - 4. One (1) current transducer of each type provided.
 - 5. One (1) panel and field signal surge arrestor of each type provided.
 - 6. One (1) signal isolator of each type provided.
 - 7. Five (5) fuses of each type used.
 - 8. One spare float.
 - 9. One spare ultrasonic transmitter and sensor.
- B. All parts shall be furnished in containers which are clearly marked and identified as to the contents.

1.12 TEST PROCEDURE DEVELOPMENT AND DOCUMENTATION

- A. I&C subcontractor shall prepare and submit to the Engineer for review, a detailed description of the test procedures that he proposed to perform to demonstrate conformance of the complete system of instrumentation and controls to this Specification.
- B. It is recommended that the I&C subcontractor develop the test procedures in two steps by first submitting general descriptions and outlines of the tests and then, upon receipt of approval, submit the required detailed procedures and forms.

C. Operational Acceptance Tests

1. The I & C subcontractor shall prepare check-off sheet(s) for each loop and an instrument calibration sheet for each active I & C element (except simple hand switches, lights, etc.). These check-off and data sheets shall form the basis for these operational tests and this documentation.
2. Each loop check-off sheet shall cite the following information and shall provide spaces for sign-off on individual items and on the completed loop by the I & C subcontractor:
 - a. Project name;
 - b. Loop number;
 - c. For each element: Tag number, description, manufacturer and model number, installation bulletin, and Specification sheet number;
 - d. Loop description;
 - e. Installation check;
 - f. Termination check;
 - g. Calibration check;
 - h. Adjustment check;
 - i. Space for comments;
 - j. Space for loop sign-off by I&C subcontractor and date.
3. Each instrument calibration sheet shall provide the following information and a space for sign-off on individual items and on the completed unit by the I&C subcontractor:
 - a. Project name;
 - b. Loop number;
 - c. Tag number;
 - d. Manufacturer;

- e. Model number;
- f. Serial number;
- g. Calibration range;
- h. Calibration data: Input, output, and error at 10 percent, 50 percent and 90 percent of span;
- i. Switch setting, contact action, and dead band for discrete elements;
- j. Space for comments;
- k. Space for sign-off by I&C subcontractor and date.

D. Functional Acceptance Tests

The I & C subcontractor shall prepare two types of test forms as follows:

1. For those functions that can be demonstrated on a loop-by-loop basis, the form shall include:
 - a. Project name;
 - b. Loop number;
 - c. Loop description;
 - d. Test procedure description;
 - e. For each component: Tag number, description, manufacturer, and data sheet number;
 - f. Space for sign-off and date by both I & C subcontractor and Engineer
2. For those functions that cannot be demonstrated on a loop-by-loop basis, the test form shall be a listing of the specific tests to be conducted. With each test description the following information shall be included:
 - a. Spec page and paragraph of function demonstrated;
 - b. Description of function;

- c. Space for sign-off and date by both I & C subcontractor and Engineer.

PART 2 PRODUCTS

2.01 GENERAL

- A. The process instrumentation and control system shall provide all of the functions as described hereinafter for each loop and as shown by the electrical Drawings. Major equipment items are specified for each loop. However, it shall be the responsibility of the I&C subcontractor to provide all items of equipment, whether indicated or not, that are necessary to affect the required loop performance.
- B. Display and control loops are shown on the Drawings.
- C. Control panels, field instruments, RTU, Terminal Jbox shall be provided with a U.L. label and manufactured by a U.L. 508 and 698A panel shop. Manufacturer (see paragraph D below). Panel manufacturer shall submit proof of current enrollment in the U.L.'s custom builder's program.
- D. Process instrumentation and control systems including field instruments, new sewage control panel, and new terminal jbox along with field instruments shall be provided by one of the approved I&C Control Contractors listed below:
 - 1. C.C. Controls
 - 2. Champion Controls
 - 3. Revere Controls

2.02 UNIT PROCESS – WASTEWATER PUMPING

- A. Functions:
 - 1. Monitor phase of normal and emergency power supply. When any power leg is out of phase, indicate phase failure and stop pumps.
 - 2. Provide Hand/Off/Auto control for submersible sewage duplex pumps. Operation is same for each pump. In Hand mode, pump runs. In Off mode, pump will not run. In Auto mode, pump runs when called by the ultrasonic level controller calling for the LEAD pump to run (lead pump selected via alternation relay in the control panel relay logic). Continuous level is provided in analog format via the proposed level transducer in the wetwell. A second pump may be called to run (if in AUTO) once the LAG set point is tripped. See the drawings. There shall be a HWL high water level float also with alarm output. Relay

logic shall be configured to operate the floats as backup to a malfunctioning level transducer and/or PLC.

3. Monitoring of the floats and their status, ultrasonic level controller, and the future combustible gas concentration percentage shall be provided through the PLC/RTU to the City's SCADA via cellular telemetry.
4. A control panel intrusion signal shall be provided if the control panel or RTU panel door is opened.
5. Provide status of pump running, pump fault, loss of phase, 120V control power loss (indicating utility power loss), see the control schematic drawings for more information.
6. An Ultrasonic Level transmitter, manufactured by Siemens with the sensor made for sewage waste water wetwell and harsh explosive environment such as class 1, division 2, group D with the wastewater diaphragm seal for use in wastewater application shall be installed in the lift station wet well to provide continuous level readings via a 4-20mA signal, 2 wire loop device. Transmitter to be installed in the wet well, see drawings. Provide a display to be mounted onto the deadfront for the Level.
7. Provide panel pilot lights indicating the float levels triggered, see the drawings. Relay logic shall be configured to operate the floats as back-up to a malfunctioning level transducer and/or PLC.

2.03 LEVEL SWITCH, FLOAT TYPE WITH INTEGRAL SWITCH

- A. Direct-acting floats shall be provided, the float type consisting of a non-mercury switch enclosed in a float and connected to a two-conductor, combination support and signal cable. The entire assembly shall form a completely watertight and impact-resistance unit. Each Float shall be of chemical-resistant polypropylene material or other corrosion-resistant material. Cable shall be rugged and flexible with heavy neoprene or PVC jacket. The actuation/de-actuation differential shall not exceed 1-inch. The switch shall be rated at 5 amps at 120VAC. Unit shall be pipe mounted or suspended type as noted and provided with a minimum 50 feet of cable from float vendor, unless otherwise noted (see the drawings for wetwell distance to control panel/terminal jbox). Provide 316 Stainless steel mounting J-hooks at wetwell for Float and pump cables

- B. Each suspended type shall be provided with necessary brackets and clamps to suspend the unit from the top of wetwell cable j hook hanger. All hardware in wetwell shall be 316SS. The suspended type shall include an integral or attached weight assembly for stabilization and positive operation of the unit. All mounting clamps shall be PVC or Neoprene.
- C. Unit shall be Anchor Scientific, or equal.

2.04 TERMINAL JBOX AND EXPLOSION PROOF SEAL OFFS

- A. Provide a Terminal Jbox, Explosion proof NEMA 7 rated, with the water proof capabilities of a 4X enclosure. Refer to the City of Boca Raton current lift station standards and as indicated on the drawings, provide Terminals for discrete and analog equipment as well as pump cables and floats. At all conduit penetrations from wetwell, valve vault, combustible gas detector (when used), and any other conduits between the RTU and/or LSCP and the wetwell and the valve vault. All conduits entering the terminal Jbox shall have duct seal. The conduits leaving the terminal Jbox to the LSCP and the RTU shall have either ES sealing hubs from Crouse Hinds or explosion proof sealing conduit fittings from Crouse Hinds and filled with Chico cement. Refer to the details.

2.05 WETWELL ULTRASONIC LEVEL SENSOR AND TRASNMITTER

- A. The Ultrasonic level sensor and 4-20mA transmitter shall be provided to provide continuous level, measured by ultrasonic means via a sensor installed in the wetwell. The Unit shall be manufactured by Siemens, with a class 1, Division 2, Group D level sensor, installed and mounted onto the wetwell via an L shape 316 stainless steel bracket and 316SS hardware. Provide transmitter with 4-20mA output for RTU/PLC connection. Sensor cable shall be of sufficient length to make it to the wetwell and terminate at the transmitter in the lift station control panel (through the terminal Jbox) as indicated on the drawings

2.06 CONTROL PANEL MISCELLANEOUS ELECTRICAL

The I&C contractor shall provide space in the control panel interior for an “add a phase” starting and running capacitor package in the event the Owner switches from a single-phase submersible pump with built in capacitors to a single-phase pump that needs for the control panel starter to also include the “add a phase” device as part of the control panel.

A. Circuit Breakers

1. Eaton.
2. Amperage Ratings shall be as indicated on drawings.
3. Interrupting ratings shall be as indicated on drawings.
4. MCB and ECB shall be furnished with an auxiliary contact.
5. Provide a feeder breaker for the Lift Station control Panel, and also 120V power to the RTU panel, see the drawings.

B. Buses

1. Bussman 600volt, dual element type.

C. Control Relays

1. Control relays shall be programmable.
2. Omron or equal.

D. Indicator Lights

1. Square D trans type 6 volt, class 9001, Type K, push to test, or equal.
2. Lens color shall be as noted.

E. Selector Switches

1. Square D, Class 9001, Type K or equal.
2. Operators shall be black knob type or key switch, 3-position or 2-position, as noted.
3. Selector switches shall be spring return where noted.

F. Pushbuttons

1. Square D Class 9001, Type K, pushbutton or equal.

G. Elapsed Time Meter

1. Hour meter, non-reset type, Cramer 635K, or equal.

H. Ground Fault Duplex Receptacle

1. Leviton Duplex receptacle or equal.
2. AC receptacle box shall be Steel City 58351-1/2 or equal.
3. Covers shall be Steel City 58-C-5 or equal.

I. Motor Starter

1. Provide Eaton NEMA sized FVNR starter sized for the motor load in the drawings, including the overloads; this shall apply to lift station 27. For lift station 53, replace the existing FVNR starters for equivalent similar starters sized to handle the larger pump load.
2. Provide auxiliary contacts as required.

J. Signal Isolation

1. Signal isolator shall be plug-in type.
2. Wilkerson or equal.

K. Phase Monitor

1. Diversified or equal with auto reset.

L. Surge and Lightning Arrestors

1. All control panels shall be provided with surge and lightning arrestors as specified.
2. Control Panel Surge Suppressor
 - a. Lightning surge suppressors shall be Edco, 15kA or equal.
 - b. Surge arrestor shall be GE Tranquell, 9L15FCB001.
3. Signal
 - a. Panel surge suppressors (PSA) shall be Edco PC 642C Series, 2 channel or equal.
 - b. Field surge suppressors (PSA) shall be Edco SS64 Series, pipe style or equal.

- M. Generator Receptacle, match Owner's standard, base bid on the following:
1. Amperage rating shall match Owner's standard; base bid based as indicated on drawings. Shall match the Owner's standard for generator receptacles.
 2. Coordinate with Owner before submitting shop drawing for exact model number.
 3. Receptacle shall be installed separate from control panel, on its own j-box and angle adapter, pipe stand mounted, see the drawings.
- N. Panel internal Lamp
1. 5 watts, 120V, 12" minimum LED, Stego, or equal.
 2. with built-in on/off switch. But controlled via panel door
 3. Provide handy box with light switch.
- O. High Level Alarm Light
1. Red, 120V, Major, CVP10R, or equal.
 2. Alarm light guard, Major, VGD-1, or equal.
- P. Flasher
1. 90 FPM, 120V.
 2. SSAC, FS127, or equal.
 3. Alarm Horn
- Q. Surge Capacitor
1. General Electric 9L18BAB301, or equal.
- R. Ground Lug
1. #1/0 Wire IIsco AU-O, or equal.
- S. Magnetic Door Switch
1. Simplex, UL listed, magnetic flush or surface mounted contact and magnet. Contacts shall be hermetically sealed.

2. Edwards, Model #61 or equal.
- T. Intrinsically Safe Relay
1. Intrinsically safe relays shall be Gems SAF-PAK or equal.
 2. Furnish additional intrinsically safe relays per pump manufacturer.
- U. Time Delay Relays
1. Time delay relays shall have programmable with adjustable ranges, DIP switch settable.
 2. Omron or equal
- V. Pressure Gauge
1. Provide an analog pressure gauge.

2.08 CONTROL POWER TRANSFORMER

- A. Square D, Type KF, Class 9070 of the KVA size as called out on the drawings.

2.09 FIELD PANEL CONSTRUCTION

- A. Field panels shall be UL listed, NEMA 3R, Type 316 Stainless Steel enclosure with 3-point padlockable handles conforming to the requirements of the National Electrical Manufacturer's Association.
- B. In addition to the NEMA 3R standard, the panel shall conform to the following requirements:
1. Minimum metal thickness shall be 12-gauge.
 2. All doors shall be rubber-gasketed with continuous hinge.
 3. Provide type 316 stainless steel drip shield.
 4. Provide aluminum dead front panel for component mounting as shown on drawings.
 5. Cabinets shall be mounted as indicated on drawings. Include exhaust and intake fan

6. Print pocket and one (1) set of reduced drawings shall be provided on interior side of door.
7. Minimum overall dimensions shall be as indicated by drawings.
8. Control panel shall be painted or powder coated with a white marine grade coating.

2.10 PANEL ELECTRICAL

A. Wiring

1. All electrical wiring shall be in accordance with the applicable requirements of Division 16 – Electrical. Wires shall be 600-volt class, PVC insulated stranded copper and shall be the sizes required for the current to be carried but not below 14 AWG enclosed in either sheet metal raceway or plastic wiring duct. Wiring for signal circuits shall be twisted shielded pairs not smaller than No. 18 AWG, and be separated at least 6 inches from any power wiring.
2. All panel wiring shall be labeled with T&B Shrink-Kon HVM marker system.
3. All wires shall be run in plastic wire ways except (1) field wiring, (2) wiring between mating blocks in adjacent sections, (3) wiring run from components on a swing-out panel to components on a part of the fixed structure, (4) wiring run to panel mounted components on the door and the like. Wiring run on a swing out panel to other components on a fixed panel shall be made up in nylon wire ties bundles and secured so that bundles are not strained at the terminals.
4. Wiring run to control devices on the front panels shall be tied together at short intervals with nylon ties and secured to the inside face of the panel using adhesive mounts and adhesive strips.
3. Wiring to rear terminals on panel mounted instruments shall be run in plastic wares secured to horizontal brackets run above or below the instruments in the same plane as the rear of the instruments.
4. Shields of instrument cable shall only be grounded on one side of each circuit. The side to be grounded shall be nearest the source of excitation.
5. Care shall be exercised to properly insulate the ungrounded side of the loop to prevent ground loops from occurring.

6. Conformance to the above wiring installation requirements shall be reflected by details shown on the shop drawings for the Engineer's review.
7. Wire Marking
 - a. Each signal, alarm, control, and indicating circuit conductor connected to a given electrical point shall be designated by a single unique number which shall be shown on all shop drawings. These numbers shall be marked on all conductors using white plastic heatshrink sleeves with typewritten characters. Instrument signal conductors shall be tagged with unique multiple digit numbers. Wires from the circuit breaker panelboard shall be tagged indicating the branch circuit breaker number.

B. Terminal Blocks

1. Terminal blocks shall be on-piece molded plastic blocks with screw type terminals and barriers rated for 300 volts. Terminals shall be double sided. Terminals shall have permanent, legible identification.
2. Wires shall be terminated at the terminal blocks with crimp type, pre insulated, locking forked-tongue lugs. Lugs shall be of the appropriate size for the terminal block screws and for the number and size of the wires terminated.
3. Allow 20% extra terminals for spares.

C. Power Supplies

1. Provide dc power supplies as required to power instruments requiring external dc power.
2. Power supplies shall convert 120V ac, 60-Hz power to dc power of the appropriate voltage(s) with sufficient voltage regulation and ripple control to assure that the instruments being supplied can operate within their required tolerances.
3. Output overvoltage and overcurrent protective devices shall be provided with the power supply to protect the instruments from damage due to power supply failure and to protect the power supply from damage due to external failure. Provide NEMA 1 enclosure for all power supplies. Power supplies shall be mounted such that dissipated heat does not adversely affect other components.

2.11 NAMEPLATES, NAME TAGS AND SERVICE LEGENDS

- A. All components provided under this section, both field and panel mounted, shall be provided with permanently mounted name tags bearing the entire ISA tag number of the components. Panel mounted tags shall be plastic; field mounted tags shall be stamped stainless steel.
- B. Circuit breakers and all dead front panel items shall be clearly labeled by name, not tag number. Nameplates are defined as inscribed laminated plastic plates mounted under or near a panel face mounted instrument. Service legends are defined as inscribed laminated plastic integrally mounted on a panel face mounted instrument.
- C. Service legends and nameplates shall be engraved, rigid, laminated plastic. Service legends and nameplates shall be fastened to the panel by screws or with a specially applied adhesive. Fastening shall not depend only on the adhesive backing of the nameplate. Unless otherwise noted, color shall be black with white letters and letter height shall be 3/16-inch high characters.
- D. All field mounted tags shall be 16-gauge, 304 stainless steel with 3/16-inch high characters.
- E. Each panel shall be provided with a cabinet face mounted laminated nameplate as specified above. Unless otherwise noted, color shall be black with white letters 1/2-inch high.

PART 3 EXECUTION

3.01 GENERAL

- A. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work which has a neat and finished appearance.
- B. Electrical work shall be performed in compliance with these Specifications and the NEC. Where these Specifications and the Drawings do not delineate precise installation procedures, API RP 550 shall be used as a guide to installation procedures.
- C. Coordinate I&C work with the City, the Contractor and work of other trades to avoid conflicts, errors, delays and unnecessary interference with operation of the existing lift station during construction.

3.02 PROTECTION OF EQUIPMENT

- A. Throughout this Contract, the Contractor shall provide protection for materials and equipment against loss or damage and from the effects of weather. Prior to installation, store items in indoor, dry locations. Provide heating in storage areas for items subject to corrosion under damp conditions. Specific storage requirements shall be in accordance with the ENGINEER-reviewed I&C subcontractor's recommendations.

3.03 EQUIPMENT INSTALLATION

- A. Field equipment and panels shall be mounted as shown by the drawings. Provide 316 stainless steel hardware for all panels, enclosures, and instruments to be mounted onto existing structures and new racks.
- B. Follow manufacturers' installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between manufacturers' instructions, and these Contract Documents, follow Engineer's decision, at no additional cost to Owner. Keep copy of manufacturers' instructions on the jobsite available for review at all times.
- C. Where existing materials and equipment are removed or relocated, remove and deliver to the Owner all materials no longer used unless otherwise directed by the Engineer. Repair affected surfaces to conform to the type, quality, and finish of the surrounding surface in a neat and workmanlike manner. Follow any specific instructions given by the Engineer.

3.04 ELECTRIC CONTROL AND SIGNAL WIRING

- A. Control and signal wiring external to the control panels and all power wiring shall conform to the requirements of Division 16 - Electrical.
- B. Control and signal wiring in control panels shall be restrained by plastic ties or ducts. Hinge wiring shall be secured at each end so that any bending or twisting will be around the longitudinal axis of the wire and the bend area shall be protected with a sleeve.
- C. Arrange wiring neatly, cut to proper length and remove surplus wire. Provide abrasion protection for any wire bundles which pass through holes or across edges of sheet metal.
- D. Wiring shall not be spliced or tapped except at device terminals or terminal blocks.

- E. Panels and panel mounted equipment shall be assembled as far as possible at the I&C subcontractor's plant. No work, other than correction of minor defects or minor transit damage, shall be done on the panels at the job site.
- F. I&C subcontractor shall observe and advice on the installation to the extent required to certify in writing that the equipment will perform as required.

3.05 MANUFACTURER'S SERVICES

- A. The supervisory services of a factory-trained person who is specifically trained on the type of equipment herein specified shall be provided for a period of not less than one (1) eight (8)-hour day during construction to assist the Contractor in the location of sleeves; methods of installing conduits and special cable; mounting, piping and wiring of one of each type of device and the method of protecting all of the equipment prior to placing it into service. Upon completion of the installation, the services of the above service engineer shall be provided for a period of not less than one (1) four (4)-hour day for calibration and start-up of the equipment and instructing the operating personnel. The minimum days specified above does not relieve the Instrumentation Subcontractor from providing sufficient service to place the system into satisfactory operation.
- B. No form of energy shall be turned on to any part of the instrumentation system prior to receipt by the Engineer of a certified statement of approval of the installation from the Contractor containing his supplier's authorization for energizing the system.
- C. A factory trained service person shall be provided for placing the system into operation. After the system is being operated by the Owner's personnel, the service engineer shall return for a one-day instruction course in the maintenance and operation of the system.
- D. All instrumentation shall be calibrated in the presence of the Engineer in accordance with the range and accuracy specified herein. Certified test reports shall be filed with the Engineer.

3.06 TESTING

- A. All elements of the Instrumentation and Control system shall be tested to demonstrate that the total system satisfies all of the requirements of this specification.
- B. All special testing materials and equipment shall be provided by the I & C Subcontractor. Where it is not practical to test with real process variables, the I & C subcontractor shall provide suitable means of simulation. These simulation techniques shall be subject to the approval of the ENGINEER.

- C. The I & C Subcontractor shall coordinate all of his testing with the CONTRACTOR and all other associated subcontractors.
- D. As a minimum, the testing shall include the following:
 - 1. Factory Tests
 - a. All analog panels and panel assemblies shall be tested for proper operation at the I & C subcontractor's factory prior to the shipment of any system element to the site. Results of the factory tests shall be recorded and submitted for approval before shipment of any panel or panel assembly to the plant.
 - 2. Operational Acceptance Tests
 - a. The objective of these tests is to demonstrate that the system of Process Instrumentation and Control is READY for final operation.
 - b. The I & C System shall be checked for proper installation, adjusted, and calibrated on a loop-by-loop basis to verify that it is ready to function as specified
 - c. All system elements shall be checked to verify that they have been installed properly and that all terminations have been made correctly.
 - d. All discrete elements and systems shall have their set points adjusted and shall be checked for proper operation (e.g., interlock functions, contact closure on rising/falling P.V., etc.).
 - e. All continuous elements and systems shall have three-point calibrations performed. All controller tuning constants shall be adjusted to preliminary settings.
 - f. The OPERATIONAL ACCEPTANCE TESTS shall be completed prior to starting the FUNCTIONAL ACCEPTANCE TESTS. The actual testing program shall be conducted in accordance with prior approved procedures and shall be documented as required hereinafter.
 - 3. Functional Acceptance Tests
 - a. The objective of these tests is to demonstrate that the system of Instrumentation and Controls is operating and complying with the specified performance requirements.

- b. A witnessed, FUNCTIONAL ACCEPTANCE TEST shall be performed on the complete system of Instrumentation and Controls. Each function shall be demonstrated to the satisfaction of the ENGINEER on a loop-by-loop and/or paragraph-by-paragraph basis.
- c. The I&C contractor providing the PLC/RTU shall provide for the pump station status and alarms to be collected by the new AB PLC and RTU system and ultimately displayed at the City's existing SCADA system; programming of the PLC/RTU and the City's existing SCADA system shall be provided by the City. The I&C Vendor shall provide support during testing and startup of the duplex pump station equipment and include configuration, calibration, and testing of field instruments. See other specification sections.
- d. Each test shall be witnessed and signed off by both the I & C subcontractor and the ENGINEER upon satisfactory completion.
- e. The actual testing program shall be conducted in accordance with prior approved procedures and shall be documented as required hereinafter.
- f. Provide training on the use and maintenance of the control panel and RTU equipment, and field instruments.
- g. The I & C subcontractor shall notify the ENGINEER at least 2 weeks prior to the date of the FUNCTIONAL ACCEPTANCE TEST.

3.07 CLEAN-UP

- A. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps, and debris from premises and from interior and exterior of all devices and equipment. Touch-up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish.

END OF SECTION

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SECTION 16912

RTU EQUIPMENT

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The RTU Contractor shall furnish, install, and place into service the proposed duplex sewage pump cellular radio telemetry system that will collect the status signals from the sewage pump station discrete and analog instruments, alarm signals, and equipment from the control panel and field instruments, via the proposed cellular based Allen Bradely PLC-RTU system, and the communication with the existing City of Boca Raton Central SCADA RTU radio and existing SCADA system.
- B. Provide all equipment including new and discrete PLC/RTU I/O cards and analog I/O cards and RTU PLC configuration for proper communication of the new PLC based on the Allen Bradley Control Logix 1400 PLC system and MDS Orbit LTE/G4 cellular based RTU system and the existing City of Boca Raton SCADA Computer System. The City shall provide SIMM card for communications with the existing SCADA system, programming of the RTU and the City's existing SCADA system shall be provided by the City.
- C. All communications hardware, cellular based radio software and drivers (as may be required), discrete and analog wiring, I/O points wiring, power supplies, relays, time delay relays, output and interposing relays, fuses, 120V TVSS and SPD for power and signal I/O, terminals, and all other cables shall be provided for a complete RTU based cellular based telemetry system where the SCAD Pack PLC collects the signals and the radio transmits to the Owner's central SCADA the I/O points for pump station equipment and field instruments, including status and alarm readings.
- D. In order to establish sole source responsibility for the hardware; the RTU system shall be provided by the same I&C Contractor providing all other Controls, pump station control panel, including internal components, and field instruments in this project; this I&C Contractor shall be responsible for the RTU hardware equipment, including the PLC, the I/O, the cellular based radio, cellular antenna, and the RTU enclosure and all of its components, see the drawings.
- E. The rehabilitated lift station control panel with its new field instruments, terminal jbox shall be provided and configured/calibrated by the I&C control Contractor.

- F. The contractor shall provide 8 hours of support to the city's SCADA programmer above and beyond the time scheduled for testing and startup.
- G. Refer to drawings, RTU and pump control panel schematics for more information.

1.02 MANUFACTURER

- A. The RTU equipment provided shall be based on the Allen Bradley Micro Logix 1400 PLC system with the required I/O for all the discrete and analog points and 25% spares available in the I/O cards.
- B. The RTU system shall collect all discrete signals like starting and running of the pump motors, the FVNR starter running status, overload faults, panel intrusion, and wetwell level signals of the floats, Utility/Control 120V power available, loss of phase, and analog signal provided by the wetwell level, and other equipment called out on the drawings.
- C. Provide all supporting equipment, terminals, wiring, 120V and 24V SPD, and panel surge suppressors for analog input signals as required.

Minimally provide the following major equipment RTU panel components:

1. Allen Bradley Micro Logix 1400 PLC system.
2. Allen Bradley AB 1400 type discrete, and analog cards as required to provide 25% spares after all I/O per the drawings and specifications are accounted for.
3. A Quint 4 1AC/24VDC/5 Amp 100-240VAC Power Supply or equal.
4. Provide a cellular based radio modem manufactured by MDS Orbit with 4G/LTE.
5. Terminals and fuses as required for the discrete and analog I/O.
6. 4-20mA panel surge arrestor as required for wetwell ultrasonic level sensor and transmitter, the wetwell floats, and other equipment called out on the drawings.
7. Provide new conduit penetrations at bottom of proposed RTU panel for discrete and analog conduits with discrete and analog signal wires, see the drawings. Include duct seal at all conduit penetrations.
8. Provide a din rail mounted UPS, 650VA minimum.

9. Additional relays and as required.
10. Provide sealed lead acid 12V, 10 Ah, see the drawings.
11. Refer to the RTU control schematic drawings for more details.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 16900 – Control Panel
- B. Section 16050 – Electrical General Provisions.
- C. Section 16960 – SCADA System.

1.04 SUBMITTALS

- A. Submittals shall be made in accordance with the General Requirements.
 1. It is incumbent upon the Contractor to coordinate the work specified in these Sections so that a complete Radio telemetry system be provided.
 2. During the period of preparation of this submittal, the Contractor shall authorize direct informal liaison between the I&C Supplier, and the Engineer for exchange of technical information. As a result of this liaison certain minor refinements and revisions in the systems as specified may be authorized informally by the Engineer, but these shall not alter the scope of the work or cause increase or decrease in the Contract price. During this informal exchange no oral statement by the Engineer shall be construed to give formal approval of any component or method, nor shall any statement be construed to grant formal exception to, or variation from these specifications.
- B. Five complete sets of Operation and Maintenance Manuals shall be provided.
- C. Warranty information shall be submitted in accordance with general conditions.

1.05 QUALITY ASSURANCE

- A. All equipment, software and programming furnished under this specification shall be new and unused, shall be the product of a manufacturer having a successful record of manufacturing and servicing the equipment specified herein for a minimum of five (5) years.

1.06 WARRANTY

- A. The Contractor shall warrant all equipment and its installation for a period of one (1) year from the date of Owner acceptance of the system.

PART 2 PRODUCTS

2.01 GENERAL

- A. Contractor shall provide, install, configure, program, and test the new equipment, controls, and field instruments for the proposed cellular telemetry system at the City of Boca Raton duplex lift station No 27 new I/O operating over cellular telemetry and provide the existing central SCADA system with equipment status and alarms.

2.02 GENERAL PLC-RTU EQUIPMENT/SCADA EQUIPMENT REQUIREMENTS

- A. The work under this section includes the furnishing of all labor materials equipment and supervision for furnishing the proposed I/O points via the cellular-based telemetry system as indicated on the drawings and specifications.
- B. Coordinate with the City of Boca Raton personnel the configuration, and programming of the proposed duplex pump station PLC-RTU equipment and the existing SCADA computer system. This work shall include all configuration, programming coordination, drivers, and labor for a fully functional RTU system that provides graphical interface of its equipment over the existing SCADA system.
- C. Submittals
 - 1. Submit shop drawings and product data for equipment furnished in accordance with the General Conditions.
 - 2. Furnish Operation and Maintenance Manuals in accordance with the General Conditions.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Construct radio system in accordance with the Contract documents and the pump controller manufacturer's requirements.

3.02 DOCUMENTATION

- A. Reports shall be included in the O&M manuals reflecting test, and equipment performance and final corrections.

3.03 TESTING

- A. All elements of the cellular telemetry system installation shall be checked in the presence of the Engineer and to his satisfaction. The RTU supplier along with the I&C supplier shall provide instrument technicians for the purposes of startup and testing, and any training needed.
- B. Testing shall include for the Contractor to aim and install the cellular based antennas.

3.04 TRAINING

- A. Contractor shall schedule at a time convenient to the Owner and its personnel for the training on the operation, use, and maintenance of the proposed PLC and RTU equipment, RTU batteries, power supplies, fuses, panel, and the interface with the lift station control panel and field instruments.

END OF SECTION

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APPENDIX A

OWNER OBTAINED PERMITS

**FDOH General Permit for Constructing a Domestic Wastewater Collection/Transmission System
FDOH General Permit for Construction of Water Main Extensions for PWSs
Lake Worth Drainage District Right-of-Way Permit**

**All other permits necessary for construction of proposed infrastructure improvements to be paid
for and obtained by the Contractor**

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Mission:

To protect, promote & improve the health of all people in Florida through integrated state, county & community efforts.



Ron DeSantis
Governor

Joseph A. Ladapo, M.D., Ph.D.
State Surgeon General

Vision: To be the Healthiest State in the Nation

Notification of Acceptance of Use of a General Permit

Permittee:

Justin Barrington, P.E.
Deputy Director
City of Boca Raton Utilities Department
1401 Glades Road
Boca Raton, FL 33301
jbarrington@myboca.com

Permit Number: 138270-646-DSGP**Issue Date:** 01/10/2025**Expiration Date:** 01/09/2030**County:** Palm Beach**Project:** 138270-646-DSGP Old Floresta Lake Floresta and Tunison Palms Infrastructure Upgrades**Water Supplier:** City of Boca Raton**PWS ID:** 4500130

Dear Mr. Barrington:

On December 12, 2024 the Florida Department of Health-Palm Beach County, as an approved local program of the Florida Department of Environmental Protection, received a "Notice of Intent to Use the General Permit for Construction of Water Main Extensions for PWSs" [DEP Form No. [62-555.900\(7\)](#)], under the provisions of Rule [62-4.530](#) and Chapter [62-555](#), Florida Administrative Code (F.A.C.). The proposed project includes :

Construction of approximately 560 LF of 4" DIP, 29,320 LF 6" DIP, 1,960 LF 8" DIP, 2,230 LF 10" DIP, 30 LF 16" DIP, 30 LF 20" DIP, 30 LF 24" DIP Water Mains, (34) Fire Hydrants, and (56) sample points to replace aging water mains at Old Floresta, Lake Floresta, and Tunison Palms neighborhood between NW 12th Ave , West Palmetto Park Rd, the El Rio Canal and Lake Worth Drainage District 47 Canal in the City of Boca Raton, Florida.

Based upon the submitted Notice and accompanying documentation, this correspondence is being sent to advise that the Department does not object to the use of such general permit at this time. Please be advised that the permittee is required to abide by Rule [62-555.405, F.A.C.](#), all applicable rules in Chapters [62-4](#), [62-550](#), [62-555](#), F.A.C., and the General Conditions for All General Drinking Water Permits (found in [62-4.540, F.A.C.](#)).

When any existing asbestos cement (AC) pipes are replaced under this permit, the permittee shall do so in accordance with the applicable rules of the Federal Asbestos Regulation and Florida DEP requirements. For specific requirements applicable to AC pipes, the permittee should contact the Air and Waste Management section managers prior to commencing any such activities at (561) 837-5900 #3. Please be aware that a notification is required to be submitted to the Department for a regulated project.

The permittee shall comply with all sampling requirements specific to this project. These requirements are attached for review and implementation. Pursuant to Rule [62-555.345, F.A.C.](#), the permittee shall submit a certification of construction completion [DEP Form No. [62-555.900\(9\)](#)] to the Department and obtain approval, or clearance, from the Department before placing any water main



extension constructed under this general permit into operation for any purpose other than disinfection or testing for leaks.

Within 30 days after the sale or legal transfer of ownership of the permitted project that has not been cleared for service in total by the Department, both the permittee and the proposed permittee shall sign and submit an application for transfer of the permit using Form [62-555.900\(8\), F.A.C.](#), with the appropriate fee. The permitted construction is not authorized past the 30-day period unless the permit has been transferred.

This 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, per Rule [62-4.030, F.A.C.](#)

Sincerely,
For the Division Director

A handwritten signature in blue ink, appearing to read "Jorge Patino", is written over a horizontal line.

Jorge Patino, P.E.,
Environmental Administrator
Division of Environmental Public Health

MP/JH/JP

c: Engineer-of-record: Harrison Barron, P.E.
Utility: Same

Civil Penalty May Be Incurred
if this project is placed into operation before obtaining a clearance from this office.

Requirements for clearance upon completion of projects are as follows:

1) Clearance Form

Submission of a fully completed Department of Environmental Protection (DEP) Form [62-555.900\(9\)](#) *Certification of Construction Completion and Request for Clearance to Place Permitted PWS Components into Operation.*

2) Record Drawings

Submission of the portion of record drawings showing deviations from the DEP construction permit, including preliminary design report or drawings and specifications, if there are any deviations from said permit (Note that it is necessary to submit a copy of only the portion of record drawings showing deviations and not a complete set of record drawings.).

3) Bacteriological Results

Copies of satisfactory bacteriological analysis (a.k.a. Main Clearance), taken within sixty (60) days of completion of construction, from locations within the distribution system or water main extension to be cleared, in accordance with Rules [62-555.315\(6\)](#), [62-555.340](#), and [62-555.330](#), F.A.C. and American Water Works Association (AWWA) Standard C 651-92, as follows:

- Connection to an existing system
- The end point of the proposed addition
- Any water lines branching off a main extension
- Every 1,200 feet on straight runs of pipe

Each location shall be sampled on two consecutive days, with sample points and chlorine residual readings clearly indicated on the report. A sketch or description of all bacteriological sampling locations must also be provided. **All samples shall be collected by an employee of a state certified laboratory or a certified operator and be reported on DEP Reporting Format 62-550.730.**

For further clarification contact:
Mark Peters
Engineering Specialist III
Florida Department of Health Palm Beach
Plan Review & Permit Section
800 Clematis Street, 4th Floor
West Palm Beach, FL 33401
561-837-5900 #5



138270-646-DSGP

NOTICE OF INTENT TO USE THE GENERAL PERMIT FOR CONSTRUCTION OF WATER MAIN EXTENSIONS FOR PWSs

INSTRUCTIONS: This notice shall be completed and submitted by persons proposing to construct projects permitted under the "General Permit for Construction of Water Main Extensions for Public Water Systems" in Rule 62-555.405, F.A.C. AT LEAST 30 DAYS BEFORE BEGINNING CONSTRUCTION OF A WATER MAIN EXTENSION PROJECT, complete and submit one copy of this notice to the appropriate Department of Environmental Protection (DEP) District Office or Approved County Health Department (ACHD) along with payment of the proper permit processing fee. (When completed, Part II of this notice serves as the preliminary design report for a water main extension project, and thus, it is unnecessary to submit a separate preliminary design report or drawings, specifications, and design data with this notice.) All information provided in this notice shall be typed or printed in ink. The DEP permit processing fee for projects requiring the services of a professional engineer during design is \$650, and the DEP permit processing fee for projects not requiring the services of a professional engineer during design is \$500.* Some ACHDs charge a county permit processing fee in addition to the DEP permit processing fee. Checks for permit processing fees shall be made payable to the Department of Environmental Protection or the appropriate ACHD. NOTE THAT A SEPARATE NOTIFICATION AND A SEPARATE PERMIT PROCESSING FEE ARE REQUIRED FOR EACH NON-CONTIGUOUS PROJECT.†

* Except as noted in paragraphs 62-555.520(3)(a) and (b), F.A.C., projects shall be designed under the responsible charge of one or more professional engineers licensed in Florida.

† Non-contiguous projects are projects that are neither interconnected nor located nearby one another (i.e., on the same site, on adjacent streets, or in the same neighborhood).

I. General Project Information

A. Name of Project: **Old Floresta, Lake Floresta Park, and Tunison Palms Infrastructure Updates**

B. Description of Project and Its Purpose:

Replacement of approximately 34,160 linear feet of existing domestic water mains (WM) within existing right-of-way. The Old Floresta Infrastructure Improvements includes the installation of approximately 560 LF of 4" DIP WM, 29,320 LF of 6" DIP WM, 1,960 LF of 8" DIP WM, 2,230 LF of 10" DIP WM, 30 LF of 16" DIP WM, 30 LF of 20" DIP WM, and 30 LF of 24" DIP WM via open-cut excavation. The purpose of this project is to replace aging existing water mains, including abandonment of existing asbestos cement water mains, as well as relocating existing water mains from behind properties to the ROW in the front of existing residences.

C. Location of Project

1. County Where Project Located: Palm Beach County

2. Description of Project Location:

The project is generally located in the neighborhood of Old Floresta, Lake Floresta Park, and Tunison Palms between NW 12th Avenue, W. Palmetto Park Road, the El Rio Canal, and Lake Worth Drainage District L 47 Canal.

D. Estimate of Cost to Construct Project: \$22,350,000.00

E. Estimate of Dates for Starting and Completing Construction of Project:

January 2025 through December 2026

F. Permittee

PWS/Company Name: City of Boca Raton		PWS Identification No.: 4500130	
PWS Type: <input checked="" type="checkbox"/> Community <input type="checkbox"/> Non-Transient Non-Community <input type="checkbox"/> Transient Non-Community <input type="checkbox"/> Consecutive			
Contact Person: Justin Barrington, P.E.		Contact Person's Title: Deputy Director	
Contact Person's Mailing Address: 1401 Glades Road			
City: Boca Raton		State: FL	Zip Code: 33431
Contact Person's Telephone Number: 561-338-7300		Contact Person's Fax Number: 561-447-4716	
Contact Person's E-Mail Address: jbarrington@ci.boca-raton.fl.us			

* This information is required only if the permittee is a public water system (PWS).

G. Public Water System (PWS) Supplying Water to Project

PWS Name: Boca Raton Water Treatment Plant		PWS Identification No.: 4500130	
PWS Type: <input checked="" type="checkbox"/> Community <input type="checkbox"/> Non-Transient Non-Community <input type="checkbox"/> Transient Non-Community <input type="checkbox"/> Consecutive			
PWS Owner: City of Boca Raton			
Contact Person: Justin Barrington, P.E.		Contact Person's Title: Deputy Director	
Contact Person's Mailing Address: 1401 Glades Road			
City: Boca Raton		State: FL	Zip Code: 33431
Contact Person's Telephone Number: 561-338-7300		Contact Person's Fax Number: 561-447-4716	
Contact Person's E-Mail Address: jbarrington@ci.boca-raton.fl.us			

NOTICE OF INTENT TO USE THE GENERAL PERMIT FOR CONSTRUCTION OF WATER MAIN EXTENSIONS FOR PWSs

Project Name: Old Floresta, Lake Floresta Park, Tunison Palms Infrastructure Upgrades **Permittee:** Boca Raton

H. Public Water System (PWS) that Will Own Project After It Is Placed into Permanent Operation

PWS Name: Boca Raton Water Treatment Plant		PWS Identification No.: *4500130
PWS Type: * <input checked="" type="checkbox"/> Community <input type="checkbox"/> Non-Transient Non-Community <input type="checkbox"/> Transient Non-Community <input type="checkbox"/> Consecutive		
PWS Owner: City of Boca Raton		
Contact Person: Justin Barrington, P.E.		Contact Person's Title: Deputy Director
Contact Person's Mailing Address: 1401 Glades Road		
City: Boca Raton	State: FL	Zip Code: 33431
Contact Person's Telephone Number: 561-338-7300		Contact Person's Fax Number: 561-447-4716
Contact Person's E-Mail Address: jbarrington@ci.boca-raton.fl.us		

* This information is required only if the owner/operator is an existing PWS.

I. Professional Engineer(s) or Other Person(s) in Responsible Charge of Designing Project*

Company Name: Holtz Consulting Engineers, Inc		
Designer(s): Robert Harrison Barron III, P.E.		Title(s) of Designer(s): Associate Engineer
Qualifications of Designer(s):		
<input checked="" type="checkbox"/> Professional Engineer(s) Licensed in Florida – License Number(s): 91550		
<input type="checkbox"/> Public Officer(s) Employed by State, County, Municipal, or Other Governmental Unit of State†		
<input type="checkbox"/> Plumbing Contractor(s) Licensed in Florida – License Number(s): ^		
Mailing Address of Designer(s): 270 S Central Boulevard, Suite 207		
City: Jupiter	State: FL	Zip Code: 33458
Telephone Number of Designer(s): 561-575-2005		Fax Number of Designer(s): 561-575-2009
E-Mail Address(es) of Designer(s): Harrison.Barron@holtzconsulting.com		

* Except as noted in paragraphs 62-555.520(3)(a) and (b), F.A.C., projects shall be designed under the responsible charge of one or more professional engineers licensed in Florida.

† Attach a detailed construction cost estimate showing that the cost to construct this project is \$10,000 or less.

^ Attach documentation showing that this project will be installed by the plumbing contractor(s) designing this project, documentation showing that this project involves a public water system serving a single property and fewer than 250 fixture units, and a detailed construction cost estimate showing that the cost to construct this project is \$50,000 or less.

II. Preliminary Design Report for Project*

A. Service Area, Water Use, and Service Pressure Information

1. Design Type and Number of Service Connections, and Average Daily Water Demands and Maximum-Day Water Demands, in the Entire Area to Be Served by the Water Mains Being Constructed Under this Project:

A = Type of Service Connection	B = Number of Service Connections	C = Average Daily Water Demand Per Service Connection, gpd	D = Total Average Daily Water Demand ^a , gpd (Columns BxC for Residential Service Connections)	E = Total Maximum-Day Water Demand ^b , gpd
Single-Family Home			0	
Mobile Home			0	
Apartment			0	
Commercial, Institutional, or Industrial Facility ^a				
Total	0		0	0

- a. Description of Commercial, Institutional, or Industrial Facilities and Explanation of Method(s) Used to Estimate Average Daily Water Demand for These Facilities:

The proposed water mains are replacing aging water mains and will not be adding any additional water demand. There are no new service connections.

- b. Explanation of Peaking Factor(s) or Method(s) Used to Estimate Maximum-Day Water Demand:

N/A - The proposed water mains are replacing aging water mains and will not be adding any additional water demand. There are no new service connections.

NOTICE OF INTENT TO USE THE GENERAL PERMIT FOR CONSTRUCTION OF WATER MAIN EXTENSIONS FOR PWSs

Project Name: Old Floresta, Lake Floresta Park, and Tunison Palms Infrastructure Updates Permittee: City of Boca Raton

2. Explanation of Peaking Factor(s) or Method(s) Used to Estimate Design Peak-Hour Water Demand and, for Small Water Systems that Use Hydropneumatic Tanks or that Are Not Designed to Provide Fire Protection, Peak Instantaneous Water Demand:

N/A

3. Design Fire-Flow Rate and Duration:

N/A

4. Design Service Pressure Range:

N/A

B. Project Site Information

1. ATTACH A SITE PLAN OR SKETCH SHOWING THE SIZE AND APPROXIMATE LOCATION OF NEW OR ALTERED WATER MAINS, SHOWING THE APPROXIMATE LOCATION OF HYDRANTS, VALVES, METERS, AND BLOW-OFFS IN SAID MAINS, AND SHOWING HOW SAID MAINS CONNECT TO THE PUBLIC WATER SYSTEM SUPPLYING WATER FOR THE PROJECT.
2. Description of Any Areas Where New or Altered Water Mains Will Cross Above or Under Surface Water or Be Located in Soil that Is Known to Be Aggressive:

N/A

C. Information About Compliance with Design and Construction Requirements

1. If this project is being designed to comply with the following requirements, initial in ink before the requirements. If any of the following requirements do not apply to this project or if this project includes exceptions to any of the following requirements as allowed by rule, mark "X" before the requirements and complete Part II.C.2 below. *RSWW = Recommended Standards for Water Works* as incorporated into Rule 62-555.330, F.A.C.

- | | |
|---------|---|
| RHB III | a. This project is being designed to keep existing water mains and service lines in operation during construction or to minimize interruption of water service during construction. [RSWW 1.3.a; exceptions allowed under FAC 62-555.330] |
| RHB III | b. All pipe, pipe fittings, pipe joint packing and jointing materials, valves, fire hydrants, and meters installed under this project will conform to applicable American Water Works Association (AWWA) standards. [FAC 62-555.320(21)(b), RSWW 8.0, and AWWA standards as incorporated into FAC 62-555.330; exceptions allowed under FAC 62-555.320(21)(c)] |
| RHB III | c. All public water system components, excluding fire hydrants, that will be installed under this project and that will come into contact with drinking water will conform to NSF International Standard 61 as adopted in Rule 62-555.335, F.A.C., or other applicable standards, regulations, or requirements referenced in paragraph 62-555.320(3)(b), F.A.C. [FAC 62-555.320(3)(b); exceptions allowed under FAC 62-555.320(3)(d)] |
| RHB III | d. All pipe and pipe fittings installed under this project will contain no more than 8.0% lead, and any solder or flux used in this project will contain no more than 0.2% lead. [FAC 62-555.322] |
| RHB III | e. All pipe and pipe fittings installed under this project will be color coded or marked in accordance with subparagraph 62-555.320(21)(b)3, F.A.C., using blue as a predominant color. (Underground plastic pipe will be solid-wall blue pipe, will have a co-extruded blue external skin, or will be white or black pipe with blue stripes incorporated into, or applied to, the pipe wall; and underground metal or concrete pipe will have blue stripes applied to the pipe wall. Pipe striped during manufacturing of the pipe will have continuous stripes that run parallel to the axis of the pipe, that are located at no greater than 90-degree intervals around the pipe, and that will remain intact during and after installation of the pipe. If tape or paint is used to stripe pipe during installation of the pipe, the tape or paint will be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe; for pipe with an internal diameter of 24 inches or greater, tape or paint will be applied in continuous lines along each side of the pipe as well as along the top of the pipe. Aboveground pipe will be painted blue or will be color coded or marked like underground pipe.) [FAC 62-555.320(21)(b)3] |
| X | f. All new or altered water mains included in this project are sized after a hydraulic analysis based on flow demands and pressure requirements. ATTACH A HYDRAULIC ANALYSIS JUSTIFYING THE SIZE OF ANY NEW OR ALTERED WATER MAINS WITH AN INSIDE DIAMETER OF LESS THAN THREE INCHES. [FAC 62-555.320(21)(b) and RSWW 8.1] |

NOTICE OF INTENT TO USE THE GENERAL PERMIT FOR CONSTRUCTION OF WATER MAIN EXTENSIONS FOR PWSs

Project Name: Old Floresta, Lake Floresta Park, and Tunison Palms Infrastructure Updates	Permittee: City of Boca Raton
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- | | | | |
|---------|--|----|---|
| RHB III | | g. | The inside diameter of new or altered water mains that are included in this project and that are being designed to provide fire protection and serve fire hydrants will be at least six inches. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.1.2] |
| RHB III | | h. | New or altered water mains that are included in this project and that are <u>not</u> being designed to carry fire flows do <u>not</u> have fire hydrants connected to them. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.1.5] |
| RHB III | | i. | This project is being designed to minimize dead-end water mains by making appropriate tie-ins where practical. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.1.6.a] |
| RHB III | | j. | New or altered dead-end water mains included in this project will be provided with a fire or flushing hydrant or blow-off for flushing purposes. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.1.6.b] |
| RHB III | | k. | Sufficient valves will be provided on new or altered water mains included in this project so that inconvenience and sanitary hazards will be minimized during repairs. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.2] |
| RHB III | | l. | New or altered fire hydrant leads included in this project will have an inside diameter of at least six inches and will include an auxiliary valve. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.3.3] |
| RHB III | | m. | All fire hydrants that will be installed under this project and that will have unplugged, underground drains will be located at least three feet from any existing or proposed storm sewer, stormwater force main, pipeline conveying reclaimed water regulated under Part III of Chapter 62-610, F.A.C., or vacuum-type sanitary sewer; at least six feet from any existing or proposed gravity- or pressure-type sanitary sewer, wastewater force main, or pipeline conveying reclaimed water <u>not</u> regulated under Part III of Chapter 62-10, F.A.C.; and at least ten feet from any existing or proposed "on-site sewage treatment and disposal system." [FAC 62-555.314(4)] |
| X | | n. | At high points where air can accumulate in new or altered water mains included in this project, provisions will be made to remove the air by means of air relief valves, and automatic air relief valves will <u>not</u> be used in situations where flooding of the valve manhole or chamber may occur. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.4.1] |
| RHB III | | o. | The open end of the air relief pipe from all automatic air relief valves installed under this project will be extended to at least one foot above grade and will be provided with a screened, downward-facing elbow. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.4.2] |
| RHB III | | p. | New or altered chambers, pits, or manholes that contain valves, blow-offs, meters, or other such water distribution system appurtenances and that are included in this project will <u>not</u> be connected directly to any sanitary or storm sewer, and blow-offs or air relief valves installed under this project will <u>not</u> be connected directly to any sanitary or storm sewer. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.4.3] |
| RHB III | | q. | New or altered water mains included in this project will be installed in accordance with applicable AWWA standards or in accordance with manufacturers' recommended procedures. [FAC 62-555.320(21)(b), <i>RSWW</i> 8.5.1, and AWWA standards as incorporated into FAC 62-555.330] |
| RHB III | | r. | A continuous and uniform bedding will be provided in trenches for underground pipe installed under this project; backfill material will be tamped in layers around underground pipe installed under this project and to a sufficient height above the pipe to adequately support and protect the pipe; and unsuitably sized stones (as described in applicable AWWA standards or manufacturers' recommended installation procedures) found in trenches will be removed for a depth of at least six inches below the bottom of underground pipe installed under this project. [FAC 62-555.320(21)(b), <i>RSWW</i> 8.5.2] |
| RHB III | | s. | All water main tees, bends, plugs, and hydrants installed under this project will be provided with thrust blocks or restrained joints to prevent movement. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.5.4] |
| RHB III | | t. | New or altered water mains that are included in this project and that will be constructed of asbestos-cement or polyvinyl chloride pipe will be pressure and leakage tested in accordance with AWWA Standard C603 or C605, respectively, as incorporated into Rule 62-555.330, F.A.C., and all other new or altered water mains included in this project will be pressure and leakage tested in accordance with AWWA Standard C600 as incorporated into Rule 62-555.330. [FAC 62-555.320(21)(b)1 and AWWA standards as incorporated into FAC 62-555.330] |
| RHB III | | u. | New or altered water mains, including fire hydrant leads and including service lines that will be under the control of a public water system and that have an inside diameter of three inches or greater, will be disinfected and bacteriologically evaluated in accordance with Rule 62-555.340, F.A.C. [FAC 62-555.320(21)(b)2 and FAC 62-555.340] |
| X | | v. | New or altered water mains that are included in this project and that will be installed in areas where there are known aggressive soil conditions will be protected through use of corrosion-resistant water main materials, through encasement of the water mains in polyethylene, or through provision of cathodic protection. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.5.7.d] |

NOTICE OF INTENT TO USE THE GENERAL PERMIT FOR CONSTRUCTION OF WATER MAIN EXTENSIONS FOR PWSs

Project Name: Old Floresta, Lake Floresta Park, and Tunison Palms Infrastructure Updates	Permittee: City of Boca Raton
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- | | | |
|---------|--|---|
| RHB III | | w. New or relocated, underground water mains included in this project will be laid to provide a horizontal distance of at least three feet between the outside of the water main and the outside of any existing or proposed vacuum-type sanitary sewer, storm sewer, stormwater force main, or pipeline conveying reclaimed water regulated under Part III of Chapter 62-610, F.A.C.; a horizontal distance of at least six feet between the outside of the water main and the outside of any existing or proposed gravity-type sanitary sewer (or a horizontal distance of at least three feet between the outside of the water main and the outside of any existing or proposed gravity-type sanitary sewer <u>if the bottom of the water main will be laid at least six inches above the top of the sewer</u>); a horizontal distance of at least six feet between the outside of the water main and the outside of any existing or proposed pressure-type sanitary sewer, wastewater force main, or pipeline conveying reclaimed water not regulated under Part III of Chapter 62-610, F.A.C.; and a horizontal distance of at least ten feet between the outside of the water main and all parts of any existing or proposed "on-site sewage treatment and disposal system." [FAC 62-555.314(1); exceptions allowed under FAC 62-555.314(5)] |
| RHB III | | x. New or relocated, underground water mains that are included in this project and that will cross any existing or proposed gravity- or vacuum-type sanitary sewer or storm sewer will be laid so the outside of the water main is at least six inches above the other pipeline or at least 12 inches below the other pipeline; and new or relocated, underground water mains that are included in this project and that will cross any existing or proposed pressure-type sanitary sewer, wastewater or stormwater force main, or pipeline conveying reclaimed water will be laid so the outside of the water main is at least 12 inches above or below the other pipeline. [FAC 62-555.314(2); exceptions allowed under FAC 62-555.314(5)] |
| RHB III | | y. At the utility crossings described in Part II.C.1.w above, one full length of water main pipe will be centered above or below the other pipeline so the water main joints will be as far as possible from the other pipeline <u>or</u> the pipes will be arranged so that all water main joints are at least three feet from all joints in vacuum-type sanitary sewers, storm sewers, stormwater force mains, or pipelines conveying reclaimed water regulated under Part III of Chapter 62-610, F.A.C., and at least six feet from all joints in gravity- or pressure-type sanitary sewers, wastewater force mains, or pipelines conveying reclaimed water <u>not</u> regulated under Part III of Chapter 62-610, F.A.C. [FAC 62-555.314(2); exceptions allowed under FAC 62-555.314(5)] |
| X | | z. New or altered water mains that are included in this project and that will cross above surface water will be adequately supported and anchored, protected from damage and freezing, and accessible for repair or replacement. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.7.1] |
| X | | aa. New or altered water mains that are included in this project and that will cross under surface water will have a minimum cover of two feet. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.7.2] |
| X | | bb. New or altered water mains that are included in this project and that will cross under surface water courses greater than 15 feet in width will have flexible or restrained, watertight pipe joints and will include valves at both ends of the water crossing so the underwater main can be isolated for testing and repair; the aforementioned isolation valves will be easily accessible and will <u>not</u> be subject to flooding; the isolation valve closest to the water supply source will be in a manhole; and permanent taps will be provided on each side of the isolation valve within the manhole to allow for insertion of a small meter to determine leakage from the underwater main and to allow for sampling of water from the underwater main. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.7.2] |
| RHB III | | cc. This project is being designed to include proper backflow protection at those new or altered service connections where backflow protection is required or recommended under Rule 62-555.360, F.A.C., or in <i>Recommended Practice for Backflow Prevention and Cross-Connection Control</i> , AWWA Manual M14, as incorporated into Rule 62-555.330, F.A.C.; <u>or</u> the public water system that will own this project after it is placed into operation has a cross-connection control program requiring water customers to install proper backflow protection at those service connections where backflow protection is required or recommended under Rule 62-555.360, F.A.C., or in AWWA Manual M14. [FAC 62-555.360 and AWWA Manual M14 as incorporated into FAC 62-555.330] |
| RHB III | | dd. Neither steam condensate, cooling water from engine jackets, nor water used in conjunction with heat exchangers will be returned to the new or altered water mains included in this project. [FAC 62-555.320(21)(b) and <i>RSWW</i> 8.8.2] |

NOTICE OF INTENT TO USE THE GENERAL PERMIT FOR CONSTRUCTION OF WATER MAIN EXTENSIONS FOR PWSSs

Project Name: Old Floresta, Lake Floresta Park, and Tunison Palms Infrastructure Updates Permittee: City of Boca Raton

2. Explanation for Requirements Marked "X" in Part II.C.1 Above, Including Justification, Documentation, Assurances, and/or Alternatives as Required by Rule for Exceptions to Requirements in Part II.C.1:

F. There are no new additional water mains proposed as part of this project. All proposed water mains are replacing existing water mains in-kind.

N. Proposed air relief valves located within manholes where flooding may occur shall be equipped with an inflow preventer meeting the requirements of AWWA C514 in accordance with F.A.C. 62-555.320(21)(b) and the Recommended Standards for Water Works.

V. There are no known aggressive soil conditions in the proposed project area.

Z. The proposed water mains are not proposed to cross over any bodies of water.

AA. The proposed water mains are not proposed to cross under any bodies of water.

BB. The proposed water mains are not proposed to cross under any bodies of water.

I completed Part II of this notice, and the information provided in Part II and on the attachment(s) to Part II is true and accurate to the best of my knowledge and belief.

Signature, Seal, and Date of Professional Engineer (PE) or
Signature and Date of Other Person in Responsible Charge of
Designing Project:*

THIS ITEM HAS BEEN DIGITALLY
SEALED BY

SIGNATURE

Robert H Barron III

Robert Harrison Barron III

ON THE DATE ADJACENT TO THE SEAL.

PRINTED COPIES OF THIS NOTICE
NOT CONSIDERED SIGNATURE
THIS SIGNATURE MUST BE
ELECTRONIC COPIES.

Digitally signed by Robert H Barron III
DN: CN=Robert H Barron III, O=HOLTZ CONSULTING ENGINEERS, C=US
Date: 2024.07.09 15:23:35-04'00'



Printed/Typed Name: Robert Harrison Barron III, P.E.

License Number of PE or License Number or Title of Other
Person in Responsible Charge of Designing Project:*

91550

Portion of Preliminary Design Report for Which Responsible:
Entire Project

Signature, Seal, and Date of Professional Engineer (PE) or
Signature and Date of Other Person in Responsible Charge of
Designing Project:*

Printed/Typed Name:

License Number of PE or License Number or Title of Other
Person in Responsible Charge of Designing Project:*

Portion of Preliminary Design Report for Which Responsible:

* Except as noted in paragraphs 62-555.520(3)(a) and (b), F.A.C., projects shall be designed under the responsible charge of one or more PEs licensed in Florida. If this project is being designed under the responsible charge of one or more PEs licensed in Florida, Part II of this notice shall be completed, signed, sealed, and dated by the PE(s) in responsible charge. If this project is not being designed under the responsible charge of one or more PEs licensed in Florida, Part II shall be completed, signed, and dated by the person(s) in responsible charge of designing this project.

NOTICE OF INTENT TO USE THE GENERAL PERMIT FOR CONSTRUCTION OF WATER MAIN EXTENSIONS FOR PWSs

Project Name: Old Floresta, Lake Floresta Park, and Tunison Palms Infrastructure Updates Permittee: City of Boca Raton

III. Certifications

A. Certification by Permittee

I am duly authorized to sign this notice on behalf of the permittee identified in Part I.F of this notice. I certify that, to the best of my knowledge and belief, this project complies with Chapter 62-555, F.A.C. I also certify that construction of this project has not begun yet and that, to the best of my knowledge and belief, this project does not include any of the following construction work:

- construction of water mains conveying raw or partially treated drinking water;
- construction of drinking water treatment, pumping, or storage facilities or conflict manholes;
- construction of water mains in areas contaminated by low-molecular-weight petroleum products or organic solvents;
- construction of an interconnection between previously separate public water systems or construction of water mains that create a "new system" as described under subsection 62-555.525(1), F.A.C.; or
- construction of water mains that will remain dry following completion of construction.

(A specific construction permit is required for each project involving any of the above listed construction work.)

I understand that, if this project is designed under the responsible charge of one or more professional engineers (PEs) licensed in Florida, the permittee must retain a Florida-licensed PE to take responsible charge of inspecting construction of this project for the purpose of determining in general if the construction proceeds in compliance with the Department of Environmental Protection construction permit, including the approved preliminary design report, for this project. I understand that the permittee must have complete record drawings prepared for this project. I also understand that the permittee must submit a certification of construction completion to the Department and obtain written approval, or clearance, from the Department before the permittee places this project into operation for any purpose other than disinfection or testing for leaks.

Justin Barrington
Digitally signed by Justin Barrington
Date: 2024.11.26 11:51:38 -05'00'
Signature and Date

Justin Barrington, P.E.
Printed or Typed Name

Deputy Director
Title

B. Certification by PWS Supplying Water to Project

I am duly authorized to sign this notice on behalf of the PWS identified in Part I.G of this notice. I certify that said PWS will supply the water necessary to meet the design water demands for this project. As indicated below, the water treatment plant(s) to which this project will be connected has(have) the capacity necessary to meet the design water demands for this project, and I certify that all other PWS components affected by this project also have the capacity necessary to meet the design water demands for this project. I certify that said PWS is in compliance with applicable planning requirements in Rule 62-555.348, F.A.C.; applicable cross-connection control requirements in Rule 62-555.360, F.A.C.; and to the best of my knowledge and belief, all other applicable rules in Chapters 62-550, 62-555, and 62-699, F.A.C.; furthermore, I certify that, to the best of my knowledge and belief, said PWS's connection to this project will not cause said PWS to be in noncompliance with Chapter 62-550 or 62-555, F.A.C. I also certify that said PWS has reviewed the preliminary design report for this project and that said PWS considers the connection(s) between this project and said PWS acceptable as designed.

- Name(s) of Water Treatment Plant(s) to Which this Project Will Be Connected:

Boca Raton Water Treatment Plant

- Total Permitted Maximum Day Operating Capacity of Plant(s), gpd: 70,000,000
- Total Maximum Day Flow at Plant(s) as Recorded on Monthly Operating Reports During Past 12 Months, gpd:
41,664,000 - November 2023

Justin Barrington
Digitally signed by Justin Barrington
Date: 2024.11.26 11:51:57 -05'00'
Signature and Date

Justin Barrington, P.E.
Printed or Typed Name

Deputy Director
Title

C. Certification by PWS that Will Own Project After It Is Placed into Permanent Operation

I am duly authorized to sign this notice on behalf of the PWS identified in Part I.H of this notice. I certify that said PWS will own this project after it is placed into permanent operation. I also certify that said PWS has reviewed the preliminary design report for this project and that said PWS considers this project acceptable as designed.

Justin Barrington
Digitally signed by Justin Barrington
Date: 2024.11.26 11:52:19 -05'00'
Signature and Date

Justin Barrington, P.E.
Printed or Typed Name

Deputy Director
Title

NOTICE OF INTENT TO USE THE GENERAL PERMIT FOR CONSTRUCTION OF WATER MAIN EXTENSIONS FOR PWSs

Project Name: Old Floresta, Lake Floresta Park, and Tunison Palms Infrastructure Updates	Permittee: City of Boca Raton
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D. Certification by Professional Engineer(s) in Responsible Charge of Designing Project*

I, the undersigned professional engineer licensed in Florida, am in responsible charge of designing this project. I certify that, to the best of my knowledge and belief, the design of this project complies with Chapter 62-555, F.A.C. I also certify that, to the best of my knowledge and belief, this project is not being designed to include any of the following construction work:

- construction of water mains conveying raw or partially treated drinking water;
- construction of drinking water treatment, pumping, or storage facilities or conflict manholes;
- construction of water mains in areas contaminated by low-molecular-weight petroleum products or organic solvents;
- construction of an interconnection between previously separate public water systems or construction of water mains that create a "new system" as described under subsection 62-555.525(1), F.A.C.; or
- construction of water mains that will remain dry following completion of construction.

(A specific construction permit is required for each project involving any of the above listed construction work.)

Signature, Seal, and Date:

THIS ITEM HAS BEEN DIGITALLY SIGNED BY

E

Digitally signed by Robert H. Barron III
DN: CN=Robert H. Barron III, O=HOLTZ CONSULTING ENGINEERS, C=US
Date: 2024.07.09 15:23:55-04'00'

Robert H Barron III

Robert Harrison Barron III
ON THE DATE ADJACENT TO THE SEAL.

PRINTED COPIES OF THIS SIGNATURE MUST BE CONSIDERED SIGNATURES. THIS SIGNATURE MUST BE CONSIDERED SIGNATURES. THIS SIGNATURE MUST BE CONSIDERED SIGNATURES.

Printed/Typed Name: Robert Harrison Barron III, P.E.

License Number: 91550

Portion of Preliminary Design Report for Which Responsible:
Entire Project

Signature, Seal, and Date:

Printed/Typed Name:

License Number:

Portion of Preliminary Design Report for Which Responsible:

* Except as noted in paragraphs 62-555.520(3)(a) and (b), F.A.C., projects shall be designed under the responsible charge of one or more professional engineers (PEs) licensed in Florida. If this project is being designed under the responsible charge of one or more PEs licensed in Florida, Part III.D of this notice shall be completed by the PE(s) in responsible charge. If this project is not being designed under the responsible charge of one or more PEs licensed in Florida, Part III.D does not have to be completed.

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Mission:

To protect, promote & improve the health of all people in Florida through integrated state, county & community efforts.



Ron DeSantis
Governor

Joseph A. Ladapo, MD, PhD
State Surgeon General

Vision: To be the Healthiest State in the Nation

NOTIFICATION OF ACCEPTANCE OF USE OF A GENERAL PERMIT/PERMIT ISSUANCE

PERMITTEE:**Permitee:**

Justin Barrington, P.E.
Deputy Director
City of Boca Raton Utilities Department
1401 Glades Road
Boca Raton, FL 33301
jbarrington@myboca.com

PERMIT NUMBER: 138270-647-DWC

ISSUE DATE: 01/10/2025

EXPIRATION DATE: 01/09/2030

COUNTY: Palm Beach

PROJECT NAME: Old Floresta Lake Floresta and Tunison Palms Infrastructure Upgrades

WASTEWATER TREATMENT: Boca Raton Wastewater Facility

FACILITY ID: FL0026344

Dear Mr. Barrington:

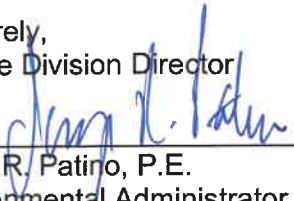
This letter acknowledges receipt of your Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System for the subject project and issuance of a permit under the provisions of Palm Beach County Ordinance No. 97-58. Our Office received the Notice on December 12, 2024.

This is to advise you that the Florida Department of Health Palm Beach County (Department), as the delegated agent of the Florida Department of Environmental Protection, does not object to your use of such general permit and that you are hereby authorized to perform the work shown on the approved plan(s) attached hereto and made a part hereof.

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 will subject the permittee to enforcement action and possible penalties.

Sincerely,
For the Division Director


Jorge R. Patino, P.E.
Environmental Administrator
Division of Environmental Public Health

MP/JH/JP

c: Engineer-of-record: Harrison Barron, PE
Utility: same



FDEP General Permit Requirements

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 FDEP 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 FDEP 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 in accordance with Rule 62-604.550, F.A.C. For unauthorized spills of wastewater 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. All Spills are to be reported orally to the Department within 24 hours from the time the permittee, or other designee becomes aware of the circumstances. [62-604.550]

ADDITIONAL INFORMATION:

Once a collection/transmission system is cleared for operation, the provisions below shall be met by the owner/operator of the system in accordance with Rule 62-604.500, F.A.C.

1. All collection/transmission systems shall be operated and maintained to provide uninterrupted service. All pump stations shall be operated and maintained to provide the emergency pumping capability requirements in paragraph 62-604.400(2)(a), F.A.C., the lightning and transient voltage surge protections in paragraph 62-604.400(2)(b), F.A.C., and the design and signage requirements in paragraph 62-604.400(2)(d), F.A.C. Also, all equipment, pipes, manholes, pump stations, and other appurtenances necessary for the collection/transmission of domestic wastewater, including equipment provided pursuant to subsection 62-604.400(2), F.A.C., shall be maintained to function as intended. [62-604.500(2) and (3)]
2. The owner/operator of a collection/transmission system shall evaluate and update the emergency response plan portion of the operation and maintenance manual annually. The emergency response plan shall assess system security including cybersecurity; water quality monitoring for sanitary sewer overflows affecting surface waters; and, hurricane and severe storm preparedness and response. [62-604.500(4)]

3. Collection/transmission systems shall be maintained to minimize excessive infiltration and inflow into the collection/transmission system, as well as excessive leakage from the collection/transmission system. The owner/operator of a collection/transmission system shall take corrective actions when infiltration, inflow, or leakage is excessive. Infiltration and inflow are considered excessive if one or both cause or contribute to sanitary sewer overflows. Leakage, or exfiltration, is considered excessive if it causes or contributes to a violation of surface water quality standards or ground water quality standards. [62-604.500(5)]
4. All collection/transmission systems shall be operated and maintained to prevent sanitary sewer overflows. Owners/operators shall evaluate the cause of all sanitary sewer overflows and evaluate potential corrective measures to avoid future sanitary sewer overflows. Corrective actions shall be taken by the owner/operator of the collection/transmission system if excessive inflow and infiltration causes or contributes to a sanitary sewer overflow. The owner/operator of a satellite collection system shall take corrective actions for a sanitary sewer overflow in the receiving collection system caused by excessive inflow and infiltration in the satellite collection system. [62-604.500(6)]
5. The approved Operation and Maintenance Manual and emergency response plan pursuant to Rule 62-604.500(4), F.A.C., shall be kept available at a site convenient for use by operation and maintenance personnel and for inspection by the Florida Department of Environmental Protection personnel.

Palm Beach County Ordinance No. 97-58 Requirements

PBC 1. It shall be the responsibility of the permittee to retain a professional engineer, registered in Florida, to observe that the construction is in accordance with the submitted plans.

PBC 2. This permit does not include construction of any conflict manholes. The construction shall be strictly in accordance with the "Standard Water and Sewer Separation Statement" and other design specifications noted on the engineering plans. If field conditions require deviations from the proposed design, the project engineer shall consult with the Department prior to construction.

PBC 3. Prior to construction, all required permits or approvals must be obtained for all aspects of the project from the appropriate agencies.

PBC 4. Applications for abandonment of all septic systems serving this property must be submitted prior to final approval for use.



138270-647-DWL

Florida Department of Environmental Protection

Notification/Application for Constructing a Domestic Wastewater Collection/Transmissions System

Part I - General

Subpart A: Permit Application Type (Check only one)*

- ☐ Individual permit for a domestic wastewater collection/transmission system serving **10 or greater** equivalent dwelling units (EDU). An EDU is equal to 3.5 persons. Criteria for an individual permit are contained in Rule 62-604.600(7), F.A.C.
Application fee: \$500
- ☐ Individual permit for a domestic wastewater collection/transmission system serving **less than 10** equivalent dwelling units (EDU). An EDU is equal to 3.5 persons. Criteria for an individual permit are contained in Rule 62-604.600(7), F.A.C.
Application fee: \$300
- ☐ Minor revision to an individual permit for a domestic wastewater collection/transmission system.
Application fee: \$250
- ☒ Notice of Intent to use the general permit for a domestic wastewater collection/transmission system. Criteria for a general permit are contained in Rule 62-604.600(6), F.A.C. Projects not meeting the criteria in Rule 62-604.600(6), F.A.C., must apply for an individual permit.
Application fee: \$250

*Note: Each non-contiguous project (i.e., projects that are not interconnected or are not located on adjacent streets or in the same neighborhood) requires a separate application and fee.

Subpart B: Instructions

- (1) This form shall be completed for all public and private domestic wastewater collection/transmission system construction projects as follows:
 - If this is a Notice of Intent to use the general permit, this notification shall be submitted to the Department **at least 30 days prior to initiating construction.**
 - If this is an application for an individual permit, the permit must be obtained prior to initiating construction.
- (2) One copy of the completed form shall be submitted to the appropriate DEP district office or delegated local program along with the appropriate fee, and one copy of the following supporting documents. Checks should be made payable to the Florida Department of Environmental Protection, or the name of the appropriate delegated local program. Forms and documents may be submitted electronically in accordance with the [Wastewater Electronic Document Submission](#) instructions available from DEP's website.
 - If this is a Notice of Intent to use the general permit, attach a site plan or sketch showing the size and approximate location of new or altered gravity sewers, pump stations and force mains; showing the approximate location of manholes and isolation valves; and showing how the proposed project ties into the existing or proposed wastewater facilities. The site plan or sketch shall be signed and sealed by a professional engineer registered in Florida.
 - If this is an application for an individual permit, one set of plans and specifications shall be submitted with this application. The plans and specifications shall include lift station design calculations if a lift station is proposed. Chapters 10 and 20 of *Recommended Standards for Wastewater Facilities, 2014*, provide helpful guidance on the proper preparation of plans and specifications. The plans and specifications shall be signed and sealed by a Professional Engineer registered in Florida.
- (3) All information shall be typed or printed in ink if submitting paper forms. Where attached sheets (or other technical documentation) are utilized in lieu of the blank spaces provided, indicate appropriate cross-references on the form. For Items (1) through (4) of Part II of this application form, if an item is not applicable to your project, indicate "NA" in the appropriate space provided.

RECEIVED

DEC 12 2024

Page 1

Part II – Project Documentation

(1) Collection/Transmission System Permittee

Name Justin Barrington, P.E. Title Deputy Director
Company Name City of Boca Raton
Address 1401 Glades Road
City Boca Raton State FL Zip 33431
Telephone 561-338-7300 Cell _____ Fax 561-447-4716
Email jbarrington@ci.boca-raton.fl.us

(2) General Project Information

Project Name Old Floresta, Lake Floresta Park, Tunison Palms Infrastructure Upgrades
Project Address N. Limit: L-47 Canal, S. Limit: W. Palmetto Park Rd., W. Limit: NW 12th Ave., E Limit: El Rio Canal
City Boca Raton State Florida Zip 33486
County Palm Beach County Latitude 26.354322 Longitude -80.103791

Project Description and Purpose (including the total length and material of each diameter of proposed gravity sewers and forcemains, total number of manholes, total number of pump stations, and connections to existing system):

Old Floresta, Lake Floresta Park, and Tunison Palms Infrastructure Improvements project includes replacement of approx. 360 LF of existing 6" DIP force main connecting to Lift Station No. 72., replacement of approx. 1450 LF of 8" DIP force main connecting to Lift Station No. 52, and replacement of approx. 3,790 LF of existing force main with new 24" DIP force main. The project also includes re-routing of approx. 1,250 LF of 6" HDPE force main to eliminate redundant pumping. The project also includes reconstruction of existing Eductor Lift Station No. 27 as a duplex submersible wastewater pump station. The project's objective is to replace/rehabilitate existing aging force mains and sanitary sewer pump station infrastructure.

Estimated date for: Start of construction January 2025 Completion of Construction December 2026

Number of connections to existing system or treatment plant Replacement of five (5) existing connections to existing

(3) Project Capacity

Type of Unit	Number of Units	Population Per Unit	Total Population (Number of Units x Population Per Unit)	Per Capita Flow in Gallons per Day (GPD)	Total Average Daily Flow in GPD (Total Population x Per Capita Flow)	Peak hour flow in Gallons Per Minute (GPM)
Single-Family Home	N/A					
Mobile Home						
Apartment						
Commercial, Institutional, or Industrial Facility*						
Total	NA	NA		NA		

* Description of commercial, institutional, and industrial facilities and explanation of method used to estimate per capita flow for these facilities:

There is no change in intended service capacity. No new flow will be added to the existing system.

(4) Pump Station Data (attached additional sheets as necessary)

Location	Type	Maximum Estimated Flow to the Station (GPD)	Average Estimated Flow to the Station (GPD)	Minimum Estimated Flow to the Station (GPD)	Operating Conditions [GPM @ FT (TDH)]
Existing LS 27	Submersible Duplex	30 gpm	6 gpm		54 GPM at 9.2 ft
LS 53			41.78		20567 M @ 45 ft

(5) Collection/Transmission System Design Information

- A. This information must be completed for all projects by the applicant's professional engineer, and if applicable, those professional engineers in other disciplines who assisted with the design of the project. The checklist below shall be used for conventional collection/transmission systems while Attachment I to this form shall be used for low pressure sewer systems, including septic tank effluent pump (STEP) systems, and Attachment II shall be used for vacuum sewer systems (include Attachments I or II with the submittal of this form as applicable). These checklists cover important items but are not necessarily completely comprehensive of collection system construction and do not relieve the engineer from designing the collection system following sound engineering practices.

Complete the tables below (or Attachments I or II as applicable) as follows:

- The engineer shall initial each requirement if the project has been designed to comply with the standard or criteria.
- Mark "NA" if the requirement does not apply to this project and provide an explanation in section (5)B.
- Mark "NC" if the project has not been designed to comply with the requirement and provide an explanation in section (5)B, including any rule references.

Note, if the project has not been designed in accordance with the standards and criteria set forth in Rules 62-604.400(1) and (2), F.A.C., an application for an individual permit shall be submitted. However, if Rules 62-604.400(1) and (2), F.A.C., specifically allow for another alternative that will result in an equivalent level of reliability and public health protection, the project can be constructed using the general permit. Also note that each requirement below and in Attachments I and II includes a reference to guidance or rule for further information. The guidance documents given in the checklists are as follows:

- "RSWF" – Recommended Standards for Wastewater Facilities (2014). Health Research, Inc., Health Education Services Division, P.O. Box 7126, Albany, NY 12224, www.healthresearch.org
- "MOPFD-12" – Alternative Sewer Systems, Manual of Practice No. FD-12. Alternative Sewer Systems (1986). Water Environment Federation, 602 Wythe Street, Alexandria, VA 22314, www.wef.org.
- "FL DSG" – Design and Specification Guidelines for Low Pressure Sewer Systems (1981). Department of Environmental Protection, 2600 Blair Stone Road, MS 3540, Tallahassee, FL 32399-2400, www.floridadep.gov.
- "EPA ACS" – Alternative Wastewater Collection Systems (1991). EPA/625/1-91/024. NTIS# PB93-1162591N2; National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, www.ntis.gov.

General Requirements

Initials (or "NA" or "NC")	Item Number	Requirement
NA	1	The project is designed based on an average daily flow of 100 gallons per capita plus wastewater flow from industrial plants and major institutional and commercial facilities unless water use data or other justification is used to better estimate the flow. The design includes an appropriate peaking factor, which covers I/I contributions and non-wastewater connections to those service lines. (Note, see Attachment I for low pressure sewer systems) [RSWF 11.243]
RHB	2	Procedures are specified for operation of the collection/transmission system during construction if work is performed on a system currently in operation. [RSWF 20.15]
RHB	3	The project is designed to be located on public rights-of-way, land owned by the permittee, or easements and to be located no closer than 100 feet from a public drinking water supply well and no closer than 75 feet from a private drinking water supply well; or documentation is provided in Part II.(5)B., showing that another alternative will result in an

Initials (or "NA" or "NC")	Item Number	Requirement
		equivalent level of reliability and public health protection. [62-604.400(1)(b) and (c), F.A.C.]
RHB	4	The project is designed with no physical connections between a public or private potable water supply system and a sewer or force main and with no water pipes passing through or coming into contact with any part of a sewer manhole. [RSFW 38.1]
RHB	5	The project is designed to preclude the deliberate introduction of storm water, surface water, groundwater, roof runoff, subsurface drainage, swimming pool drainage, air conditioning system condensate water, non-contact cooling water except as provided by Rule 62-610.668(1), F.A.C., and sources of uncontaminated wastewater, except to augment the supply of reclaimed water in accordance with Rule 62-610.472(3)(c), F.A.C. [62-604.400(1)(d), F.A.C.]
RHB	6	The project is designed so that all new or relocated, buried sewers and force mains, are located in accordance with the separation requirements from water mains and reclaimed water lines of Rules 62-604.400(2)(g) and (h), F.A.C. Note, if the criteria of Rules 62-604.400(2)(g) 4. or (2)(h)3., F.A.C., are used, describe in Part II.(5)B. alternative construction features that will be provided to afford a similar level of reliability and public health protection. [62- 604.400(2)(g) and (h), F.A.C.; 62-555.314, F.A.C.]

Gravity Sewers

Initials (or "NA" or "NC")	Item Number	Requirement
NA	7	The project is designed with no public gravity sewer conveying raw wastewater less than 8 inches in diameter. [RSWF 33.1]
NA	8	The design considers buoyancy of sewers, and appropriate construction techniques are specified to prevent flotation of the pipe where high groundwater conditions are anticipated. [RSWF 33.3]
NA	9	All sewers are designed with slopes to give mean velocities, when flowing full, of not less than 2.0 feet per second, based on Manning's formula using an "n" value of 0.013; or if it is not practicable to maintain these minimum slopes and the depth of flow will be 0.3 of the diameter or greater for design average flow, the owner of the system has been notified that additional sewer maintenance will be required. The pipe diameter and slope are selected to obtain the greatest practical velocities to minimize solids deposition problems. Oversized sewers are not specified to justify flatter slopes. [RSWF 33.41, 33.42, and 33.43]
NA	10	Sewers are designed with uniform slope between manholes. [RWSF 33.44]
NA	11	Where velocities greater than 10 fps are designed, provisions to protect against displacement by erosion and impact are specified. [RSWF 33.45]
NA	12	Sewers on 20% slopes or greater are designed to be anchored securely with concrete, or equal, anchors spaced as follows: not over 36 feet center to center on grades 20% and up to 35%; not over 24 feet center to center on grades 35% and up to 50%; and not over 16 feet center to center on grades 50% and over. [RSWF 33.46]
NA	13	Sewers 24 inches or less are designed with straight alignment between manholes. Where curvilinear sewers are proposed for sewers greater than 24 inches, the design specifies compression joints; ASTM or specific pipe manufacturer's maximum allowable pipe joint deflection limits are not exceeded; and curvilinear sewers are limited to simple curves which start and end at manholes. [RSWF 33.5]
NA	14	Suitable couplings complying with ASTM specifications are required for joining dissimilar materials. [RSWF 33.7]
NA	15	Sewers are designed to prevent damage from superimposed loads. [RSWF 33.7]
NA	16	Appropriate specifications for the pipe and methods of bedding and backfilling are provided so as not to damage the pipe or its joints, impede cleaning operations and future tapping, nor create excessive side fill pressures and ovalation of the pipe, nor seriously impair flow capacity. [RSWF 33.81]
NA	17	Appropriate deflection tests are specified for all flexible pipe including PVC. Testing is

Initials (or "NA" or "NC")	Item Number	Requirement
		required after the final backfill has been in place at least 30 days to permit stabilization of the soil-pipe system. Testing requirements specify: 1) no pipe shall exceed a deflection of 5%; 2) using a rigid ball or mandrel for the deflection test with a diameter not less than 95% of the base inside diameter or average inside diameter of the pipe, depending on which is specified in the ASTM specification, including the appendix, to which the pipe is manufactured; and 3) performing the test without mechanical pulling devices. [RSWF 33.85]
NA	18	Leakage tests are specified requiring that: 1) the leakage exfiltration or infiltration does not exceed 100 gallons per inch of pipe diameter per mile per day for any section of the system; 2) exfiltration or infiltration tests be performed with a minimum positive head of 2 feet; and 3) air tests, as a minimum, conform to the test procedure described in ASTM C-828 for clay pipe, ASTM C 924 for concrete pipe, ASTM F-1417 for plastic pipe, and for other materials appropriate test procedures. [RSWF 33.93, 33.94, and 33.95]
NA	19	If an inverted siphon is proposed, documentation of its need is provided in Part II.(5)B. Inverted siphons are designed with: 1) at least two barrels; 2) a minimum pipe size of 6 inches; 3) necessary appurtenances for maintenance, convenient flushing, and cleaning equipment; and 4) inlet and discharge structures having adequate clearances for cleaning equipment, inspection, and flushing. Design provides sufficient head and appropriate pipe sizes to secure velocities of at least 3.0 fps for design average flows. The inlet and outlet are designed so that the design average flow may be diverted to one barrel, and that either barrel may be cut out of service for cleaning. [RSWF 35]

Manholes

Initials (or "NA" or "NC")	Item Number	Requirement
NA	20	The project is designed with manholes at the end of each line; at all changes in grade, size, or alignment; at all intersections; and at distances not greater than 400 feet for sewers 15 inches or less and 500 feet for sewers 18 inches to 30 inches, except in the case where adequate modern cleaning equipment is available at distances not greater than 600 feet. [RSWF 34.1]
NA	21	Design requires drop pipes to be provided for sewers entering manholes at elevations of 24 inches or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches, the invert is designed with a fillet to prevent solids deposition. Inside drop connections (when necessary) are designed to be secured to the interior wall of the manhole and provide access for cleaning. Design requires the entire outside drop connection be encased in concrete. [RSWF 34.2]
NA	22	Manholes are designed with a minimum diameter of 48 inches and a minimum access diameter of 24 inches. [RSWF 34.3]
NA	23	Design requires that a bench be provided on each side of any manhole channel when the pipe diameter(s) are less than the manhole diameter and that no lateral sewer, service connection, or drop manhole pipe discharges onto the surface of the bench. [RSWF 34.5]
NA	24	Design requires: 1) manhole lift holes and grade adjustment rings be sealed with non-shrinking mortar or other appropriate material; 2) inlet and outlet pipes be joined to the manhole with a gasketed flexible watertight connection or another watertight connection arrangement that allows differential settlement of the pipe and manhole wall; and 3) watertight manhole covers be used wherever the manhole tops may be flooded by street runoff or high water. [RSWF 34.6]
NA	25	Manhole inspection and testing for water-tightness or damage prior to placing into service are specified. Air testing, if specified for concrete sewer manholes, conforms to the test procedures described in ASTM C-1244. [RSWF 34.7]
NA	26	Electrical equipment specified for use in manholes is consistent with Item 46 of this checklist. [RSWF 34.9]

Stream Crossings

Initials (or "NA" or "NC")	Item Number	Requirement
NA	27	Sewers and force mains entering or crossing streams are designed to be constructed of ductile iron pipe with mechanical joints or so they will remain watertight and free from changes in alignment or grade or constructed of HDPE with fused joints for directional drilling. Appropriate materials which will not readily erode, cause siltation, damage pipe during placement, or corrode the pipe are specified to backfill the trench. [RSWF 36.21]
NA	28	Stream crossings are designed to incorporate valves or other flow regulating devices (which may include pump stations) on the shoreline or at such distances from the shoreline to prevent discharge in the event the line is damaged. [62- 604.400(2)(j)5., F.A.C.]
NA	29	Sewers and force mains entering or crossing streams are designed at a sufficient depth below the natural bottom of the stream bed to protect the line. At a minimum, the project is designed with subaqueous lines to be buried at least three feet below the design or actual bottom, whichever is deeper, of a canal and other dredged waterway or the natural bottom of streams, rivers, estuaries, bays, and other natural water bodies; or if it is not practicable to design the project with less than three-foot minimum cover, alternative construction features (e.g. a concrete cap, sleeve, or some other properly engineered device to insure adequate protection of the line) are described in Part II.C. [62- 604.400(2)(j)1., F.A.C., and RSWF 36.11]
NA	30	Specifications require permanent warning signs be placed on the banks of canals, streams, and rivers clearly identifying the nature and location (including depths below design or natural bottom) of subaqueous crossings and suitably fixed signs be placed at the shore, for subaqueous crossings of lakes, bays, and other large bodies of water, and in any area where anchoring is normally expected. [62-604.400(2)(j)2., F.A.C.]
NA	31	Provisions for testing the integrity of subaqueous lines are specified. [62-604.400(2)(j)4., F.A.C.]
NA	32	Supports are designed for all joints in pipes utilized for aerial crossings and to prevent overturning and settlement. Expansion jointing is specified between above ground and below ground sewers and force mains. The design considers the impact of floodwaters and debris. [RSWF 37]
NA	33	Aerial crossings are designed to maintain existing or required navigational capabilities within the waterway and to reserve riparian rights of adjacent property owners. [62- 604.400(2)(j)3., F.A.C.]

Pump Stations

Initials (or "NA" or "NC")	Item Number	Requirement
NC	34	In areas with high water tables, pump stations are designed to withstand flotation forces when empty. When siting the pump station, the design considers the potential for damage or interruption of operation because of flooding. Pump station structures and electrical and mechanical equipment are designed to be protected from physical damage by the 100-year flood. Pump stations are designed to remain fully operational and accessible during the 25-year flood unless lesser flood levels are appropriate based on local considerations, but not less than the 10-year flood. [62-604.400(2)(e), F.A.C.]
RHB	35	Pump stations are designed to be readily accessible by maintenance vehicles during all weather conditions. [RSWF 41.2]
RHB	36	Wet well and pump station piping is designed to avoid operational problems from the accumulation of grit. [RSWF 41.3]
NA	37	Dry wells, including their superstructure, are designed to be completely separated from the wet well. Common walls are designed to be gas tight. [RSWF 42.21]
RHB	38	The design includes provisions to facilitate removing pumps, motors, and other mechanical and electrical equipment. [RSWF 42.22]
RHB	39	The design includes provisions for: 1) suitable and safe means of access for persons wearing self-

Initials (or "NA" or "NC")	Item Number	Requirement
		contained breathing apparatus are provided to dry wells, and to wet wells; 2) stairway access to wet wells more than 4 feet deep containing either bar screens or mechanical equipment requiring inspection or maintenance; 3) for built-in-place pump stations, a stairway to the dry well with rest landings at vertical intervals not to exceed 12 feet; 4) for factory-built pump stations over 15 feet deep, a rigidly fixed landing at vertical intervals not to exceed 10 feet unless a manlift or elevator is provided; and 5) where a landing is used, a suitable and rigidly fixed barrier to prevent an individual from falling past the intermediate landing to a lower level. If a manlift or elevator is provided, emergency access is included in the design. [RSWF 42.23]
RHB	40	Specified construction materials are appropriate under conditions of exposure to hydrogen sulfide and other corrosive gases, greases, oils, and other constituents frequently present in wastewater. [RSWF 42.25]
RHB	41	Multiple pumps are specified, and each pump has an individual intake. Where only two units are specified, they are of the same size. Specified units have capacity such that, with any unit out of service, the remaining units will have capacity to handle the design peak hourly flow. [RSWF 42.31 and 42.36]
NA	42	Bar racks are specified for pumps handling wastewater from 30 inch or larger diameter sewers. Where a bar rack is specified, a mechanical hoist is also provided. The design includes provisions for appropriate protection from clogging for small pump stations. [RSWF 42.322]
NA	43	Pumps handling raw wastewater are designed to pass spheres of at least 3 inches in diameter. Pump suction and discharge openings are designed to be at least 4 inches in diameter. Note, this provision is not applicable to grinder pumps. [RSWF 42.33]
RHB	44	The design requires pumps be placed such that under normal operating conditions they will operate under a positive suction head, unless pumps are suction-lift pumps. [RSWF 42.34]
MAG	45	The design requires: 1) pump stations be protected from lightning and transient voltage surges; and 2) pump stations be equipped with lightning arrestors, surge capacitors, or other similar protection devices and phase protection. Note, small pump stations serving a single building are not required to provide surge protection devices if not necessary because the pump station is protected by the surge protection device of the single building. [62-604.400(2)(b), F.A.C.]
MAG	46	The design requires 1) electrical systems and components (e.g., motors, lights, cables, conduits, switch boxes, control circuits, etc.) in raw wastewater wet wells, or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors may be present, comply with the National Electrical Code requirements; 2) electrical equipment located in wet wells be suitable for use under corrosive conditions; 3) each flexible cable be provided with a watertight seal and separate strain relief; 4) a fused disconnect switch located above ground be provided for the main power feed for all pump stations; 5) electrical equipment exposed to weather to meet the requirements of weatherproof equipment NEMA 3R or 4; 6) a 110 volt power receptacle to facilitate maintenance be provided inside the control panel for pump stations that have control panels outdoors; and 7) ground fault interruption protection be provided for all outdoor outlets. [RSWF 42.35]
NA	47	The design requires a sump pump equipped with dual check valves be provided in dry wells to remove leakage or drainage with discharge above the maximum high water level of the wet well. [RSWF 42.37]
RHB	48	Pump/pump station design capacities are based on the peak hourly flow and are adequate to maintain a minimum velocity of 2 feet per second in the force main. [RSWF 42.38]
MAG	49	The design includes provisions to automatically alternate the pumps in use. [RSWF 42.4]
RHB	50	The design requires: 1) suitable shutoff valves be placed on the suction line of pumps/dry pit pumps; 2) suitable shutoff and check valves be placed on the discharge line of each pump (except on screw pumps); 3) a check valve be located between the shutoff valve and the pump; 4) check valves be suitable for the material being handled; 5) check valves be placed on the horizontal portion of discharge piping (except for ball checks, which may be placed in the vertical run); 6) all valves be capable of withstanding normal pressure and

Initials (or "NA" or "NC")	Item Number	Requirement
		water hammer; and 7) all shutoff and check valves be operable from the floor level and accessible for maintenance. [RSWF 42.5]
NA	51	The effective volume of wet wells is based on design average flows and a filling time not to exceed 30 minutes unless the facility is designed to provide flow equalization. The pump manufacturer's duty cycle recommendations were utilized in selecting the minimum cycle time. [RSWF 42.62]
RHB	52	The design requires wet well floors have a minimum slope of 1 to 1 to the hopper bottom and the horizontal area of hopper bottoms be no greater than necessary for proper installation and function of the inlet. [RSWF 42.63]
RHB	53	For covered wet wells, the design provides for air displacement to the atmosphere, such as an inverted "j" tube or other means. [RSWF 42.64]
NA	54	The design provides for adequate ventilation at all pump stations. Mechanical ventilation shall be provided where the dry well is below the ground surface. Permanently installed ventilation shall be provided if screens or mechanical equipment requiring maintenance or inspection are located in the wet well. Pump stations are designed with no interconnection between the wet well and dry well ventilation systems. [RSWF 42.71]
NA	55	The design requires all intermittently operated ventilation equipment to be interconnected with the respective pit lighting system and the manual lighting/ventilation switch to override the automatic controls. [RSWF 42.73]
NA	56	The design requires the fan wheels of ventilation systems be fabricated from non-sparking material and automatic heating and dehumidification equipment be provided in all dry wells. [RSWF 42.74]
NA	57	If wet well ventilation is continuous, design provides for at least 12 complete 100% fresh air changes per hour; if wet well ventilation is intermittent, design provides for at least 30 complete 100% fresh air changes per hour; and design requires air to be forced into wet wells by mechanical means rather than solely exhausted from the wet well. [RSWF 42.75]
NA	58	If dry well ventilation is continuous, design provides at least 12 complete 100% fresh air changes per hour; and dry well ventilation is intermittent, design provides for at least 30 complete 100% fresh air changes per hour, unless a system of two speed ventilation with an initial ventilation rate of 30 changes per hour for 10 minutes and automatic switch over to 6 changes per hour is used to conserve heat. [RSWF 42.76]
RHB	59	Pump stations are designed and located on the site to minimize adverse effects from odors, noise, and lighting. [62- 604.400(2)(c), F.A.C.]
NA	60	The design requires pump stations be enclosed with a fence or otherwise designed with appropriate features to discourage the entry of animals and unauthorized persons. Posting of an unobstructed sign made of durable weather resistant material at a location visible to the public with a telephone number for a point of contact in case of emergency is specified. [62-604.400(2)(d), F.A.C.]
NA	61	The design requires suitable devices for measuring wastewater flow at all pump stations. Indicating, totalizing, and recording flow measurement are specified for pump stations with a 350 gpm or greater design peak flow. [RSWF 42.8]
RHB	62	The project is designed with no physical connections between any potable water supplies and pump stations. If a potable water supply is brought to a station, reduced-pressure principle backflow-prevention assemblies are specified. [RSWF 42.9 and 62-555.30(4), F.A.C.]

Additional Items to be Completed for Suction-Lift Pump Stations

Initials (or "NA" or "NC")	Item Number	Requirement
NA	63	The design requires all suction-lift pumps to be either self-priming or vacuum-priming and the combined total of dynamic suction-lift at the "pump off" elevation and required net positive suction head at design operating conditions not to exceed 22 feet. For self-priming

Initials (or "NA" or "NC")	Item Number	Requirement
		pumps, the design requires: 1) pumps be capable of rapid priming and repriming at the "lead pump on" elevation with self-priming and repriming accomplished automatically under design operating conditions; 2) suction piping not to exceed the size of the pump suction or 25 feet in total length; and 3) priming lift at the "lead pump on" elevation to include a safety factor of at least 4 feet from the maximum allowable priming lift for the specific equipment at design operating conditions. For vacuum-priming pump stations, the design requires dual vacuum pumps capable of automatically and completely removing air from the suction-lift pumps and the vacuum pumps be adequately protected from damage due to wastewater. [RSWF 43.1]
NA	64	The design requires: 1) suction-lift pump equipment compartments to be above grade or offset and to be effectively isolated from the wet well to prevent a hazardous and corrosive sewer atmosphere from entering the equipment compartment; 2) wet well access not to be through the equipment compartment and to be at least 24 inches in diameter; 3) gasketed replacement plates be provided to cover the opening to the wet well for pump units to be removed for service; and 4) no valving be located in the wet well. [RSWF 43.2]

Additional Items to be Completed for Submersible Pump Stations

Initials (or "NA" or "NC")	Item Number	Requirement
RHB	65	Submersible pumps and motors are designed specifically for raw wastewater use, including totally submerged operation during a portion of each pump cycle and to meet the requirements of the National Electrical Code for such units. Provisions for detecting shaft seal failure or potential seal failure are included in the design. [RSWF 44.1]
RHB	66	The design requires submersible pumps be readily removable and replaceable without dewatering the wet well or disconnecting any piping in the wet well. [RSWF 44.2]
MAG	67	In submersible pump stations, electrical supply, control, and alarm circuits are designed to provide strain relief; to allow disconnection from outside the wet well; and to protect terminals and connectors from corrosion by location outside the wet well or through use of watertight seals. [RSWF 44.31]
MAG	68	In submersible pump stations, the design requires the motor control center to be located outside the wet well, readily accessible, and protected by a conduit seal or other appropriate measures meeting the requirements of the National Electrical Code, to prevent the atmosphere of the wet well from gaining access to the control center. If a seal is specified, the motor can be removed and electrically disconnected without disturbing the seal. The design requires control equipment exposed to weather to meet the requirements of weatherproof equipment NEMA 3R or 4. [RSWF 44.32]
MAG	69	In submersible pump stations, the design requires: 1) pump motor power cords be flexible and serviceable under conditions of extra hard usage and to meet the requirements of the National Electrical Code standards for flexible cords in wastewater pump stations; 2) ground fault interruption protection be used to de-energize the circuit in the event of any failure in the electrical integrity of the cable; and 3) power cord terminal fittings be corrosion-resistant and constructed in a manner to prevent the entry of moisture into the cable, provided with strain relief appurtenances, and designed to facilitate field connecting. [RSWF 44.33]
RHB	70	In submersible pump stations, the design requires all shut-off and check valves be located in a separate valve pit. Provisions to remove or drain accumulated water from the valve pit are included in the design. [RSWF 44.4]

Emergency Operations for Pump Stations

Initials (or "NA" or "NC")	Item Number	Requirement
MAG	71	Pump stations are designed with an alarm system which activates in cases of power failure, sump pump failure, pump failure, unauthorized entry, or any cause of pump station malfunction. Pump station alarms are designed to be telemetered to a facility that is manned 24 hours a day. If such a facility is not available and a 24-hour holding capacity is not provided, the alarm is designed to be telemetered to utility offices during normal working hours and to the home of the responsible person(s) in charge of the lift station during off-duty hours. Note, if an audio-visual alarm system with a self-contained power supply is provided in lieu of a telemetered system, documentation is provided in Part II.(5)B. showing an equivalent level of reliability and public health protection. [RSWF 46]
RHB	72	The design requires emergency pumping capability be provided for all pump stations. For pump stations that receive flow from one or more pump stations through a force main or pump stations discharging through pipes 12 inches or larger, the design requires uninterrupted pumping capability be provided, including an in-place emergency generator. Where portable pumping and/or generating equipment or manual transfer is used, the design includes sufficient storage capacity with an alarm system to allow time for detection of pump station failure and transportation and connection of emergency equipment. [62-604.400(2)(a)1. and 2., F.A.C., and RSWF 47.423 and 47.433]
NA	73	The design requires: 1) emergency standby systems to have sufficient capacity to start up and maintain the total rated running capacity of the station, including lighting, ventilation, and other auxiliary equipment necessary for safety and proper operation; 2) special sequencing controls be provided to start pump motors unless the generating equipment has capacity to start all pumps simultaneously with auxiliary equipment operating; 3) a riser from the force main with rapid connection capabilities and appropriate valving be provided for all pump stations to hook up portable pumps; and 4) all pump station reliability design features be compatible with the available temporary service power generating and pumping equipment of the authority responsible for operation and maintenance of the collection/transmission system. [62-604.400(2)(a)3., F.A.C., and RSWF 47.431]
MAG	74	The design provides for emergency equipment to be protected from operation conditions that would result in damage to the equipment and from damage at the restoration of regular electrical power. [RSWF 47.411, 47.417, and 47.432]
NA	75	Where independent substations are used for emergency power, each separate substation and its associated transmission lines is designed to be capable of starting and operating the pump station at its rated capacity. [RSWF 47.44]

Force Mains

Initials (or "NA" or "NC")	Item Number	Requirement
RHB	76	Force mains are designed to maintain, at design pumping rates, a cleansing velocity of at least 2 feet per second. The minimum force main diameter specified for raw wastewater is not less than 4 inches. (Not applicable to low pressure sewer systems) [RSWF49.1]
RHB	77	The design requires: 1) branches of intersecting force mains be provided with appropriate valves such that one branch may be shut down for maintenance and repair without interrupting the flow of other branches; and 2) stub-outs on force mains, placed in anticipation of future connections, be equipped with a valve to allow such connection without interruption of service. [62-604.400(2)(f), F.A.C.]
RHB	78	The design requires air relief valves be placed at high points in the force main to prevent air locking. [RSWF49.2]
RHB	79	Specified force main pipe and joints are equal to water main strength materials suitable for design conditions. The force main, reaction blocking, and station piping are designed to withstand water hammer pressures and stresses associated with the cycling of wastewater

Initials (or "NA" or "NC")	Item Number	Requirement
		pump stations. [RSWF 49.4]
RHB	80	When the Hazen and Williams formula is used to calculate friction losses through force mains, the value for "C" is 100 for unlined iron or steel pipe for design. For other smooth pipe materials, such as PVC, polyethylene, lined ductile iron, the value for C does not exceed 120 (130 for PVC and HDPE) for design. (Not applicable to low pressure sewer systems) [RSWF 49.61]
RHB	81	Where force mains are constructed of material, which might cause the force main to be confused with potable water mains, specifications require the force main to be clearly identified. [RSWF 49.7]
RHB	82	Leakage tests for force mains are specified including testing methods and leakage limits. [RSWF 49.8]

Note, if this project is an alternative collection system (i.e. a low pressure sewer system or a vacuum sewer system), complete the checklist items on Attachment I for low pressure sewer systems or Attachment II for vacuum sewer systems. Include the attachment with the submittal. For any items marked "NA" or "NC," provide an explanation in section 5(B).

- B. Explanation for Requirements or Standards Marked "NA" or "NC" in II(5)A above, which includes Attachments I and II (attach additional sheets if necessary):

For item 1 there are no additional connections added that need to be estimated for this project.
For items 7-19 there is no Gravity Sewer in this project.
For items 20-26 there are no manholes being installed for this project.
For items 27-33 there are no stream crossings, aerial or otherwise, in this project.
For item 34, improvements are proposed to be made to an existing lift station to increase operational reliability and security. The existing wet well is constructed in the center of a neighborhood street and functions as a cascading pump station at the terminal end of an existing gravity sewer main. There is no available real estate within which to reconstruct the station in a manner which raises the wet well. All electrical facilities shall be constructed to min. 1.0-ft above the base flood elevation as identified in FEMA FIRM Panel 12099C1176F.
For item 37, no dry well construction is proposed for this project.
For item 39, There are no dry wells, built-in-place pump stations, factory-built pump station, nor landings in this project. The existing wet well does not have mechanical equipment requiring inspection nor maintenance that would necessitate stairway access.
For item 42, no bar racks are being included in this project.
For item 43, proposed pumps include a vane impeller with cutter system (grinder pump).
For item 47, no dry wells are included in this project.
For item 51, Lift Station No. 27 is an existing station with an existing wet well structure being rehabilitated under this project. Cycle times have been reviewed to ensure that max starts per hour are not exceeded for the proposed pumps.
For item 54, no dry wells nor mechanical screening equipment is included in this project.
For items 55-58, there are no accessible confined spaces that would require ventilation.
For item 60, the wet well and valve vault are being reconstructed in H-20 load rated structures in the center of a residential neighborhood street in their existing locations. Accessible facilities shall be locked. Utility provided signage shall be included.
For item 61, peak hourly flow for Lift Station No. 27 is only estimated to be 30 gpm.
For items 63-64 there are no suction-lift submersible pump stations being installed
For item 73, Lift Station No. 27 is a low flow system anticipated to receive emergency flow management via existing utility vac-truck and pumping equipment. A temporary gravity overflow tie-in is available for back-up flow control during emergency conditions.
For item 75, no independent substations are used for emergency power.

The design requires pump stations be enclosed with a fence or otherwise designed with appropriate features to discourage the entry of animals and unauthorized persons. Posting of an unobstructed sign made of durable weather resistant material at a location visible to the public with a telephone number for a point of contact in case of emergency is specified.
[62-604.400(2)(d), F.A.C.]

PART III - Certifications

(1) Collection/Transmission System Permittee

I, the undersigned owner or authorized representative* of City of Boca Raton
am fully aware that the statements made in this application for a construction permit are true, correct and complete to the best of my knowledge and belief. I agree to retain the design engineer or another professional engineer registered in Florida, to conduct on-site observation of construction, to prepare a certification of completion of construction, and to review record drawings for adequacy. Further, I agree to provide an appropriate operation and maintenance manual for the facilities pursuant to Rule 62-604.500(4), F.A.C., and to retain a professional engineer registered in Florida to examine (or to prepare if desired) the manual. I am fully aware that Department approval must be obtained before this project is placed into service for any purpose other than testing for leaks and testing equipment operation.

Signed Justin Barrington Digitally signed by Justin Barrington
Date: 2024.11.26 11:58:59 -05'00' Date See digital signature.
Name Justin Barrington, P.E. Title Deputy Director

*Attach a letter of authorization.

(2) Owner of Collection/Transmission System

I, the undersigned owner or authorized representative* of City of Boca Raton certify that we will be the Owner of this project after it is placed into service. I agree that we will operate and maintain this project** in a manner that will comply with applicable Department rules. Also, I agree that we will promptly notify the Department if we sell or legally transfer ownership of this project.

Signed Justin Barrington Digitally signed by Justin Barrington
Date: 2024.11.26 11:59:18 -05'00' Date See digital signature.
Name Justin Barrington, P.E. Title Deputy Director

Company Name City of Boca Raton
Address 1401 Glades Road
City Boca Raton State FL Zip 33431
Telephone 561-338-7300 Cell _____ Fax 561-447-4716
Email jbarrington@ci.boca-raton.fl.us

* Attach a letter of authorization

**Description of the owner's portion if split N/A

Second Owner of Collection/Transmission System (if system is divided with different owners)

I, the undersigned owner or authorized representative* of N/A certify that we will be the Owner of this project after it is placed into service. I agree that we will operate and maintain this project in a manner that will comply with applicable Department rules. Also, I agree that we will promptly notify the Department if we sell or legally transfer ownership of this project.

Signed _____ Date _____
Name N/A Title _____
Company Name _____
Address _____
City _____ State _____ Zip _____
Telephone _____ Cell _____ Fax _____
Email _____

* Attach a letter of authorization

**Description of the second owner portion if split N/A

(3) Wastewater Facility Serving Collection/Transmission System**

If this is a Notice of Intent to use a general permit, check here:

☒ The undersigned owner or authorized representative* of City of Boca Raton wastewater facility

hereby certifies that the above referenced facility has the capacity to receive the wastewater generated by the proposed collection system; is in compliance with the capacity analysis report requirements of Rule 62-600.405, F.A.C.; is not under a Department order associated with effluent violations or the ability to treat wastewater adequately; and will provide the necessary treatment and disposal as required by Chapter 403, F.S., and applicable Department rules.

If this is an application for an individual permit, check one:

☐ The undersigned owner or authorized representative* of the _____ wastewater facility hereby certifies that the above referenced facility has and will have adequate reserve capacity to accept the flow from this project and will provide the necessary treatment and disposal as required by Chapter 403, F.S., and applicable Department rules.

☐ The undersigned owner or authorized representative* of the _____ wastewater facility hereby certifies that the above referenced facility currently does not have, but will have prior to placing the proposed project into operation, adequate reserve capacity to accept the flow from this project and will provide the necessary treatment and disposal as required by Chapter 403, F.S., and applicable Department rules.

Name of Treatment Plant Serving Project City of Boca Raton Wastewater Treatment Facility
County Palm Beach City Boca Raton
DEP Facility ID: FL 0026344
Maximum monthly average daily flow over the last 12 month period 15.365 MGD Month(s) used 04/2024
Maximum three-month average daily flow over the last 12 month period 14.756 MGD Month(s) used 04/2024
Current permitted capacity 17.5 MGD ☒ AADF ☐ MADF ☐ TMADF
Current outstanding flow commitments (including this project) against treatment plant capacity This project does not add any flows to the treatment facility. MGD

Justin Barrington Digitally signed by Justin Barrington
Signed _____ Date: 2024.11.26 11:59:53 -05'00' Date See digital signature.
Name Justin Barrington, P.E. Title Deputy Director
Company Name City of Boca Raton
Address 1401 Glades Road
City Boca Raton State FL Zip 33431
Telephone 561-338-7300 Cell _____ Fax 561-447-4716
Email jbarrington@ci.boca-raton.fl.us

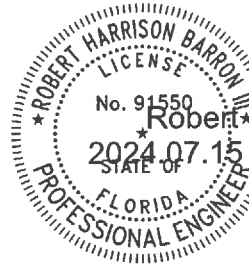
* Attach a letter of authorization

** If there is an intermediate satellite collection system between the project and the final receiving facility collection system, a letter shall be attached certifying that the intermediate downstream satellite collection system has adequate reserve capacity to accept the flow from this project.

(4) Professional Engineer Registered in Florida

I, the undersigned professional engineer registered in Florida, certify that I am in responsible charge of the preparation and production of engineering documents for this project; that plans and specifications for this project have been completed; that I have expertise in the design of wastewater collection/transmission systems; and that, to the best of my knowledge and belief, the engineering design for this project complies with the requirements of Chapter 62-604, F.A.C.

(Affix Seal)



THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY ROBERT HARRISON BARRON III, P.E. ON THE DATE ADJACENT TO THE SEAL.

2024.07.15 15:28:51-04'00'

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THIS SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

Signed Robert Harrison Barron III, P.E.

Date See digital signature.

Name Robert Harrison Barron III, P.E.

Florida Registration No. 91550

Company Name Holtz Consulting Engineers, Inc.

Address 270 S. Central Boulevard, Suite 207

City Jupiter State Florida Zip 33458

Telephone 561-575-2005 Cell 561-889-5848 Fax 561-575-2009

Email Harrison.Barron@holtzconsulting.com

Portion of the project for which responsible: All sanitary sewer piping and lift station improvements except electrical

Second Engineer (if applicable)

(Affix Seal)



This item has been signed and sealed by Michael A. Guida PE using a Digital Signature and date. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic Copies.

Digitally signed by Michael A GUIDA
DN: c=US, o=Florida,
dnQualifier=A01410C00000
181B1CB462E00035ABD,
cn=Michael A GUIDA
Date: 2024.07.16 10:57:49
-04'00'

Signed Michael A. Guida, P.E.

Date See digital signature.

Name Michael A. Guida, P.E.

Florida Registration No. 60755

Company Name C&W Engineering

Address 6903 Vista Parkway North, Suite 10

City West Palm Beach State Florida Zip 33411

Telephone 561-642-5333 Cell _____ Fax _____

Email mguida@cweng.us

Portion of the Project for Which Responsible: Lift station electrical improvements



LAKE WORTH DRAINAGE DISTRICT Right-of-Way Permit

Date Issued: April 23, 2025
Permit No.: RW-24-0278
Permittee: City of Boca Raton
1401 Glades Road
Boca Raton, FL 33431

Permit Use Type: Utilities

Project Description: Install sixty-five linear feet (65 L.F) of twenty-four-inch (24") Forcemain (FM) over the existing eighty-four-inch (84") culvert within L-47 Canal and NW 9th Ct. Remove all existing Forcemains and any other non-operational and unpermitted utilities from the L-47 Right-of-Way. Removal of all temporary bypasses and appurtenance structures from L-47 Right-of-Way, restore all roadway pavements where disturbed by construction activity. Concrete sidewalks will be permitted under a separate permit. ****NO ABANDONED UTILITY IS ALLOWED TO REMAIN WITHIN L-47 ROW****

Project Location: LWDD L-47 Canal, NW 9TH CT
Section 24 Township 47 S, Range 42 E

This permit is issued by the Lake Worth Drainage District (LWDD) pursuant to an initial application received on 10/1/2024. The application, including all plans and specifications submitted to LWDD, is by reference made a part hereof.

This permit is a revocable authorization to use or occupy LWDD right-of-way, subject to the general and special conditions contained herein, which the permittee acknowledges and agrees to be bound by acceptance of this permit.

Should the permittee object to any permit conditions, a request to petition the LWDD Board of Supervisors must be submitted in writing no later than 30 days from date of permit issuance. The LWDD Board of Supervisors will consider the petition at the next available Board meeting, providing the petition is received more than 10 business days prior to the next available Board meeting. All petitions should include permittee name, contact information, condition(s) being contested, and explanation of disputed items.

1.0 General Conditions

- 1.1 All structures and/or works located on LWDD rights-of-way constructed by permittee shall remain the property of the permittee, who shall be solely responsible for ensuring that such structures and other uses remain in good and safe condition. It is left to the sole discretion of LWDD to determine if the facilities are being properly maintained. Permittees are advised that other federal, state and local safety standards may govern the occupancy and use of the LWDD's rights-of-way. The LWDD assumes no duty with regard to ensuring that such uses are so maintained and assumes no liability with regard to injuries caused to others by any such failure.
- 1.2 Permittee solely acknowledges and accepts the duty and all associated responsibilities to incorporate safety features, which meet applicable engineering practice and industry standards, into the design, construction, operation and continued maintenance of the permitted facilities/authorized use. This duty shall include, but not be limited to, permittee's consideration of LWDD's regulation and fluctuation, without notice, of water levels in canals and works, as well as the permittee's consideration of upgrades and modifications to the Permitted facilities/authorized use which may be necessary to meet any future changes to applicable engineering practice and accepted industry

standards. Permittee acknowledges that LWDD's review and issuance of this permit, including, but not limited to, any field inspections performed by LWDD, does not in any way consider or ensure that the permitted facilities/authorized use is planned, designed, engineered, constructed, or will be operated, maintained or modified to meet applicable engineering practice and accepted industry standards, or otherwise provide any safety protections. Permittee further acknowledges that any inquiries, discussions, or representations, whether verbal or written, by or with any LWDD staff or representative during the application review and permit issuance process, including, but not limited to, any field inspections, shall not in any way be relied upon by permittee as LWDD's assumption of any duty to incorporate safety features, as set forth above, and shall also not be relied upon by permittee in order to meet permittee's duty to incorporate safety features, as set forth above.

- 1.3** Permittee agrees to abide by all terms and conditions of this permit, including any representations made on the permit applications and related documents. Permittee agrees to pay all demolition, removal and restoration costs, investigative costs, court costs and reasonably attorney's fees, including appeals, resulting from any action taken by LWDD to obtain compliance with the conditions of the permit or removal of the permitted use. If legal action is taken by LWDD, "reasonable attorney's fees" is understood to mean the fair market value of the services provided, based upon what a private attorney would charge.
- 1.4** This permit does not create any vested rights, and except for governmental entities and utilities, is revocable at will upon 30 days prior written notice. LWDD reserves the right to amend the terms and conditions contained herein at any time and for any reason. Permittee bears all risk of loss as to monies expended in furtherance of the permitted use. Upon revocation, the permittee shall promptly modify, relocate or remove the permitted use and properly restore the right-of-way to the LWDD's satisfaction. In the event of failure to so comply within the specified time frame, LWDD may remove the permitted use and permittee shall be responsible for all removal and restoration costs. In addition, the permittee agrees and acknowledges that any failure to comply constitutes a violation of section 298.66, Florida Statutes, and LWDD may pursue any and all remedies available under law.
- 1.5** This permit does not convey any property rights nor any rights or privileges other than those specified herein and this permit shall not, in any way, be construed as an abandonment of any other such impairment or disposition of LWDD's property rights. The LWDD approves the permitted use only to the extent of its interest in the works of LWDD. Permittee shall obtain all other necessary federal, state, local, special district and private authorizations prior to the start of any construction or alteration authorized by this permit. Permittee shall comply with any more stringent conditions or provisions which may be set forth in other required Permits or other authorizations. However, the LWDD, assumes no duty to ensure that any such authorizations have been obtained or to protect the legal rights of the underlying fee owner, in those instances where the LWDD owns less than fee.
- 1.6** Unless specifically prohibited or limited by statute, permittee agrees to indemnify, defend and save the LWDD (which used herein includes LWDD and its past, present and/or future employees, agents, representatives, officers and/or Board members and any of their successors and assigns) from and against any and all lawsuits, actions, claims, demands, losses, expenses, costs, attorney's fees, judgments and liabilities which arise from or may be related to the ownership, construction, maintenance or operation of the permitted use or the possession, utilization, maintenance, occupancy or ingress and egress of the LWDD's right-of-way which arise directly or indirectly and are caused in whole or in part by the acts, omissions or negligence of the permittee or of third parties. Permittee acknowledges that LWDD is exempt from liability for personal injury and damages that may occur as a result of permitted use or activity by virtue of Chapter 2009-258, Laws of Florida. Permittee agrees to provide legal counsel acceptable to the LWDD if requested for the defense of any such claims.
- 1.7** Permittee releases LWDD for any and all damages that may be caused by LWDD to the permitted use, while exercising its responsibilities and obligations of maintenance of its drainage system. The LWDD is not responsible for the repair of or claims of damage to any facilities and uses which may incur damage resulting from water fluctuations or flows, or by the use of LWDD's rights-of-way by LWDD or a third party. Improvements placed within the right-of-way are done so at the sole risk of the owner/permittee.
- 1.8** The LWDD is not responsible for any personal injury or property damage which may directly or indirectly result from the use of water from the LWDD canals or any activities which may include use of

contact with water from LWDD canals, since LWDD periodically sprays its canals and/or rights-of-way for aquatic weed control purposes and uses substances which may be harmful to human health or plant life.

- 1.9** The LWDD does not waive sovereign immunity, per section 768.28, Florida Statutes.
- 1.10** As specified by LWDD, permittee shall maintain insurance coverage to the required amounts and limits throughout the duration of the permit.
- 1.11** The permittee shall not engage in any activity regarding the permitted use which interferes with the construction, alteration, maintenance or operation of the works of LWDD including, but not limited to: a) discharging of debris or aquatic weeds into the works of LWDD; b) causing erosion or shoaling within the works of LWDD; c) planting trees or shrubs or erecting structures which limit or prohibit access by LWDD equipment and vehicles, except as authorized by the permit; d) leaving construction or other debris on the LWDD right-of-way or waterway; e) damaging LWDD berms and levees; f) removing of LWDD owned spoil material; g) removing or damaging LWDD locks, gates, and fencing; h) opening of LWDD rights-of-way to unauthorized vehicular access; or i) running or allowing livestock on the LWDD rights-of-way.
- 1.12** Permittee shall allow all LWDD staff the right to inspect the permitted use at any reasonable time.
- 1.13** Permittee shall allow, without charge or any interference, the LWDD, its employees, agents, and contractors, to utilize the permitted facilities before, during and after construction for the purpose of conducting LWDD's routine and emergency, canal operation, maintenance, and construction activities. To the extent there is a conflicting use, the LWDD's use shall have priority over the permittee's use.
- 1.14** This permit is non-exclusive and revocable. Permittee shall not interfere with any other existing or future permitted uses or facilities authorized by the LWDD.
- 1.15** If the use involves the construction of facilities for a non-exempt water withdrawal or surface water discharge, the permittee must apply for and obtain the appropriate water management permit before or concurrently with any activities which may be conducted pursuant to this permit.
- 1.16** Permittee authorizes the LWDD to record the permit through filing the appropriate notice in the public records of Palm Beach County. Governmental entities and utilities are not subject to this provision.
- 1.17** Permittee shall be responsible for the repair or replacement of any existing facilities located within the LWDD right-of-way which are damaged as a result of construction or maintenance of the authorized facility.
- 1.18** If determined that the permitted use interferes with LWDD's canal maintenance, operations or rehabilitation efforts, permittee agrees that all or part of the permitted use must be removed and/or reconstructed at permittees expense.
- 1.19** The Permittee, assigns or successors in title shall operate and maintain the permitted facilities in perpetuity, and shall be responsible for removal of all facilities and restoration of LWDD's right-of-way if the permit is not transferred. Permittee shall provide prior written notice to their successors in title of the permit and its terms and conditions. As the LWDD has no control over the sale or transfer of real or personal property, it is the sole obligation of a permittee to disclose the existence of an LWDD right-of-way permit, its terms and conditions to prospective purchasers.
- 1.20** Permittee agrees that the transfer of any rights, title or interests of the property or facility ownership referenced in this permit herein shall require a transfer of permit. Within thirty (30) days of any transfer of interest or control of the subject property, the permittee must notify the LWDD in writing of the property transfer. Notification of the transfer does not by itself constitute a permit transfer. All successors and assigns shall be required to apply for a transfer of permit with LWDD within 60 days of obtaining property or facility. LWDD shall have the right to approve in writing the successors and assigns of transfer of any rights or conditions contained in this permit, which approval shall not be unreasonably withheld. Failure to submit a transfer of permit shall be considered a default of the terms

and conditions of this permit and LWDD shall have the right to terminate this permit upon 10 days written notice to permittee. Failure to timely transfer the permit will necessitate Permittee, assigns or successors in title to remove all of the facilities and restore LWDD's right-of-way.

- 1.21** This permit is issued by the LWDD as a license to use or occupy LWDD works or lands. It does not create any right of entitlement, either legal or equitable, to the continued use of the LWDD works or lands. Since this permit conveys no right to the continued use of the works or lands, the LWDD is under no obligation to transfer this permit to any subsequent owner. By acceptance of this permit, the permittee expressly acknowledges that the permittee bears all risks of loss as a result of the revocation of this permit. The permittee, assigns or successors shall be responsible for removal of all facilities and restoration of LWDD's right-of-way if the permit is not transferred.
- 1.22** Permittee agrees that no other encroachments and/or facilities shall be located within the right-of-way without prior authorization from LWDD.
- 1.23** It shall be the responsibility of the permittee to locate and protect the underground facilities of the LWDD or those of others prior to and during construction.
- 1.24** Permittee shall take the necessary precautions to prevent turbidity and/or silting upstream or downstream during construction.
- 1.25** All unpermitted facilities installed prior to or during construction must be removed prior to the project's final approval.
- 1.26** The permittee must make a copy of this permit available and/or post at the job site prior to and during any construction. Failure to comply may result in suspension of construction.
- 1.27** Permittee agrees that significant construction shall commence within one year and construction be completed within two (2) years from the date of permit issuance or the permit may terminate and a new permit application must be submitted. The new application must meet current operating policies including current applicable fees. Prior to the expiration date, the permittee may submit a request in writing for an extension of time to commence or complete construction.
- 1.28** Permittee or permittee's representative shall notify the LWDD construction inspector at least forty-eight (48) hours prior to any work to be undertaken within LWDD rights-of-way. All underground installations must be inspected prior to backfilling.
- 1.29** No dewatering into LWDD canals is authorized until written notification of approval from South Florida Water Management District has been submitted to LWDD.
- 1.30** Any non-compliance by the permittee of any condition listed herein will result in the termination of this permit, removal of permitted uses or facilities at the permittees expense, and/or LWDD requesting other jurisdictional agencies to withhold their final approvals.
- 1.31** Permittee shall submit record drawings within sixty (60) days of project completion. Drawings shall be signed and sealed by a Florida Professional Engineer and shall include sufficient information to show that the permitted facilities have been installed or constructed in substantial compliance with the plans and design approved by the LWDD. All elevations shall be referenced to N.G.V.D. 1929 (adjusted). In lieu of signed and sealed record drawings utility cable companies may submit, within sixty (60) days of project completion, a project certification stating that the permitted facilities have been installed or constructed in substantial compliance with the plans and design approved by the LWDD. Failure of the permittee to provide these drawings or certification within the time specified may result in LWDD revoking this permit and requesting that all jurisdictional agencies withhold their final approval until the drawings are received and approved by LWDD.
- 1.32** Special Conditions that are specific to the project site and right-of-way usage shall be incorporated into this permit as may be necessary in the best interest of the LWDD.

2.0 Special Conditions

- 2.1 The permittee or authorized representative is required to schedule a mandatory, on-site preconstruction meeting at <https://www.lwdd.net/48-hour-construction-notice> and with LWDD Field Representative, Corey Tyson at ctyson@lwdd.net and 561-819-5591.
- 2.2 This permit authorizes the Installation of sixty-five linear feet (65 L.F) of twenty-four-inch (24") Forcemain (FM) over the existing eighty-four-inch (84") culvert within L-47 Canal and NW 9th Ct. Removal of all existing Force mains and any other non-operational and unpermitted utilities from the L-47 Right-of-Way. Removal of all temporary bypasses and appurtenance structures from L-47 Right-of-Way, restore all roadway pavements where disturbed by construction activity pursuant to the application submitted on October 01, 2024 and revised plan on January 30th, 2025.
- 2.3 Permittee should retain the services of a licensed Professional Land Surveyor to stake the LWDD right-of-way prior to the construction/installation of any permitted facilities. LWDD retains the right to require the Permittee/Contractor to stake the LWDD right-of-way in the event of a dispute. Any constructed/installed facilities that are inconsistent with the permitted plans will be required to be removed from the LWDD right-of-way and the LWDD right-of-way restored at the Permittee's expense. LWDD will not allow incorrectly installed facilities to remain within the LWDD right-of-way.
- 2.4 The proposed sidewalk is not included in this permit and should be permitted separately.
- 2.5 If watermain is abandoned on NW 12TH Ave within the L-47 ROW, it should be completely removed.
- 2.6 All underground utilities placed within the LWDD's canal rights-of-way must be identified with LWDD approved permanent witness markers identifying utility type and location."
- 2.7 Should any valves or valve boxes be permitted in LWDD's rights of way, they shall have a minimum HS-20 (traffic bearing) load rating.
- 2.8 Issuance of this permit shall not be construed as a pre-emption of municipal or county regulations requiring that such utilities be installed underground.
- 2.9 The permitted crossing shall be a minimum **depth of 36 Inches** below the maintenance berm or as depicted on the approved plans, whichever is greater.
- 2.10 Any abandoned facilities or non-operational facility must be completely removed from LWDD L-47 right-of-way.
- 2.11 Permittee and contractors shall be responsible for the safety and wellbeing of the public during the term of this permit and operate in a safe manner at all times.
- 2.12 LWDD is not responsible for damage to any equipment within the L-47 Canal Right-of-Way that may occur as a result of LWDD responding to an emergency event or during normal maintenance operations. Permittee agrees to indemnify and hold LWDD harmless under these conditions.
- 2.13 No temporary or permanent signage shall be installed within the LWDD L-47 Right-of-Way.
- 2.14 Permittee shall restore LWDD's right-of-way to its original or better condition where disturbed by construction activity.

Approved by:

Shawn Mitchell

Shawn Mitchell
Permit Coordinator



Brian Tilles, P.E.
Director, Right-of-Way Regulation

Exhibit Map



Legend



Right-of-Way Permit



LWDD Canals



Township and Range Grid



Section Grid



Right of Way Lines

Permit Number: RW-24-0278

Record Type: Utilities

Permittee: City of Boca Raton Justin Barrington P.E.

Application Name: Dec 11 2nd 15_NAA_(City of Boca Raton) L-47

Old Floresta Infrastructure Upgrades

Palm Beach County, FL

Sec/Twp/Rge
24/47/42

Date
2024-11-24

Latitude (DMS): 26° 21m 27s N
Longitude (DMS): 80° 6m 20s W

State Plane Coordinates
X: 949032.25 Y: 736675.13



Lake Worth Drainage District
13081 S Military Trail
Delray Beach, FL 33484
(561) 498-5363





LAKE WORTH DRAINAGE DISTRICT Right-of-Way Permit

Date Issued: April 23, 2025
Permit No.: RW-25-0028 (MODIFICATION)
Permittee: City of Boca Raton
1401 Glades Road
Boca Raton, FL 33431
Permit Use Type: Culvert Crossing
Project Description: Modification of existing permit no 81-2056R.09 to install new five feet (5') wide six-inch (6") thick concrete sidewalk and connect to existing sidewalk on the east side of NW 9TH Ct over existing culvert crossing within the L-47 Canal. **Twenty-four-inch forcemain permitted separately under RW-24-0278**
Project Location: LWDD L-47 Canal, NW 9th Ct
Section 24 Township 47 S, Range 42 E

This permit is issued by the Lake Worth Drainage District (LWDD) pursuant to an initial application received on 1/30/2025. The application, including all plans and specifications submitted to LWDD, is by reference made a part hereof.

This permit is a revocable authorization to use or occupy LWDD right-of-way, subject to the general and special conditions contained herein, which the permittee acknowledges and agrees to be bound by acceptance of this permit.

Should the permittee object to any permit conditions, a request to petition the LWDD Board of Supervisors must be submitted in writing no later than 30 days from date of permit issuance. The LWDD Board of Supervisors will consider the petition at the next available Board meeting, providing the petition is received more than 10 business days prior to the next available Board meeting. All petitions should include permittee name, contact information, condition(s) being contested, and explanation of disputed items.

1.0 General Conditions

- 1.1 All structures and/or works located on LWDD rights-of-way constructed by permittee shall remain the property of the permittee, who shall be solely responsible for ensuring that such structures and other uses remain in good and safe condition. It is left to the sole discretion of LWDD to determine if the facilities are being properly maintained. Permittees are advised that other federal, state and local safety standards may govern the occupancy and use of the LWDD's rights-of-way. The LWDD assumes no duty with regard to ensuring that such uses are so maintained and assumes no liability with regard to injuries caused to others by any such failure.
- 1.2 Permittee solely acknowledges and accepts the duty and all associated responsibilities to incorporate safety features, which meet applicable engineering practice and industry standards, into the design, construction, operation and continued maintenance of the permitted facilities/authorized use. This duty shall include, but not be limited to, permittee's consideration of LWDD's regulation and fluctuation, without notice, of water levels in canals and works, as well as the permittee's consideration of upgrades and modifications to the Permitted facilities/authorized use which may be necessary to meet any future changes to applicable engineering practice and accepted industry standards. Permittee acknowledges that LWDD's review and issuance of this permit, including, but not limited to, any field inspections performed by LWDD, does not in any way consider or ensure that the permitted facilities/authorized use is planned, designed, engineered, constructed, or will be operated,

maintained or modified to meet applicable engineering practice and accepted industry standards, or otherwise provide any safety protections. Permittee further acknowledges that any inquiries, discussions, or representations, whether verbal or written, by or with any LWDD staff or representative during the application review and permit issuance process, including, but not limited to, any field inspections, shall not in any way be relied upon by permittee as LWDD's assumption of any duty to incorporate safety features, as set forth above, and shall also not be relied upon by permittee in order to meet permittee's duty to incorporate safety features, as set forth above.

- 1.3** Permittee agrees to abide by all terms and conditions of this permit, including any representations made on the permit applications and related documents. Permittee agrees to pay all demolition, removal and restoration costs, investigative costs, court costs and reasonably attorney's fees, including appeals, resulting from any action taken by LWDD to obtain compliance with the conditions of the permit or removal of the permitted use. If legal action is taken by LWDD, "reasonable attorney's fees" is understood to mean the fair market value of the services provided, based upon what a private attorney would charge.
- 1.4** This permit does not create any vested rights, and except for governmental entities and utilities, is revocable at will upon 30 days prior written notice. LWDD reserves the right to amend the terms and conditions contained herein at any time and for any reason. Permittee bears all risk of loss as to monies expended in furtherance of the permitted use. Upon revocation, the permittee shall promptly modify, relocate or remove the permitted use and properly restore the right-of-way to the LWDD's satisfaction. In the event of failure to so comply within the specified time frame, LWDD may remove the permitted use and permittee shall be responsible for all removal and restoration costs. In addition, the permittee agrees and acknowledges that any failure to comply constitutes a violation of section 298.66, Florida Statutes, and LWDD may pursue any and all remedies available under law.
- 1.5** This permit does not convey any property rights nor any rights or privileges other than those specified herein and this permit shall not, in any way, be construed as an abandonment of any other such impairment or disposition of LWDD's property rights. The LWDD approves the permitted use only to the extent of its interest in the works of LWDD. Permittee shall obtain all other necessary federal, state, local, special district and private authorizations prior to the start of any construction or alteration authorized by this permit. Permittee shall comply with any more stringent conditions or provisions which may be set forth in other required Permits or other authorizations. However, the LWDD, assumes no duty to ensure that any such authorizations have been obtained or to protect the legal rights of the underlying fee owner, in those instances where the LWDD owns less than fee.
- 1.6** Unless specifically prohibited or limited by statute, permittee agrees to indemnify, defend and save the LWDD (which used herein includes LWDD and its past, present and/or future employees, agents, representatives, officers and/or Board members and any of their successors and assigns) from and against any and all lawsuits, actions, claims, demands, losses, expenses, costs, attorney's fees, judgements and liabilities which arise from or may be related to the ownership, construction, maintenance or operation of the permitted use or the possession, utilization, maintenance, occupancy or ingress and egress of the LWDD's right-of-way which arise directly or indirectly and are caused in whole or in part by the acts, omissions or negligence of the permittee or of third parties. Permittee acknowledges that LWDD is exempt from liability for personal injury and damages that may occur as a result of permitted use or activity by virtue of Chapter 2009-258, Laws of Florida. Permittee agrees to provide legal counsel acceptable to the LWDD if requested for the defense of any such claims.
- 1.7** Permittee releases LWDD for any and all damages that may be caused by LWDD to the permitted use, while exercising its responsibilities and obligations of maintenance of its drainage system. The LWDD is not responsible for the repair of or claims of damage to any facilities and uses which may incur damage resulting from water fluctuations or flows, or by the use of LWDD's rights-of-way by LWDD or a third party. Improvements placed within the right-of-way are done so at the sole risk of the owner/permittee.
- 1.8** The LWDD is not responsible for any personal injury or property damage which may directly or indirectly result from the use of water from the LWDD canals or any activities which may include use of contact with water from LWDD canals, since LWDD periodically sprays its canals and/or rights-of-way for aquatic weed control purposes and uses substances which may be harmful to human health or plant life.

- 1.9** The LWDD does not waive sovereign immunity, per section 768.28, Florida Statutes.
- 1.10** As specified by LWDD, permittee shall maintain insurance coverage to the required amounts and limits throughout the duration of the permit.
- 1.11** The permittee shall not engage in any activity regarding the permitted use which interferes with the construction, alteration, maintenance or operation of the works of LWDD including, but not limited to: a) discharging of debris or aquatic weeds into the works of LWDD; b) causing erosion or shoaling within the works of LWDD; c) planting trees or shrubs or erecting structures which limit or prohibit access by LWDD equipment and vehicles, except as authorized by the permit; d) leaving construction or other debris on the LWDD right-of-way or waterway; e) damaging LWDD berms and levees; f) removing of LWDD owned spoil material; g) removing or damaging LWDD locks, gates, and fencing; h) opening of LWDD rights-of-way to unauthorized vehicular access; or i) running or allowing livestock on the LWDD rights-of-way.
- 1.12** Permittee shall allow all LWDD staff the right to inspect the permitted use at any reasonable time.
- 1.13** Permittee shall allow, without charge or any interference, the LWDD, its employees, agents, and contractors, to utilize the permitted facilities before, during and after construction for the purpose of conducting LWDD's routine and emergency, canal operation, maintenance, and construction activities. To the extent there is a conflicting use, the LWDD's use shall have priority over the permittee's use.
- 1.14** This permit is non-exclusive and revocable. Permittee shall not interfere with any other existing or future permitted uses or facilities authorized by the LWDD.
- 1.15** If the use involves the construction of facilities for a non-exempt water withdrawal or surface water discharge, the permittee must apply for and obtain the appropriate water management permit before or concurrently with any activities which may be conducted pursuant to this permit.
- 1.16** Permittee authorizes the LWDD to record the permit through filing the appropriate notice in the public records of Palm Beach County. Governmental entities and utilities are not subject to this provision.
- 1.17** Permittee shall be responsible for the repair or replacement of any existing facilities located within the LWDD right-of-way which are damaged as a result of construction or maintenance of the authorized facility.
- 1.18** If determined that the permitted use interferes with LWDD's canal maintenance, operations or rehabilitation efforts, permittee agrees that all or part of the permitted use must be removed and/or reconstructed at permittees expense.
- 1.19** The Permittee, assigns or successors in title shall operate and maintain the permitted facilities in perpetuity, and shall be responsible for removal of all facilities and restoration of LWDD's right-of-way if the permit is not transferred. Permittee shall provide prior written notice to their successors in title of the permit and its terms and conditions. As the LWDD has no control over the sale or transfer of real or personal property, it is the sole obligation of a permittee to disclose the existence of an LWDD right-of-way permit, its terms and conditions to prospective purchasers.
- 1.20** Permittee agrees that the transfer of any rights, title or interests of the property or facility ownership referenced in this permit herein shall require a transfer of permit. Within thirty (30) days of any transfer of interest or control of the subject property, the permittee must notify the LWDD in writing of the property transfer. Notification of the transfer does not by itself constitute a permit transfer. All successors and assigns shall be required to apply for a transfer of permit with LWDD within 60 days of obtaining property or facility. LWDD shall have the right to approve in writing the successors and assigns of transfer of any rights or conditions contained in this permit, which approval shall not be unreasonably withheld. Failure to submit a transfer of permit shall be considered a default of the terms and conditions of this permit and LWDD shall have the right to terminate this permit upon 10 days written notice to permittee. Failure to timely transfer the permit will necessitate Permittee, assigns or successors in title to remove all of the facilities and restore LWDD's right-of-way.

- 1.21** This permit is issued by the LWDD as a license to use or occupy LWDD works or lands. It does not create any right of entitlement, either legal or equitable, to the continued use of the LWDD works or lands. Since this permit conveys no right to the continued use of the works or lands, the LWDD is under no obligation to transfer this permit to any subsequent owner. By acceptance of this permit, the permittee expressly acknowledges that the permittee bears all risks of loss as a result of the revocation of this permit. The permittee, assigns or successors shall be responsible for removal of all facilities and restoration of LWDD's right-of-way if the permit is not transferred.
- 1.22** Permittee agrees that no other encroachments and/or facilities shall be located within the right-of-way without prior authorization from LWDD.
- 1.23** It shall be the responsibility of the permittee to locate and protect the underground facilities of the LWDD or those of others prior to and during construction.
- 1.24** Permittee shall take the necessary precautions to prevent turbidity and/or silting upstream or downstream during construction.
- 1.25** All unpermitted facilities installed prior to or during construction must be removed prior to the project's final approval.
- 1.26** The permittee must make a copy of this permit available and/or post at the job site prior to and during any construction. Failure to comply may result in suspension of construction.
- 1.27** Permittee agrees that significant construction shall commence within one year and construction be completed within two (2) years from the date of permit issuance or the permit may terminate and a new permit application must be submitted. The new application must meet current operating policies including current applicable fees. Prior to the expiration date, the permittee may submit a request in writing for an extension of time to commence or complete construction.
- 1.28** Permittee or permittee's representative shall notify the LWDD construction inspector at least forty-eight (48) hours prior to any work to be undertaken within LWDD rights-of-way. All underground installations must be inspected prior to backfilling.
- 1.29** No dewatering into LWDD canals is authorized until written notification of approval from South Florida Water Management District has been submitted to LWDD.
- 1.30** Any non-compliance by the permittee of any condition listed herein will result in the termination of this permit, removal of permitted uses or facilities at the permittees expense, and/or LWDD requesting other jurisdictional agencies to withhold their final approvals.
- 1.31** Permittee shall submit record drawings within sixty (60) days of project completion. Drawings shall be signed and sealed by a Florida Professional Engineer and shall include sufficient information to show that the permitted facilities have been installed or constructed in substantial compliance with the plans and design approved by the LWDD. All elevations shall be referenced to N.G.V.D. 1929 (adjusted). In lieu of signed and sealed record drawings utility cable companies may submit, within sixty (60) days of project completion, a project certification stating that the permitted facilities have been installed or constructed in substantial compliance with the plans and design approved by the LWDD. Failure of the permittee to provide these drawings or certification within the time specified may result in LWDD revoking this permit and requesting that all jurisdictional agencies withhold their final approval until the drawings are received and approved by LWDD.
- 1.32** Special Conditions that are specific to the project site and right-of-way usage shall be incorporated into this permit as may be necessary in the best interest of the LWDD.

2.0 Special Conditions

- 2.1 The permittee or authorized representative is required to schedule a mandatory, on-site preconstruction meeting at <https://www.lwdd.net/48-hour-construction-notice> and with LWDD Field Representative, Corey Tyson at ctyson@lwdd.net and 561-819-5591.
- 2.2 This permit authorizes the Modification of existing permit no 81-2056R.09 to install new five feet (5') wide six-inch (6") thick concrete sidewalk and connect to existing sidewalk on the east side of NW 9TH Ct over existing culvert crossing within the L-47 Canal pursuant to the application submitted on January 31st, 2025.
- 2.3 Permittee should retain the services of a licensed Professional Land Surveyor to stake the LWDD right-of-way prior to the construction/installation of any permitted facilities. LWDD retains the right to require the Permittee/Contractor to stake the LWDD right-of-way in the event of a dispute. Any constructed/installed facilities that are inconsistent with the permitted plans will be required to be removed from the LWDD right-of-way and the LWDD right-of-way restored at the Permittee's expense. LWDD will not allow incorrectly installed facilities to remain within the LWDD right-of-way.
- 2.4 The permittee shall provide a report to LWDD every **five years**, prepared and signed and sealed by a professional Florida engineer as to the structural integrity of the culvert pipe.
- 2.5 The permittee will be responsible for the removal of any silt and/or sediment as indicated in the pipe inspection report submitted to LWDD every five years.
- 2.6 The permittee shall restore LWDD's right-of-way to its original or better condition where disturbed by construction activity.
- 2.7 Any sidewalk or pathway that is proposed within LWDD's rights-of-way with six-inch (6") thick concrete, or to meet LWDD approved alternate loading and material(s). The LWDD will not be held responsible or liable for any damage to the sidewalk or pathway resulting from LWDD operations and maintenance procedures, or any property damage or personal injury resulting from any sidewalk or pathway damage. All repairs are to be the responsibility of the permittee.
- 2.8 The Permittee shall be responsible for the correction of any erosion, shoaling or water quality problems that result from the construction or operation of the surface water management system. LWDD reserves the right to require that additional water quality treatment methods be incorporated into the drainage system if such measures are shown to be necessary based on local, SFWMD, USACE, FDEP and/or EPA standards that are required.
- 2.9 It shall be the responsibility of the Permittee or Permittee's contractor(s) installing the above described facility to maintain the continuous uninterrupted free flow of water in the canal. It shall further be the duty of the Permittee to obtain the approval of LWDD for any construction methods, which would be contrary to the above. The Permittee shall also be responsible for the installation of silt screens and/or turbidity barriers as necessary to maintain the clarity of the water. PERMITTEE'S FAILURE TO COMPLY WITH WRITTEN NOTICE OF A VIOLATION OF THE CONDITIONS OF THIS PERMIT SHALL, AFTER FIVE (5) WORKING DAYS, AUTOMATICALLY WITHOUT FURTHER NOTICE VOID THIS PERMIT, BUT NOT THE PERMITTEE'S LIABILITY INVOLVED HEREIN. ANY BOND CONDITIONED BY THIS PERMIT SHALL BE UTILIZED FOR THE RESTORATION OF ANY DAMAGES DONE TO THE CANAL RIGHT-OF-WAY BY THE PERMITTEE OR THE PERMITTEE'S CONTRACTOR(S).
- 2.10 Permittee agrees that the stormwater discharge authorized by this permit shall comply with all applicable provisions of Part IV of Chapter 373, Florida Statutes, as well as applicable management and storage of surface water rules, including but not limited to, 40E-4.301, 40E-400.215, and 40E-400.315, Florida Administrative Code, and Section 5.2 of the SOUTH FLORIDA WATER MANAGEMENT DISTRICT Basis of Review. All costs of correcting any violations of SOUTH FLORIDA WATER MANAGEMENT DISTRICT law and rules shall be the exclusive obligation of Permittee.
- 2.11 The permittee shall take all reasonable precautions necessary to prevent turbidity or silting upstream or downstream during construction.
- 2.12 The Permittee, LWDD approved assignees, and/or successors in title agree to operate and maintain the

system/facility in perpetuity, including correction of any damages caused because of this installation. Pursuant to General Conditions of this permit, the Permittee agrees that the transfer of any rights, title or interests of the property or facility ownership referenced in this permit herein shall require a transfer of this permit.

- 2.13** Permittee may, at its sole expense, modify the facility involved and installed herein under the condition that same does not unreasonably interfere with LWDD's use of its right-of-way and under the condition that the plans and specifications for such modification have been permitted by LWDD through application of permit modification.

Approved by:

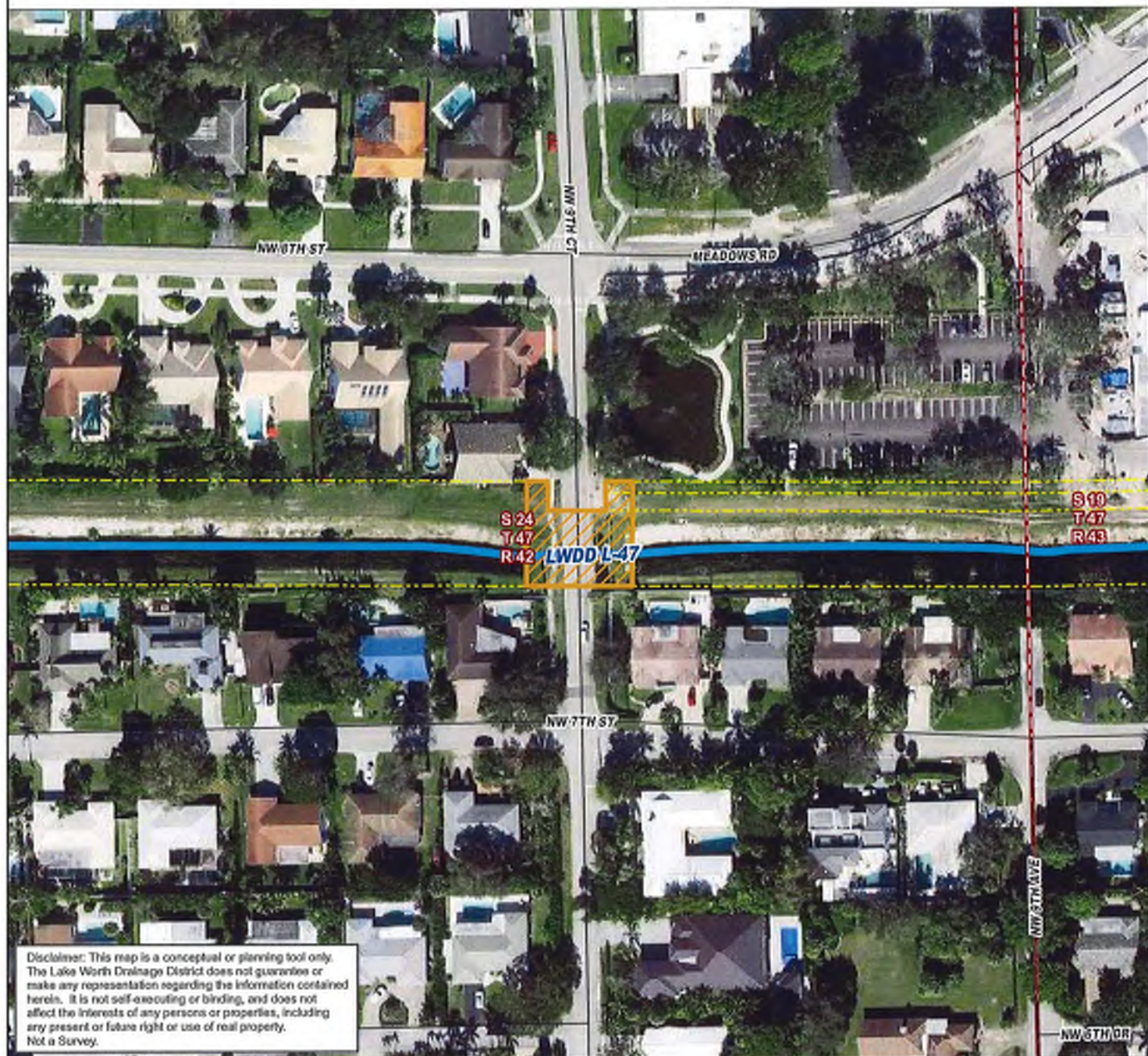
Shawn Mitchell

Shawn Mitchell
Permit Coordinator

Brian Tilles

Brian Tilles, P.E.
Director, Right-of-Way Regulation

Exhibit Map



Legend

- Right-of-Way Permit
- LWDD Canals
- Township and Range Grid
- Section Grid
- Right of Way Lines

Permit Number: RW-25-0028

Record Type: Culvert Crossing

Permittee: City of Boca Raton - Justin Barrington

Application Name: Feb 24 2nd 15_NAA_(City of Boca Raton) L-47

Old Floresta Infrastructure Upgrades

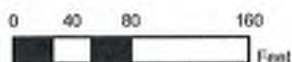
Palm Beach County, FL

Sec/Twp/Rge
24/47/42

Date
2025-02-09

Latitude (DMS): 26° 21m 27s N
Longitude (DMS): 80° 6m 20s W

State Plane Coordinates
X: 949033.99 Y: 736681.8



Lake Worth Drainage District
13081 S Military Trail
Delray Beach, FL 33484
(561) 498-5363



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APPENDIX B

SUNSHINE 811 DESIGN TICKET INFORMATION

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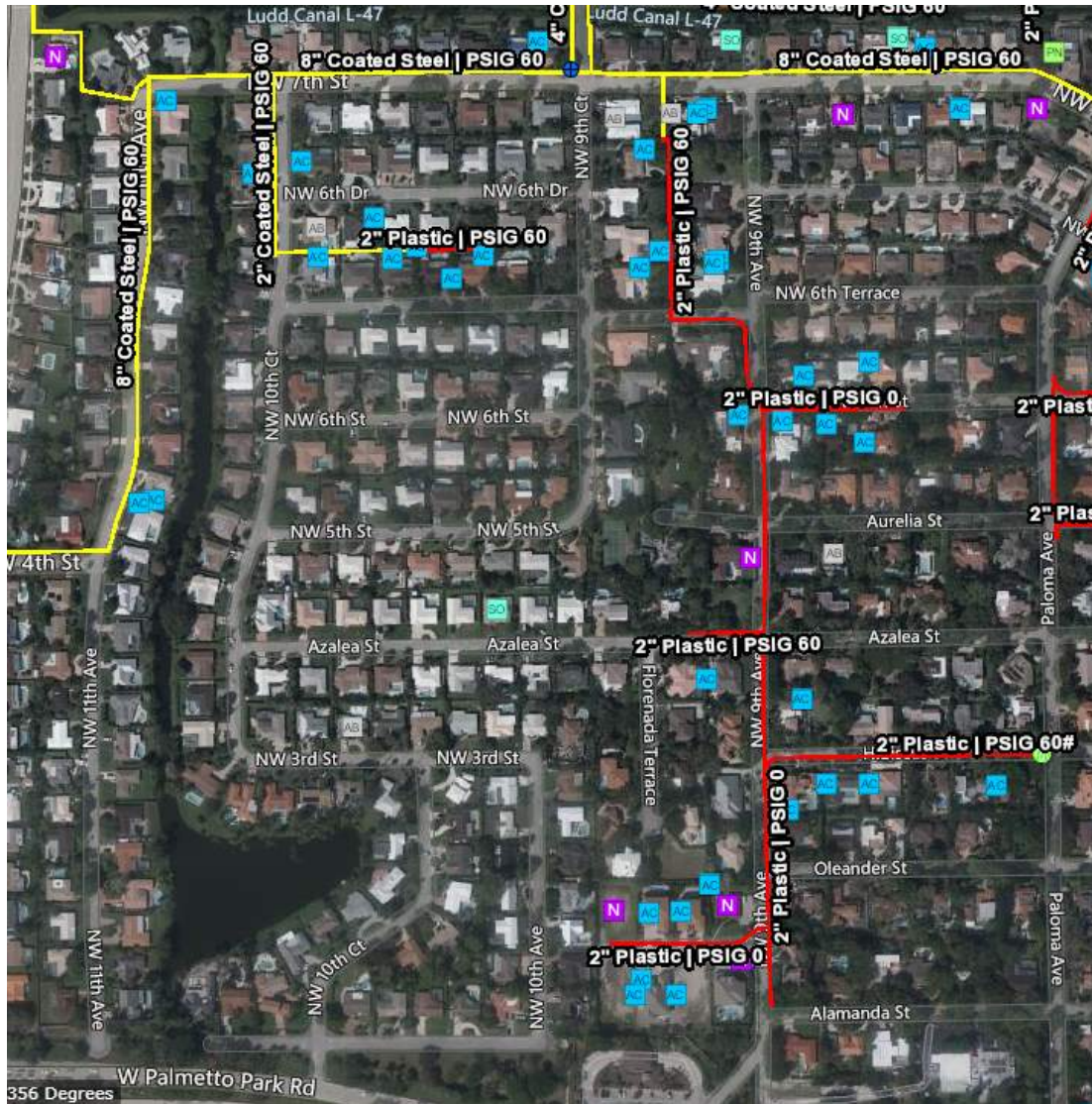
From: Bono, Peter <pbono@chpk.com>
Sent: Friday, March 25, 2022 5:42 PM
To: Kelley Conboy
Cc: ENGINEERING - WPB
Subject: RE: 811 Design Ticket (049202090)

Good Afternoon,

NOTE: THE EXACT LOCATIONS OF THE FACILITIES POSTED NEEDS TO BE CONFIRMED BY SPOT DIGGING PRIOR TO FINALIZING ANY UNDERGROUND DESIGN

The attached sketches do not replace any 811 locate services or/and tickets.

The exact locations of any gas main or service should be verified by spot digging prior to any underground design or work to be performed.



Have a good day,



Peter Bono
Engineering Technician
Engineering Department
Florida Public Utilities

P.O. Box 3395, West Palm Beach FL 33402-3395
Engineering-wpb@fpuc.com
561-838-1841

From: Kelley Conboy <kelly.conboy@holtzconsulting.com>
Sent: Wednesday, March 23, 2022 9:12 AM
To: ENGINEERING - WPB <ENGINEERING-WPB@chpk.com>
Subject: [EXTERNAL] 811 Design Ticket (049202090)

Good morning Florida Public Utilities Team,

I received your information from an 811 Design ticket and am currently working on a water/sewer improvement project within the boundaries of NW 12th Ave, Palmetto Park Road, El Rio Canal, and LWDD Canal-47 in Boca Raton. We are looking for copies of any record drawings you have for the utilities you have in this area.

Attached is an aerial of the described area.

Thank you for your help!

Kelley Conboy, E.I.
Project Engineer



270 South Central Boulevard, Suite 207
Jupiter, FL 33458
Phone: 561.575.2005
Mobile: 561.324.7413
Fax: 561.575.2009

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From: Galvan, Edward <EGalvan@ci.boca-raton.fl.us>
Sent: Monday, January 31, 2022 1:00 PM
To: Harrison Barron
Cc: Christine Miranda
Subject: FW: Request for Gas Pipeline Information for City of Boca Raton

FYI

From: Garcia, Talia <TGarcia@ci.boca-raton.fl.us>
Sent: Friday, January 28, 2022 11:45 AM
To: Galvan, Edward <EGalvan@ci.boca-raton.fl.us>; Georgievski, Jimmy <JGeorgievski@ci.boca-raton.fl.us>
Subject: FW: Request for Gas Pipeline Information for City of Boca Raton

FYI – please forward as needed

Talia Garcia, P.E., ENV SP, LEED® A.P. | Utilities Engineering Manager
P 561-338-7307 | C 561-239-6292 | tgarcia@myboca.us

From: Brown, George A. <gbrown@hazenandsawyer.com>
Sent: Friday, January 28, 2022 11:35 AM
To: Garcia, Talia <TGarcia@ci.boca-raton.fl.us>
Subject: [EXTERNAL] FW: Request for Gas Pipeline Information for City of Boca Raton

Talia – please share the information below with Holtz. They need it for their design.

George A. Brown, PE

Senior Associate | Hazen and Sawyer
4000 Hollywood Blvd., Suite 750N, Hollywood, FL 33021
954 987-0066 (main) | 954 612-1578 (cell)
gbrown@hazenandsawyer.com | hazenandsawyer.com [hazenandsawyer.com]
I'm working from home. Please use my cell phone number

*Please note that my phone will automatically send any calls
from phone numbers not included in my contact information
to voicemail, please leave a message.*

From: Bono, Peter <pbono@chpk.com>
Sent: Thursday, January 27, 2022 6:00 PM
To: Brown, George A. <gbrown@hazenandsawyer.com>
Cc: ENGINEERING - WPB <ENGINEERING-WPB@chpk.com>; Glenn Willson <gwillson@vaengineering.com>; Warier, Rohit <RWarier@hazenandsawyer.com>; Talia Garcia <tgarcia@ci.boca-raton.fl.us>
Subject: RE: Request for Gas Pipeline Information for City of Boca Raton

Good Afternoon,

See below for Gas Main in the area.

2" PE GM = Plastic in red.

We do have 4" Coated steel and 8" Coated Steel in yellow.

If you have any questions feel free to contact us.

The attached sketches do not replace any 811 locate services or/and tickets.
The exact locations of any gas main or service should be verified by spot digging prior to any underground design or work to be performed.

Have a good day,



Peter Bono
Engineering Technician
Engineering Department
Florida Public Utilities
P.O. Box 3395, West Palm Beach FL 33402-3395
Engineering-wpb@fpuc.com
561-838-1841

From: Brown, George A. <gbrown@hazenandsawyer.com>
Sent: Thursday, January 27, 2022 9:21 AM
To: Talia Garcia <tgarcia@ci.boca-raton.fl.us>; Moron Leo <lmoron@chpk.com>; ENGINEERING - WPB <ENGINEERING-WPB@chpk.com>; Collins Brad <bcollins@chpk.com>; Rodriguez, Bill <brodriguez@chpk.com>
Cc: Glenn Willson <gwillson@vaengineering.com>; Warier, Rohit <RWarier@hazenandsawyer.com>
Subject: [EXTERNAL] Request for Gas Pipeline Information for City of Boca Raton

Good Morning Florida Public Utilities:

Hazen and Sawyer has be retained by the City of Boca Raton to analyze the condition of two water mains in the City of Boca Raton Old Floresta Neighborhood. The graphic below illustrates the project location and the two Boca Raton pipelines that we are analyzing. Additionally, google earth KMZ files defining the location of the pipes we are studying are attached for your convenience.

Gas pipelines owned by FPU exist in the project area. The presence of a gas pipeline may influence our analysis depending on material and the presence / absence of cathodic protection.

The City of Boca Raton requests that FPU provide the following data:

1. A map (or hand drawing sketch) that illustrates the location of the FPU gas pipelines in the area illustrated below.
2. Information on the material of the gas pipeline(s)
3. Type of cathodic protection system if the gas pipeline is metallic

The easiest way to contact me with questions is via email or 954-612-1578 (leave a voice message).

Thank you for your help on this important project to ensure the long term sustainability of the City's critical infrastructure.



George A. Brown, PE

Senior Associate | Hazen and Sawyer

4000 Hollywood Blvd., Suite 750N, Hollywood, FL 33021

954 987-0066 (main) | 954 612-1578 (cell)

gbrown@hazenandsawyer.com | hazenandsawyer.com [nam12.safelinks.protection.outlook.com]

I'm working from home. Please use my cell phone number

*Please note that my phone will automatically send any calls
from phone numbers not included in my contact information
to voicemail, please leave a message.*

From: Garcia, Talia <TGarcia@ci.boca-raton.fl.us>

Sent: Wednesday, January 12, 2022 10:59 AM

To: Brown, George A. <gbrown@hazenandsawyer.com>

Subject: other contacts for FPU

Caution! *External email – think before you click*

Here are all the contacts i have for FPU – I suggest you reach out to all! 😊

engineering-wpb@fpuc.com
BCOLLINS@FPUC.COM
brodriguez@fpuc.com

Leo Morón
Field Coordinator
561-215-0166 Mobile
lmoron@fpuc.com [nam12.safelinks.protection.outlook.com]



Talia Garcia, P.E., ENV SP, LEED® A.P. | Utilities Engineering Manager
City of Boca Raton, Utility Services Department
1401 Glades Road, Boca Raton, FL 33431
P 561-338-7307 | C 561-239-6292 | F 561-447-7416 | tgarcia@myboca.us

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Please note: Florida has a very broad public records law. Most written communications to or from local officials regarding city business are public records, and are available to the public and media upon request. Your e-mail communications may therefore be subject to public disclosure. The City of Boca Raton scanned this outbound message for viruses, vandals and malicious content and found this message to be free of such content.



3-GIS LEGEND

VZB BURIED CABLE

Existing



Proposed (In Progress Construction)



Abandoned

ABN-ABN-ABN-ABN-ABN-

Other Cable (Verizon Owned)

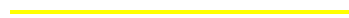


Existing Span (Verizon Owned)



VZB DIRECT BURIED CABLE

Existing



Proposed (In Progress Construction)



Abandoned

ABN-ABN-ABN-ABN-ABN-

VZB AERIAL CABLE

Existing



Proposed (In Progress Construction)



Abandoned

ABN-ABN-ABN-ABN-ABN-

VZB FSRV (UNVERIFIED)

Aerial



Buried



VZB BURIED CONDUIT (SPAN)

Existing



Proposed (In Progress Construction)



Abandoned



VZB SUBMARINE CABLE

Existing



Proposed (In Progress Construction)



Abandoned



VZB Not Protected Leased

Span Leased



Proposed Leased



Proposed Existing Leased





MCI METRO
ACCESS TRANSMISSION SERVICES CORP.

OUTSIDE PLANT CONSTRUCTION
FIBER OPTIC CABLE ROUTE

PROJECT NUMBER:
1801CUWL180

600 S DIXIE HWY - SEGMENT 07

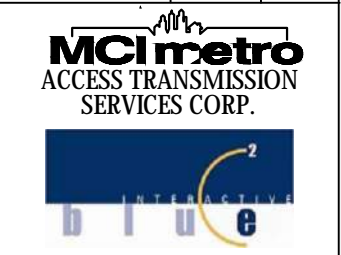
BOCA RATON
PALM BEACH COUNTY

PROJECT: # 1801CUWL180

TO

MAP FOOTAGE:
SURVEY:
RAILROAD:

MATERIALS		



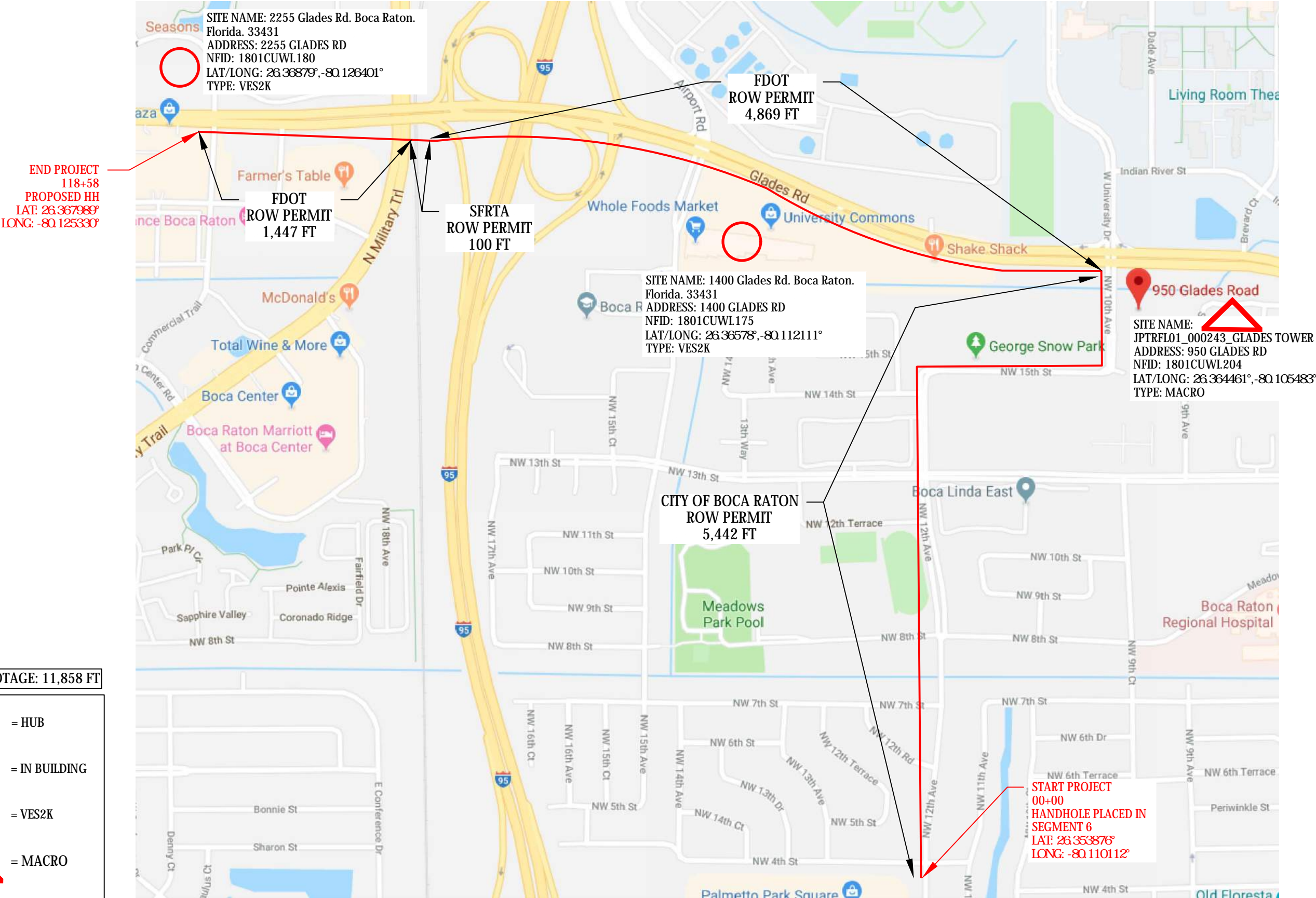
TITLE: FIBER OPTIC CABLE ROUTE

1200 NW 4TH ST
TO
2200 W GLADES RD


REVISIONS	
DATE	DESCRIPTION
06/11/19	SFRTA COMMENTS


HOR. SCALE:
VERT. SCALE:


VICINITY MAP





TOTAL FOOTAGE: 11,858 FT

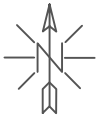
 = HUB

 = IN BUILDING

 = VES2K

 = MACRO

 = SMALL CELL



PROJECT: # 1801CUWL180

TO

MAP FOOTAGE:
SURVEY:
RAILROAD:

MATERIALS

MCI metro
ACCESS TRANSMISSION
SERVICES CORP.



TITLE: FIBER OPTIC CABLE ROUTE

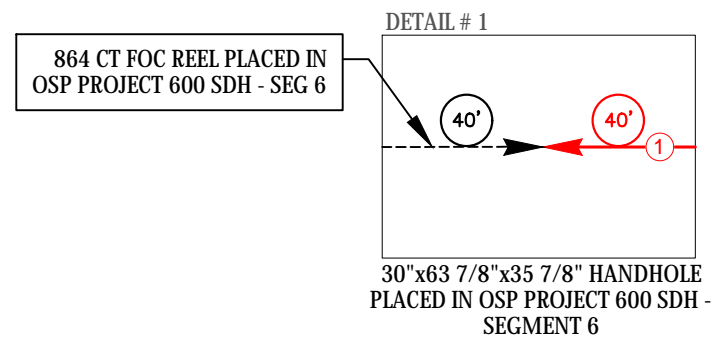
1200 NW 4TH ST
TO
2200 W GLADES RD

REVISIONS

DATE	DESCRIPTION
06/11/19	SFRTA COMMENTS

HOR. SCALE:
VERT. SCALE:

REEL # 1



COMM ——— C ———

GAS - - - - - G - - - - - G - - - - -

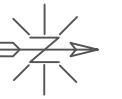
STORM - - - - - SS - - - - - SS - - - - -

WM - - - - - W - - - - - W - - - - -

SWR - - - - - S - - - - - S - - - - -

PWR - - - - - E - - - - - E - - - - -

**NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT**



PROJECT: # 1801CUWL180

TO

MAP FOOTAGE:
SURVEY:
RAILROAD:

[illegible]

TITLE: FIBER OPTIC CABLE ROUTE

1200 NW 4TH ST

0

2200 W GLADES RD

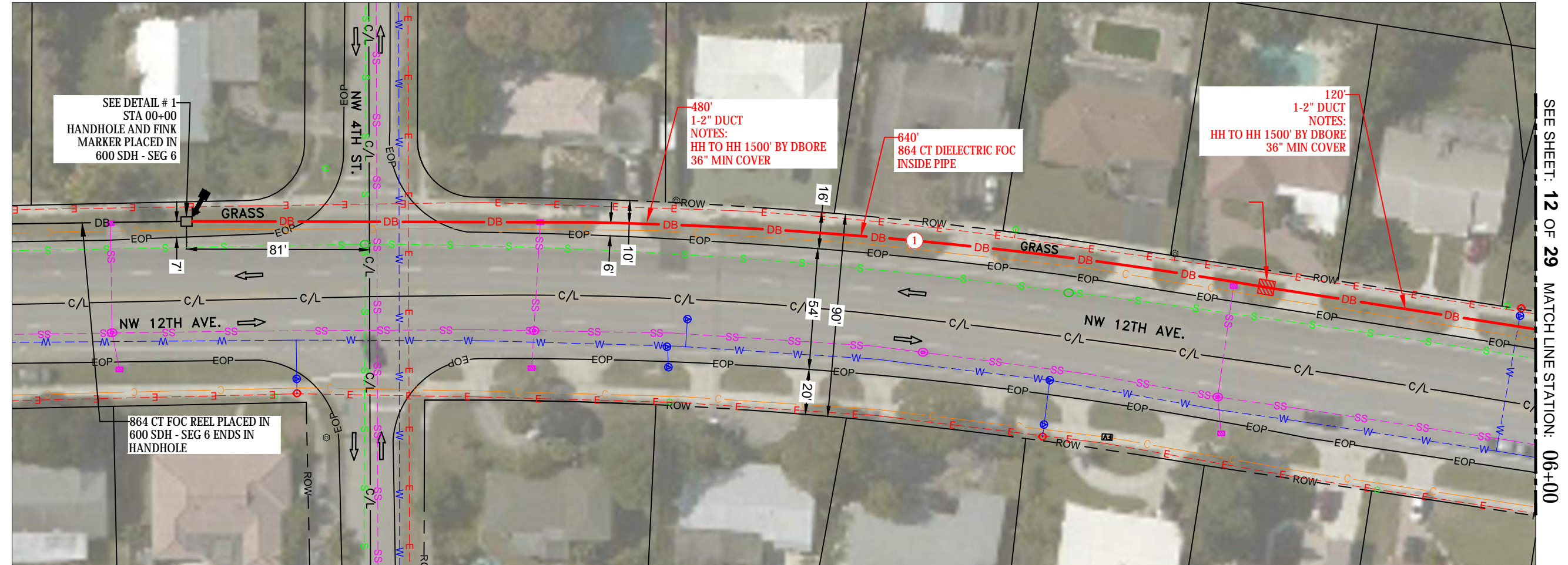
REVISIONS

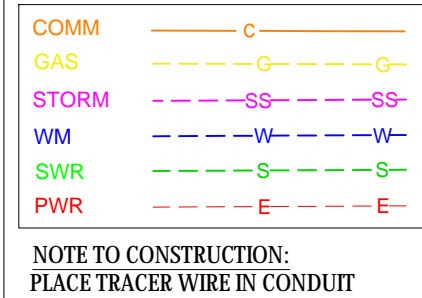
DATE	DESCRIPTION
06/11/19	SFRTA COMMENTS

HOR. SCALE: 1" = 50'
VERT. SCALE: 1" = 2'

11 OF 29

PLAN VIEW





TO

MAP FOOTAGE:	
SURVEY:	
RAILROAD:	

[illegible]

TITLE: FIBER OPTIC CABLE ROUTE

1200 NW 4TH ST

TO

2200 W GLADES RD

[illegible]

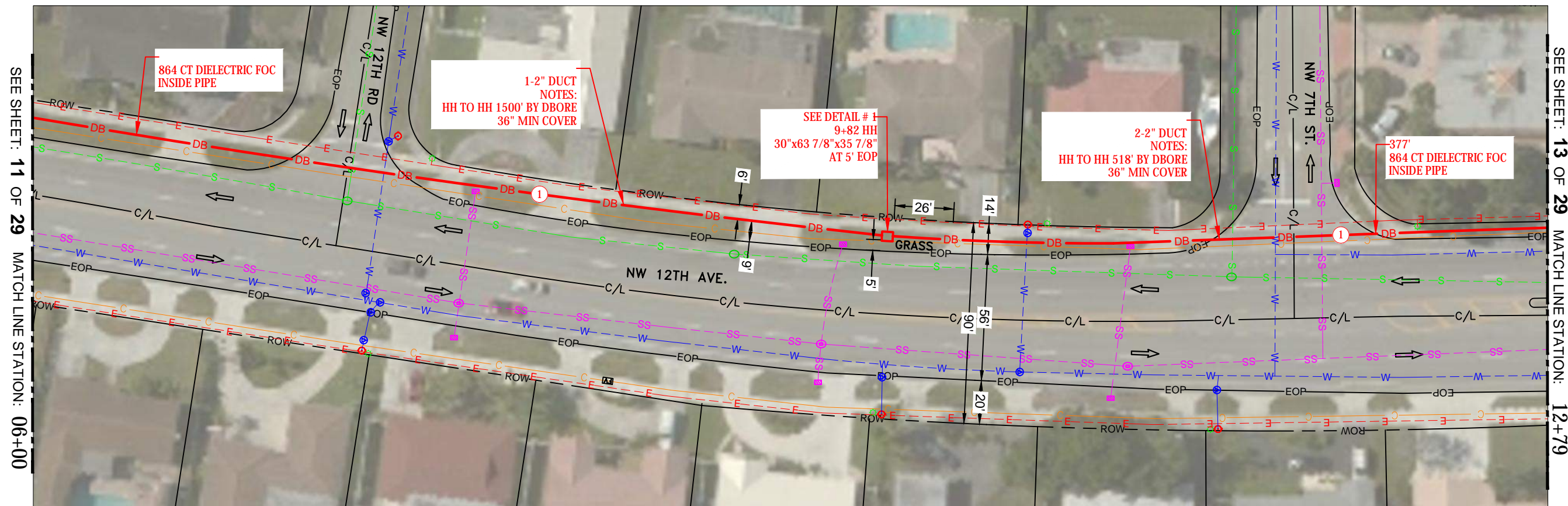
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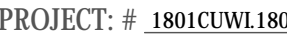
HOR. SCALE: 1" = 50'
VERT. SCALE: 1" = 2'

12 OF 29

--	--

PLAN VIEW





TO

MAP FOOTAGE.
SURVEY:
RAILROAD:

MATERIALS



1200 NW 4TH ST

0

2200 W GLADES RD

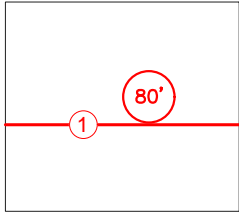
REVISIONS

DATE	DESCRIPTION
06/11/19	SFRTA COMMENTS

HOR. SCALE: 1" = 50'
VERT. SCALE: 1" = 2'

13 OF 29

DETAIL # 1



30"x63 7/8"x35 7/8"
HANDHOLE
TO BE PLACED FLUSH
WITH GRADE
CUT AND RESTORE
5' OF SIDEWALK

COMM ————— C —————

GAS - - - - - G - - - - - G

STORM - - - - - SS - - - - - SS

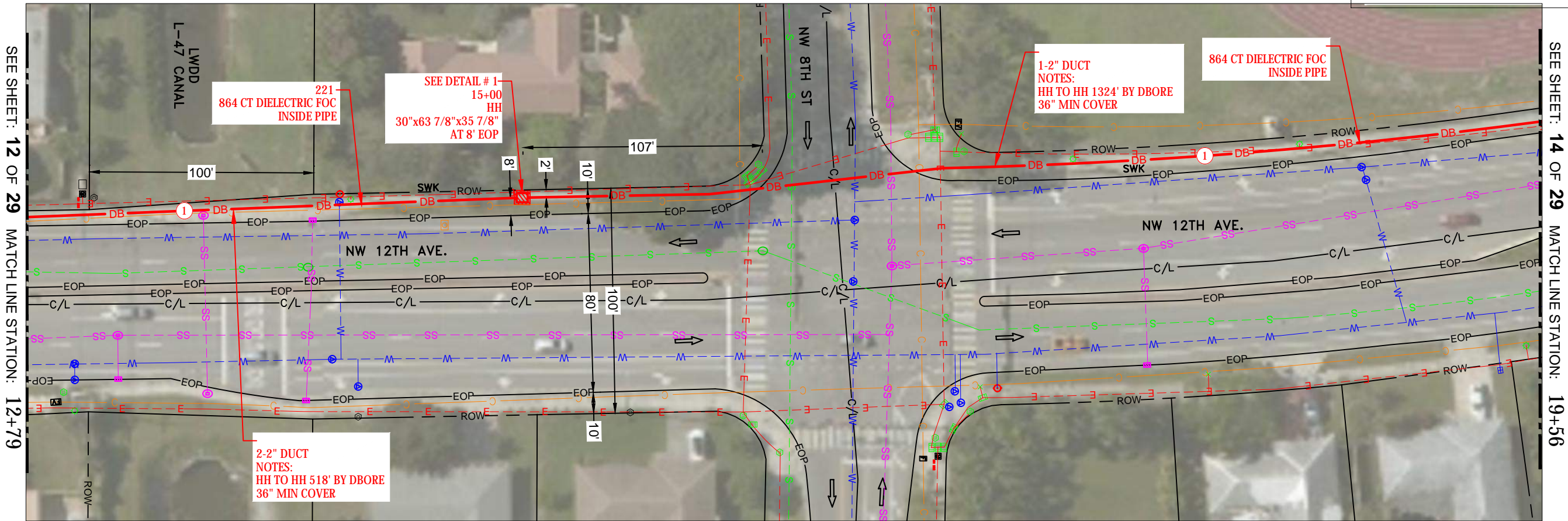
WM - - - - - W - - - - - W

SWR - - - - - S - - - - - S

PWR - - - - - E - - - - - E

NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT

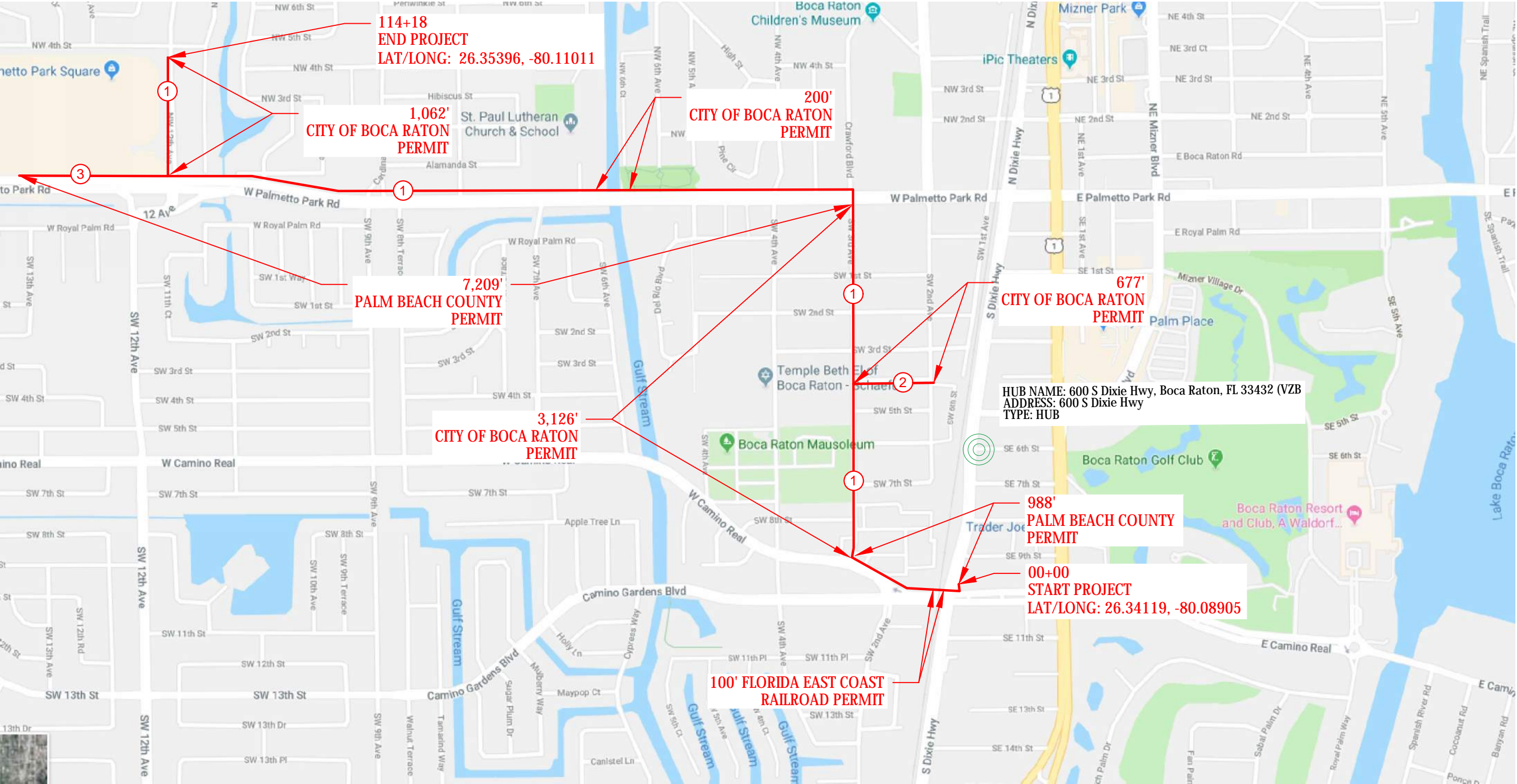
PLAN VIEW



SEE SHEET: **12 OF 29** MATCH LINE STATION: **12+79**

CITY OF BOCA RATON
PALM BEACH COUNTY

VICINITY MAP

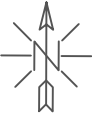


TOTAL LINEAR FOOTAGE: 13,362 FT

= HUB

= MACRO

= SMALL CELL



PROJECT: # 1801CUWL188

TO

MAP FOOTAGE:
SURVEY:
RAILROAD:

MATERIALS



TITLE: FIBER OPTIC CABLE ROUTE

1 E CAMINO REAL
TO
1200 NW 4TH ST

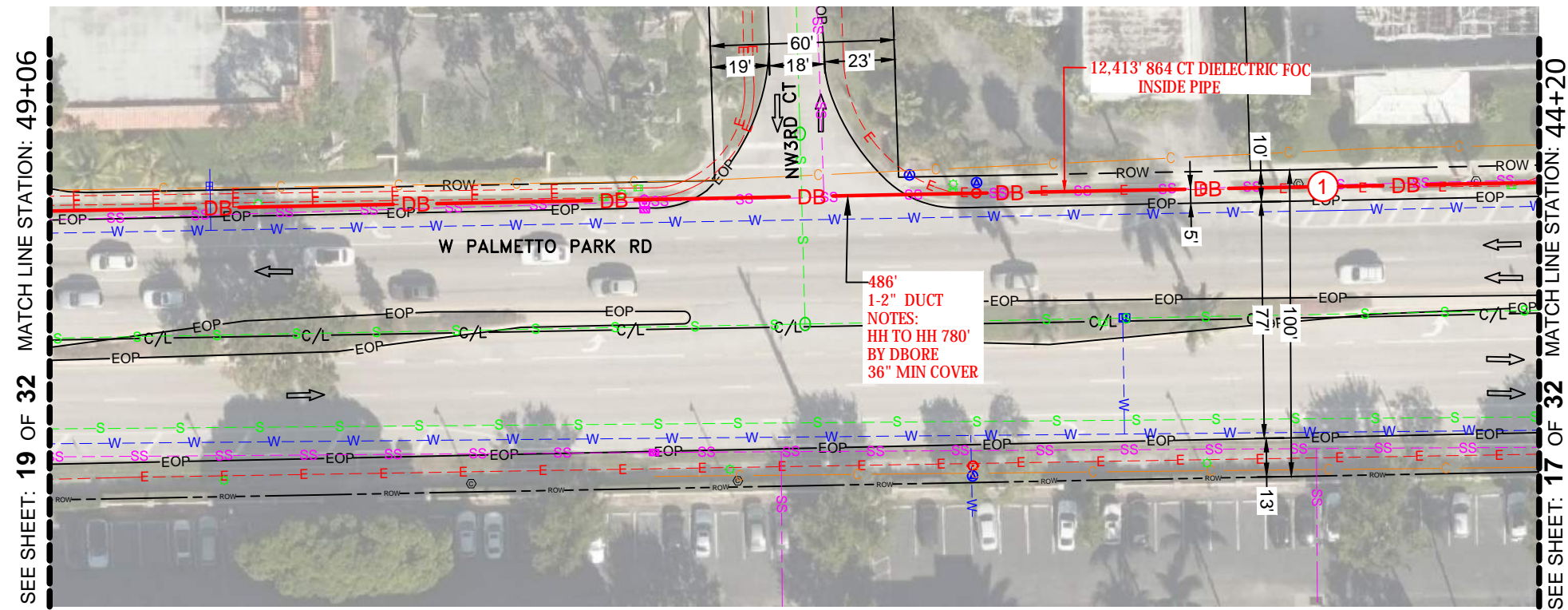
REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

B SIZE DWG:
D SIZE DWG:

HDPE

PLAN VIEW



COMM ——— C ———

GAS - - - - G - - - - G

STORM - - - - SS - - - - SS

WM - - - - W - - - - W

SWR - - - - S - - - - S

PWR - - - - E - - - - E

NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT



PROJECT: # 1801CUWL188

TO

MAP FOOTAGE:
SURVEY:
RAILROAD:

[illegible]

TITLE: FIBER OPTIC CABLE ROUTE

1 E CAMINO REAL

TO

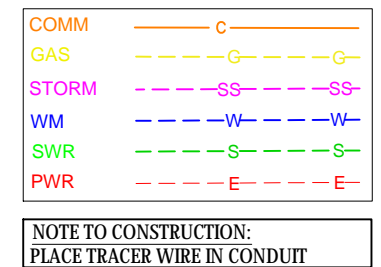
1200 NW 4TH ST

REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

B SIZE DWG: 1"= 50'
D SIZE DWG: 1"=2'

18 OF 32



TO

MAP FOOTAGE.
SURVEY:
RAILROAD:

[illegible]

TITLE: FIBER OPTIC CABLE ROUTE

1 E CAMINO REAL

TO

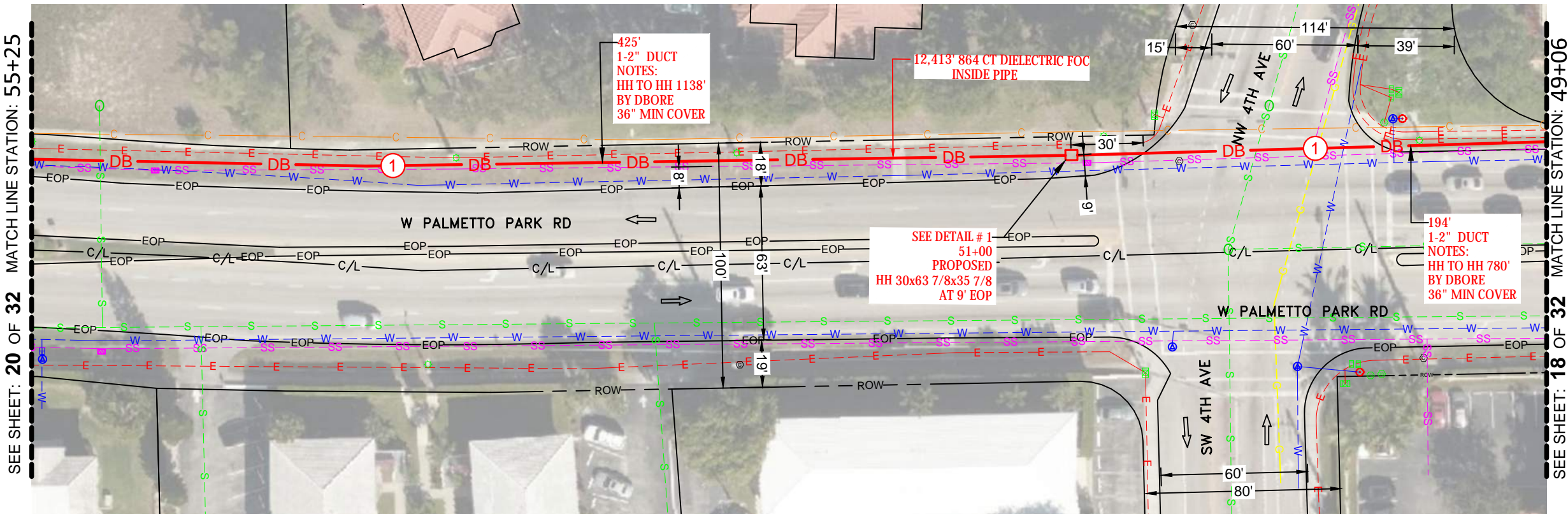
1200 NW 4TH ST

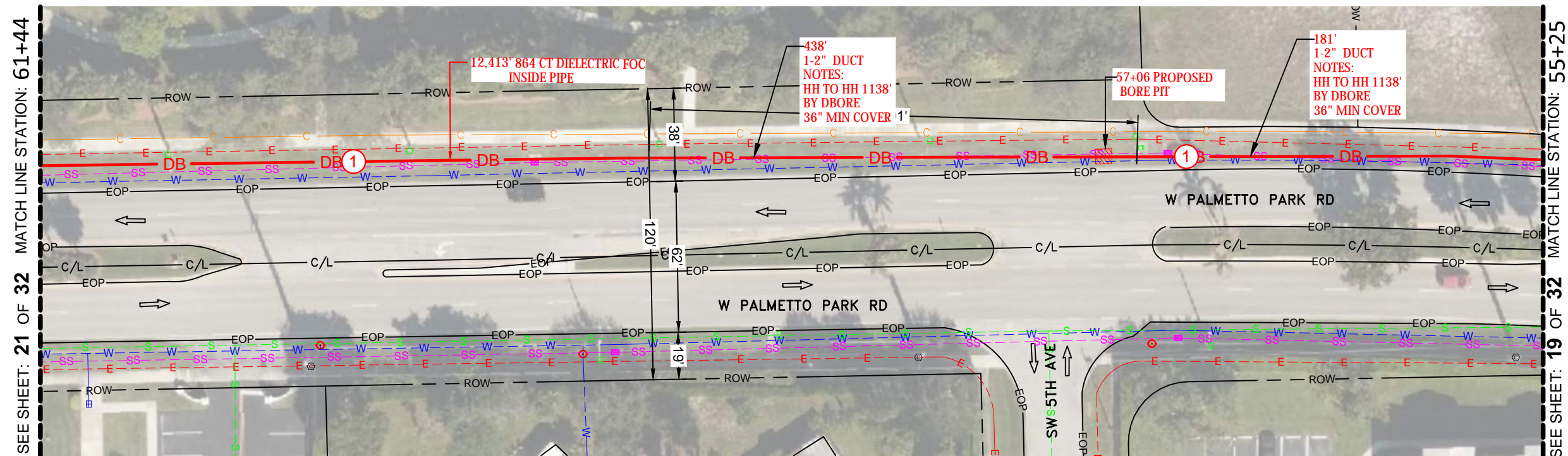
REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

B SIZE DWG: 1"= 50'
D SIZE DWG: 1"=2'

PLAN VIEW

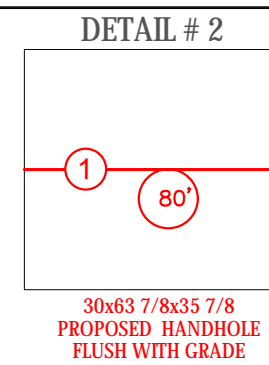




COMM	_____ C _____
GAS	_____ G _____ G _____
STORM	_____ SS _____ SS _____
WM	_____ W _____ W _____
SWR	_____ S _____ S _____
PWR	_____ E _____ E _____

NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT

[illegible]



COMM ————— C —————

GAS - - - - - G - - - - -

STORM - - - - - SS - - - - - SS

WM - - - - - W - - - - - W

SWR - - - - - S - - - - - S

PWR - - - - - E - - - - - E

NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT



PROJECT: # 1801CUWL188

TO

MAP FOOTAGE:	
SURVEY:	
RAILROAD:	

[illegible]

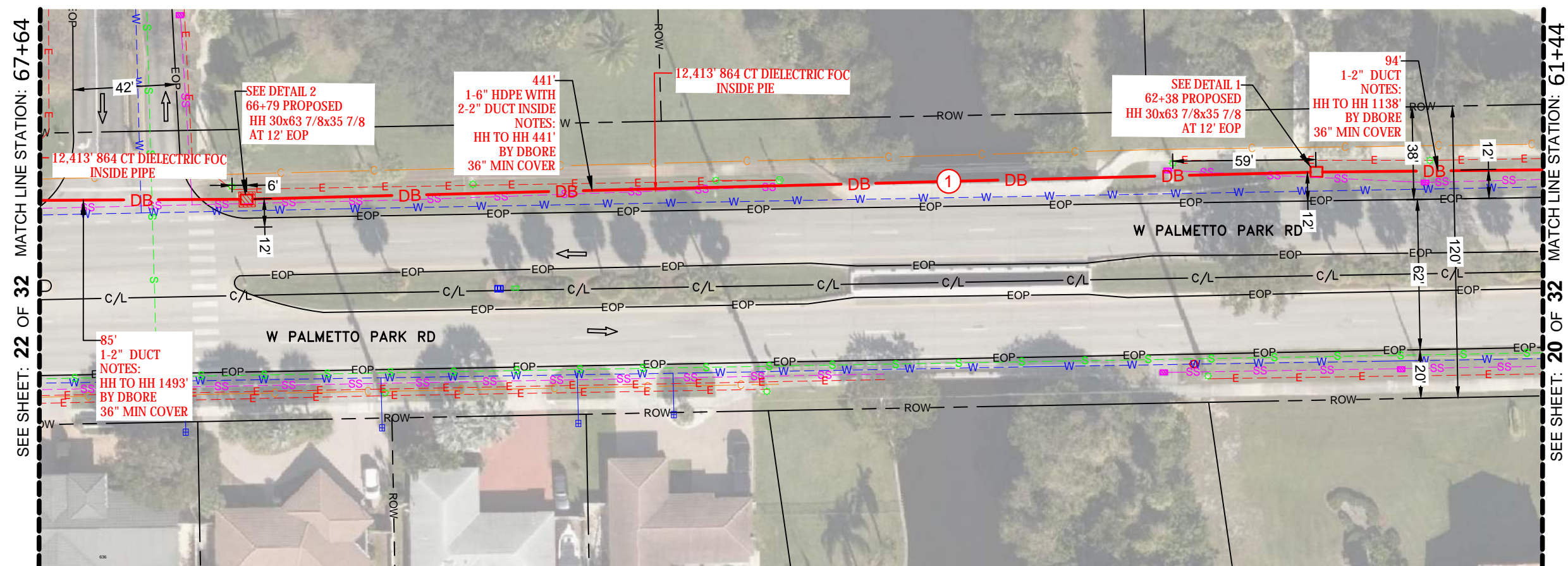
1200 NW 4TH ST

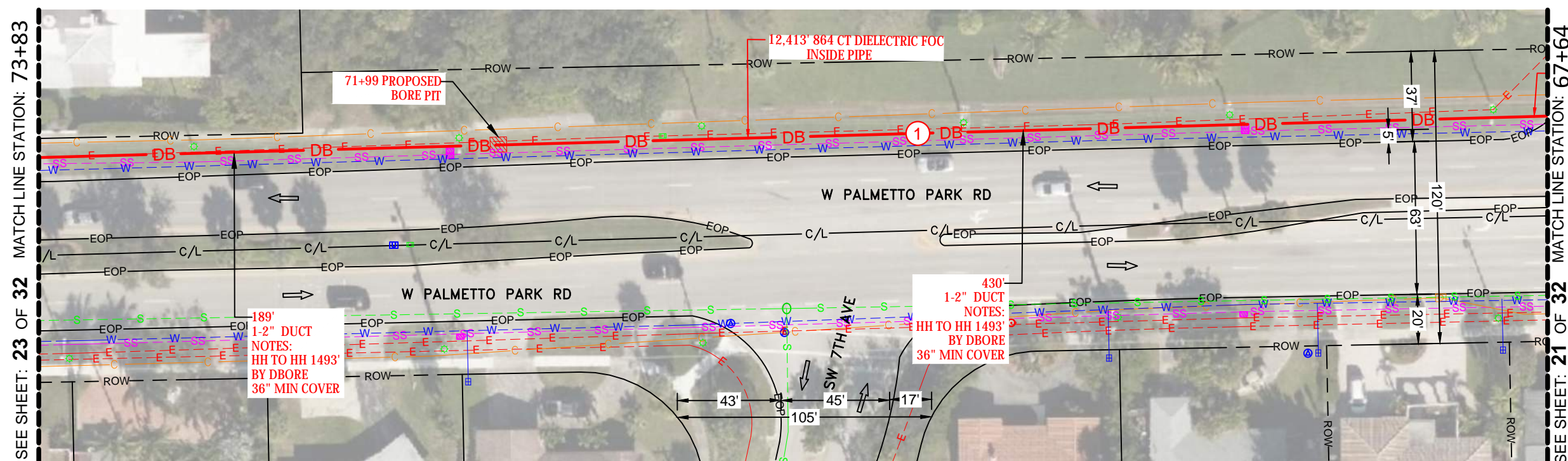
REVISIONS

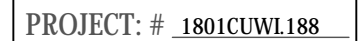
DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

B SIZE DWG: 1" = 50'
D SIZE DWG: 1" = 2'

PLAN VIEW







TO

MATERIALS

[illegible]

1 E CAMINO REAL

TO

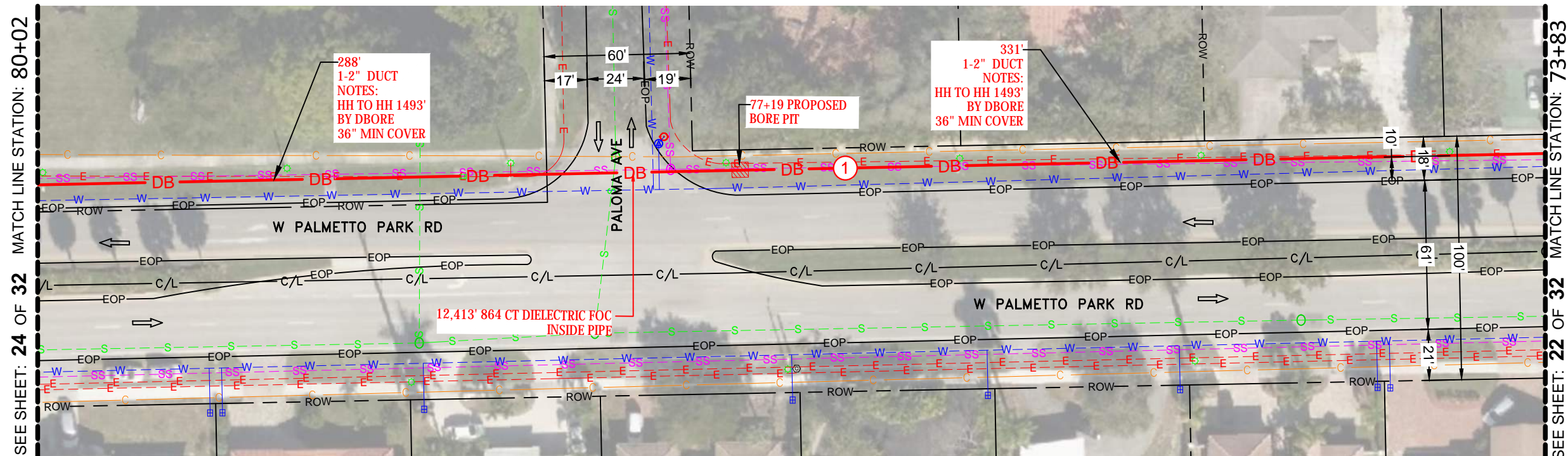
1200 NW 4TH ST

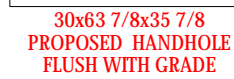
REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

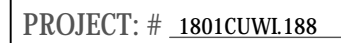
B SIZE DWG: 1"= 50'
D SIZE DWG: 1"=2'

PLAN VIEW





NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT



TO

MAP FOOTAGE:	
SURVEY:	
RAILROAD:	

[illegible]

TO

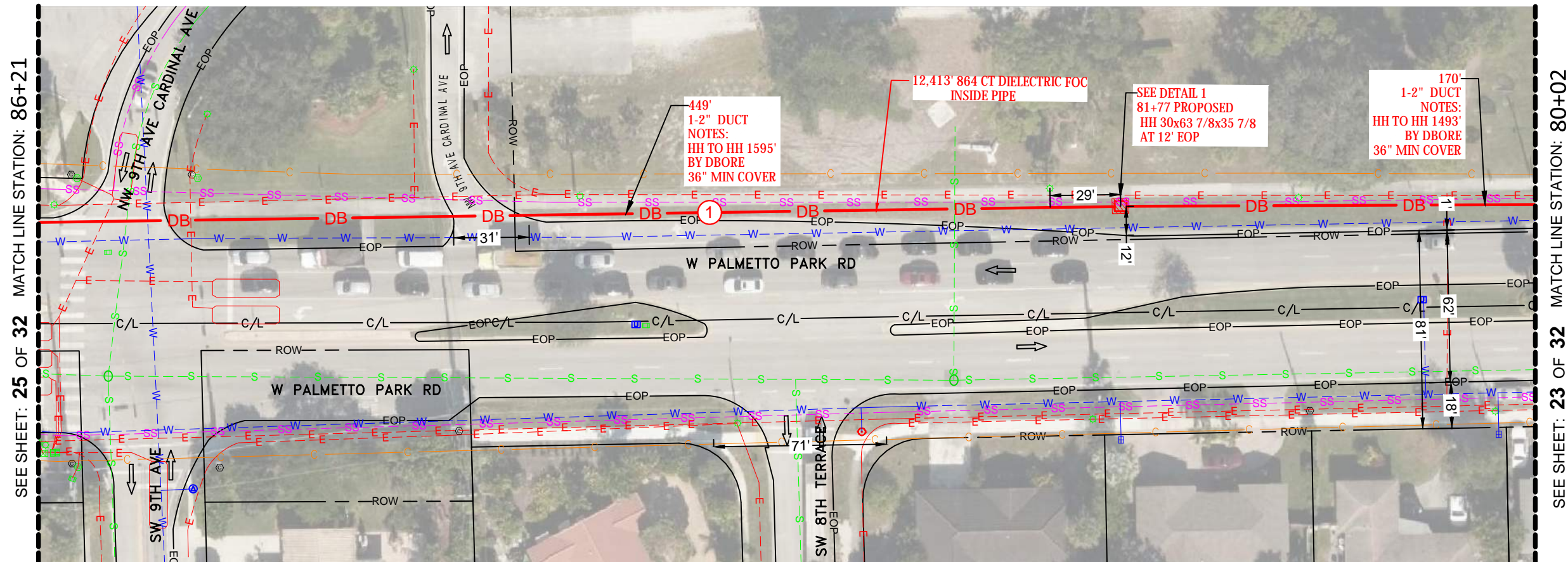
1200 NW 4TH ST

REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

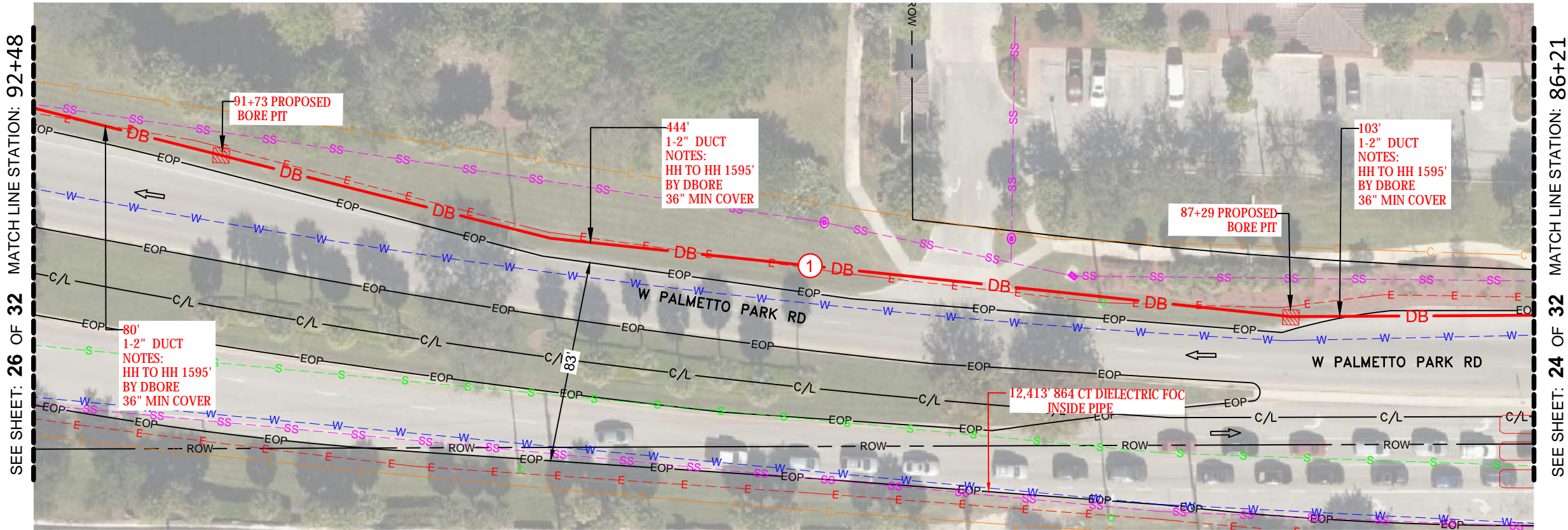
B SIZE DWG: 1" = 50'
D SIZE DWG: 1" = 2'

PLAN VIEW



SEE SHEET: **23** OF **32** MATCH LINE STATION: **80+02**

PLAN VIEW



COMM

GAS

STORM

WM

SWR

PWR

C

G

SS

W

S

E

NOTE TO CONSTRUCTION:

PLACE TRACER WIRE IN CONDUIT



PROJECT: # 1801CUWL188

TO

MAP FOOTAGE:
SURVEY:
RAILROAD:

MATERIALS



TITLE: FIBER OPTIC CABLE ROUTE

1 E CAMINO REAL

TO

1200 NW 4TH ST

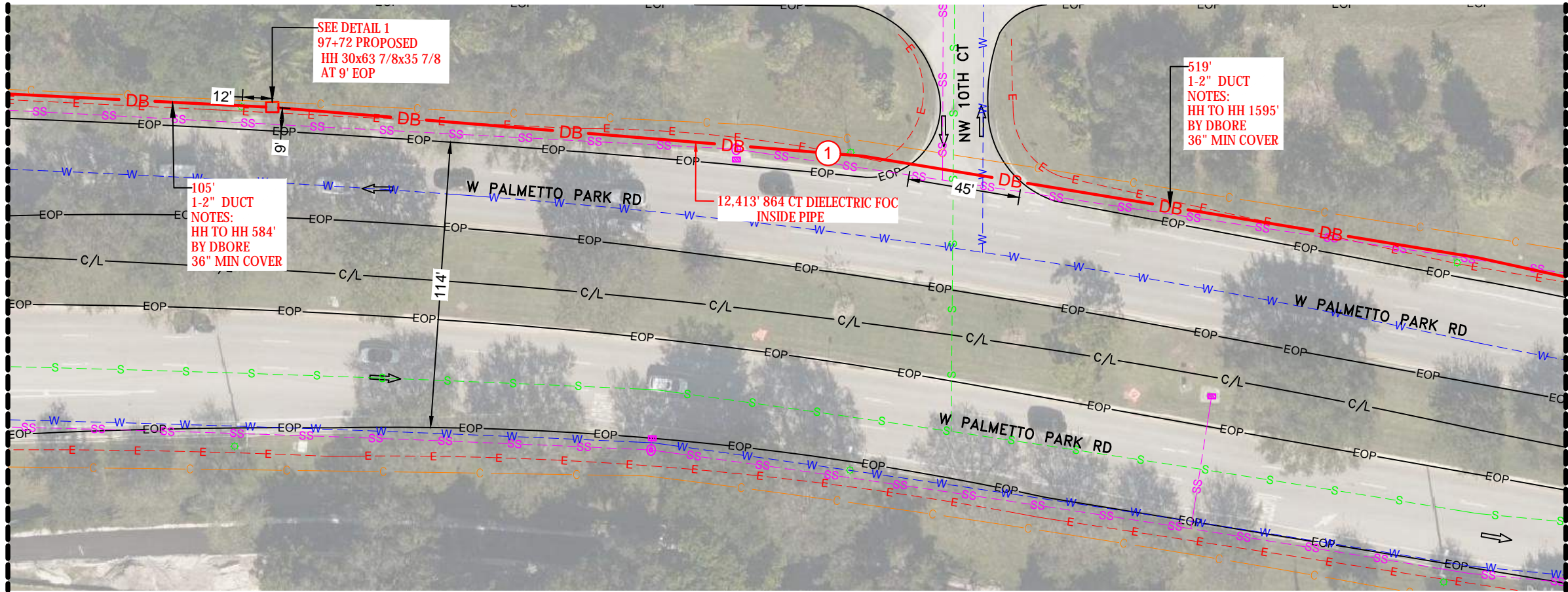
REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

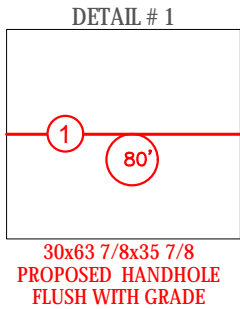
B SIZE DWG: 1"= 50'
D SIZE DWG: 1"=2'

PLAN VIEW

SEE SHEET: 27 OF 32 MATCH LINE STATION: 98+72

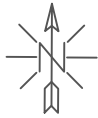


SEE SHEET: 25 OF 32 MATCH LINE STATION: 92+48



COMM	C
GAS	G
STORM	SS
WM	W
SWR	S
PWR	E

NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT



PROJECT: # 1801CUWL188

TO

MAP FOOTAGE:
SURVEY:
RAILROAD:



TITLE: FIBER OPTIC CABLE ROUTE

1 E CAMINO REAL

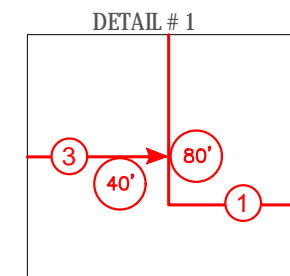
TO

1200 NW 4TH ST

REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

B SIZE DWG: 1"= 50'
D SIZE DWG: 1"=2'



NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT

[illegible]

PLAN VIEW



TO

MAP FOOTAGE:
SURVEY:
RAILROAD:

[illegible]

1 E CAMINO REAL

TO

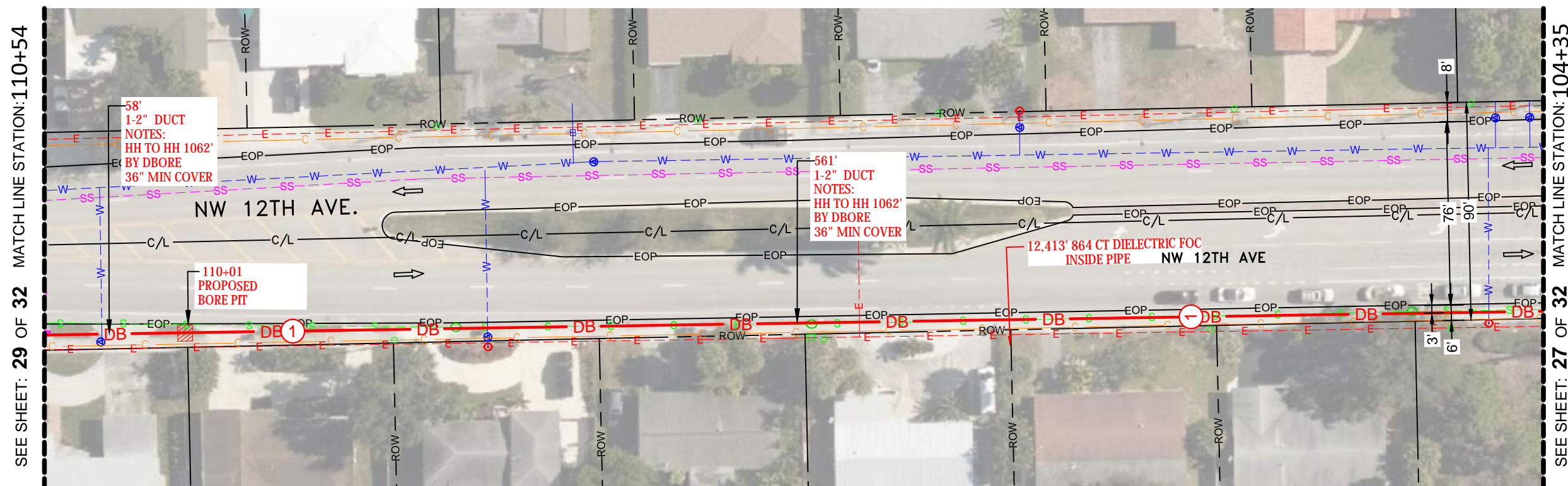
1200 NW 4TH ST

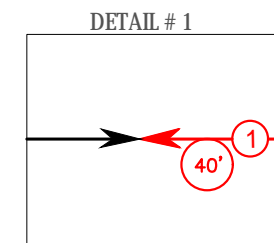
REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

B SIZE DWG:	1"= 50'
D SIZE DWG:	1"=2'

28
OF
32



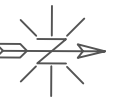


30x63 7/8x35 7/8
PROPOSED HANDHOLE
FLUSH WITH GRADE

Diagram illustrating the structure of the 5S rRNA gene in different species, showing the 5' end, the middle, and the 3' end of the gene.

Species	5' end	Middle	3' end
COMM	C		
GAS	G		G
STORM	S		S
WM	W		W
SWR	S		S
PWR	E		E

**NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT**



TO

MAP FOOTAGE:
SURVEY:
RAILROAD:

[illegible]

TITLE: FIBER OPTIC CABLE ROUTE

1 E CAMINO REAL

TO

1200 NW 4TH ST

REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

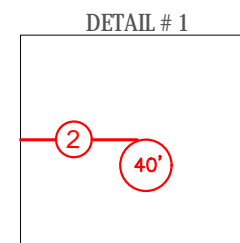
B SIZE DWG: 1" = 50'
D SIZE DWG: 1" = 2'

29

OF

32

PLAN VIEW



30x63 7/8x35 7/8
PROPOSED HANDHOLE
FLUSH WITH GRADE

Protocol	Signal
COMM	C (solid orange line)
GAS	G (dashed yellow line)
STORM	SS (dashed magenta line)
WM	W (dashed blue line)
SWR	S (dashed green line)
PWR	E (dashed red line)

NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT



PROJECT: # 1801CUWL188

TO

MAP FOOTAGE:	
SURVEY:	
RAILROAD:	

[illegible]

TITLE: FIBER OPTIC CABLE ROUTE

1 E CAMINO REAL

TO

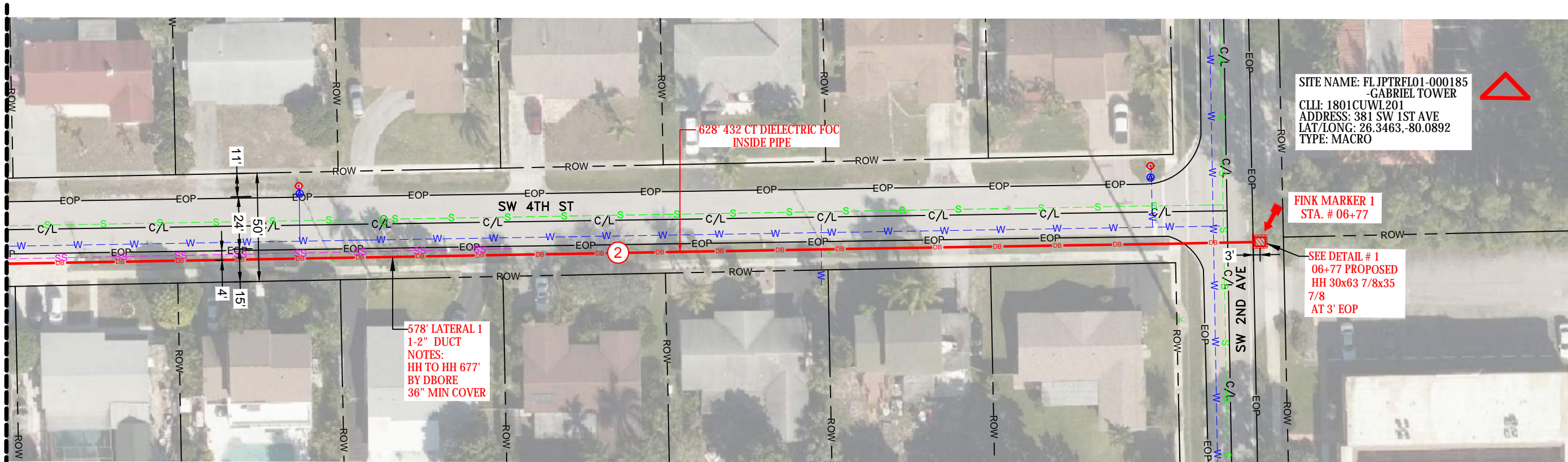
1200 NW 4TH ST

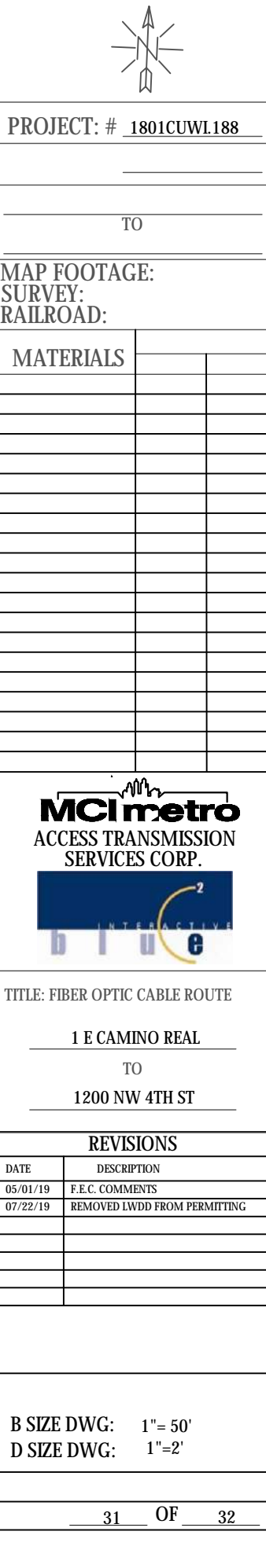
REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

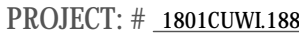
B SIZE DWG: 1" = 50'
D SIZE DWG: 1" = 2'

30 OF 32





480'



TO

MAP FOOTAGE:
SURVEY:
RAILROAD:

[illegible]

1 E CAMINO REAL

TO

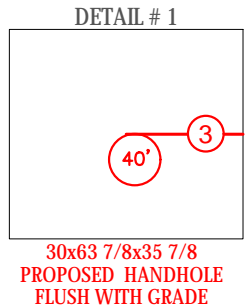
1200 NW 4TH ST

REVISIONS

DATE	DESCRIPTION
05/01/19	F.E.C. COMMENTS
07/22/19	REMOVED LWDD FROM PERMITTING

B SIZE DWG: 1"= 50'
D SIZE DWG: 1"=2'

32 OF 32



COMM ——— C ———

GAS - - - - G - - - - G -

STORM - - - - SS - - - - SS -

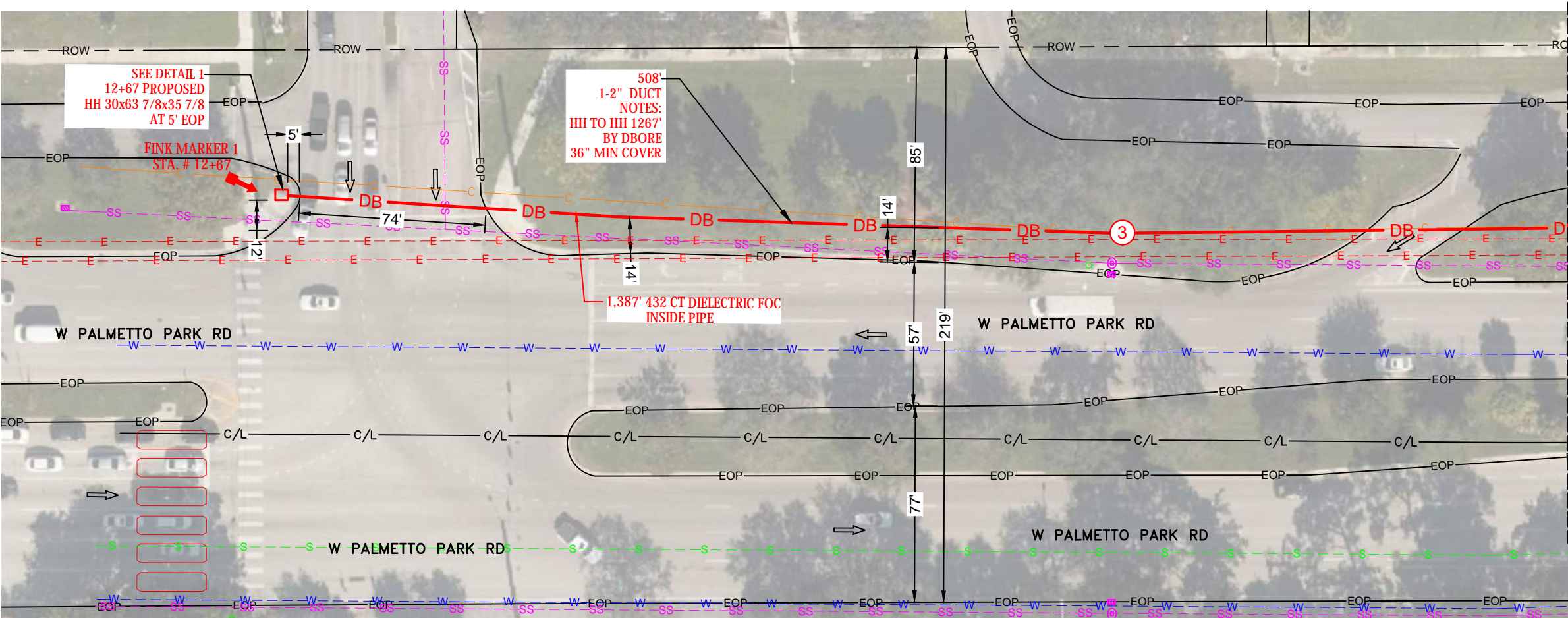
WM - - - - W - - - - W -

SWR - - - - S - - - - S -

PWR - - - - E - - - - E -

NOTE TO CONSTRUCTION:
PLACE TRACER WIRE IN CONDUIT

PLAN VIEW



PROFILE VIEW

508'

Confidential: For Florida Power & Light Company use only.



Primary Map: S-0368

Updated: 01/05/2022

Confidential: For Florida Power & Light Company use only.

370. (340300, 134100)

Updated: 12/16/2021

Primary Map: S-0367

Confidential: For Florida Power & Light Company use only.

[illegible]

Primary Map: R-0368

Updated: 02/11/2022

Confidential: For Florida Power & Light Company use only.

Primary Map: R-0367

Updated: 02/18/2022

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APPENDIX C

CITY OF BOCA RATON APPROVED UTILITY PRODUCT LIST

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CITY OF Boca Raton

UTILITY SERVICES DEPARTMENT

1401 GLADES ROAD • BOCA RATON, FL 33431 • PHONE (561) 338-7300 • FAX (561) 338-7345 • www.myboca.us

6.1 SHOP DRAWING SUBMITTALS & APPROVED UTILITY PRODUCT LIST

6.1.1 Shop Drawing Submittals

The Underground Utility Contractor shall submit the following items separately for approval by the City prior to the scheduling of the Preconstruction Meeting.

1. **Three (3)** sets of the following attached "City of Boca Raton Approved Product List" pages 1 through 14 to be submitted for the materials on each project. ***The First page shall bear the signature of the Underground Contractor and Engineer of Record. The subsequent pages shall bear the initials of the Underground Contractor and Engineer of Record on bottom right corner of every page. One (1) set must bear the original signature and initials; the remaining four (2) sets can be copies. Only one single brand name will be circled in every block of items that will be installed on the project. Do not circle multiple brand names under any single item. Circle "Not applicable" if that block item is not going to be used. If only water distribution materials are going to be used submit Pages 1 through 8. If only sanitary sewer materials are going to be used submit Page 1 and Pages 9 through 15. If only a water service is going to be installed submit Page 1 and Pages 7 and 8.*** For all items not listed on the "City of Boca Raton Approved Products List", the Contractor shall submit **Three (3)** sets of standard shop drawings or manufacturer's catalogs with the model number or type of the item circled or otherwise designated. The City shall have the right to reject any product not listed within the "City of Boca Raton Approved Product List". The submittals shall bear the signed approval of the Underground Utility Contractor and the Engineer of Record. One (1) set must have an original signature.
2. **Three (3)** complete sets of detailed sanitary sewer shop drawings for all sanitary manholes shall be ***submitted bearing the stamped approval and initials/signature of the Underground Utility Contractor and the Engineer of Record on every sheet.*** One (1) set must have an original - original stamp and initials/signatures.
3. **Three (3)** complete of detailed wet well shop drawings and a complete set of the lift station pump sizes and electrical shop drawings are also required as applicable and shall be ***submitted bearing the stamped approval and initials/signature of the Underground Utility Contractor and the Engineer of Record on every sheet.*** One (1) set must have an original - original stamp and initials/signatures.

Each of the above listed items shall be submitted separately for approval and must be accompanied by a letter of transmittal indicating the contents of the package, project name, project location, contact person and contact information (email, phone, address, company, etc.). The separate packages can be included on one transmittal.



CITY OF Boca Raton

UTILITY SERVICES DEPARTMENT

1401 GLADES ROAD • BOCA RATON, FL 33431 • PHONE (561) 338-7300 • FAX (561) 338-7345 • www.myboca.us

6.1.2 Project Information

Project Name: _____

Concurrence of Underground

Utility Contractor:

Signature Date

Print Name

Company

Concurrence of the Engineer:

Signature Date

Print Name

Firm

By signature above, the Underground Utility Contractor for referenced project agrees to adhere to the following product specifications. It is understood that the Engineering Division of the Municipal Services Department will reject construction not in accordance with this document.

Basis: The following products and specifications have been found to be acceptable and/or desirable in their respective groups. Shop drawings need not be submitted for approval if the contractor uses products on this list. Any substitutions or changes for these products must be submitted to the City of Boca Raton Utility Services Department for approval prior to their use. For all items not listed on the "City of Boca Raton Approved Products List", the Contractor shall submit **Three (3)** sets of standard shop drawings or manufacturer's catalogs with the model number or type of the item circled or otherwise designated. The City shall have the right to reject any product not listed within the "City of Boca Raton Approved Product List". ***One (1) set of the submittals shall bear the original signed approval of the Underground Utility Contractor and the Engineer of Record, the remaining four (2) sets can be a copy.***

6.1.3 Approved Products List for Water Distribution/Sanitary Sewer Utility Construction

ALL ITEMS TO BE MANUFACTURED IN THE UNITED STATES

A. WATER DISTRIBUTION

1. WATER DISTRIBUTION DUCTILE PIPE

Brand Name:

- American Cast Iron Co.
- U.S. Pipe
- McWane/Clow
- Griffin Pipe

Model Type: Push-on Pipe

Specifications and Requirements:

Conforms to ANSI/AWWA C150/A21.50 and C151/A21.51 with Interior Cement lining and seal coating
ANSI/AWWA C104/A21.4 and Exterior Asphaltic Coating

Pressure class 350 for 12" and smaller

Pressure class 250 for pipes larger than 12"

Pipe shall be color coded per FAC 62-555.320

2. WATER DISTRIBUTION LOCATION WIRE AND TAPE

Brand Name	Model Type	Specifications and Requirements
Any manufacturer	Blue coated wire.	Wire shall be 14 gauge multiple stranded.
Any manufacturer	Location wire	2-inch wide for water main installation

3. WATER DISTRIBUTION PIPE FITTINGS

Brand Name:

- American Cast Iron Pipe
- Tyler/Union/McWane
- Star Pipe Products
- U.S. Pipe

Model Type: Compact Body

Specifications and Requirements:

Mechanical joint, compact body per ANSI/AWWA C153/A21.53 cement-lined and seal coated per ANSI/AWWA C104/A21.4

4. WATER DISTRIBUTION PIPE RESTRAINTS – Fittings and Valves

Brand Name	Model Type
EBAA Iron	DIP – Megalug – 1100 Series
Sigma	DIP – One-Lok D-SLDE (Domestic)
Star Pipe Products	DIP – Stargrip series 3000 (Domestic)
Tyler Union	DIP – TufGrip – 1000 Series (Domestic)

Specifications and Requirements:

For DIP at MJ connections – Fittings and Valves.

5. WATER DISTRIBUTION PIPE RESTRAINTS – Bell & 2nd MJ Restraint

Brand Name	Model Type
EBAA Iron	Series 1100
	Series 1500TD
	Series 2000PV
Star Pipe Products	1100 Series (Domestic)
Ford/Uniflange	Series 1390-CU

Specifications and Requirements:

For bell and second MJ Restraint.

6. WATER DISTRIBUTION PIPE RESTRAINTS – Restraining Gaskets

Brand Name	Model Type
US Pipe/McWane	Field LOC gasket
American Cast Iron Pipe	Fast grip gasket
Griffin Pipe Products	Talon RJ gasket

Specifications and Requirements:

To be used for ductile pipe through a casing only.

7. WATER DISTRIBUTION TAPPING SLEEVES – Mechanical Joint

Brand Name	Model Type
American Flow Control	2800 Series
Mueller	H615
Tyler/Union/McWane	MJ Cast Iron 5-149-CI

Specifications and Requirements:

Mechanical joint tapping sleeve for the tapping of Cast Iron, Ductile and C-900 PVC pipe.

8. WATER DISTRIBUTION TAPPING SLEEVES – Stainless Steel

Brand Name	Model Type
Mueller	H-304 SS
JCM Industries	JCM 432
Smith-Blair	664-665
Ford Meter Box Co.	FTSS Series

Specifications and Requirements:

Full Stainless Steel with wrap around gasket for the tapping of Asbestos Cement and Class 160-200 SDR 26-21 PVC (SCH 40 OD) pipe only.

9. WATER DISTRIBUTION TAPPING SLEEVES – Epoxy Coated

Brand Name	Model Type
JCM Industries	JCM 412
Smith-Blair	622

Specifications and Requirements:

Epoxy coated with stainless steel bolts to be pre-approved by Utility Services Department for use.

10. WATER DISTRIBUTION TAPPING VALVES

Brand Name	Model Type
American Flow Control	2500 Series
Clow/McWane	F-6114
Mueller	T2360

Specifications and Requirements:

Conforms to ANSI/AWWA C509 or C515.

Flange by mechanical joint with centering ring and stainless-steel flange accessories – resilient wedge.

11. WATER DISTRIBUTION BUTTERFLY VALVES

Brand Name	Model Type
Mueller	Linseal III
Pratt	Groundhog
Dezurik	BAW
Clow/M&H Valve/McWane	4500 Series

Specifications and Requirements:

Conforms to ANSI/ASTM C504.

12. WATER DISTRIBUTION GATE VALVES

Brand Name	Model Type
American Flow Products	2500 Series
Mueller	A-2360
M&H/McWane	Style 4067
Kennedy Valve/McWane	Ken-seal-FW
Clow/McWane	F-6100 resilient wedge

Specifications and Requirements:

Mechanical joint; conforms to ANSI/AWWA C509 or C515.

Resilient seat or resilient wedge non-rising stem.

13. WATER DISTRIBUTION AIR RELEASE VALVES/COMBINATION AIR RELEASE VALVES

Brand Name	Model Type
Val-matic	45
Crispin	PL-20A
DeZurik/Apco	200-A
Empire/Golden Anderson	920
DeZurik/Apco	145C

Specifications and Requirements:

2" Unless otherwise approved by the Department

Stainless steel trim AWWA C-512.

Meeting application and type of main.

14. WATER INFLOW PREVENTER ARV

Brand Name	Model Type
Val-Matic	1301

Specifications and Requirements:

Conforms to AWWA C514.

1" unless otherwise approved by the Department

15. WATER DISTRIBUTION VALVE BOX AND COVER

Brand Name	Model Type
Tyler/Union/McWane	6850 Series, 461-S Type
Bingham Taylor	4905 Series

Specifications and Requirements:

Boxes shall be set in concrete and have a brass valve identification tag cast in the concrete

Screw Type with Cast iron cover marked "WATER" or "REUSE"

16. WATER DISTRIBUTION CAST IRON BLOW OFF BOX

Brand Name	Model Type	Specifications and Requirements
US Foundry	USF #7630	Raised "W" on lid

17. FIRE HYDRANTS

Brand Name	Model Type
Mueller	Centurion #A-423
American Flow Control	American Darling 5 1/4 B-84-B 5

Specifications and Requirements:

Breakaway traffic type with 5-1/4" minimum main valve opening.

NSF/ANSI 61 and NSF/ANSI 372

Factory Silver.

Bury to suit.

No drain vents or plugs.

No extensions will be allowed.

18. WATER DISTRIBUTION BRASS ID TAGS

Brand Name	Model Type	Specifications and Requirements
Wager Company	Bronze ID Disk	Permanent tags required at the valve box and fittings.

19. WATER DISTRIBUTION CASING SPACERS AND END SEALS

Brand Name	Model Type
Cascade	Style CCS Style CCES
PSI	Spacer S12G-2 End Seal Model "S"

Specifications and Requirements:

Casing spacers to be stainless steel for pipe to be positioned in center of casing.

End seals to be neoprene with stainless steel bands.

20. SERVICE SADDLE

Brand Name	Model Type	Specifications and Requirements
Ford Meter Box Co.	202B	Bronze saddle with brass bales.
Mueller	BR2B Series	Bronze saddle with brass bales.
AY McDonald	#3826	Bronze saddle with brass bales
Romac	202NS	Ductile Iron Body – ASTM-A 536
Smith Blair	317	Ductile Iron Body – ASTM-A 536
Total Pipe Solution, Inc.	Triple Tap Model T3	Ductile Iron Body – ASTM-A 536

21. CORPORATION STOPS

Brand Name	Model Type
Ford Meter Box Co.	FB1100—X-NL
Mueller	B25028-I.P.
AY McDonald	4704B-22-I.P.

Specifications and Requirements:

X refers to the line size.

Brass ball valve type - conforms to ANSI/AWWA C800.

Iron pipe threads by Packed Joint/110 Compression.

22. WATER SERVICE LINE POLYETHYLENE TUBING

Brand Name	Model Type
Performance Pipe/Chevron Phillips	Driscoplex 5100 black with blue stripes and blue writing.
Endot	Endopure – blue with white or black writing
Vanguard	Bruiser HDPE – blue with white or black writing
Charter Plastics	Blue Ice – blue with white or black writing

Specifications and Requirements:

P.E. 3408/4710-DR-9 AWWA C-901 ASTM D2737.

Size is based on O.D.

23. WATER SERVICE CASING PIPE

Brand Name:

- Charlotte
- National Pipe and Plastics
- North American Pipe
- JM Pipe

Model Type: Schedule 40 PVC Pipe

Specifications and Requirements:

ASTM D1785/D2665.

24. CURB STOPS

Brand Name	Model Type
Ford Meter Box Co.	B41-777W-G-NL.
Mueller	300 Series
AY McDonald	4602B-22 IP

Specifications and Requirements:

Must have Optional Padlock Wing.

Brass - conforms to ANSI/AWWA C800.

NSF-61 thread sealer/locker required for threaded connections.

25. SERVICE FITTINGS, COUPLINGS, CLAMPS & HARDWARE

Brand Name	Model Type
Ford Meter Box Co.	C14; C84; C44; Y44-247-G-NL; C38-XX-XX-NL
Mueller	110 Conductive
AY McDonald	4753-22; 4754-22; 4758-22

Y48-247-G-NL

Specifications and Requirements:

Compression couplings for Polyethylene tubing.

Not allowed to be used to extend tubing lengths.

26. WATER METER BOX

Brand Name	Model Type	Specifications and Requirements
Hubbell Power Systems Inc/CDR	B10111818M - 1" – Departmental Approval Required B10132418M – 1", 1.5" and 2" meter	Box, Depth 18", Tier 8 Box, Depth 18", Tier 15 or 22 where required.
Hubbell Power Systems Inc/CDR	C08111802D009 C08132402D009	Lid, W/CI Reader (6x9) (or w/AMR-AMI lid option where required)
Oldcastle/Carson	1419 – 1" and 1.5" meter 1220 – 1.5" meter 1730 – 2" meter	Box, Depth 18", Tier 8 Box, Depth 18", Tier 15 or Tier 22 where required. Lid, Flush w/CI Reader (or Flush w/AMR-AMI recess lid option where required)

Specifications and Requirements:

Lid must meet traffic rating of installed meter box.

B. SANITARY SEWER

1. GRAVITY SANITARY SEWER PVC PIPE

(Circle appropriate brand & specifications)

Brand Name:

- JM Pipe.
- North American (NAPCO)
- National Pipe & Plastics
- Diamond

Model Type: Push-on Pipe

Specifications and Requirements: *(select i. or ii.)*

i. PVC pipe shall conform to:

- ASTM D3034 SDR 26 for 4" through 15"
- ASTM F679 PS115 for 18" through 48" Heavy Wall Pipe

Pipe shall be green in color.

OR

ii. PVC pipe shall conform to:

- ANSI/AWWA C900-07: Class 235 DR18 for 4" through 12"
- PVC 14" and up shall conform to ANSI/AWWA C905 DR25

Pipe shall be green in color.

2. SANITARY SEWER FORCE MAIN PVC PIPE

Brand Name:

- JM Pipe.
- North American (NAPCO)
- National Pipe & Plastics
- Diamond

Model Type: Push-on Pipe

Specifications and Requirements:

PVC pipe shall conform to ANSI/AWWA C900-07:

- Class 305 DR14 for 4" through 12"

Pipe shall be green in color.

3. GRAVITY SANITARY SEWER AND FORCE MAIN DUCTILE PIPE

Brand Name:

- American Cast Iron Pipe
- McWane/Clow
- US Pipe
- Griffin Pipe

Model Type: Push-on Pipe

Specifications and Requirements:

Conforms to ASTM A716/A746 Ceramic Epoxy Lined – Protecto 401 (40 mils); asphalt coated on the outside.

- Pressure Class 350 for 4" through 24"

OR

- Class 50 or higher for 4" through 24"

Pipe shall be green stripped.

4. GRAVITY SANITARY SEWER PVC PIPE FITTINGS

(Circle appropriate brand & specifications)

Brand Name:

- Multi Fittings.
- Plastic Trends
- Harco

Model Type: Push-on

Specifications and Requirements: *(select i. or ii.)*

i. PVC pipe shall conform to:

- ASTM D3034 SDR 26 for 4" through 15"
- ASTM F679 PS115 for 18" through 48" Heavy Wall Pipe

OR

ii. PVC pipe shall conform to:

- C900-DR18 for 4" through 12"
- C905 DR25 for 14" and up

Non-pressure (gravity sewer only).

5. SANITARY SEWER DUCTILE PIPE FITTINGS

Brand Name:

- US Pipe
- American Cast Iron Pipe
- Star Pipe Products
- Tyler/Union/ Foundry/ McWane

Model Type: Compact Fitting

Specifications and Requirements:

Mechanical joint, compact body per ANSI/AWWA C153/A21.53

Conforms to ASTM A716/A746 Ceramic Epoxy Lined – Protecto 401 (40 mils);

Asphalt coated on the outside.

6. SANITARY SEWER FORCE MAIN PIPE RESTRAINTS – Fittings and Valves

Brand Name	Model Type DIP	Model Type PVC
EBAA Iron	Megalug – 1100 Serie	Megalug 2000 PV Series
Sigma	One-Lok D-SLDE (Domestic)	One-Lok D-SLCE (Domestic)
Star Pipe Products	Stargrip series 3000 (Domestic)	Stargrip series 4000 (Domestic)
Tyler Union	TufGrip – 1000 Series (Domestic)	TufGrip – 2000 Series (Domestic)

Specifications and Requirements:

For DIP at MJ connections – Fittings and Valves.

7. SANITARY SEWER FORCE MAIN PIPE RESTRAINTS – Bell & 2nd MJ Restraint

Brand Name	Model Type
EBAA Iron	Series 1500TD
Star Pipe Products	1100 Series (Domestic)
Ford/Uniflange	Series 1390-CU

Specifications and Requirements:

For bell and second MJ Restraint.

8. SANITARY SEWER FORCE MAIN PIPE RESTRAINTS – Restraining Gaskets

Brand Name	Model Type
US Pipe/McWane	Field LOC gasket
American Cast Iron Pipe	Fast grip gasket
Griffin Pipe Products	Talon RJ gasket

Specifications and Requirements:

To be used for ductile pipe through a casing only.

9. SANITARY SEWER FORCE MAIN TAPPING SLEEVES – Mechanical Joint

Brand Name	Model Type
American Flow Control	2800 Series
Mueller	H615
Tyler/Union/McWane	MJ Cast Iron 5-149-CI

Specifications and Requirements:

Mechanical joint tapping sleeve for the tapping of Cast Iron, Ductile and C-900 PVC pipe.

10. SANITARY SEWER FORCE MAIN TAPPING SLEEVES – Stainless Steel

Brand Name	Model Type
Mueller	H-304 SS
JCM Industries	JCM 432
Smith-Blair	664-665

Specifications and Requirements:

Full Stainless Steel with wrap around gasket for the tapping of Asbestos Cement and Class 160-200 SDR 26-21 PVC (SCH 40 OD) pipe only.

11. SANITARY SEWER FORCE MAIN TAPPING SLEEVES – Epoxy Coated

Brand Name	Model Type
JCM Industries	JCM 412
Smith-Blair	622

Specifications and Requirements:

Epoxy coated with stainless steel bolts to be pre-approved by Utility Services Department for use.

12. SANITARY SEWER FORCE MAIN TAPPING VALVES

Brand Name	Model Type
American Flow Control	2500 Series
Clow/McWane	F-6114
Mueller	T2360

Specifications and Requirements:

Conforms to ANSI/AWWA C509 or C515.

Flange by mechanical joint with centering ring and stainless-steel flange accessories – resilient wedge.

13. SANITARY SEWER PLUG VALVES

Brand Name	Model Type
DeZurik	CI FLG N/LUBE w/OP NUT

Specifications and Requirements:

MJ and Flange to Flange

14. SANITARY SEWER CHECK VALVES

Brand Name	Model Type
Kennedy	1126A

Specifications and Requirements:

MJ and Flange to Flange

15. SANITARY SEWER FORCE MAIN GATE VALVES

Brand Name	Model Type
American Flow Products	2500 Series
Mueller	A-2360
M&H/McWane	Style 4067
Kennedy Valve/McWane	Ken-seal-FW
Clow/McWane	F-6100 resilient wedge

Specifications and Requirements:

Mechanical joint; conforms to ANSI/AWWA C509 or C515.

Resilient seat or resilient wedge non-rising stem.

16. SANITARY SEWER FORCE MAIN AIR RELEASE VALVES

Brand Name	Model Type
Val-matic	48
Crispin	SL-20 (sewer)
DeZurik/Apco	400
Empire/Golden Anderson	925

Specifications and Requirements:

Stainless steel trim AWWA C-512.

2" unless otherwise approved by the Department.

Meeting application and type of main.

17. SANITARY SEWER FORCE MAIN VALVE BOX AND COVER

Brand Name	Model Type
Tyler/Union/McWane	6850 Series, 461-S Type
Bingham Taylor	4905 Series

Specifications and Requirements:

Boxes shall be set in concrete and have a brass valve identification tag cast in the concrete

Screw Type with Cast iron cover marked "SEWER".

18. SANITARY SEWER FORCE MAIN BRASS ID TAGS

Brand Name	Model Type	Specifications and Requirements
Wager Company	Bronze ID Disk	Permanent tags required at the valve box and fittings.

19. SANITARY SEWER PVC MANHOLE ADAPTORS

Brand Name	Model Type	Specifications and Requirements
Harco	PVC Sewer Adaptor	Grouted repair coupling for connecting to existing manholes only

20. SANITARY SEWER CAST IN PLACE FLEXIBLE MANHOLE BOOTS

Brand Name	Model Type
Chardon Rubber Co./Wabtec Rubber Products	LockJoint flexible Manhole Sleeve CP-Series

Brand Name	Model Type
A-LOK Products	Z-LOK F208-8

Specifications and Requirements:

Manhole boot supplied by precast company with stainless steel bands.

21. SANITARY SEWER MANHOLE RING AND COVER

Brand Name	Model Type	Specifications and Requirements
US Foundry	420-C	Raised letters "SANITARY SEWER" & "BOCA RATON"
US Foundry	420-C	Raised letters "SANITARY SEWER" Only for manholes not maintained by the City of Boca Raton (Private)

22. SANITARY SEWER MANHOLE INSERT

Brand Name	Model Type
Rainstopper	HDPE

Specification and Requirements:

Required in all new and/or rehabilitated manholes.

23. SANITARY SEWER CLEANOUT BOX IN ASPHALT

Brand Name	Model Type	Specifications and Requirements
US Foundry	7635	Raised "S" on lid.

24. SANITARY SEWER FORCE MAIN CASING SPACERS AND END SEALS

Brand Name	Model Type
Cascade	Style CCS; Style CCES
PSI	Spacer S12G-2 End Seal Model "S"

Specifications and Requirements:

Casing spacers to be stainless steel for pipe to be positioned in center of casing.

End seals to be neoprene with stainless steel bands.

25. SANITARY SEWER PRECAST INTERIOR MANHOLE & WETWELL COATING

Brand Name	Model Type	Specifications and Requirements
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Madewell Products Corp.	Mainstay Composite Liner	ML-72 (Half-inch application) DS-5 (100-mil application) (highly corrosive environments)
SewperCoat®	SewerperCoat® PG	Half-inch application

26. SANITARY SEWER PRECAST EXTERIOR MANHOLE & WETWELL COATING

Brand Name	Model Type	Specifications and Requirements
Carboline	Bitumastic 300M Coal Tar Epoxy	AWWA C-210; primary (6-8 ft.) and second application (8-10 ft.) – 1 coat each

27. SANITARY SEWER FORCE MAIN LOCATION WIRE AND TAPE

Brand Name	Model Type	Specifications and Requirements
Any manufacturer	green coated wire.	Wire shall be 14 gauge multiple stranded.
Any manufacturer	Location wire	2-inch wide for force main installation

APPENDIX D

GEOTECHNICAL REPORT

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**REPORT OF
GEOTECHNICAL EXPLORATION**

**LAKE FLORESTA PARK – INFRASTRUCTURE UPGRADES
NW 7TH STREET AND NW 7TH AVENUE
AND
NW 7TH STREET AND NW 9TH COURT
BOCA RATON, FLORIDA**

FOR

**HOLTZ CONSULTING ENGINEERS, INC.
270 SOUTH CENTRAL BOULEVARD
SUITE 207
JUPITER, FLORIDA 33458**

PREPARED BY

**NUTTING ENGINEERS OF FLORIDA, INC.
1310 NEPTUNE DRIVE
BOYNTON BEACH, FLORIDA 33426**

ORDER NO. 18669.3

FEBRUARY 2022



Geotechnical & Construction Materials
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February 17, 2022

Mr. Harrison Barron, P.E.
Holtz Consulting Engineers, Inc.
270 South Central Boulevard, Suite 207
Jupiter, Florida 33458
Phone: 561-575-2005 Email: Harrison.barron@holtzconsulting.com

Subject: Report of Geotechnical Exploration
 Lake Floresta Park
 Infrastructure Upgrades
 NW 7th Street and NW 7th Avenue
 NW 7th Street and NW 9th Court
 Boca Raton, Florida

Dear Mr. Barron:

Nutting Engineers of Florida, Inc. (NE), has performed a Geotechnical Exploration for the proposed infrastructure upgrades along the above referenced roadways in Boca Raton, Florida. This exploration was performed in accordance with the written authorization to proceed provided by Holtz Consulting Engineers, Inc. dated February 14, 2020. This study was performed to develop information regarding existing subsurface conditions at specific test locations. This information along with proposed construction information provided was used to develop general opinions regarding remedial and preparatory earthwork for the new replacement lines. This report presents our findings and recommendations based upon the information examined at the time of this evaluation.

PROJECT INFORMATION

We understand that plans include the various improvements of the city's watermain lines along/adjacent to the above referenced street locations within Lake Floresta Park. The new lines will be installed via directional drilling methods and open cut methods where lateral conflicts may exist. We understand that some installation or drilling operations will extend well below ten feet.

We note that the depth, size, and makeup of the existing pipes and the proposed depths, size, and makeup of the new pipes were not known at the time of this report. It is anticipated that all utilities will be constructed to less than twenty feet below existing surface grades and our subsurface exploration reflects this. If this information is incorrect our office must be notified in writing in order to perform additional test borings to address the correct depths for the proposed construction.

Based on the proposed installation methods, soil information was needed in order to estimate possible soil conditions that may be encountered during directional drilling operations as well as open cut excavation where needed along the line.

We anticipate that final elevations are within less than one foot of existing elevations; however, the final surface elevation shall be determined by a professional architect, civil engineer, or other qualified party.

NE should be notified in writing by the client of any changes in the proposed construction along with a request to amend our analysis and/or recommendations within.

GENERAL SUBSURFACE CONDITIONS

Soil Survey Maps

As part of the geotechnical exploration, we have reviewed available Natural Resources Conservation Service (NRCS) online soil survey map for Palm Beach County. The USDA online NRCS mapping provides qualitative information about potential general shallow soil conditions in the project vicinity.

This information was derived from approximately 6 ft. deep manual auger borings, aerial photo, and surface feature interpretation at some point in the past. The NRCS data may or may not reflect actual current site conditions. As indicated in the online Soil Survey Mapping at the time the survey was conducted, one main soil description was identified within the subject area. We note that the soil surveys were typically penetrated to a depth of approximately six feet. The soil type is outlined below.

Paola-St Lucie Sand

This unit consists of nearly level to sloping, excessively drained, deep, sandy soils in long, narrow dune-like ridges near the Atlantic coast. In general, the subsoils are white to yellowish sands that extend to a depth of approximately six feet or more.

Subsurface Exploration

NUTTING ENGINEERS OF FLORIDA, INC. performed four Standard Penetration Test (SPT) borings (ASTM D-1586) to depths of twenty feet below the land surface. The locations of the test borings are indicated on the boring location plan presented in the Appendix of this report. We note that the number of borings and locations were determined based on the site plan prepared by Holtz Consulting Engineers, Inc. The boring locations were identified in the field using approximate methods; namely, a measuring wheel and available surface controls. As such the soil boring locations should be considered to be approximate.

We note that due to the potential for underground utilities at the test boring locations, the upper four feet of the soil profile was manually cleared. Because of this, the relative density of the upper four feet was not obtained.

Test Boring Results

In general, the test boring locations recorded a surficial topsoil underlain by very loose to loose light brown to light gray sand in the upper eight feet, underlain by very loose to medium dense light brown to brown sand to a depth of twenty-feet, the maximum depth explored. Please see the enclosed soil classification sheet in the Appendix of this report for additional important information regarding these descriptions, the field evaluation and other related information.

Note: Substantially different subsurface conditions may exist at other areas of the site. Buried debris may or may not be identified or adequately delineated by soil borings. Test pit excavation can provide more insight into such conditions and rock lithology if present. Such conditions may be revealed during site development activities (e.g., proof rolling, utility & foundation excavation activities) or other related activities. Should additional assurance be desired by the client, further subsurface investigation could be performed.

Groundwater Information

The immediate groundwater level is typically measured at the boring locations at the time of drilling. The groundwater level was encountered at depths ranging from approximately five to eight feet below the existing ground surface.

The immediate depth to groundwater measurements presented in this report will not provide a reliable indication of stabilized or more long-term depth to groundwater at this site. Water table elevations can vary dramatically with time through rainfall, droughts, storm events, flood control activities, nearby surface water bodies, tidal activity, pumping and many other factors. For these reasons, this immediate depth to water data **should not** be relied upon alone for project design considerations.

ANALYSIS AND RECOMMENDATIONS

Pipeline Installation Via Directional Drilling

Based on the borings performed for this project, it is our opinion that the proposed water main line may be supported on the existing in place soils using directional drilling methods at the locations of the test borings. Any excavated soils that may be produced from open cuts should be evaluated by our office. Suitable excavated materials may be used for pipe bedding and general backfill, if needed. During excavation or directional drilling processes, any questionable soils/conditions must be evaluated by Nutting Engineers.

If during excavation deleterious soils are encountered, we recommend that any unsuitable material be removed within the area of the watermain and replaced with clean structural fill. NE must be notified of such conditions to evaluate the deleterious soils. Discussions should be held with interested parties to effectively determine the suitability of this material.

CONSTRUCTION CONSIDERATIONS

The following are some considerations for the proposed pipe installation where open cuts are needed to be performed based on the anticipated construction and boring results.

Trench Excavations

Excavations of five feet or more will need to be sloped or shored in accordance with State of Florida and OSHA recommendations. It is our opinion that if the excavation remains dry, temporary side slopes of 3 horizontal to 1 vertical may be used for this project. Where existing utilities, roadways or other obstructions prevent sloping the soils, shoring will be required. Where temporary shoring will be required, the table presented below should be used for earth pressure determinations.

We note that the values in the table are based on visual classification and if more exact values are needed, specific laboratory testing should be performed. Also, the depths of the soils were not included since the depths of each stratum vary. Also, appropriate factors of safety should be applied by the design engineer depending on the application. We are available to assist in the design process if needed.

TABLE OF GENERAL SOIL PARAMETERS

SOIL DESCRIPTION	SOIL UNIT WEIGHT (PCF)		ANGLE OF INTERNAL FRICTION (DEGREES)	EARTH PRESSURE COEFFICIENT	
	SATURATED	SUB-MERGED		ACTIVE (Ka)	PASSIVE (Kp)
Very Loose Sand	110	48	28	0.36	2.8
Loose Sand	115	53	30	0.33	3
Medium Dense to Dense Sand	120	58	32	0.31	3.25

If shoring involves installing sheet piles by vibratory methods, the vibrations should be monitored with seismograph equipment.

Open Cut Pipeline Installation and Backfilling

All grass, weeds, and root zones and pavement section should be stripped and removed from the pipeline area. Based on the results of the borings performed for this project, the geotechnical engineer of record should observe the excavated soils to determine if the soils may be stockpiled for use as backfill.

If the contractor encounters soils that are different from those encountered in this study, we should be notified so that a determination of suitability can be provided.

Since the immediate water table was encountered at depths of approximately five to six feet below the existing ground surface, dewatering may be required in order to allow for proper compaction and installation of the pipeline. Dewatering procedures, if pursued, should be developed by an experienced dewatering contractor. This was beyond the scope of services at this time. We recommend that the water table be kept at least two feet below the invert elevation of the pipeline during installation and initial compaction operations. **If the contractor needs to pump water out within the excavation, the contractor needs to monitor that sands are not being piped within the sand filled vertical solution holes within the limestone stratum if present. This may cause voids in locations far from the actual dewatering area.** Installation of the pipe in the “wet” using alternative procedures may be feasible.

In open cut areas, the bedding soils should be compacted to at least 95 percent of the modified Proctor maximum dry density to a depth of 12 inches below the compacted surface. Once the pipe section is installed, backfill around and above the pipe should be compacted in maximum loose lifts of 6 inches, and each lift should be compacted to at least 95 percent of the modified Proctor maximum dry density (AASHTO T-180 specifications).

The backfill soils should be clean fine sands having no more than 12 percent passing the No. 200 sieve, with a maximum particle size of 3 inches. It appears that the existing soils (except the organic soils) will meet these requirements.

Replacing/repairing the roadway and green areas should be in accordance with the Civil Engineers plans.

GENERAL INFORMATION

Our client for this geotechnical evaluation was:

Mr. Harrison Barron, P.E.
Holtz Consulting Engineers, Inc.
270 South Central Boulevard, Suite 207
Boca Raton, Florida 33458

The contents of this report are for the exclusive use of the client, the client’s design & construction team and governmental authorities for this specific project exclusively. Information conveyed in this report shall not be used or relied upon by other parties or for other projects without the expressed written consent of Nutting Engineers of Florida, Inc. This report discusses geotechnical considerations for this site based upon observed conditions and our understanding of proposed construction for foundation support. Environmental issues including (but not limited to), soil and/or groundwater contamination, and other environmental considerations are beyond our scope of service for this project. As such, this report should not be used or relied upon for evaluation of environmental issues.

Prior to initiating compaction operations, we recommend that representative samples of the structural fill material to be used and acceptable in-place soils be collected and tested to determine their compaction and classification characteristics. The maximum dry density, optimum moisture content, gradation and plasticity characteristics should be determined. These tests are needed for compaction quality control of the structural fill and existing soils, and to determine if the fill material is acceptable.

If conditions are encountered which are not consistent with the findings presented in this report, or if proposed construction is moved from the location investigated, this office shall be notified immediately so that the condition or change can be evaluated, and appropriate action taken.

The vibratory compaction equipment may cause vibrations that could be felt by persons within nearby buildings and could potentially induce structural settlements. Additionally, preexisting settlements may exist within these structures that could be construed to have been caused or worsened by the proposed vibratory compaction after the fact. Pre- and post-conditions surveys of these structures along with the vibration monitoring during vibratory compaction could be performed to better evaluate this concern. The contractor should exercise due care during the performance of the vibratory compaction work with due consideration of potential impacts on existing structures. If potential vibrations and impacts are not considered tolerable, then alternate foundation modification techniques should be considered.

Nutting Engineers of Florida, Inc. (NE), recommends that we be contracted to provide input to the design team and owner during the foundation and earthwork design process and that we review final foundation drawings and specifications to verify that our report recommendations and design intent have been properly implemented. NE shall also perform testing and inspections during the earthwork and foundation construction as recommended in this report. If NE is not engaged to perform these services as detailed herein, the Client agrees that NE shall bear no liability for the interpretation, implementation of our report, its recommendations and/or inspection and testing services as described in this report if implemented by others.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein, have been presented after being prepared in accordance with general accepted professional practice in the field of foundation engineering, soil mechanics and engineering geology. No other warranties are implied or expressed.

We appreciate the opportunity to be of service on this project. If we can be of any further assistance, or if you need additional information, please contact us at your convenience.

Sincerely,
NUTTING ENGINEERS OF FLORIDA, INC.

Christopher E. Gworek, P.E. #69947
Senior Engineer



Eureka Desvaraines
Engineering Intern

Appendix: Boring Location Plan
 Test Boring Results
 Limitations of Liability
 Soil Classification Criteria

B-4



- LEGEND -



APPROX. TEST LOCATION



**NUTTING
ENGINEERS**
OF FLORIDA, INC.
ESTABLISHED 1967

Holtz Consulting Engineers, Inc.
Infrastructure Upgrades
Old Floresta, Lake Floresta & Tunison Palms
Boca Raton, Florida

PROJECT NO. 18669.3

APPROXIMATE
TEST LOCATION
PLAN

GEOTECHNICAL EXPLORATION
— *Not to Scale* —

FIG. 1



1310 Neptune Drive
Boynton Beach Fl., 33426
Telephone: 561-736-4900
Fax: 561-737-9975

BORING NUMBER B-1

PAGE 1 OF 1

PROJECT NUMBER 18669.3
CLIENT Holtz Consulting Engineers, Inc. PROJECT NAME Infrastructure Upgrades
PROJECT LOCATION Old Floresta, Lake Floresta and Tunison Palms, Boca Raton, Florida

DATE STARTED 2/7/22 COMPLETED 2/7/22 SURFACE ELEVATION REFERENCE Approx. @ Road Crown
DRILLING METHOD Standard Penetration Boring GROUND WATER LEVELS:
LOGGED BY T. Donovan CHECKED BY C. Gworek ∇ AT TIME OF DRILLING 7.5 ft
APPROXIMATE LOCATION OF BORING As located on site plan

TEST NUTTING BOREHOLE 1-18669.3 HOLTZ CONSULTING ENGINEERS - OLD FLORESTA LAKE PARK UNISON PALMS INFRASTRUCTURE UPGRADES BOCA RATON.GPJ GINT US.GDT 2/15/22

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	▲ SPT N VALUE ▲			
						10	20	30	40
						PL	MC	LL	
0						20	40	60	80
						□ FINES CONTENT (%) □			
						20	40	60	80
		Lt. brown fine SAND, some limestone fragments	AU 1						
		Gray fine SAND	AU 2						
5		Brown fine SAND	SS 3	2-2-2-2	4	▲			
			SS 4	2-2-2-2	4	▲			
			SS 5	2-2-1-1	3	▲			
10			SS 6	2-1-3-4	4	▲			
			SS 7	1-1-1-2	2	▲			
15									
			SS 8	3-4-3-3	7	▲			
20		Bottom of hole at 20.0 feet.							



1310 Neptune Drive
Boynton Beach Fl., 33426
Telephone: 561-736-4900
Fax: 561-737-9975

BORING NUMBER B-2

PAGE 1 OF 1

PROJECT NUMBER 18669.3
CLIENT Holtz Consulting Engineers, Inc. PROJECT NAME Infrastructure Upgrades
PROJECT LOCATION Old Floresta, Lake Floresta and Tunison Palms, Boca Raton, Florida

DATE STARTED 2/7/22 COMPLETED 2/7/22 SURFACE ELEVATION REFERENCE Approx. @ Road Crown
DRILLING METHOD Standard Penetration Boring GROUND WATER LEVELS:
LOGGED BY T. Donovan CHECKED BY C. Gworek ∇ AT TIME OF DRILLING 6.5 ft
APPROXIMATE LOCATION OF BORING As located on site plan

TEST NUTTING BOREHOLE 1-18669.3 HOLTZ CONSULTING ENGINEERS - OLD FLORESTA LAKE PARK UNISON PALMS INFRASTRUCTURE UPGRADES BOCA RATON.GPJ GINT US.GDT 2/15/22

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	▲ SPT N VALUE ▲			
						10	20	30	40
						PL MC LL			
						20	40	60	80
						□ FINES CONTENT (%) □			
						20	40	60	80
0		Gray fine SAND	AU 1						
		Lt. brown fine SAND	AU 2						
5			SS 3	2-2-3-3	5	▲			
			SS 4	2-2-3-3	5	▲			
			SS 5	1-1-2-3	3	▲			
10			SS 6	2-2-2-2	4	▲			
			SS 7	1-1-1-1	2	▲			
15									
			SS 8	2-3-3-4	6	▲			
20		Bottom of hole at 20.0 feet.							



1310 Neptune Drive
Boynton Beach Fl., 33426
Telephone: 561-736-4900
Fax: 561-737-9975

BORING NUMBER B-3

PAGE 1 OF 1

PROJECT NUMBER 18669.3
CLIENT Holtz Consulting Engineers, Inc. PROJECT NAME Infrastructure Upgrades
PROJECT LOCATION Old Floresta, Lake Floresta and Tunison Palms, Boca Raton, Florida

DATE STARTED 2/7/22 COMPLETED 2/7/22 SURFACE ELEVATION REFERENCE Approx. @ Road Crown
DRILLING METHOD Standard Penetration Boring GROUND WATER LEVELS:
LOGGED BY T. Donovan CHECKED BY C. Gworek ∇ AT TIME OF DRILLING 5.0 ft
APPROXIMATE LOCATION OF BORING As located on site plan

TEST NUTTING BOREHOLE 1-18669.3 HOLTZ CONSULTING ENGINEERS - OLD FLORESTA LAKE PARK UNISON PALMS INFRASTRUCTURE UPGRADES BOCA RATON.GPJ GINT US.GDT 2/15/22

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	▲ SPT N VALUE ▲			
						10	20	30	40
						PL	MC	LL	
0						20	40	60	80
		Gray fine SAND	AU 1						
		Brown fine SAND	AU 2						
5	∇		SS 3	2-3-2-3	5	▲			
			SS 4	3-3-3-4	6	▲			
10			SS 5	1-4-7-8	11	▲			
			SS 6	2-4-6-8	10	▲			
15			SS 7	6-7-6-7	13	▲			
20			SS 8	2-1-3-2	4	▲			
		Bottom of hole at 20.0 feet.							



1310 Neptune Drive
Boynton Beach Fl., 33426
Telephone: 561-736-4900
Fax: 561-737-9975

BORING NUMBER B-4

PAGE 1 OF 1

PROJECT NUMBER 18669.3

CLIENT Holtz Consulting Engineers, Inc. PROJECT NAME Infrastructure Upgrades

PROJECT LOCATION Old Floresta, Lake Floresta and Tunison Palms, Boca Raton, Florida

DATE STARTED 2/7/22 COMPLETED 2/7/22 SURFACE ELEVATION REFERENCE Approx. @ Road Crown

DRILLING METHOD Standard Penetration Boring GROUND WATER LEVELS:

LOGGED BY T. Donovan CHECKED BY C. Gworek ☒ AT TIME OF DRILLING 8.0 ft

APPROXIMATE LOCATION OF BORING As located on site plan

TEST NUTTING BOREHOLE 1-18669.3 HOLTZ CONSULTING ENGINEERS - OLD FLORESTA LAKE PARK UNISON PALMS INFRASTRUCTURE UPGRADES BOCA RATON.GPJ GINT US.GDT 2/15/22

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Blows	N-Value	▲ SPT N VALUE ▲			
						10	20	30	40
						PL	MC	LL	
						20	40	60	80
						☐ FINES CONTENT (%) ☐			
						20	40	60	80
0		Lt. brown fine SAND	<div>AU 1</div>						
			<div>AU 2</div>						
5			<div>SS 3</div>	2-2-2	4	▲			
		Gray fine SAND	<div>SS 4</div>	2-2-2-2	4	▲			
	▽	Lt. brown fine SAND	<div>SS 5</div>	2-1-1-2	2	▲			
10			<div>SS 6</div>	1-1-1-1	2	▲			
			<div>SS 7</div>	2-2-2-4	4	▲			
15									
			<div>SS 8</div>	2-3-5-6	8	▲			
20		Bottom of hole at 20.0 feet.							

LIMITATIONS OF LIABILITY

WARRANTY

We warrant that the services performed by Nutting Engineers of Florida, Inc. are conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession in our area currently practicing under similar conditions at the time our services were performed. **No other warranties, expressed or implied, are made.** While the services of Nutting Engineers of Florida, Inc. are a valuable and integral part of the design and construction teams, we do not warrant, guarantee or insure the quality, completeness, or satisfactory performance of designs, construction plans, specifications we have not prepared, nor the ultimate performance of building site materials or assembly/construction.

SUBSURFACE EXPLORATION

Subsurface exploration is normally accomplished by test borings; test pits are sometimes employed. The method of determining the boring location and the surface elevation at the boring is noted in the report. This information is represented in the soil boring logs and/or a drawing. The location and elevation of the borings should be considered accurate only to the degree inherent with the method used and may be approximate.

The soil boring log includes sampling information, description of the materials recovered, approximate depths of boundaries between soil and rock strata as encountered and immediate depth to water data. The log represents conditions recorded specifically at the location where and when the boring was made. Site conditions may vary through time as will subsurface conditions. The boundaries between different soil strata as encountered are indicated at specific depths; however, these depths are in fact approximate and dependent upon the frequency of sampling, nature and consistency of the respective strata. Substantial variation between soil borings may commonly exist in subsurface conditions. Water level readings are made at the time and under conditions stated on the boring logs. Water levels change with time, precipitation, canal level, local well drawdown and other factors. Water level data provided on soil boring logs shall not be relied upon for groundwater based design or construction considerations.

LABORATORY AND FIELD TESTS

Tests are performed in *general* accordance with specific ASTM Standards unless otherwise indicated. All criteria included in a given ASTM Standard are not always required and performed. Each test boring report indicates the measurements and data developed at each specific test location.

ANALYSIS AND RECOMMENDATIONS

The geotechnical report is prepared primarily to aid in the design of site work and structural foundations. Although the information in the report is expected to be sufficient for these purposes, it shall not be utilized to determine the cost of construction nor to stand alone as a construction specification. Contractors shall verify subsurface conditions as may be appropriate prior to undertaking subsurface work.

Report recommendations are based primarily on data from test borings made at the locations shown on the test boring reports. Soil variations commonly exist between boring locations. Such variations may not become evident until construction. Test pits sometimes provide valuable supplemental information that derived from soil borings. If variations are then noted, the geotechnical engineer shall be contacted in writing immediately so that field conditions can be examined and recommendations revised if necessary.

The geotechnical report states our understanding as to the location, dimensions and structural features proposed for the site. **Any significant changes of the site improvements or site conditions must be communicated in writing to the geotechnical engineer immediately** so that the geotechnical analysis, conclusions, and recommendations can be reviewed and appropriately adjusted as necessary.

CONSTRUCTION OBSERVATION

Construction observation and testing is an important element of geotechnical services. The geotechnical engineer's field representative (G.E.F.R.) is the "owner's representative" observing the work of the contractor, performing tests and reporting data from such tests and observations. **The geotechnical engineer's field representative does not direct the contractor's construction means, methods, operations or personnel.** The G.E.F.R. does not interfere with the relationship between the owner and the contractor and, except as an observer, does not become a substitute owner on site. The G.E.F.R. is responsible for his/her safety, but has no responsibility for the safety of other personnel at the site. The G.E.F.R. is an important member of a team whose responsibility is to observe and test the work being done and report to the owner whether that work is being carried out in general conformance with the plans and specifications. The enclosed report may be relied upon solely by the named client.

SOIL AND ROCK CLASSIFICATION CRITERIA

SAND/SILT

N-VALUE (bpf)	RELATIVE DENSITY
0 – 4	Very Loose
5 – 10	Loose
11 – 29	Medium
30 – 49	Dense
>50	Very dense
100	Refusal

CLAY/SILTY CLAY

N-VALUE (bpf)	UNCONFINED COMP. STRENGTH (tsf)	CONSISTENCY
<2	<0.25	v. Soft
2 – 4	0.25 – 0.50	Soft
5 – 8	0.50 – 1.00	Medium
9 – 15	1.00 – 2.00	Stiff
16 – 30	2.00 – 4.00	v. Stiff
>30	>4.00	Hard

ROCK

N-VALUE (bpf)	RELATIVE HARDNESS	ROCK CHARACTERISTICS
$N \geq 100$	Hard to v. hard	Local rock formations vary in hardness from soft to very hard within short vertical and horizontal distances and often contain vertical solution holes of 3 to 36 inch diameter to varying depths and horizontal solution features. Rock may be brittle to split spoon impact, but more resistant to excavation.
$25 \leq N \leq 100$	Medium hard to hard	
$5 \leq N \leq 25$	Soft to medium hard	

PARTICLE SIZE

Boulder	>12 in.
Cobble	3 to 12 in.
Gravel	4.76 mm to 3 in.
Sand	0.074 mm to 4.76 mm
Silt	0.005 mm to 0.074 mm
Clay	<0.005 mm

DESCRIPTION MODIFIERS

0 – 5%	Slight trace
6 – 10%	Trace
11 – 20%	Little
21 – 35%	Some
>35%	And

Major Divisions			Group Symbols	Typical names	Laboratory classification criteria			
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_z = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3			
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW			
		Gravels with fines (Appreciable amount of fines)	GW*	d	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual symbols.	
			u					
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_z = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		
			SW	Well-graded sands, gravelly sands, little or no fines			Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SP	Poorly graded sands, gravelly sands, little or no fines	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in hatched zone with P.I. between 4 and 7 are <i>borderline</i> cases requiring use of dual system.		
			SM*	d			Silty sands, sand-silt mixtures	Atterberg limits above "A" line with P.I. more than 7
			u					
			SC	Clayey sands, sand-clay mixtures				
Fine-grained soils (More than half of material is smaller than No. 200 sieve size)	Silt and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	<div><div><div>60</div><div>50</div><div>40</div><div>30</div><div>20</div><div>10</div><div>0</div></div><div><div>0</div><div>10</div><div>20</div><div>30</div><div>40</div><div>50</div><div>60</div><div>70</div><div>80</div><div>90</div><div>100</div></div><div>Liquid Limit</div></div> <p>Plasticity Index</p> <p>Plasticity Chart</p>				
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy, clays, silty clays, lean clays					
		OL	Organic silts and organic silty clays of low plasticity					
	Silt and clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts					
		CH	Inorganic clays or high plasticity, fat clays					
		OH	Organic clays of medium to high plasticity, organic silts					
	Highly organic soils	PT	Peat and other highly organic soils					

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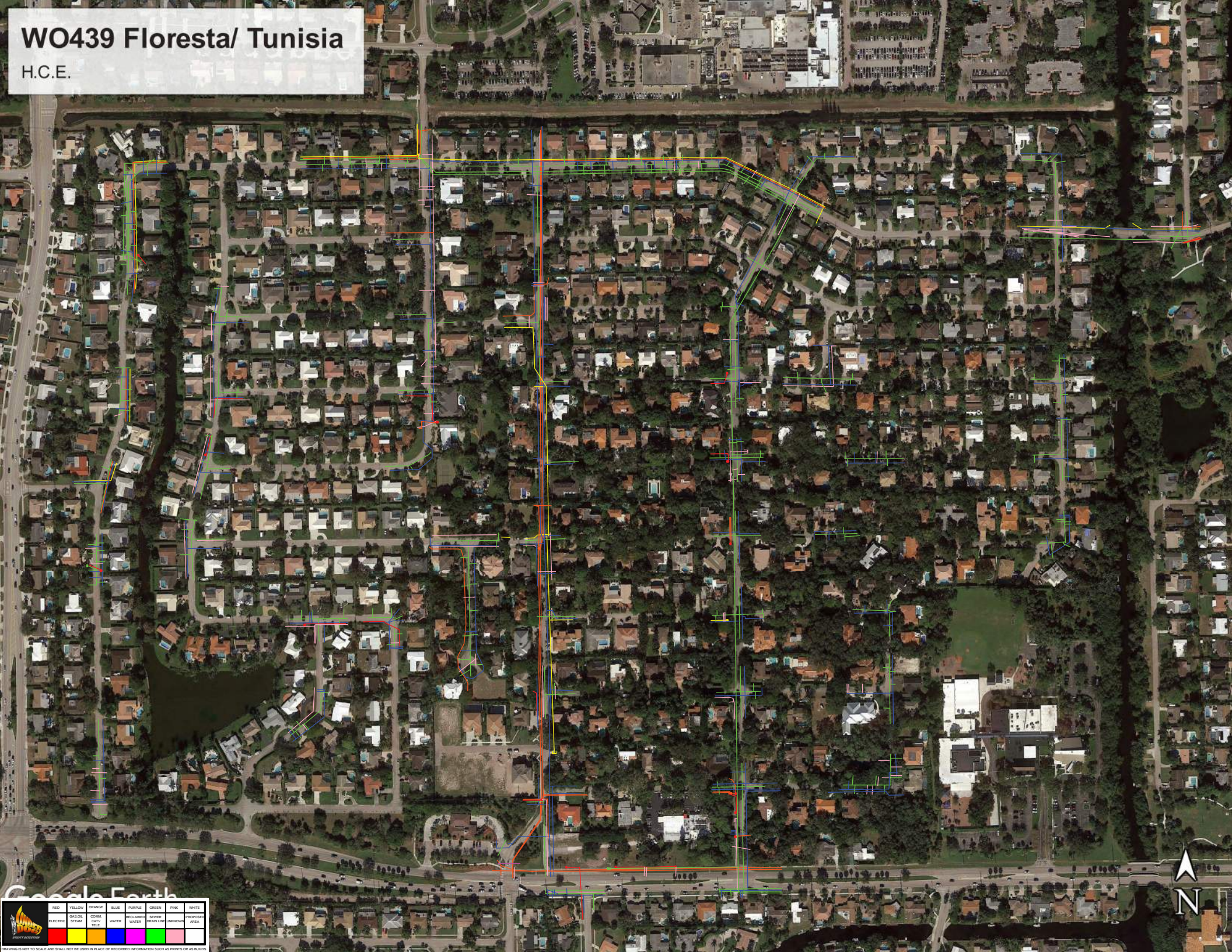
APPENDIX E

POTHOLE DATA

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WO439 Floresta/ Tunisia

H.C.E.



Google Earth

RED	YELLOW	ORANGE	BLUE	PURPLE	GREEN	PINK	WHITE
ELECTRIC	GAS/L	COM	RECLAIMED	SEWER	SWAN LANE	PROPOSED	AREA
WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER

DRAWING IS NOT TO SCALE AND SHALL NOT BE USED IN PLACE OF RECORDED INFORMATION SUCH AS PRINTS OR AS BUILDS

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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

SHEET/DRAWING #:

TH#1

PROJECT:Old Floresta

CLIENT: Holtz

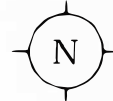
UTILITY LOCATED: REC **WATER** WATER ELECTRIC TELEPHONE COMMUNICATION SANITARY GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR FAIR **GOOD**

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR DB CBL VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: **MOIST** WET DRY **SANDY** ROCKY DEBRIS SUBMERGED

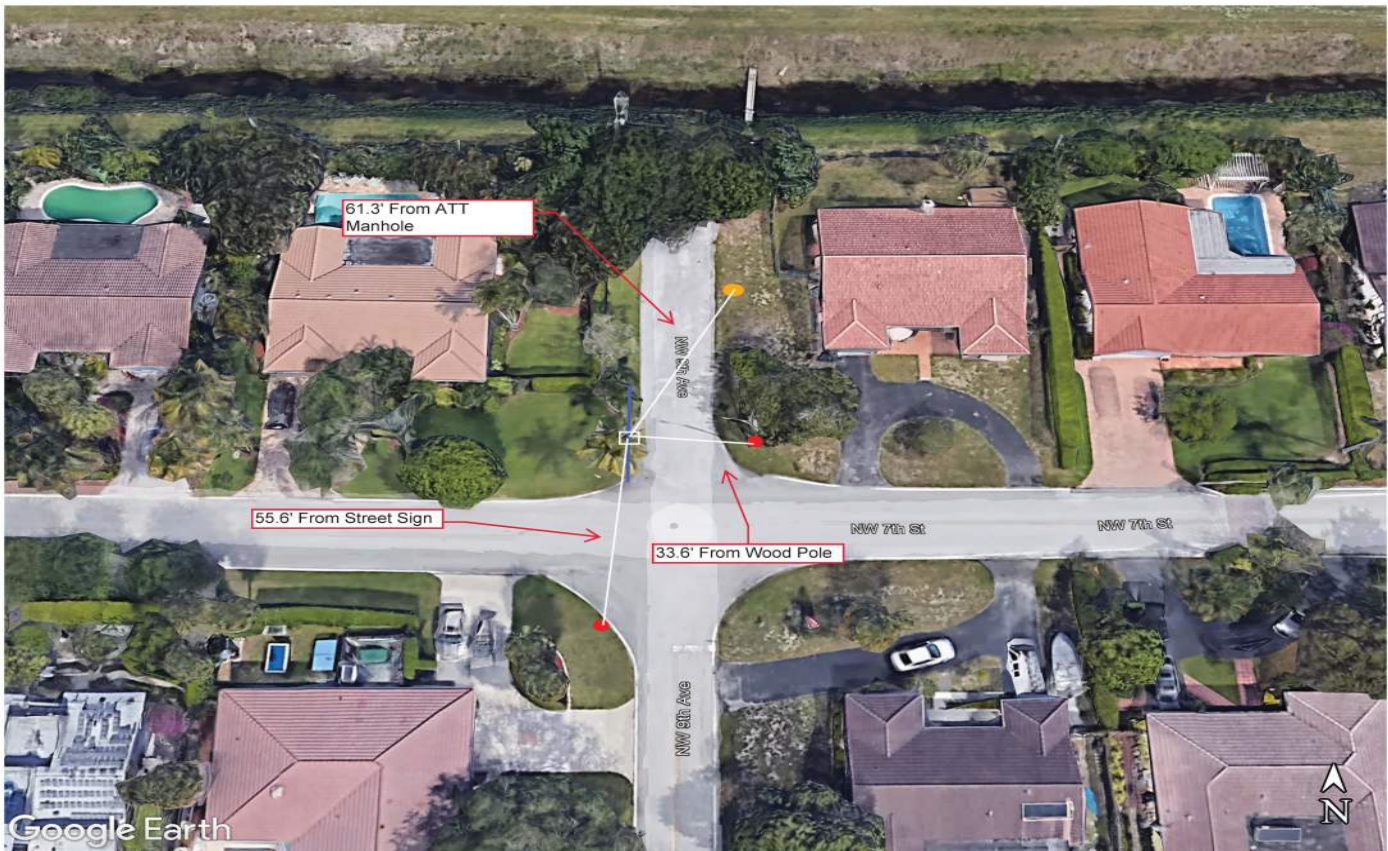
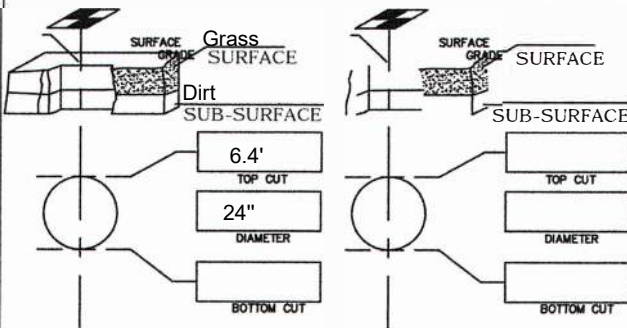
VISUALLY VERIFIED? **YES** NO



N.T.S.

Notes:24" C.I. Water Main @ 6.4'

TH#- SURFACE: **SOFT** HARD SURFACE: SOFT HARD
FACING: **N S E W** TH#- FACING: N S E W



UNDERDOG UTILITY DETECTION LLC. Utility Locating Services (561)-870-4943

All reports, drawings, sketches, narrative statements and summaries, location information and other information ("products"), in draft, review, final or other form, prepared by UNDERDOG for the use of a customer, are intended solely and exclusively for the use of that customer pursuant to a license for such exclusive use granted to the customer by UNDERDOG, and further are limited to the conditions, circumstances and discoveries at the time such product is made available to the customer. All products remain the sole property of UNDERDOG, subject to the foregoing limited license to UNDERDOG'S customer and are intended for and made available to the customer for the specific, limited purposes stated in the contract between UNDERDOG and the customer. The use of any such proprietary products by anyone other than the customer or other licensee authorized in writing by UNDERDOG is strictly prohibited. UNDERDOG has not granted any customer any right to disclose the product to any other person or entity, and further declares that any such disclosure constitutes the theft of Intellectual property. UNDERDOG does not accept or assume liability for the use of its products and disclaims all and any warranties that would or might otherwise attach to the products or their use by any person or entity.



TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

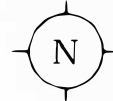
SHEET/DRAWING #:

TH#2A

PROJECT:Old Floresta

CLIENT: Holtz

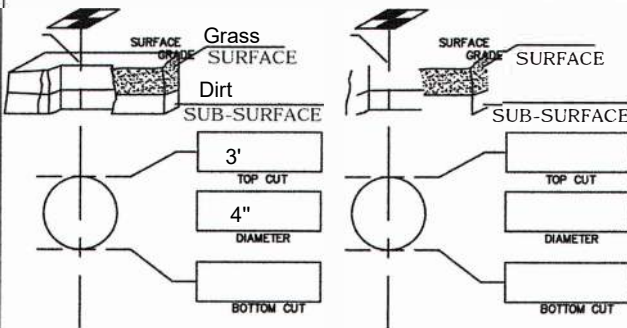
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR		DB CBL	VCPX	TILE DUCT	T.COTTA	ROUGH POUR
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES		NO				



N.T.S.

TH#:- SURFACE: **SOFT** HARD FACING: **N S** E W TH#:- SURFACE: SOFT HARD FACING: N S E W

Notes: 4" Yellow Poly @ 3'



UNDERDOG UTILITY DETECTION LLC. Utility Locating Services (561)-870-4943

All reports, drawings, sketches, narrative statements and summaries, location information and other information ("products"), in draft, review, final or other form, prepared by UNDERDOG for the use of a customer, are intended solely and exclusively for the use of that customer pursuant to a license for such exclusive use granted to the customer by UNDERDOG, and further are limited to the conditions, circumstances and discoveries at the time such product is made available to the customer. All products remain the sole property of UNDERDOG, subject to the foregoing limited license to UNDERDOG'S customer and are intended for and made available to the customer for the specific, limited purposes stated in the contract between UNDERDOG and the customer. The use of any such proprietary products by anyone other than the customer or other licensee authorized in writing by UNDERDOG is strictly prohibited. UNDERDOG has not granted any customer any right to disclose the product to any other person or entity, and further declares that any such disclosure constitutes the theft of Intellectual property. UNDERDOG does not accept or assume liability for the use of its products and disclaims all and any warranties that would or might otherwise attach to the products or their use by any person or entity.



TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

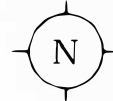
SHEET/DRAWING #:

TH#2B

PROJECT:Old Floresta

CLIENT: Holtz

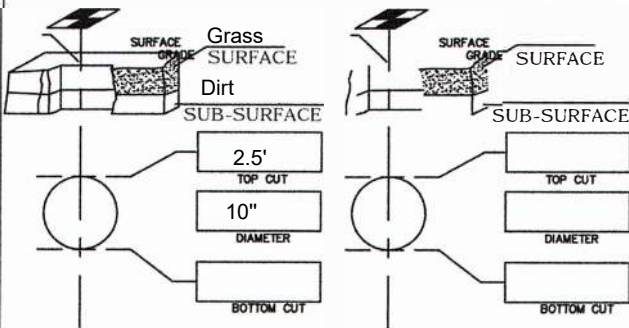
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#- SURFACE: **SOFT** HARD FACING: **N S E W** TH#- SURFACE: SOFT HARD FACING: N S E W

Notes:10" C.I. Water Main @ 2.5'



UNDERDOG UTILITY DETECTION LLC. Utility Locating Services (561)-870-4943

All reports, drawings, sketches, narrative statements and summaries, location information and other information ("products"), in draft, review, final or other form, prepared by UNDERDOG for the use of a customer, are intended solely and exclusively for the use of that customer pursuant to a license for such exclusive use granted to the customer by UNDERDOG, and further are limited to the conditions, circumstances and discoveries at the time such product is made available to the customer. All products remain the sole property of UNDERDOG, subject to the foregoing limited license to UNDERDOG'S customer and are intended for and made available to the customer for the specific, limited purposes stated in the contract between UNDERDOG and the customer. The use of any such proprietary products by anyone other than the customer or other licensee authorized in writing by UNDERDOG is strictly prohibited. UNDERDOG has not granted any customer any right to disclose the product to any other person or entity, and further declares that any such disclosure constitutes the theft of Intellectual property. UNDERDOG does not accept or assume liability for the use of its products and disclaims all and any warranties that would or might otherwise attach to the products or their use by any person or entity.



TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

SHEET/DRAWING #:

TH#3

PROJECT:Old Floresta

CLIENT: Holtz

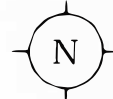
UTILITY LOCATED: REC. WATER WATER ELECTRIC TELEPHONE COMMUNICATION **SANITARY** GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR **FAIR** GOOD

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR DB CBL VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: **MOIST** WET DRY **SANDY ROCKY** DEBRIS SUBMERGED

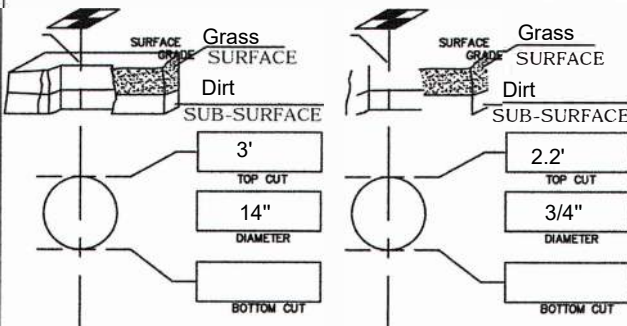
VISUALLY VERIFIED? **YES** NO



N.T.S.

TH#-FM SURFACE: **SOFT** HARD SURFACE: SOFT HARD
FACING: **N S** E W TH#-DB FACING: **N S** E W

Notes: 14" C.I. Force Main @ 3'
.75" Direct Buried Cable @2.2'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

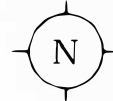
SHEET/DRAWING #:

TH#4

PROJECT:Old Floresta

CLIENT: Holtz

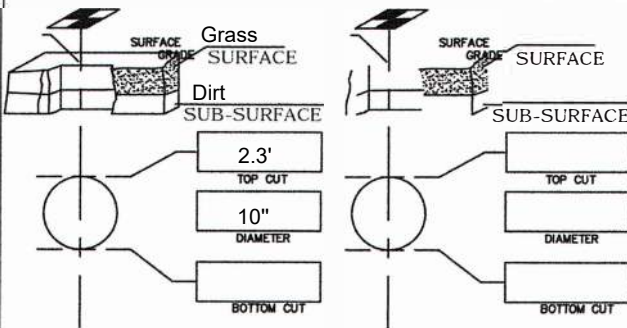
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#- SURFACE: **SOFT** HARD FACING: **N S E W** TH#- SURFACE: SOFT HARD FACING: N S E W

Notes: 10" C.I. Forced Main @ 2.3'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

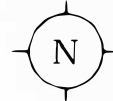
SHEET/DRAWING #:

TH#5

PROJECT:Old Floresta

CLIENT: Holtz

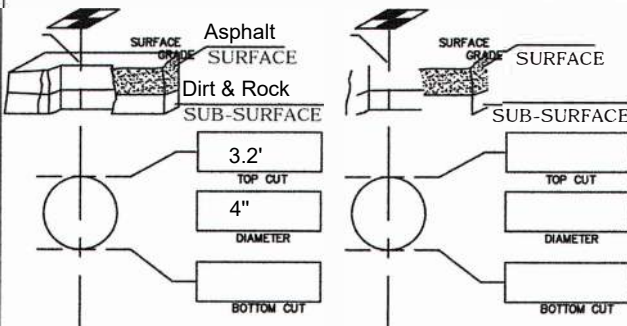
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#:- SURFACE: SOFT **HARD** SURFACE: SOFT HARD
FACING: **N S E W** TH#:- FACING: N S E W

Notes: 4" Wrapped Steel Gas @ 3.2'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

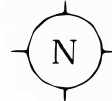
SHEET/DRAWING #:

TH # 6

PROJECT: Old Floresta

CLIENT: Holtz

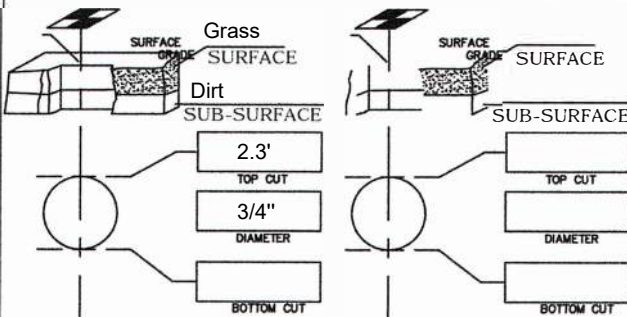
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR		DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#- SURFACE: SOFT HARD FACING: N S E W TH#- SURFACE: SOFT HARD FACING: N S E W

Notes: .75" Direct Buried Cable @ 2.3'



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FORM BY/TECHS:

DATE:06/12/2023

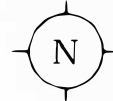
SHEET/DRAWING #:

TH#7

PROJECT:Old Floresta

CLIENT: Holtz

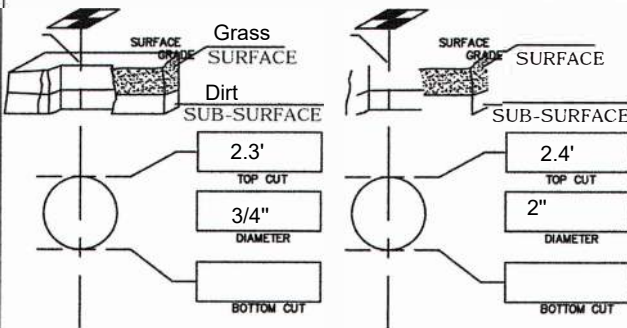
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR		DB CBL	VCPIX	TILE DUCT	T.COTTA	OTHER:
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES		NO				



N.T.S.

TH#- SURFACE: SOFT HARD FACING: N S E W TH#- SURFACE: SOFT HARD FACING: N S E W

Notes: .75" Direct Buried Cable @ 2.3'
2" Grey P.V.C. @ 2.4'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

SHEET/DRAWING #:

TH#8

PROJECT:Old Floresta

CLIENT: Holtz

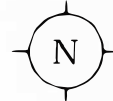
UTILITY LOCATED: REC. WATER WATER ELECTRIC TELEPHONE **COMMUNICATION** **SANITARY** GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR **FAIR** GOOD

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR **DB CBL** VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: MOIST WET **DRY** **SANDY** ROCKY DEBRIS SUBMERGED

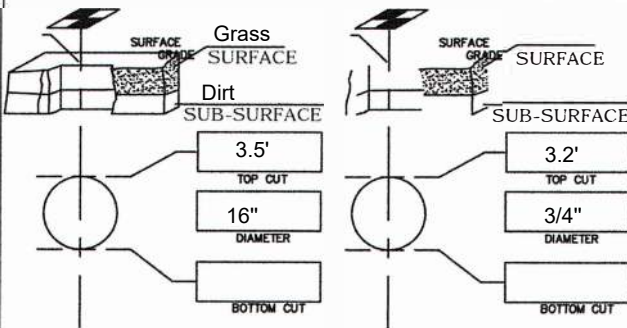
VISUALLY VERIFIED? **YES** NO



N.T.S.

TH#:- SURFACE: **SOFT** HARD FACING: N S **E** W TH#:- SURFACE: SOFT HARD FACING: **N** S E W

Notes:16" C.I. F.M. @ 3.5'
.75" D.B. Cable @ 3.2'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

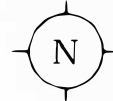
SHEET/DRAWING #:

TH#9

PROJECT:Old Floresta

CLIENT: Holtz

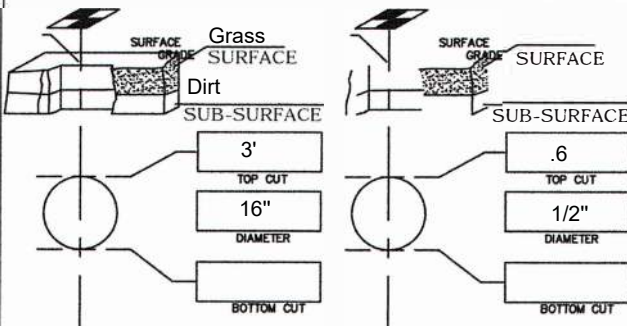
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR		DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES		NO				



N.T.S.

TH#- SURFACE: **SOFT** HARD FACING: **N S E W** TH#- SURFACE: SOFT HARD FACING: N S E W

Notes: 16" C.I.F.M. @ 3'
.75" P.V.C. Irrigation @ .6'



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DATE:06/12/2023

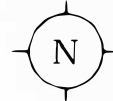
SHEET/DRAWING #:

TH#10

PROJECT:Old Floresta

CLIENT: Holtz

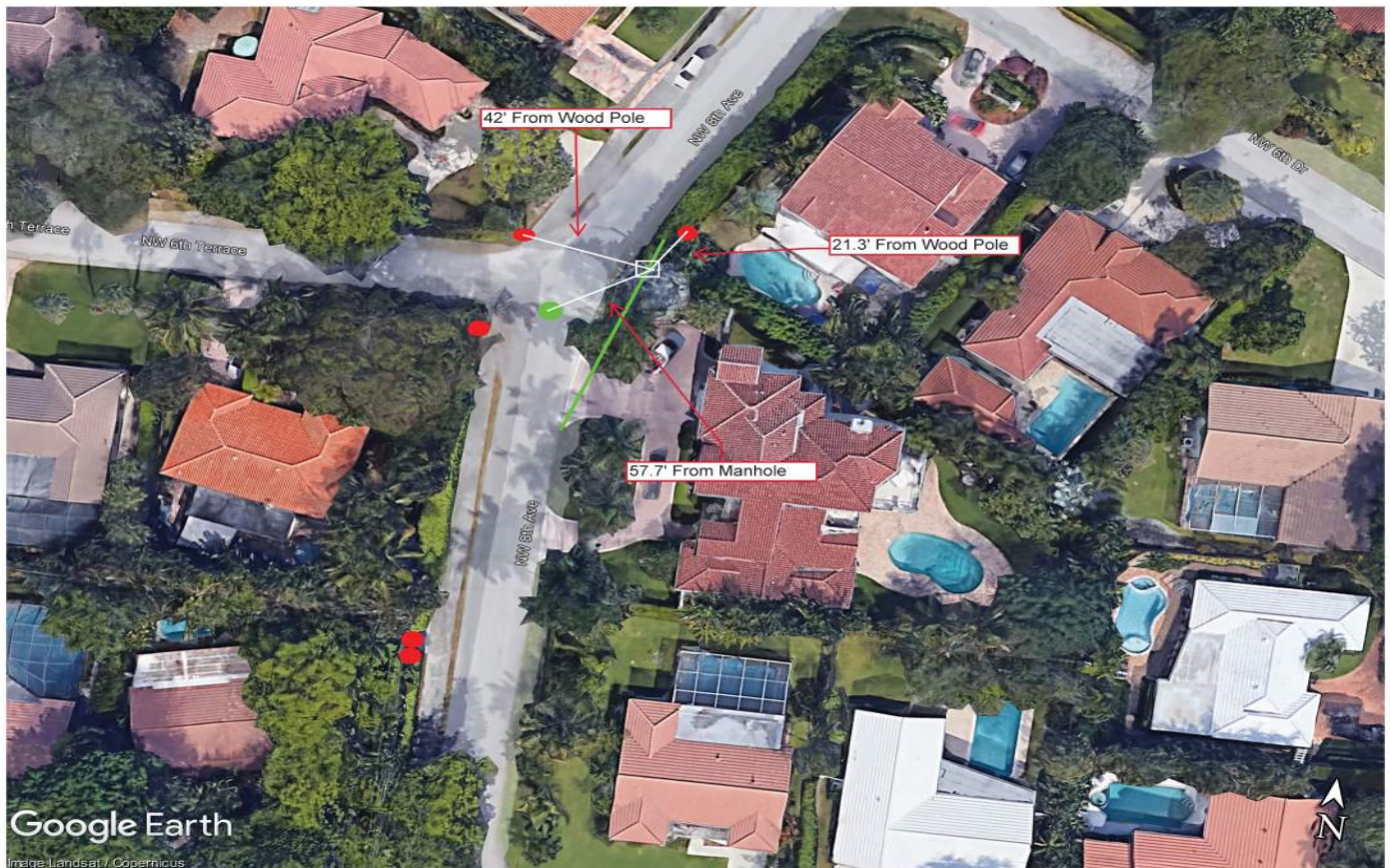
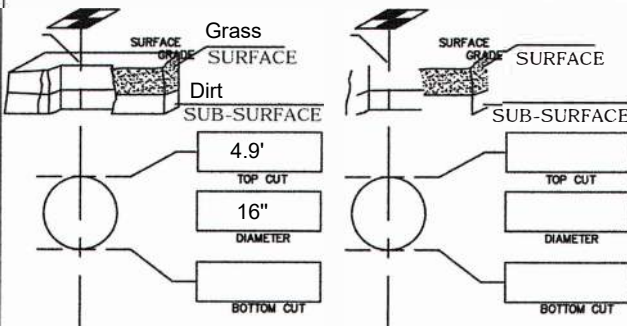
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#- SURFACE: **SOFT** HARD FACING: **N S E W** TH#- SURFACE: SOFT HARD FACING: N S E W

Notes:16" C.I. F.M. @ 4.9'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

SHEET/DRAWING #:

TH# 11

PROJECT: Old Floresta

CLIENT: Holtz

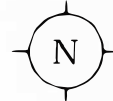
UTILITY LOCATED: REC. WATER **WATER** ELECTRIC TELEPHONE COMMUNICATION SANITARY GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR **FAIR** GOOD

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR DB CBL VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: **MOIST** WET DRY **SANDY** ROCKY DEBRIS SUBMERGED

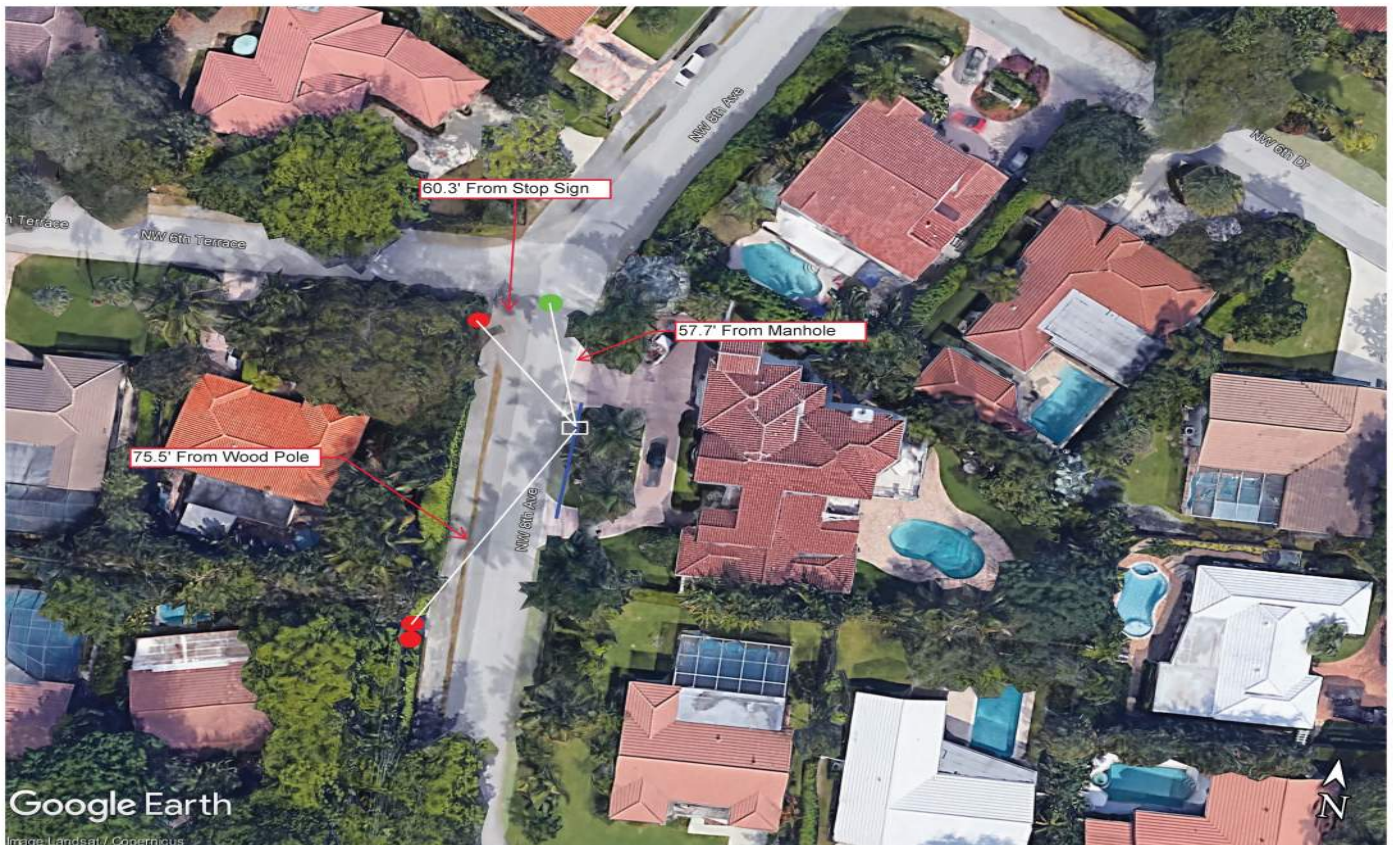
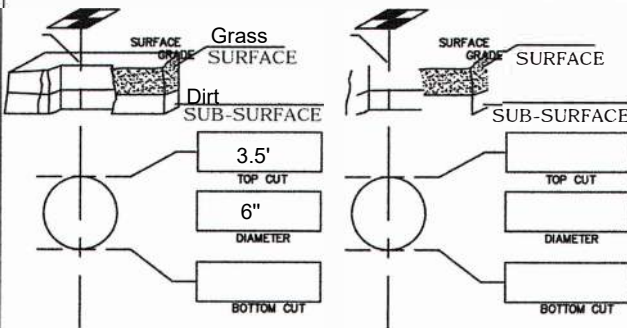
VISUALLY VERIFIED? **YES** NO



N.T.S.

TH#- SURFACE: **SOFT** HARD SURFACE: SOFT HARD
FACING: **N S E W** TH#- FACING: N S E W

Notes: 6" C.I. W.M. @ 3.5'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

SHEET/DRAWING #:

TH# 12

PROJECT:Old Floresta

CLIENT: Holtz

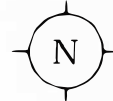
UTILITY LOCATED: REC. WATER **WATER** ELECTRIC TELEPHONE COMMUNICATION SANITARY GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR FAIR **GOOD**

MATERIAL FOUND: CI DI STEEL RCP PVC POLY AC **PCCP** ROUGH POUR
SMOOTH POUR DB CBL VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: **MOIST** WET DRY **SANDY** ROCKY DEBRIS SUBMERGED

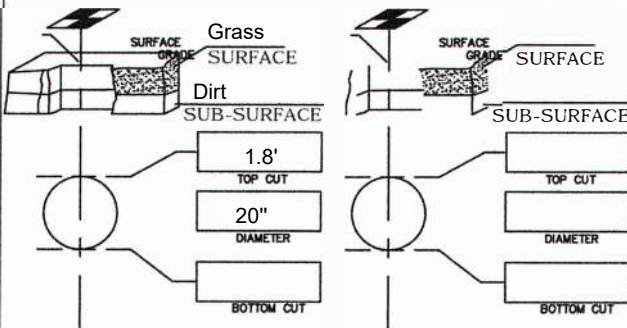
VISUALLY VERIFIED? **YES** NO



N.T.S.

TH#- SURFACE **SOFT** HARD SURFACE: SOFT HARD
FACING: N S **E W** TH#- FACING: N S E W

Notes: 20" P.C.C.P. W.M. @ 1.8'



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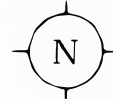
SHEET/DRAWING #:

TH#13

PROJECT:Old Floresta

CLIENT: Holtz

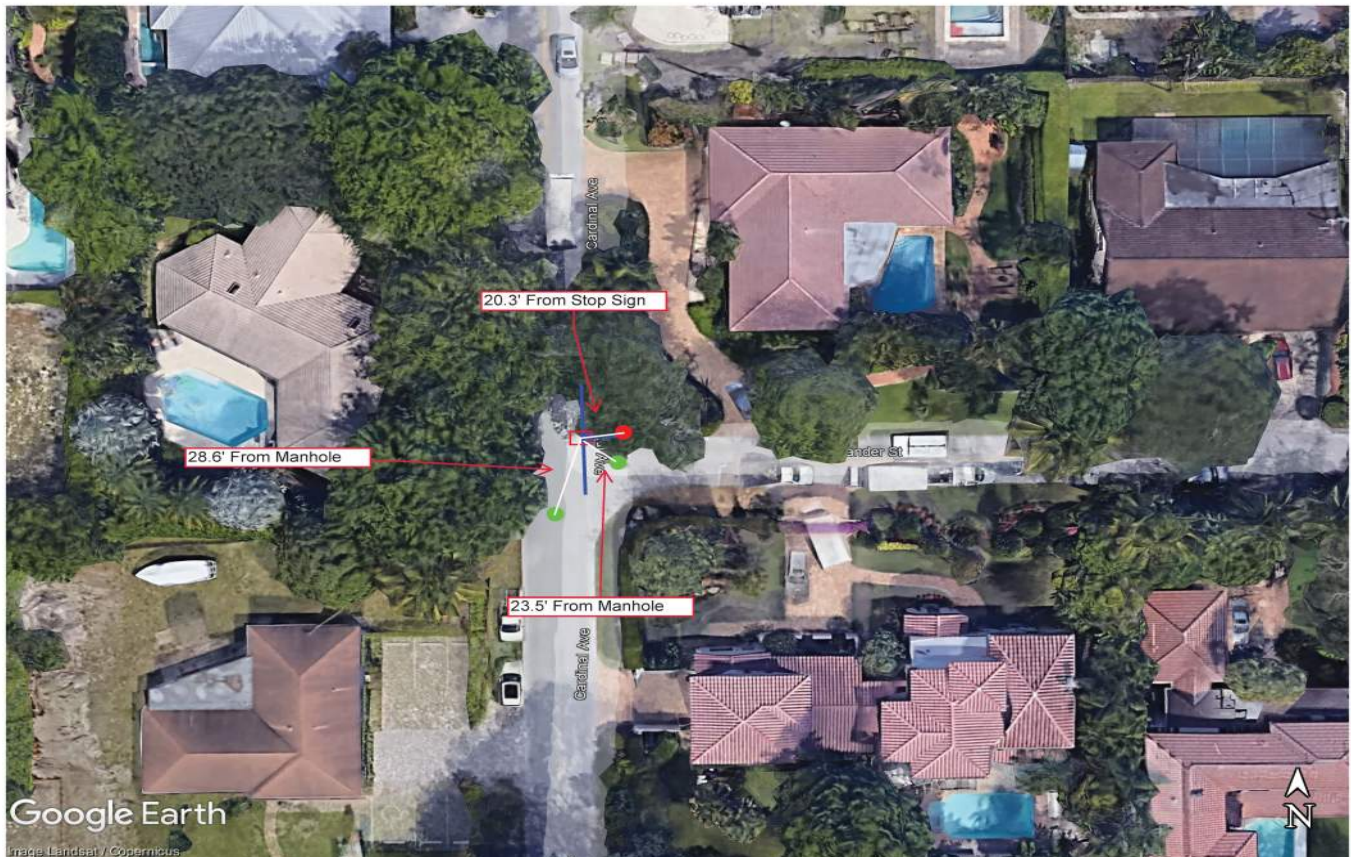
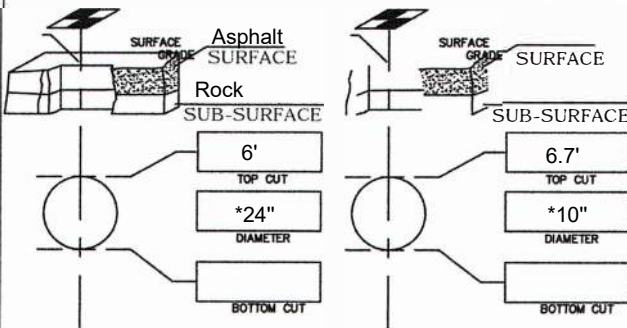
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY ROCKY	DEBRIS	SUBMERGED	
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#- SURFACE: SOFT **HARD** SURFACE: SOFT HARD
FACING: **N S** E W TH#- FACING: N S **E W**

Notes: Possible 24" C.I. W.M. @ 6'
Possible 10" Unknown W.M. @ 6.7'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

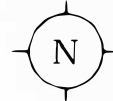
SHEET/DRAWING #:

TH# 14

PROJECT:Old Floresta

CLIENT: Holtz

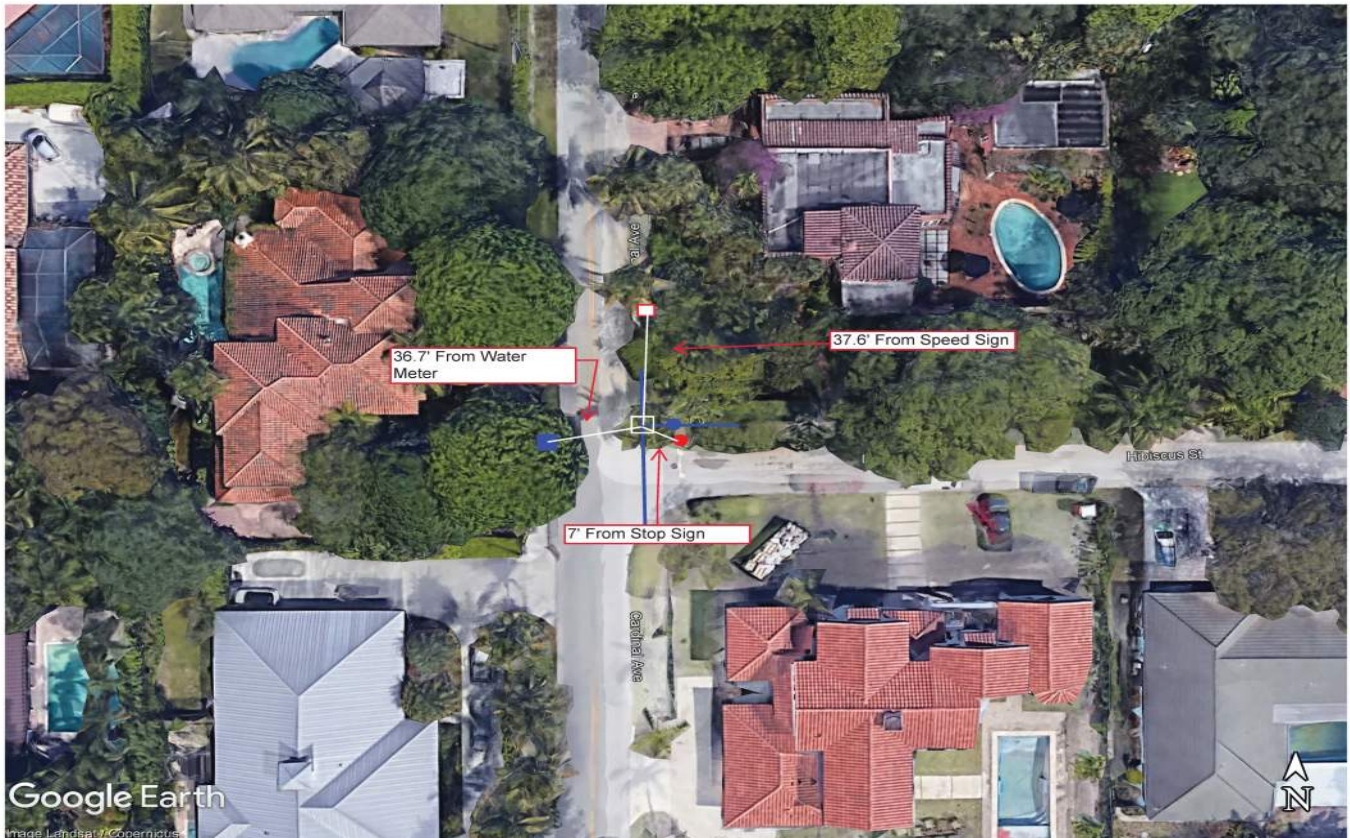
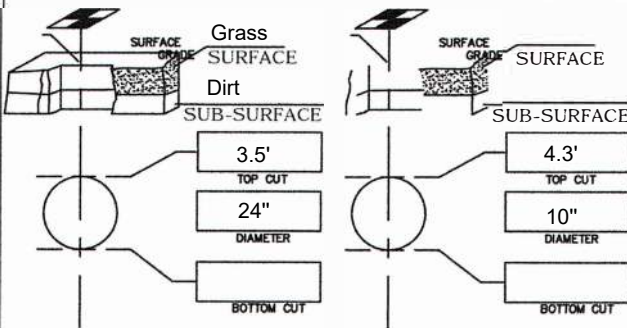
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#- SURFACE: **SOFT** HARD FACING: **N S** E W TH#- SURFACE: **SOFT** HARD FACING: N S **E W**

Notes: 24" C.I. W.M. @ 3.5'
10" C.I. W.M. @ 4.3'
2" Yellow Poly @ 2.2' Running N&S



UNDERDOG UTILITY DETECTION LLC. Utility Locating Services (561)-870-4943

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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

SHEET/DRAWING #:

TH# 15

PROJECT:Old Floresta

CLIENT: Holtz

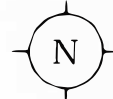
UTILITY LOCATED: REC. WATER **WATER** ELECTRIC TELEPHONE **COMMUNICATION** SANITARY GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR FAIR **GOOD**

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR **DB CBL** VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: **MOIST** WET DRY **SANDY** ROCKY DEBRIS SUBMERGED

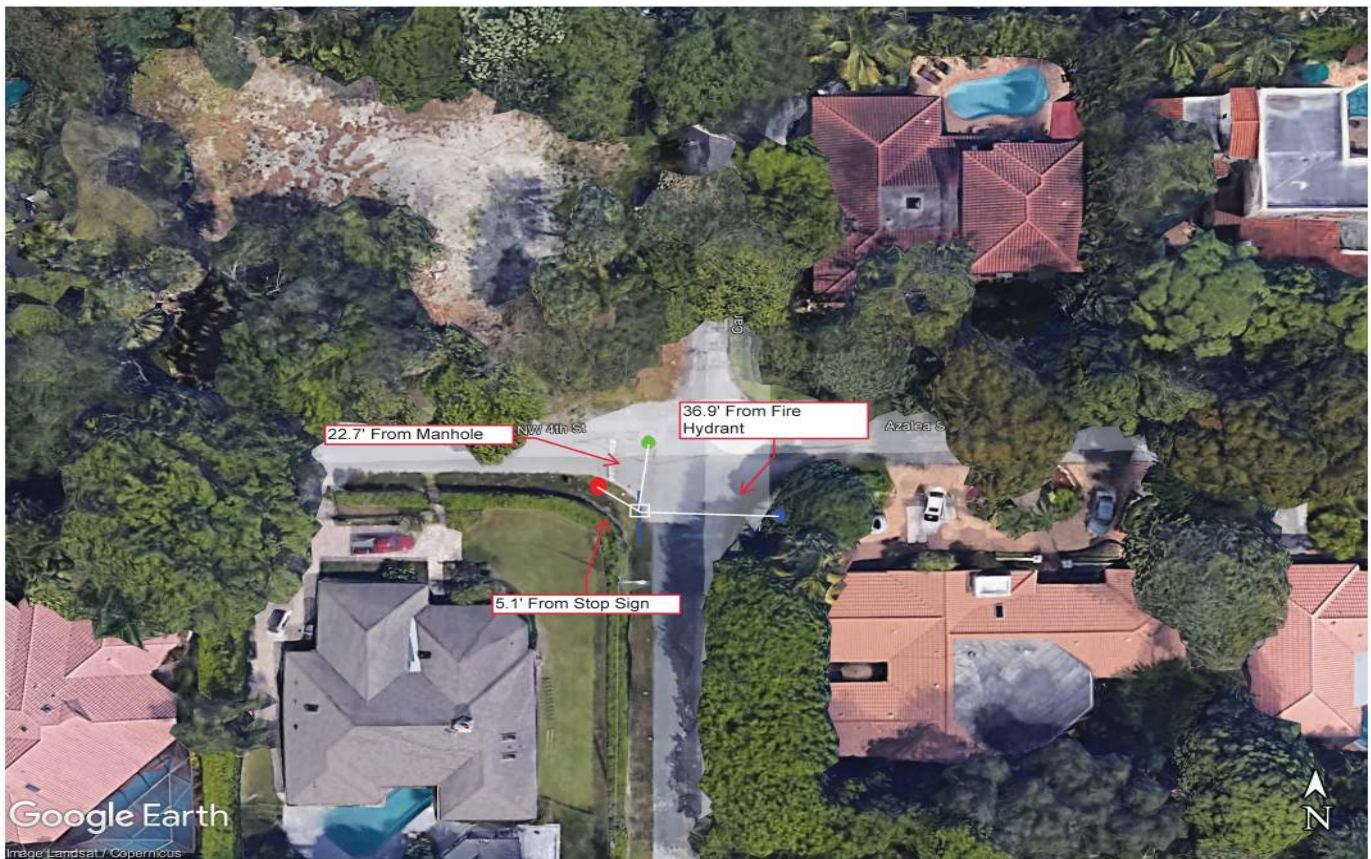
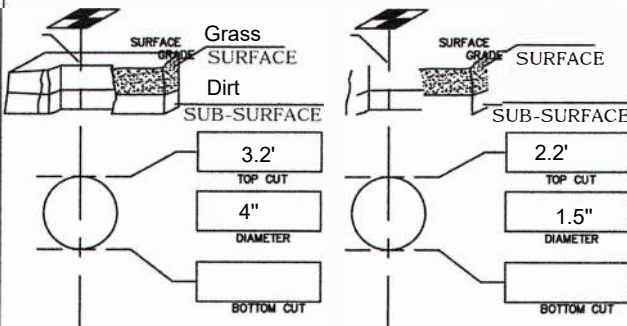
VISUALLY VERIFIED? **YES** NO



N.T.S.

TH#:- SURFACE: SOFT HARD FACING: N S E W TH#:- SURFACE: SOFT HARD FACING: N S E W

Notes: 4" C.I. @ 3.2'
3x 1.5" D.B. Cables @ 2.2'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:06/12/2023

SHEET/DRAWING #:

TH#16

PROJECT:Old Floresta

CLIENT: Holtz

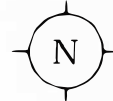
UTILITY LOCATED: REC. WATER WATER ELECTRIC TELEPHONE COMMUNICATION **SANITARY** GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR **FAIR** GOOD

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR DB CBL VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: MOIST WET **DRY** **SANDY** ROCKY DEBRIS SUBMERGED

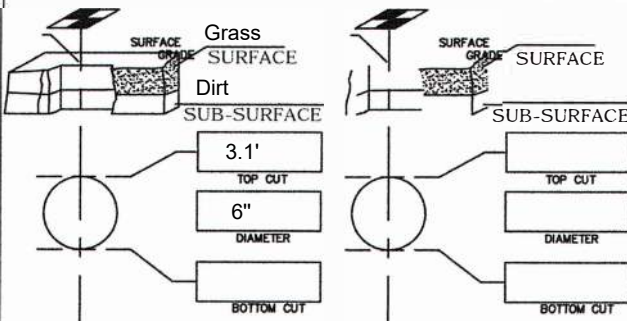
VISUALLY VERIFIED? **YES** NO



N.T.S.

Notes: 6" C.I. F.M. @ 3.1'

TH#- SURFACE: **SOFT** **HARD** SURFACE: SOFT HARD
FACING: N S **E** W TH#- FACING: N S E W



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FORM BY/TECHS:

DATE:06/12/2023

SHEET/DRAWING #:

TH#17

PROJECT:Old Floresta

CLIENT: Holtz

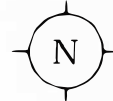
UTILITY LOCATED: REC. WATER **WATER** ELECTRIC TELEPHONE COMMUNICATION SANITARY GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR **FAIR** GOOD

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR DB CBL VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: MOIST WET **DRY** **SANDY** ROCKY DEBRIS SUBMERGED

VISUALLY VERIFIED? **YES** NO



N.T.S.

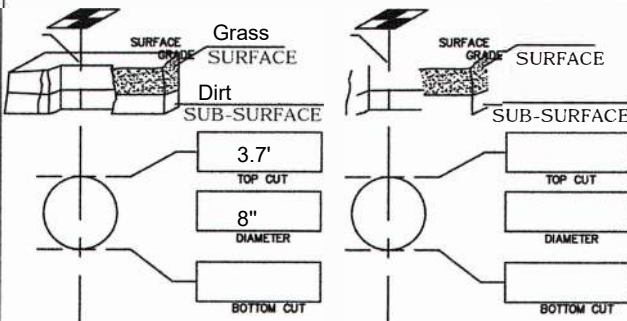
SURFACE: **SOFT** HARD

SURFACE: SOFT HARD

Notes: 8" C.I. W.M. @ 3.7'

TH#:- FACING: N S **E** W

TH#:- FACING: N S E W



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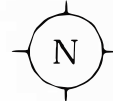
SHEET/DRAWING #:

TH#

PROJECT: Old Floresta

CLIENT: Holtz

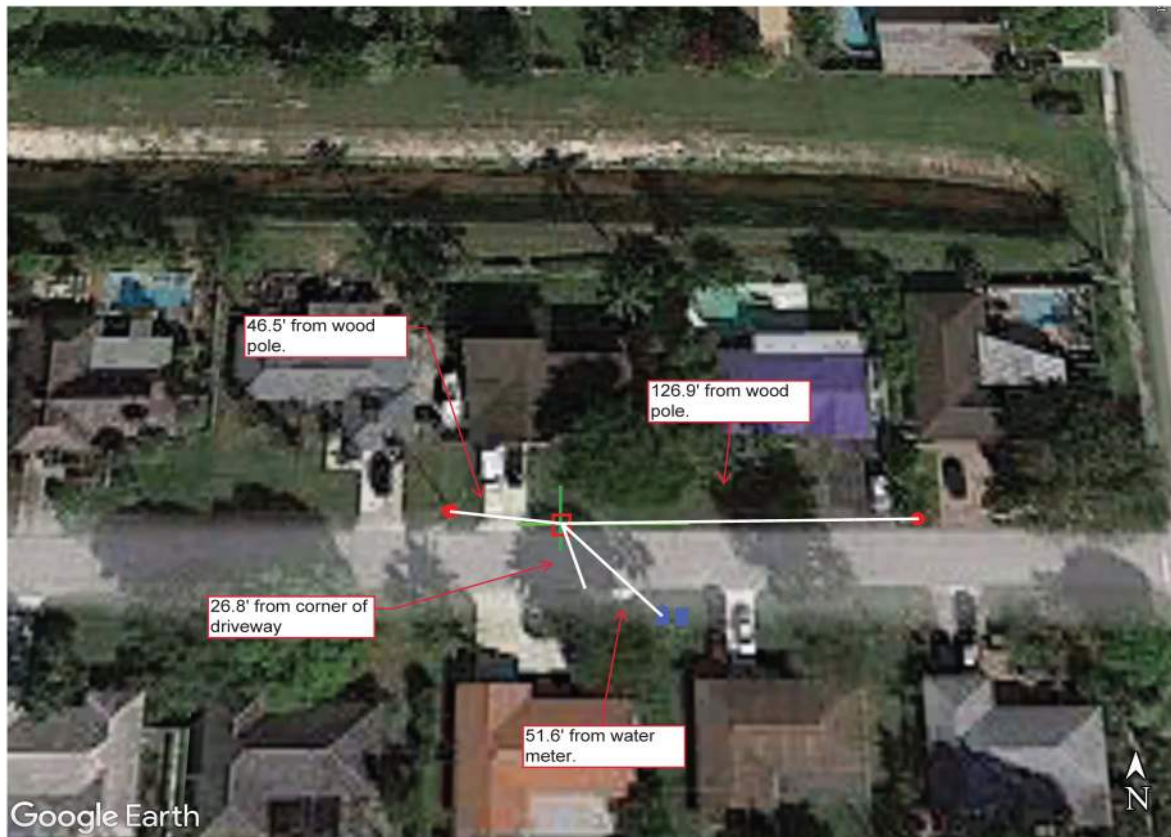
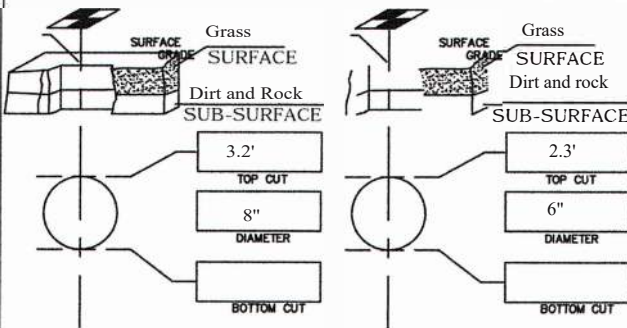
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#- SURFACE: **SOFT** HARD FACING: N S **E** W TH#- SURFACE: **SOFT** HARD FACING: N S E W

Notes: 8" Cast Iron F.M. @ 3.2'
6" Cast Iron Sewer Lateral @ 2.3'



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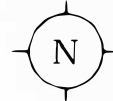
SHEET/DRAWING #:

TH# 2

PROJECT: Old Floresta

CLIENT: Holtz

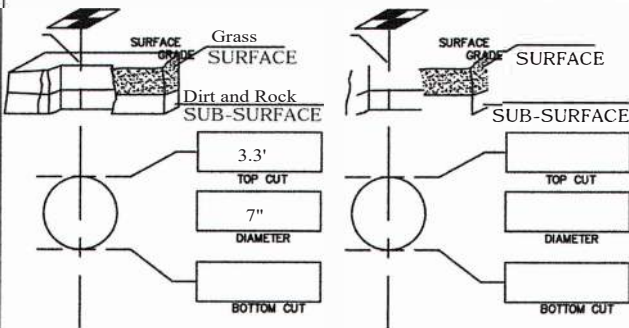
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR		DB CBL	VCPX	TILE DUCT	T.COTTA	ROUGH POUR
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

Notes:

TH#- SURFACE: **SOFT** HARD FACING: **N S** E W TH#- SURFACE: SOFT HARD FACING: N S E W



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FORM BY/TECHS:

DATE:10/27/2023

SHEET/DRAWING #:

TH# 3

PROJECT: Old Floresta

CLIENT: Holtz

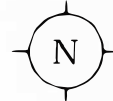
UTILITY LOCATED: REC. WATER WATER ELECTRIC TELEPHONE COMMUNICATION **SANITARY** GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR **FAIR** GOOD

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR DB CBL VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: **MOIST** WET DRY SANDY ROCKY DEBRIS SUBMERGED

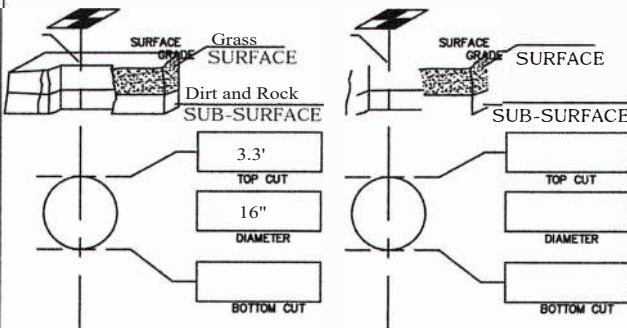
VISUALLY VERIFIED? **YES** NO



N.T.S.

Notes:

TH#- SURFACE: **SOFT** HARD SURFACE: SOFT HARD
FACING: N S **E** W TH#- FACING: N S E W



Google Earth

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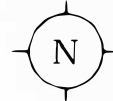
SHEET/DRAWING #:

TH# 4

PROJECT:Old Floresta

CLIENT: Holtz

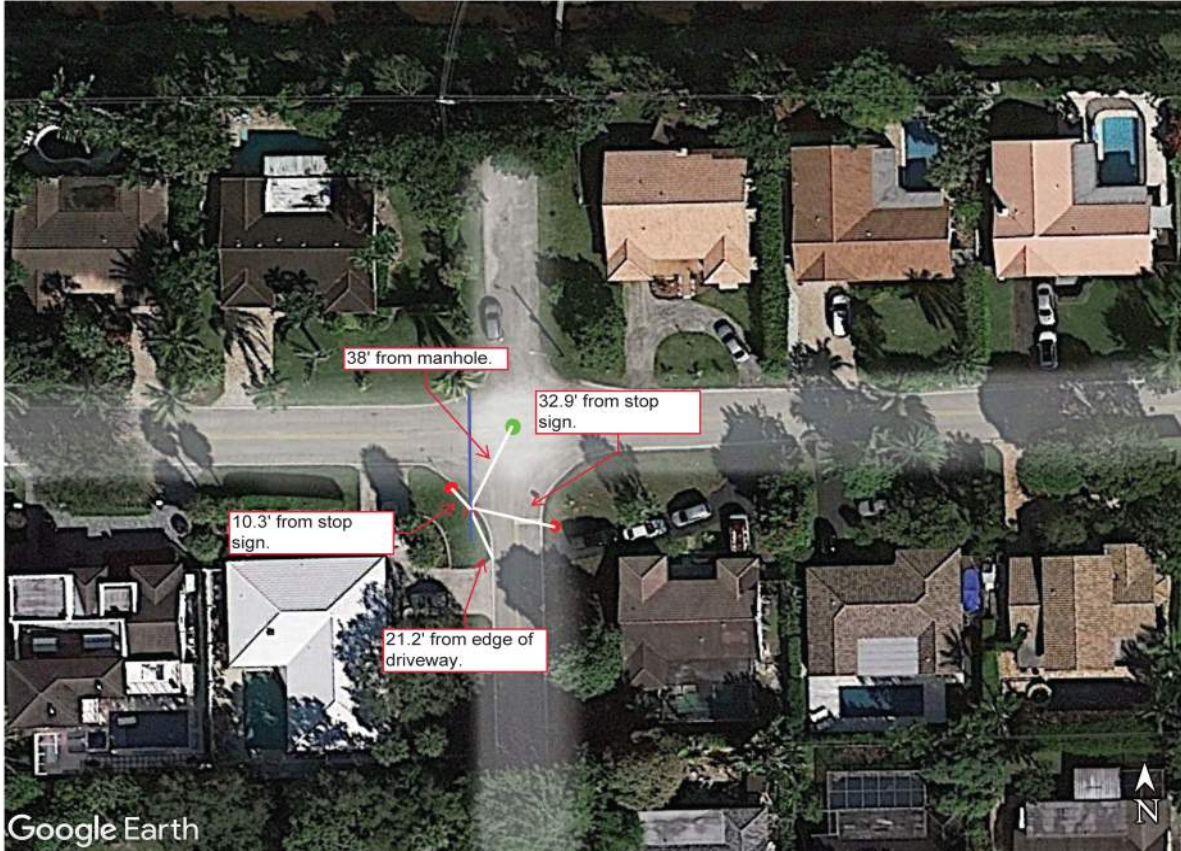
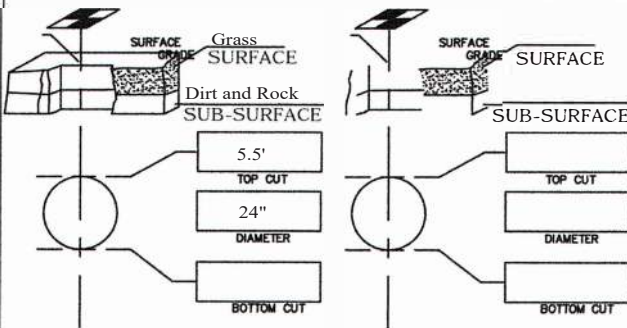
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

Notes:

TH#- SURFACE: **SOFT** HARD SURFACE: SOFT HARD
FACING: **N S** E W TH#- FACING: N S E W



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DATE:10/27/2023

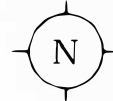
SHEET/DRAWING #:

TH#5

PROJECT:Old Floresta

CLIENT: Holtz

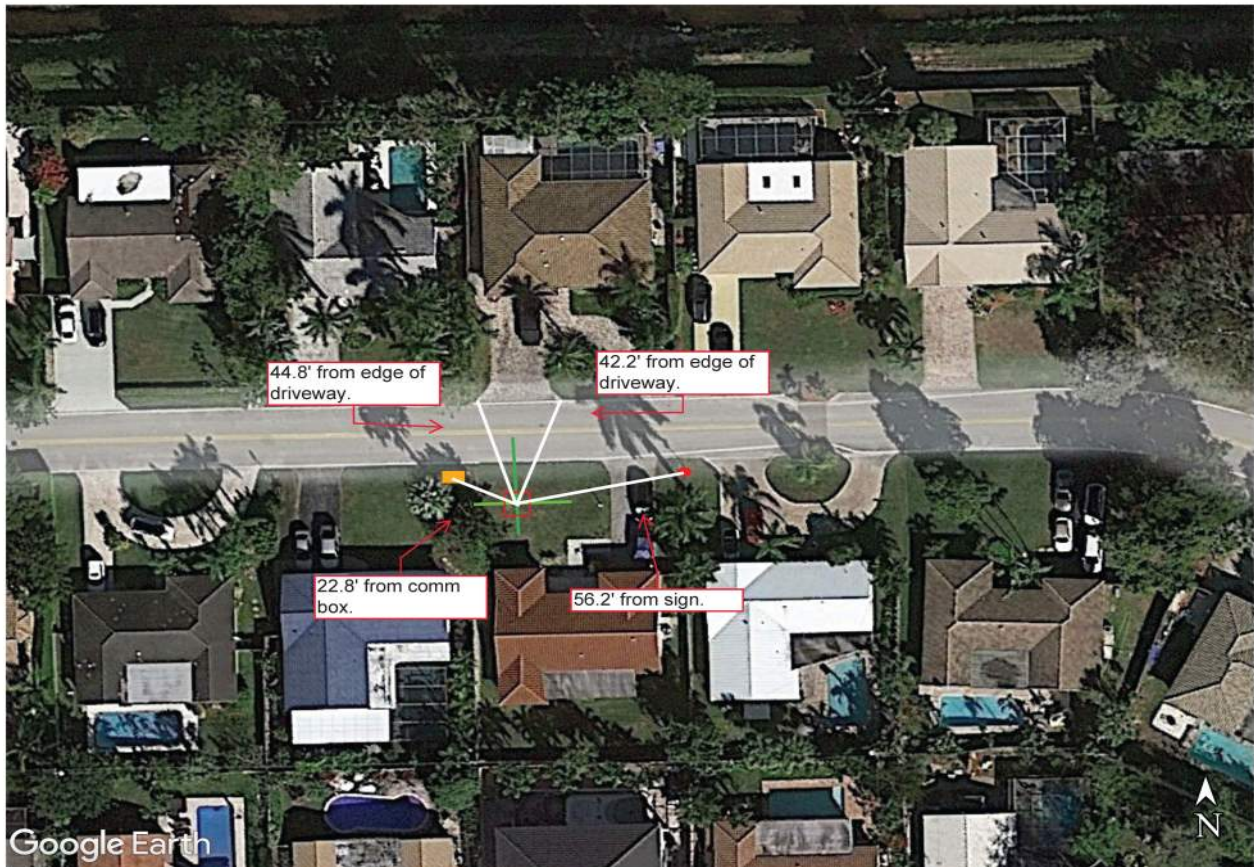
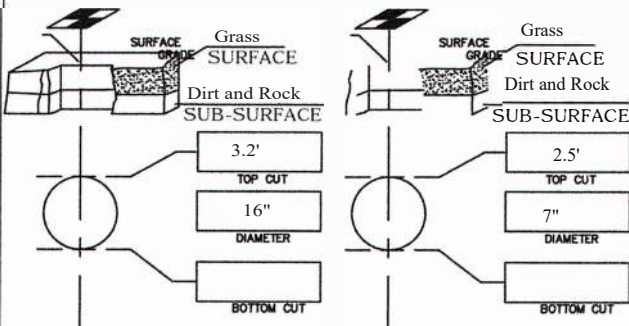
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#:	SURFACE: SOFT HARD	TH#:	SURFACE: SOFT HARD
FACING: N S E W		FACING: N S E W	

Notes: 16" Cast Iron F.M. @ 3.2'
7" Terra Cotta Sewer Lateral @ 2.5'



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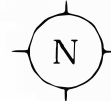
SHEET/DRAWING #:

TH# 6

PROJECT:Old Floresta

CLIENT: Holtz

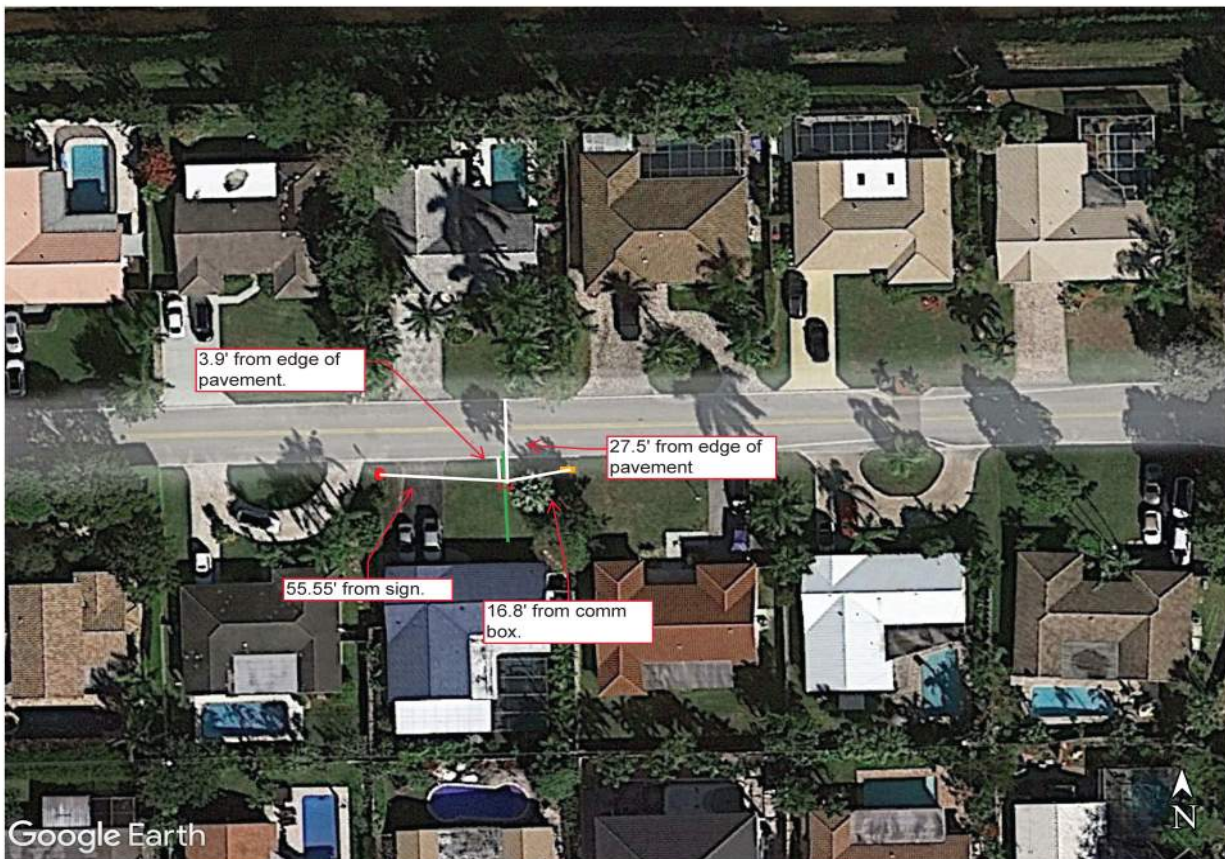
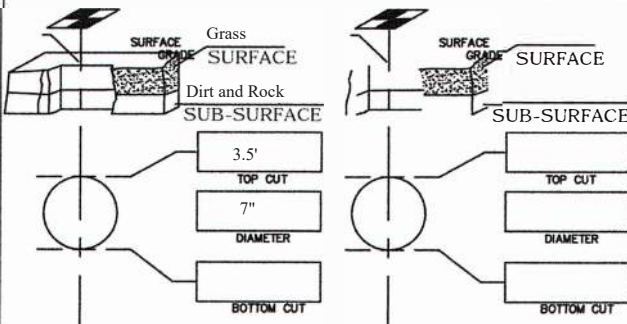
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR		DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

Notes:

TH#:- SURFACE: **SOFT** HARD FACING: **N S** E W TH#:- SURFACE: SOFT HARD FACING: N S E W



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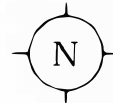
SHEET/DRAWING #:

TH# 7

PROJECT:Old Floresta

CLIENT: Holtz

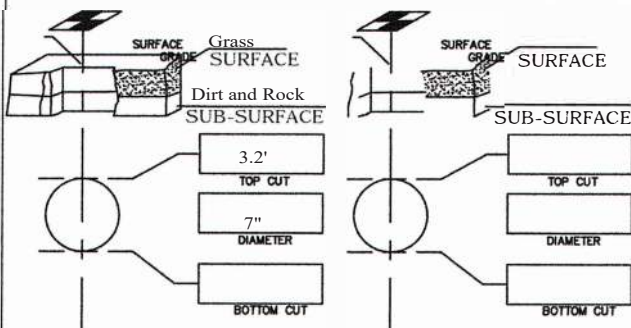
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR		DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

Notes:

TH#- SURFACE: **SOFT** HARD FACING: **N S E W** TH#- SURFACE: SOFT HARD FACING: N S E W



UNDERDOG UTILITY DETECTION LLC. Utility Locating Services (561)-870-4943

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TEST HOLE REPORT

FORM BY/TECHS:

DATE:10/27/2023

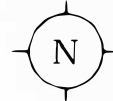
SHEET/DRAWING #:

TH# 8

PROJECT:Old Floresta

CLIENT: Holtz

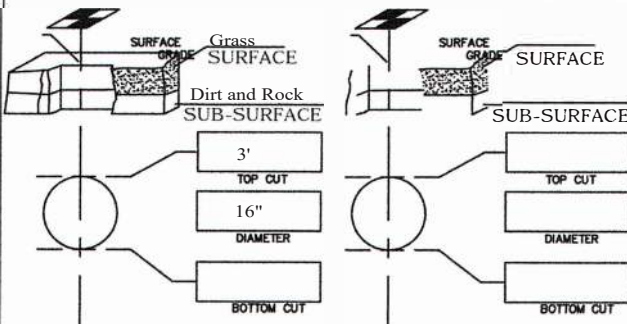
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

Notes:

TH#- SURFACE: **SOFT** HARD FACING: N S E W TH#- SURFACE: SOFT HARD FACING: N S E W



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:10/27/2023

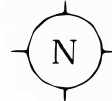
SHEET/DRAWING #:

TH# 9

PROJECT: Old Floresta

CLIENT: Holtz

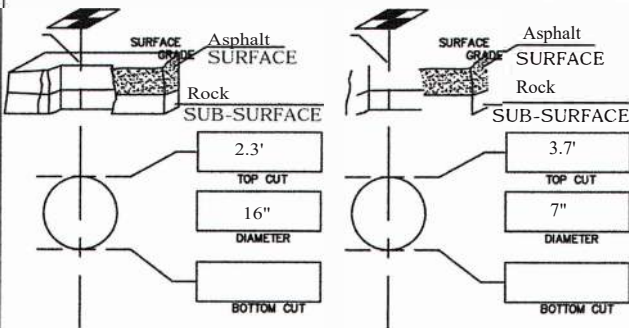
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#- SURFACE: SOFT **HARD** SURFACE: SOFT **HARD**
 FACING: **N S E W** FACING: **N S E W**

Notes: 16" Cast Iron F.M. @ 2.3'
 7" Terra Cotta Sewer Lateral @ 3.7'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:10/27/2023

SHEET/DRAWING #:

TH# 10

PROJECT:Old Floresta

CLIENT: Holtz

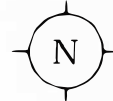
UTILITY LOCATED: REC. WATER WATER ELECTRIC TELEPHONE COMMUNICATION **SANITARY** GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR **FAIR** GOOD

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR DB CBL VCPX TILE DUCT T.COTTA OTHER:

SOIL CONDITION: **MOIST** WET DRY SANDY **ROCKY** DEBRIS SUBMERGED

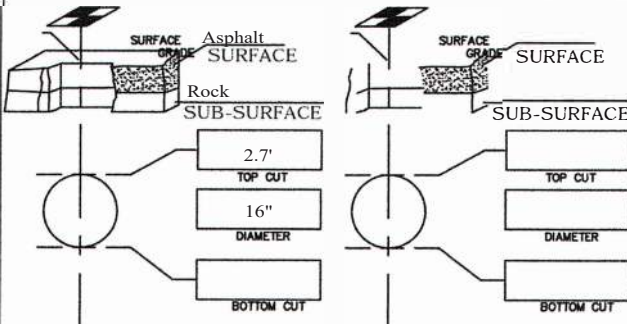
VISUALLY VERIFIED? **YES** NO



N.T.S.

Notes:

TH#- SURFACE: SOFT **HARD** SURFACE: SOFT HARD
FACING: **N S** E W TH#- FACING: N S E W



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:10/27/2023

SHEET/DRAWING #:

TH# 11

PROJECT: Old Floresta

CLIENT: Holtz

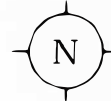
UTILITY LOCATED: REC. WATER WATER ELECTRIC TELEPHONE COMMUNICATION **SANITARY** GAS
STORM IRRIGATION UNKNOWN

CONDITION: POOR **FAIR** GOOD

MATERIAL FOUND: **CI** DI STEEL RCP PVC POLY AC PCCP ROUGH POUR
SMOOTH POUR DB CBL VCPX TILE DUCT **T.COTTA** OTHER:

SOIL CONDITION: **MOIST** WET DRY SANDY **ROCKY** DEBRIS SUBMERGED

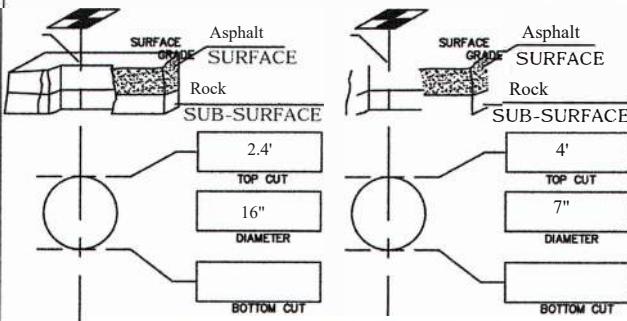
VISUALLY VERIFIED? **YES** NO



N.T.S.

TH#- SURFACE: SOFT **HARD** TH#- SURFACE: SOFT **HARD**
FACING: **N S** E W FACING: N S **E W**

Notes: 16" Cast Iron F.M @ 2.4'
7" Terra Cotta Sewer Lateral @ 4'



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TEST HOLE REPORT

FORM BY/TECHS:

DATE:10/27/2023

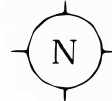
SHEET/DRAWING #:

TH# 12

PROJECT:Old Floresta

CLIENT: Holtz

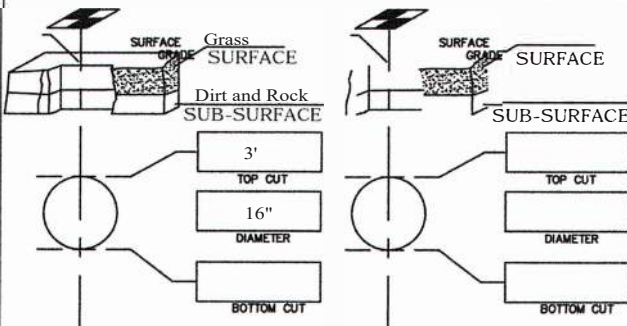
UTILITY LOCATED:	REC. WATER	WATER	ELECTRIC	TELEPHONE	COMMUNICATION	SANITARY	GAS
	STORM	IRRIGATION	UNKNOWN				
CONDITION:	POOR	FAIR	GOOD				
MATERIAL FOUND:	CI	DI	STEEL	RCP	PVC	POLY	AC
	SMOOTH POUR	DB CBL	VCPX	TILE DUCT	T.COTTA	OTHER:	
SOIL CONDITION:	MOIST	WET	DRY	SANDY	ROCKY	DEBRIS	SUBMERGED
VISUALLY VERIFIED?	YES	NO					



N.T.S.

TH#- SURFACE: **SOFT** HARD SURFACE: SOFT HARD
FACING: **N S E W** TH#- FACING: N S E W

Notes:



UNDERDOG UTILITY DETECTION LLC. Utility Locating Services (561)-870-4943

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APPENDIX F

Lift Station No. 53 – Existing Pump Data

Information included herein is intended for use as Contractor reference in retrofitting proposed replacement pumps into existing Lift Station No. 53 Wetwell. Contractor shall verify existing pumps as necessary. Contractor shall coordinate with selected pump vendor and electrical subcontractor as necessary regarding furnishing necessary brackets/adaptors and/or replacement/modification of existing pump guide rails, base elbows, and/or base plates as necessary to furnish a fully functioning system to the sole satisfaction of the OWNER. Contractor shall repair existing coatings as necessary.

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Technical Information

AMX434-184/4,3T/C

Operating data

Flow	0 US g.p.m.
Head	0 ft
Shaft power P2	
Pump efficiency	%
Required pump NPSH	
Pumpe type	Single pump
No. of pumps	1
Fluid	Water, clean

Pump

Pump Code	AMX434-184/4,3T/C
Impeller	Single channel impeller
Impeller size	180 mm
Solid size	80 mm
Discharge port	4" ANSI
Suction port	DN100

Motor

Rated voltage	230/ 460 V
Frequency	60 Hz
Rated power P2	4.3 hp
Rated speed	1750 rpm
Number of poles	4
Efficiency	85 %
Rated current	11 / 5,5 A
Degree of protection	IP 68

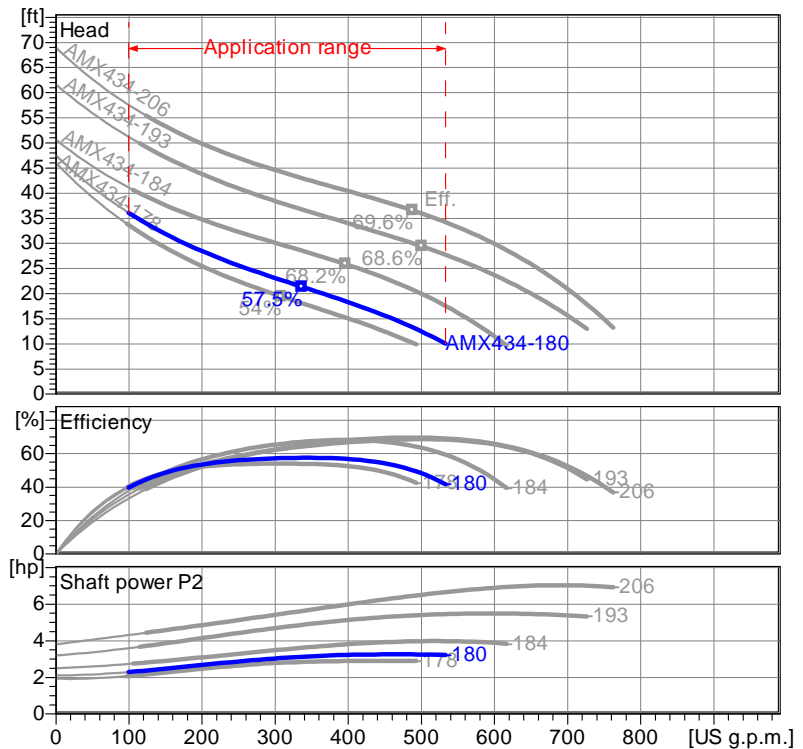
Materials

Motor housing	Cast Iron ASTM A48;Cl.40B
Impeller	Cast Iron ASTM A48;Cl.40B
Pump housing	Cast Iron ASTM A48;Cl.40B
Wear ring	Bronze ASTM B505; C93200
Motor shaft	AISI 430 F Stainless Steel
Bolts	AISI 304 Stainless Steel

Elastomeres	Nitrile Rubber
-------------	----------------

Mechanical seal on motor side	SiC / SiC
Mechanical seal on medium side	SiC / SiC
Lower Bearing	Double row angular ball bearing
Upper Bearing	Deep Groove Ball Bearing

Testnorm: HI Standard Sect. 11.6.5.4



Wet well installation with coupling kit (T, 142...206)

Dimensions in mm [inch], letters see table

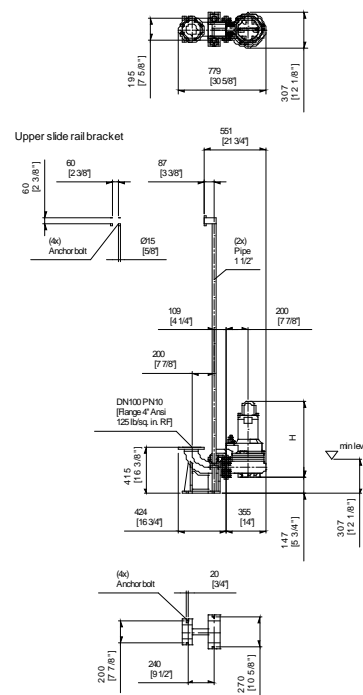


Table Dimensions
(mm)

H 685.8

Project

Project no.:

Created by:

Page:

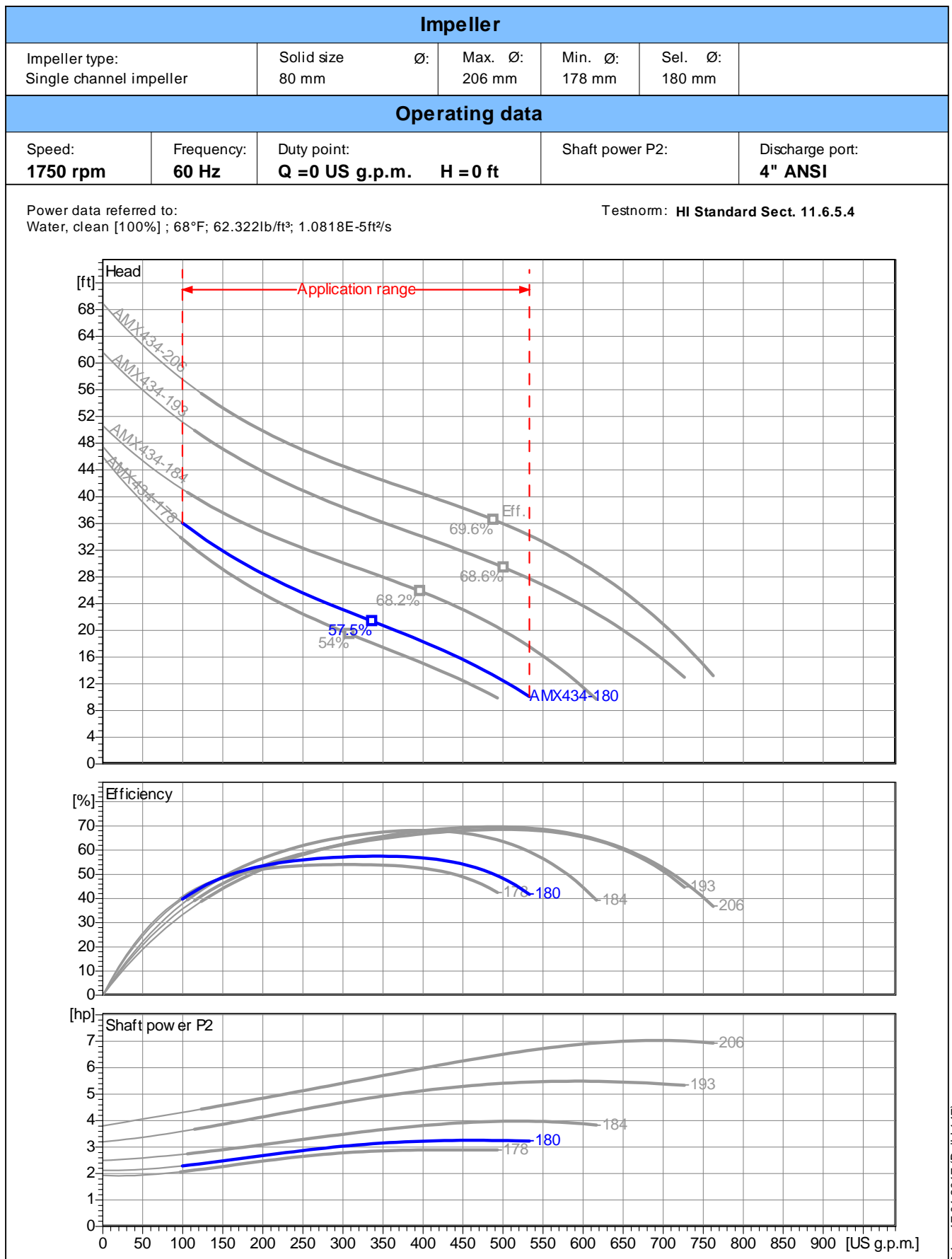
1

Date:

2020-10-14

Performance Curve

AMX434-184/4,3T/C



2.0.1 - 17.01.2017 (Build 147)

Project	Project no.:	Created by:	Page: 2	Date: 2020-10-14
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Dimensions

AMX434-184/4,3T/C

Wet well installation with coupling kit (T, 142...206)

Dimensions in mm [inch], letters see table

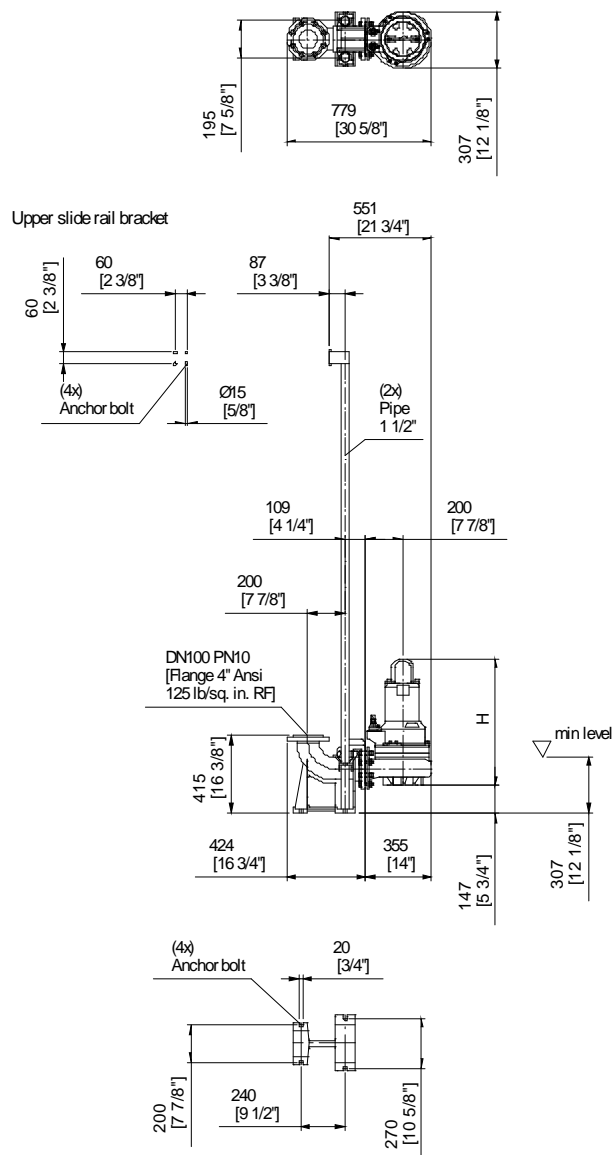


Table Dimensions

(mm)

H

685.8

min level = Minimum fluid level for intermittent operation (S3)

Project

Project no.:

Created by:

Page:

3

Date:

2020-10-14

Technical Data

AMX434-184/4,3T/C

Operating data				
Flow	0 US g.p.m.	US g.p.m.	Head	0 ft
Shaft power P2		hp	Static head	0 ft
Pump efficiency		%	Required pump NPSH	ft
Pumpe type	Single pump		No. of pumps	1
Fluid	Water, clean		Temperature	68 °F
Density	62.32	lb/ft³	Kin. viscosity	1.082E-5 ft²/s

Pump					
Pump Code	AMX434-184/4,3T/C	Speed	1750	rpm	
Suction port	DN100	Head	Max.	36.1	ft
Discharge port	4" ANSI		Min.	10.1	ft
Impeller type	Single channel impeller	Flow	Max.	532.9	US g.p.m.
Solid size	80	mm	Pump efficiency max.	57.5	%
Impeller Ø	180	mm	Required rated power max. P2	3.3	hp

Motor				
Motor design	Submersible motor		Insulation class	H
Motor name	AM173.5T/4/3		Degree of protection	IP 68
Frequency	60	Hz	Temperature class	T3C
Rated power P1	5.0	hp	NEMA code	F
Rated power P2	4.3	hp	Explosion protection	
Rated speed	1750	rpm	Efficiency at % rated power	100% 85.0 %
Rated voltage	230 / 460 V	3~		75% 87.0 %
Rated current	11.0 / 5,5	A		50% 86.0 %
Starting current, direct starting	56.0 / 28	A	cos phi at % rated power	100% 0.86
Starting current, star-delta	18	A		75% 0.80
Starting mode	Directly			50% 0.71
Power cable	10G1,5		Control cable	
Type of power cable	H07RN8-F PLUS		Type of control cable	
Cable length	32.809 ft		Service factor	1.15
Shaft seal	Mechanical seal on motor side		SiC / SiC	
	Mechanical seal on medium side		SiC / SiC	
Bearing	Lower Bearing		Double row angular ball bearing	
	Upper Bearing		Deep Groove Ball Bearing	
Remarks				

Materials / Weight			
Motor housing	Cast Iron ASTM A48; Cl.40B	Bolts	AISI 304 Stainless Steel
Pump housing	Cast Iron ASTM A48; Cl.40B	Elastomeres	Nitrile Rubber
Impeller	Cast Iron ASTM A48; Cl.40B		
Wear ring	Bronze ASTM B505; C93200		
Motor shaft	AISI 430 F Stainless Steel		
Weight aggregat	249.12 lb		

Project	Project no.:	Created by:	Page: 4	Date: 2020-10-14
---------	--------------	-------------	---------	------------------



INTERCOUNTY ENGINEERING, INC.
1925 NW 18th Street, Pompano Beach, FL 33069
Tel: (954) 972-9800 * Fax: (954) 974-0042

**TRANSMITTAL OF
CONTRACTOR'S SUBMITTAL**
(ATTACH TO EACH SUBMITTAL)

TO: Lisa Wilson-Davis, Project Manager
City of Boca Raton
1401 Glades Road
Boca Raton, FL 33431
(561) 338-7315

Submittal No.: 15020-01
☒ New Submittal ☐ Resubmittal
Project: Boca Lift Station Rehab & Repairs
Project No.: 71-18-003

FROM: Luis F. Cordova, Project Manager
Intercounty Engineering, Inc.
1925 NW 18th Street
Pompano Beach, FL 33069

Specification Section No.: 15020
(Cover only one section with each transmittal)
Schedule Date of Submittal: 11/26/18

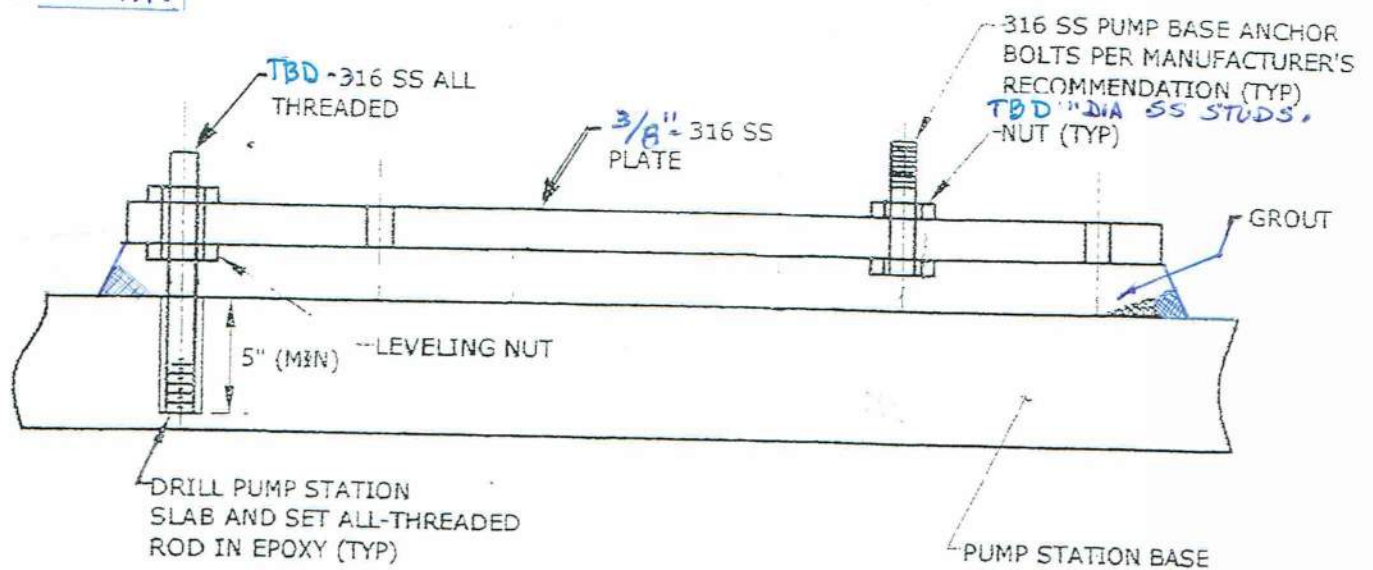
SUBMITTAL TYPE: ☒ Shop Drawing ☐ Sample ☐ Informational

The following items are hereby submitted:

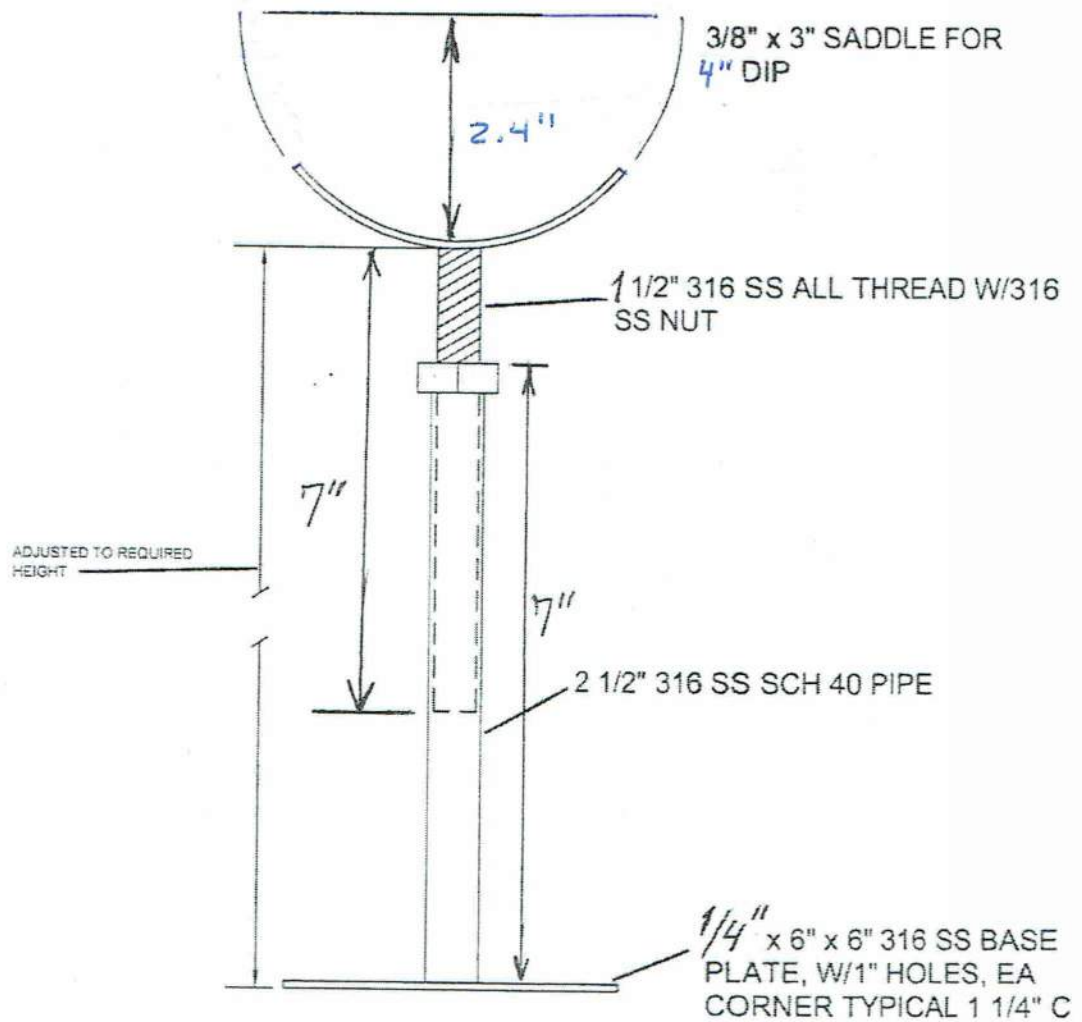
Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Supplier Name	Contains Variation to Contract	
				No	Yes
01	Pipe Support & Base Plate	15020	ASAP Fabrication Inc	X	

CONTRACTOR hereby certifies that (i) CONTRACTOR has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: Shelley McDougle, Project Coordinator



PUMP BASE PLATE
DETAIL
NTS



316

S.S. PIPE SUPPORT FOR 4" DIP PIPE - DRY
SCALE: N.T.S. PIT

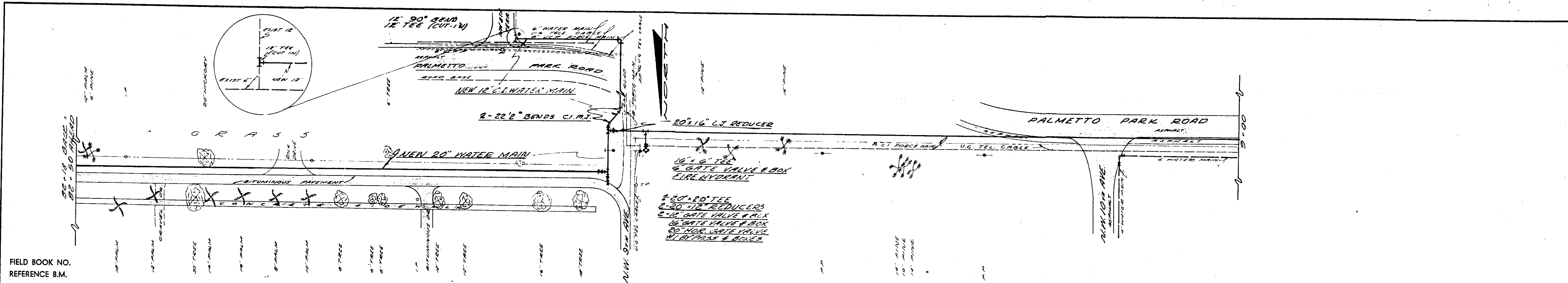
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APPENDIX G

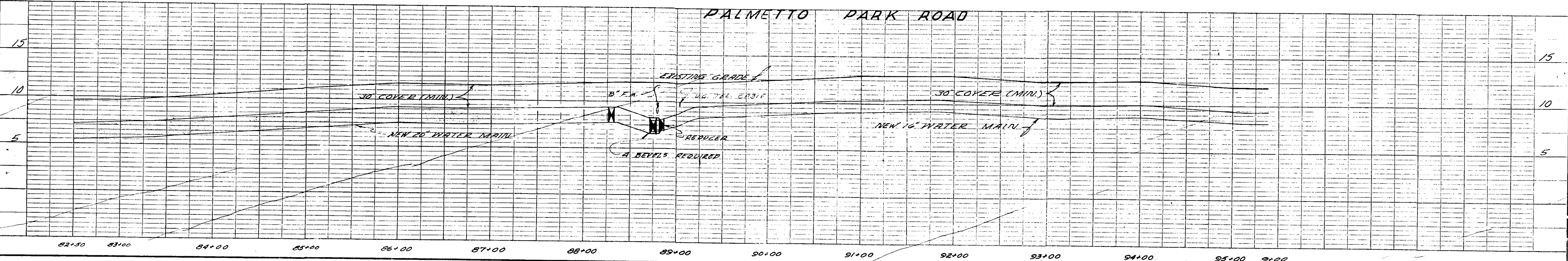
PRESTRESSED CONCRETE CYLINDER PIPE (PCCP) REFERENCE MATERIAL

CONTRACTOR shall note that PCCP pipe material data included herein is provided for reference only and is based upon available as-built and record information. CONTRACTOR shall perform subsurface utility exploration as necessary to confirm installed materials characteristics.

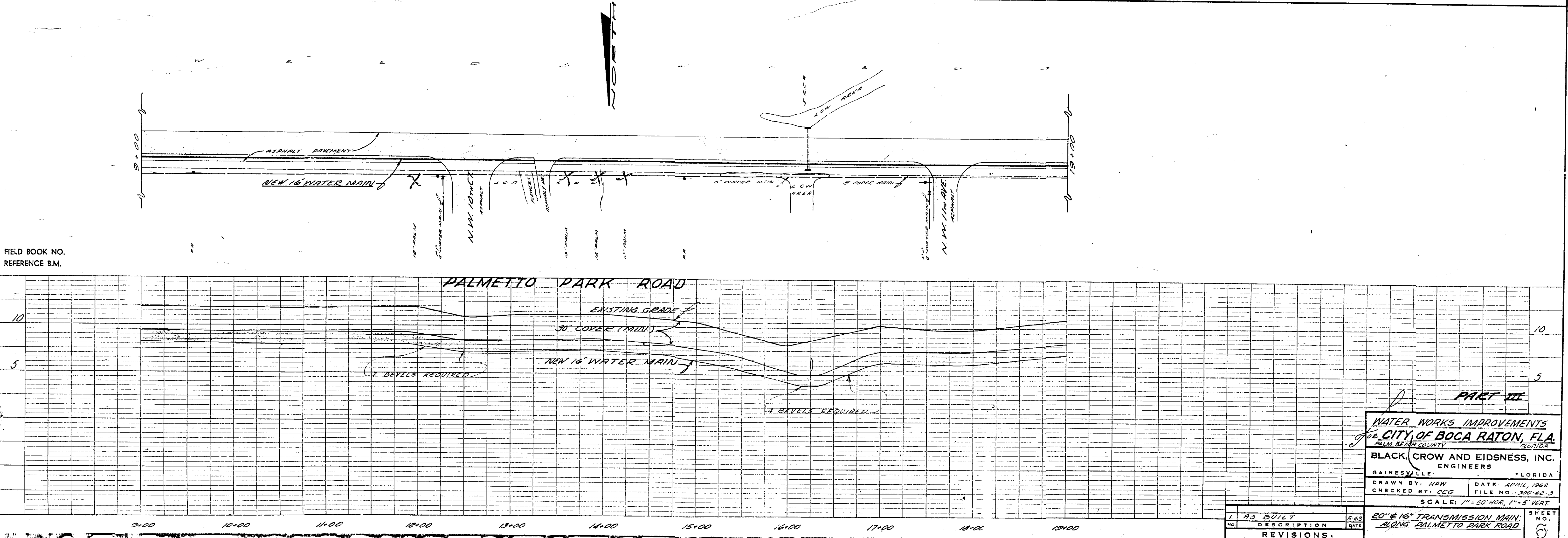
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FIELD BOOK NO.
REFERENCE B.M.



FIELD BOOK NO.
REFERENCE B.M.



WATER WORKS IMPROVEMENTS
FOR CITY OF BOCA RATON, FLA.
PALM BEACH COUNTY, FLORIDA

BLACK, CROW AND EIDSNES, INC.
ENGINEERS
GAINESVILLE, FLORIDA

DRAWN BY: HPW
CHECKED BY: CEG

DATE: APRIL, 1962
FILE NO.: 300-62-3

SCALE: 1" = 50' HOR., 1" = 5' VERT.

NO.	DESCRIPTION	DATE
1	AS BUILT	5-63

20" & 16" TRANSMISSION MAIN
ALONG PALMETTO PARK ROAD

SHEET NO. 6

FOR 16" &
20" PRESTRESSED CONCRETE CYLINDER PIPE WITH RUBBER AND STEEL JOINT (SP-5)

WATER WORKS IMPROVEMENTS - PROJECT NO. 300-62-3

BOCA RATON, FLORIDA

BLACK, CROW AND EIDNESS, INC.

SEE DRAWING D-4-282 Sheet 1

Nominal Pipe Diameter - inches	16	20
Approximate Footage - feet	2,230	7,540
Cylinder Gage - ASTM A 245-58T, Grade B	16	16
Cylinder Area - sq.in./ft.	0.718	0.718
Cylinder Test Pressure (25,000 psi) psi	166	133
Wire Size - ASTM A 227-47	No.6 MBU	No.6 MBU
Wire Spacing - in. c.c.	1.335	1.102
Wire Area - sq.in./ft.	0.260	0.315
Pressure when compression in concrete is zero - psi	208	211
Resultant compression in concrete - psi	1,389	1,460
Gross wrapping stress - psi	140,000	140,000
Dynamometer (1 wire) - lbs.	4,060	4,060
Compressive strength of centrifugated concrete at time of wrapping - psi	3,660	3,710
Core Thickness (including cylinder) - inches	1	1-1/4
Coating Thickness - inch	7/8	7/8
Joint Rings:		
Spigot Ring - special section x 4-1/2" wide		
Bell Ring 3/16" x 5 inches		
Both Zinc Coated		
Joint Depth - inches	3-1/4	3-1/4
Creep - feet	0.02	0.02
Average Laid Length - feet	16.02	16.02*
Calculation Data:	$n_i = 6.0$	$R_i = 0.05$
	$n_r = 5.0$	$C_r = 1.50$
Design Conditions:		
In Accordance with AWWA C-301-58		
Working Pressure - psi	150	150
Water Hammer Pressure - psi	75	75
H-20 Truck Load at 5' Cover		
Cover - ft	5	10

SPECIFICATION

NO. CO-62-48-1

FOR 24" PRESTRESSED CONCRETE CYLINDER PIPE WITH RUBBER AND STEEL JOINT (SP-5)

WATER WORKS IMPROVEMENTS, PROJECT NO. 300-62-3

BOCA RATON, FLORIDA

BLACK, CROW AND EIDNESS, INC.

SEE DRAWING D-4-282 Sheet 1

Nominal Pipe Diameter - inches	24	24
Approximate Footage - feet	2,925	8,600
Cylinder Gage - ASTM A 245-58T, Grade B	16	16
Cylinder Area - sq.in./ft.	0.718	0.718
Cylinder Test Pressure (25,000 psi) psi	111	111
Wire Size - ASTM A 227-47	No.6 MBU	No.6 MBU
Wire Spacing - in. c.c.	1.500	0.962
Wire Area - sq.in./ft.	0.231	0.361
Pressure when compression in concrete is zero - psi	138	209
Resultant compression in concrete - psi	1,015	1,495
Gross wrapping stress - psi	140,000	140,000
Dynamometer (1 wire) - lbs.	4,060	4,060
Compressive strength of centrifugated concrete at time of wrapping - psi	3,500	3,670
Core Thickness (including cylinder) - inches	1-1/2	1-1/2
Coating Thickness - inch	7/8	7/8
Joint Rings:		
Spigot Ring - special section x 4-1/2" wide		
Bell Ring 3/16" x 5 inches		
Both Zinc Coated		
Joint Depth - inches	3-1/4	3-1/4
Creep - feet	0.02	0.02
Average Laid Length - feet	16.02	16.02
Calculation Data:		
$n_1 = 6.0$	$R_1 = 0.05$	
$n_r = 5.0$	$C_r = 1.50$	
Design Conditions:		
In Accordance with AWWA C-301-58		
Working Pressure - psi	100	150
Water Hammer Pressure - psi	50	75
H-20 Truck Load at 5' Cover		
Cover - ft	5	7

20" VALVE (BY OTHERS)

2.00

88+38

1 20" LJB X 20" LJB X 20" LJS TEE W/20" LJS X 12" CIB RED ON LJB
OF TEE RT (RED LL = 2.80')

S 2.15

88+40P1

B 2.35

88+42

0.5

1 STR OPEN JT 1/2" ON TOP

16.04

88+58

8.1

1 STR OPEN JT 3/8" ON TOP

16.03

88+74

1 20" LJS X 20" LJB X 16" LJS TEE RT (1.99' BR LL)

S 1.82

88+76P1

B 2.10

88+78

1 20" LJS X 12" CIB RED

2.80

88+81

7.2

APPENDIX H

FDOT Standard Specifications for Road and Bridge Construction – Technical Special Provisions

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**FDOT STANDARD SPECIFICATIONS FOR
ROAD AND BRIDGE CONSTRUCTION
SPECIAL PROVISIONS INDEX**

**BID NO. 2025-028-FV
Old Floresta, Lake Floresta Park, Tunison Palms Infrastructure Updates**



All work shall conform to the FY 2024-25 Edition of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction" unless stated otherwise in the Special Provisions and shall be the basis for construction of the work.

The Special Provisions as detailed herein modify and or delete specific clauses adopted by the City of Boca Raton that add to or revise the Specifications, setting forth conditions varying from or additional to the Specifications applicable to this project.

<p>FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION SPECIAL PROVISIONS INDEX</p>
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**BID NO. 2025-028-FV
Old Floresta, Lake Floresta Park, Tunison Palms Infrastructure Updates**

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	SECTION 5: CONTROL OF THE WORK	4
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*Refers to Florida Department of Transportation "Standard Specifications for Road and Bridge Construction" dated FY 2024-25.

<p>FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION SPECIAL PROVISIONS INDEX</p>
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**BID NO. 2025-028-FV
Old Floresta, Lake Floresta Park, Tunison Palms Infrastructure Updates**

Division I – General Requirements and Covenants

SECTION 1: DEFINITIONS AND TERMS

Amend Article 1-3 Definitions. The following defined terms are modified/deleted as listed herein.

Contract Documents: Delete in entirety

Department: Delete this definition and replace with:

Department:

The City of Boca Raton.

Engineer. Delete this definition and replace with:

Engineer:

The City of Boca Raton Engineering Department or elected representative, other than the Engineer of Record or his subcontracted consultant, acting within the scope of the duties and authority assigned to them.

Proposal Form: Delete this definition and replace with:

Proposal Form:

The official form on which the Department requires formal bids to be prepared and submitted for the work, also referred to as the Bid Form.

SECTION 2: PROPOSAL REQUIREMENTS AND CONDITIONS

Delete this section and replace with following:

Proposal requirements and conditions shall be as stipulated in the "INVITATION TO BID" and the "INSTRUCTION TO BIDDERS" sections of the contract documents.

SECTION 3: AWARD AND EXECUTION OF CONTRACT

Delete this section and replace with the following:

The award and execution of the contract shall be in accordance the "INVITATION TO BID" and the "INSTRUCTION TO BIDDERS" sections of the contract documents.

SECTION 4: SCOPE OF THE WORK

Article 4-6 Final Cleaning Up of Right-of-Way

Amend this article to add the following:

All cost incurred in the restoration of public or private properties utilized for the storage of materials and equipment outside the limits of construction shall be borne by the Contractor.

SECTION 5: CONTROL OF THE WORK

This section remains the same.

SECTION 6: CONTROL OF MATERIALS

Sub article 6-1.1 General

Amend this sub article to add the following:

All tests required by the Engineer to ensure conformance with plans and specifications shall be performed by an outside professional testing laboratory and certified as to the results of such tests. All cost of required testing shall be borne by the Contractor.

SECTION 7: LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC

Sub article 7-1.1 General.

Delete the content of this sub article and replace with the following:

All City, County, State and Federal laws, regulations and ordinances must be strictly observed. The Contractor shall be responsible for all legal notices and signals to the public while the work is in progress and shall take precautions that may be necessary to protect life and property.

The Contractor shall guarantee the payment of all just claims for materials, supplies, tools, labor, or other just claims against him/her, or any subcontractor in connection with this Contract, and his/her bonds will not be released by final acceptance and payment by the City of Boca Raton unless all such claims are paid or released.

Sub article 7-13 Insurance.

Delete the content of this sub article and replace with the following:

Insurance requirements for this project shall be as stipulated in the "INVITATION TO BID" and/or the "INSTRUCTIONS TO BIDDERS" Sections of the contract documents".

SECTION 8: PROSECUTION AND PROGRESS

Sub article 8-3.2 Submission of Contract Schedule.

Delete the content of this sub article and replace with:

After the Contract has been awarded, the successful bidder shall submit to the Engineer a Gantt chart style schedule for the project showing in detail the working day on which he/she expects

to begin and complete each of the various major items of the work together with a Critical Path Method Analysis (CPM) of the same. The Bar Chart and CPM shall be updated by the Contractor and submitted to the Engineer every 30 days thereafter until issuance of the final acceptance notice. Any change to the approved schedule identified by the Contractor is to be submitted to the Owner, in writing, for review and approval within five (5) calendar days of discovery. Changes in the schedule not submitted in writing within five (5) calendar days of discovery will not be considered.

Sub article 8-3.5 Preconstruction Conference

Delete the content of the sub article and replace with the following:

After the Award of Contract and prior to issuance of the "Notice to Proceed", a preconstruction meeting will be held between the Contractor, representatives of the City Civil Engineer's office, representative of other City Departments, utility companies, and other contractors or representatives affected by the work as designated by the City Civil Engineer's office. The time and place of this conference will be set by the City Civil Engineer's office. The Contractor shall bring with him/her to this meeting a draft copy of his/her schedule for the project as specified in Article 8-3.2.

Article 8-4 Limitations of Operations.

Amend this article to add the following sub article:

8-4.10 Environmental Control.

The Contractor shall be required to strictly observe the City of Boca Raton Code of Ordinances specifically Chapter 10-64 Construction Activity regarding noise control. The Contractor shall be responsible for securing any special permits that may be required by City Codes and shall borne the fees, if any, for required permits.

SECTION 9: MEASUREMENT AND PAYMENT

Article 9-5 Partial Payments.

Delete the content of the article and replace with the following:

Partial payments and retainage shall be as stipulated in the "SPECIAL CONDITIONS" section of the Contract Documents.

Article 9-8 Acceptance and Final Payment.

Delete the content of the article and replace with the following:

Acceptance and final payments shall be as stipulated in the "SPECIAL CONDITIONS" sections of the Contract Documents.

Article 9-9 Interest Due on Delayed Payments.

Delete this article.

Division II – Construction Details

SECTION 101: MOBILIZATION

Sub article 101-2.1 Standards

Amend this sub article to add the following:

Payments for mobilization shall be as stipulated in the “SPECIAL INSTRUCTIONS” sections of the Contract Documents.

SECTION 102: MAINTENANCE OF TRAFFIC

Sub article 102-5.1 Standards

Amend this sub article to add the following:

Flashing arrow boards will be required whenever a lane drop is used on any four-lane facility and as directed by the engineer.

Article 102-6.3 Construction Methods

Amend this sub article to add the following:

The material and method of construction shall conform to the typical section detail shown on or as indicated on the approved Maintenance of Traffic Plan.

SECTION 160: STABILIZING

160-3.2.1 Sampling and Testing of Local Material

160-3.2.1.1 Verification Comparison Criteria and Resolution Procedures

160-3.5 Bearing Value

Delete the content of these sub articles

SECTION 200: ROCK BASE

Sub Article 200-7- Acceptance Program

Delete the contents of this sub article and replace with the following.

The alternative requirements set forth in the notes below shall be applied instead:

The minimum LBR value shall be 100, however, acceptance testing is not required for the LBR. For the Optional Base Group in all the repair areas in this contract, the minimum compaction requirement is 98% maximum density in accordance with AASHTO T -180.

Provide one density test for the Optional Base Group in each of the repair or restoration areas, at a location approved by the City. Density Testing Lab shall be properly certified in accordance with FDOT criteria. When tests results do not achieve the minimum density requirement, rework, re-compact and re-test the base material until a passing test is achieved.

CONTRACTOR shall be responsible for additional expenses associated with re-testing as incurred by the CITY.

SECTION 425: INLETS, MANHOLES AND JUNCTION BOXES

Sub article 425-6.7 Adjust Existing Structures

Amend this sub article to add the following:

The Contractor shall be required to adjust all sanitary and storm sewer manholes and all water valve boxes within the limits of construction. The respective utility owners shall do all other utility adjustments, if any.

The type of adjustment rings to be used on this project shall consist of those types currently approved by the Florida Department of Transportation, District 4.

SECTION 711: THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS

Sub article 711-10 - Method of Measurement

Amend this sub article to add the following:

(f) The quantity of the items Thermoplastic, STD, White, 6" and Thermoplastic, STD, Yellow, Solid, 6" to be paid for will be the number of gross miles actually constructed, completed and accepted.

(g) The bid price for the items Thermoplastic, STD, White, 6" and Thermoplastic, STD, Yellow, Solid, 6" will include the cost of all labor, materials and equipment required for the pavement marking installation.

Sub article 711-11 Basis of Payment

Amend this sub article to add the following:

Item No. 711-15-IX Thermoplastic, White, 6"- per gross mile

Item No. 711-15-2X Thermoplastic, Yellow, Solid, 6" – per gross mile

END OF SECTION

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APPENDIX I

Fire Hydrant Testing Contractor Testing Form

General Requirements for Testing:

- Contractor shall perform flow test on all installed hydrants. Flow testing shall be performed by competent staff experienced in the performance of hydrant flow testing and to the sole satisfaction of the OWNER.
- Contractor shall provide detailed plan showing intended testing schedule (including locations) and proposed equipment / calibration certificates a minimum of one week in advance of performing testing.
- Contractor shall record testing data as required in Hydrant Testing Data Collection form provided herein.
- Contractor shall furnish a calibrated 0-100 psi liquid filled pressure gauge (for static pressure testing), pressure test tree piping assembly, and calibrated hydrant testing pitot tube assembly in accordance with NFPA 291. Calibration certificates shall be dated w/in 90-days of proposed testing dates.
- Hydrants shall be tested in accordance with the procedures below.
- MOT shall be implemented as necessary for each location and to the sole satisfaction of the OWNER.

Testing Procedures:

1. Contractor shall record all pre-testing data on Hydrant Testing Data Collection form (see next sheet) including but not limited to, date, Street Number/Name, Manufacturer/Model, manufacture date, and hydrant dimensional details.
2. Contractor shall install pressure gauge assembly on hydrant for collection of static pressure data. Hydrant shall remain closed during installation. Contractor shall verify hydrant isolation gate valve is completely open.
3. Contractor shall slowly open hydrant, bleeding off air through test-tree piping bypass valve. Test-tree piping valve shall be shut once air is bled-off. Contractor shall record static pressure once stabilized using the attached form.
4. Contractor shall shut hydrant completely.
5. Contractor shall install NFPA 291 and City-approved flow diffuser on hydrant main outlet. Contractor shall verify that diffuser flow paths shall not impact adjacent property and/or shall protect adjacent property as necessary. Flow diffuser shall be adequately supported to prevent movement during flow testing.
6. Contractor shall slowly open hydrant to 100% of flow capacity, under supervision of OWNER staff, and shall flush at full capacity for 10-minutes to adequately flush system and to stabilize system pressures.
7. Contractor shall record pitot tube pressure and test flow capacity following 10-min flushing period. Data shall be recorded in accordance with NFPA 291 standards and per pitot assembly manufacturer instructions.
8. Contractor shall slowly shut hydrant, under supervision of OWNER staff, shall remove all testing equipment, and shall replace hydrant outlet caps.

City of Boca Raton - Hydrant Testing Data Collection

Location Information							Hydrant Information													Leaks/ Defects							
Testing Date	Hydrant ID	Street Number	Street	Cross Street	Location Description	Area	Hydrant Operable?	Manufacturer	Model	Year Made	Coeff.	Barrel Size	Outlet 1	Outlet 2	Outlet 3	Pumper Cap Height (in)	Static Pressure (psi)	Pitot Tube Pressure (psi)	Test Flow at Hydrant (gpm)	Calculated Flow (gpm)	Available Flow at 20 psi	a. Hydrant Valve Frozen Operating Nut Issue Leaks Extention	b. Main Valve Leaks Nozzle Issue Needs Rotation	c. Stem Issue Does Not Drain Needs Alignment	d. Out of Service Needs Bolts	e. Repair W/O or Notes	f. Found Date
4/12/2023	6B-H013	600	Palmetto Park Rd	SE 5th Ave	At Silver Palm Park	CITY		Clow	Medallion	1997	0.9	5.25	2.5	2.5	4.5	22	82	45	1130	1095	1493						
4/13/2023	6B-H011	100	SE 5th Ave	E. Royal Palm	West Of Bldg	CITY		American Dartling	B-84-B	1988	0.9	5.25	2.5	2.5	4.5	10	80	50	1190	1155	1730						
4/14/2023	6B-H012	120	SE 5th Ave	E. Royal Palm	SW of Bldg	CITY		Mueller Company	Standard T	1974	0.9	4.5	2.5	2.5	4.5	19	77	50	1190	1155	1781						

Blue fields to be collected by Contractor during Hydrant Testing

