

100% Submittal

Technical Specifications

City of Boca Raton

**Golden Harbour
Infrastructure Upgrades**

Bid 2026-014-NP



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CITY OF BOCA RATON UTILITY SERVICES
GOLDEN HARBOUR INFRASTRUCTURE
UPGRADES CITY PROJECT #: 24-0043-001-01
BID 2026-014-NP

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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 along NE Waterway Lane, Phillips Drive, Golden Harbour Drive, Kay Terrace, Silver Lane, and NE 4th Lane which are located east of NE 5th Ave, Boca Raton, Florida 33432. 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 infrastructure improvements for the neighborhood encompassing NE Waterway Lane, Phillips Drive, Golden Harbour Drive, Kay Terrace, Silver Lane, and NE 4th Lane. The Work is located east of NE 5th Ave in Boca Raton, Florida 33432. The scope of work is generally outlined below and more specifically identified in the Contract Documents.
 - 1. Installation of approximately 5,050 linear feet of water mains within road rights-of-way to replace existing water mains which are currently located in the rear yards of residential properties. This will include abandonment of the existing water main system, relocation and reconnection of the water services from the new water main to the house, as well as restoration of private and public property.
 - 2. The Work also includes milling and overlay of roadways, and minor swale improvements, as shown on the Drawings.

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 Protection 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.
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 -

SECTION 01010A

APPLICATION FOR PAYMENT NO. _____

To: City of Boca Raton (OWNER)
 From: _____ (CONTRACTOR)
 Contract: _____
 Project: Golden Harbour Infrastructure Upgrades
 OWNER's Contract No. 71-23-011. ENGINEER's Project No. 24-0043-001-01
 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: _____

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: Golden Harbour Infrastructure Upgrades Field Order Number: _____

From: _____
To: _____ Date: _____

A/E Project Number: 24-0043-001-01
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

WORK CHANGE DIRECTIVE

No. _____

DATE OF ISSUANCE _____

EFFECTIVE DATE _____

OWNER City of Boca Raton

CONTRACTOR _____

Contract: 71-23-011

Project: Golden Harbour Infrastructure Upgrades

OWNER's Contract No. _____ ENGINEER's Project No. 24-0043-001-01

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.

CHANGE ORDER

No. _____

DATE OF ISSUANCE _____

EFFECTIVE DATE _____

OWNER City of Boca Raton

CONTRACTOR _____

Contract: _____

Project: Golden Harbour Infrastructure Upgrades

OWNER's Contract No. 71-23-011

ENGINEER's Contract No. _____

24-0043-001-01

ENGINEER Craven Thompson & Associates, Inc.

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

By: _____
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.

CERTIFICATE OF SUBSTANTIAL COMPLETION

DATE OF ISSUANCE _____

OWNER City of Boca Raton

CONTRACTOR _____

Contract: _____

Project: Golden Harbour Infrastructure Upgrades

OWNER's Contract No. 71-23-011 ENGINEER's Project No. 24-0043-001-01

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

To City of Boca Raton
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

Craven Thompson & Associates, Inc.
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

City of Boca Raton
OWNER

By: _____
(Authorized Signature)

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, if any, 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 operation personnel or other contractors.
- C. Contractor is required to coordinate his activities in the interface or common areas with other contractors and the operation 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 may 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.

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 finish water main installation on one of the identified roadways before starting to install water main on another roadway. 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 roadways 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.
 - 2. 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.
 - 3. No three adjacent roadways may be under construction at the same time. Construction shall be allowed on alternating roadways such that a resident will only have to travel on one unpaved roadway to enter or exit the neighborhood or to access his or her home.
 - 4. In no case shall more than 50% of the project rights-of-way be disturbed at one time.
 - 5. At least 50% of the rights-of-way of the area under construction (in accordance with item 1 above) shall be restored to the first and second lifts of asphalt (temporary patch) and concrete (sidewalks and driveways) at all times.
 - 6. All driveways shall be made accessible at the end of each working day.
 - 7. After proposed improvement piping is installed, the Contractor shall restore the first and second lifts of asphalt (temporary patch) within 14 days after installation of the piping.
 - 8. Construction within rights of way shall be scheduled so that all improvements are completed within one time window, and residents are only disrupted for one time period. This excludes water service plumbing work on private property which shall be scheduled after water mains are tested, disinfected, and granted clearance to place into service.
 - 9. All affected residents and property owners shall be notified in writing a minimum of two weeks prior to any disruption to or construction in the road rights-of-way

adjacent to their homes. The notification shall also indicated any special traffic or parking arrangements that will affect residents.

10. 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.
11. At all times, the entire length of two generally north-south and two generally east-west streets shall remain unobstructed and open to through traffic within the identified area under construction (item 1).
12. Access for emergency vehicles shall be maintained at all times to all homes and businesses.
13. Provisions shall be made with local bus transit, school buses, garbage collection, mail delivery, and other affected services for continuation of service.
14. All excavations shall be backfilled, barricaded, 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.
15. 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 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 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 allowances:

Bid Item	Description	Not to Exceed Amount
48	Clear and Grade Swale Allowance	\$25,000.00
49	Sidewalk Allowance	\$25,000.00
	TOTAL	\$50,000.00

- 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 48 applies to payment for an increasing quantity for bid item 47. If the Owner elects to increase the quantity of Bid item 47, it shall be paid for under allowance for Bid item 48.
- 4. The use of the allowance funds in Bid Item 48 shall be based upon the Engineer's review of data collected under this project in consultation with the Owner.

5. The value of any work authorized by the Owner for use of the clear and grade swale allowance shall be based on unit price value of bid item 47.
6. The allowance for Bid Item 49 applies to payment for an increasing quantity for bid item 37 through 39. If the Owner elects to increase the quantity of Bid item 37 through 39 it shall be paid for under allowance for Bid item 49.
7. The use of the allowance funds in Bid Item 49 shall be based upon the Engineer's review of data collected under this project in consultation with the Owner.
8. The value of any work authorized by the Owner for use of the sidewalk allowance shall be based on unit price value of bid item 37 through 39.
9. The performance of work associated with Bid Item 48 & 49 shall be performed concurrent with the Golden Harbour 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. 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.
- C. Contractor is advised that bid items may be deleted if not required. No compensation will be made for deleted/not used bid items.

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, temporary facilities, 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, and administrative activities associated with project close-out. 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 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.

Partial payments for mobilization and demobilization will be 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, Florida Department of Transportation, 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 be in accordance with FDOT Standard Specifications, Section 102. All requirements under Specification Section 01570 fall under this bid item.

Payment for Bid Item 3 will be made in equal monthly amounts throughout the duration of active construction.

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 test holes 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 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. 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. 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.

The locate level shall meet the Quality levels A through D 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.

Payment for Bid Item 6 will be made in equal monthly amounts throughout the duration of active construction.

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 10: Furnish and Install Water Main

The Contractor's bid unit price per linear foot (LF) regardless of depth shall include all labor, materials, equipment, and incidentals necessary to furnish and install water main piping at the sizes indicated on the Bid Form and 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, tree root pruning and tree root removal, as approved by the City, 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, 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, protection of existing utilities, temporary by-pass pumping, tanker trucks, cutting main, temporary caps, 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 restoration (at raised Traffic Calming Speed Humps), temporary and final driveway restoration, temporary and final sod/swale restoration, temporary and final concrete apron, temporary and final concrete sidewalk and access driveways, temporary and final paver driveway restoration.

- a. Roadway restoration within City rights-of-way under this line item includes but 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 Owner.

- b. This pay item includes complete restoration of Traffic Calming Enhanced Speed Humps. See Traffic Calming Construction Detail Enhanced Speed Hump.

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
- f. Replacement of sod shall match existing sod type.

I. Bid Items 11: 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).

j. Bid Items 12 through 14: Furnish & Install New Water/Irrigation Meter with Tier 8 & Tier 15 Traffic Rated Box & Lid (Residential and Non-Residential)

The Contractor's bid unit price per each (EA) shall be full compensation for a complete installation, including the new meter box, brass fittings, poly tubing and adapters, bushings, nipples, unions, tees, any and all tools or materials required for a complete connection, 6-inch thick compacted $\frac{3}{4}$ -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 legal disposal of existing water meter box and service, new compacted fill required to restore area due to legal removal and disposal of existing water meter box and service, and all else necessary for a complete and functional installation. New meter box and lid shall be tier 8 traffic rated or unless otherwise shown on the DRAWINGS and Water Meter Inventory seen in Appendix E.

Payment for this item shall be made upon the complete installation of the meter assembly along with providing the completed old and new meter number and reading and new meter

GPS coordinates and numeric location (1-15). See Section 01720 Project Record document Form.

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 utility services.

New meters are to be furnished by the 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 Owner.

Payment for this item includes up to fifteen (15) linear feet of schedule 40 PVC service piping from new meter location at the front of property to tie-in connection point to existing water service at or near the existing meter location within private property when the existing meter is located at the front of property which shall also include but not be limited to crew time for searching/excavating for existing water service, verifying size of existing service line, water service fittings on the customer side of the water meter, and all water service fittings required to connect the new water service to the existing water service.

Payment for this line item includes removing the factory provided meter register and installing new AMR registers provided by the Owner and changing out the register cover of the AMR with the register cover originally on the meter. The register cover has the meter number engraved on it which enables Owner to identify the meter more efficiently. Factory provided meter registers to be delivered to Owner. Contractor to record the sticker tag number under the bar code that comes with new AMR register on the meter change out sheet.

Payment for this line item includes all restoration work 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 access driveways, 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
- f. Replacement of sod shall match existing sod type.

K. Bid Item No. 15: Furnish & Install Dual Check Valve

The Contractor's bid unit price per each (EA) shall be full compensation for a complete installation including all labor and material, equipment, and incidentals necessary to

furnish and install a Dual Check Valve at properties with an existing auxiliary or reclaimed water system. The Dual Check Valve location shall be installed at the rear of the new water meter. When meter setter is required, the Dual Check Valve shall be integral to the meter setter provided by manufacturer. Trenching and excavation by machinery on residential private property will not be permitted. Should the site conditions require use of hand digging (without machinery), it will be paid out of this bid item at no additional cost to the Owner.

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

L. Bid Items 16 through 19: 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 or existing meter box including furnishing and installing 2-inch polyethylene (PE) tubing, up to 10 linear feet of service piping on private property, location wire, service saddles, corporation stops, curb stops, poly tubing and poly adapters, nipples, tees, elbows, fittings and all other materials required for the complete connection (excluding piping/appurtenances to connect the proposed meter to the house), as shown on the Drawings and specified herein, and as directed by the Engineer, including but not limited to: excavation for the trench, disposal of all excess materials, bracing, sheeting, and dewatering, bedding, backfilling and compaction of trenches.

Payment for this bid item includes 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, 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).

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, temporary and final paver driveway restoration.

- a. Roadway restoration within City rights-of-way under this line item includes but 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 Owner.

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
- f. Replacement of sod shall match existing sod type.

M. Bid Item 20 through 21: Furnish and Install Gate 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 of such valves (gate or plug) 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.

N. Bid Item No. 22: Furnish & Install Fire Hydrant 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 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, blue reflective pavement marker (R.P.M.) installed within center of drive aisle closest to fire hydrant, excavation for the trench, disposal of all excess materials, tree root pruning and tree root removal, as approved by the City, 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.

Fire hydrants shall be replaced in the same approximate location as the existing fire hydrant.

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 apron, temporary and final concrete sidewalk and access driveways, 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 Owner, "out of service" tags, and all restoration WORK.

O. Bid Item 23 through 24: Furnish & Install Line Stops

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, valve box and extension to finish grade, concrete pad/jacket, restraining the existing water main in accordance with the restraint table on the Drawings, excavation for the trench, disposal of all excess materials, tree root pruning and tree root removal, as approved by the City, 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, cleaning the site of the work location, protection of existing utilities, structures, temporary by-pass pumping, tanker trucks, cutting main, temporary caps, 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 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, temporary and final paver driveway restoration.

- a. Roadway restoration within City rights-of-way under this line item includes but 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 Owner.

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
- f. Replacement of sod shall match existing sod type.

P. Bid Item 25: 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 Owner in accordance with the Contract Documents. The use of this line item is at the discretion of the Owner and Engineer.

The intended use of this bid item is to install excavatable flowable fill over new water main piping to avoid a deep excavation under an existing utility. The use of the line item is at the discretion and approval of the Owner and Engineer.

Q. Bid Item 26: Furnish and Install Sample Point

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. This item shall also include properly plugging the sample point after sampling, as directed by the Engineer.

R. Bid Item 27: 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 Owner. All work shall be in accordance with the 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 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.

This item also includes preparation of a disinfection and clearance plan for Owner and Engineer approval prior to starting disinfection.

S. Bid Item 28: 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.

T. Bid Item 29 through 30: Abandon/Deactivate, Cut and Cap and Grout Fill Existing Water Main

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 piping where shown on the Drawings and specified herein, and as directed by the Engineer, including but not limited to: preparing grouting plan for Owner and Engineer approval, 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 valves to remain in service, 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, temporary by-pass pumping, tanker trucks, cutting main, temporary caps, 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 house connections have been disconnected prior to grouting of existing pipelines. Any damages incurred to private property due to house connections not disconnected prior to grouting the pipe, the Contractor shall repair and/or replace damage at no expense to the Owner.

Contractor shall reimburse Owner salvaged value of existing fire hydrants when used for grout filling operations.

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 which are 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.

U. Bid Item 31 through 32: Remove and Dispose Existing Water Main Pipe

The Contractor's bid unit price per linear foot (LF) shall include all labor, materials, equipment, and incidentals necessary to remove and dispose of existing water/force main piping where shown on the Drawings and specified herein, and as directed by the Engineer, including but not limited to: providing all necessary trench excavation (including hand digging), disposal of all excess material, dewatering, backfill 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 work location, protection of existing utilities, temporary by-pass pumping, tanker trucks, cutting main, temporary caps, structures, trees, shrubs, and lawns, protection and repair of existing irrigation systems and all other work required for the completed remove and dispose existing water/force main pipe.

Removal and disposal of asbestos cement pipe shall be in accordance with State and Local laws.

V. Bid Item No. 33: Furnish & Install 2" Terminal Blowoff

The Contractor's bid unit price per each (EA) shall be full compensation for a complete installation of the 2-inch Terminal Blowoff with boxes, including completed installation of Concrete Meter Box extended to finish grade with traffic type lid and concrete collar installed in unpaved areas, trench excavation (including hand digging), disposal of all excess material, dewatering, backfill 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 work location, protection of existing utilities, structures, trees, shrubs, and lawns, protection and repair of existing irrigation systems, fittings, corporation stops, plugs, copper risers, nipples, brass pipe, elbows, angles valves, caps, cutting, connections, fittings and all other materials for a complete installation, as shown on the Drawings and specified herein.

W. Bid Item No. 34: Remove Existing Plug and Connect New Water Main

The Contractor's bid unit price per each (EA) shall include all labor, materials, equipment and incidentals necessary to remove existing main plug fitting and connect new water main to the existing water main where shown on the Drawings and specified herein, and as directed by the Engineer, including but not limited to: providing all necessary trench excavation (including hand digging), disposal of all excess materials, including the existing plug and mega lugs; restraining the existing water main in accordance with the restraint table on the Drawings; dewatering; trench backfill and compaction; density testing; maintaining uninterrupted service to all existing utilities; maintaining access to driveways and roadways at all times; cleaning the work site; protecting existing utilities; providing temporary bypass pumping or tanker trucks as needed; cutting and temporarily capping the main; and protecting and restoring existing structures, trees, shrubs, lawns, and irrigation systems. The bid price shall cover all work necessary to remove the existing plug fitting and complete the connection of the new water main to the existing water main.

X. Bid Item 35: 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).

Y. Bid Item 36: 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).

Z. Bid Item 37 and 38: Remove & Replace Concrete Sidewalks and Access Driveways

The Contractor's bid unit price per square yard (SY) shall include all labor, materials, equipment, and incidentals necessary for the complete removal and replacement of concrete sidewalks and driveways at the thickness indicated in the Bid Form. This item includes, but is not limited to: removal and disposal of existing material, earthwork, grading, driveway turnouts, accessible ramps, compacting subgrade to 98% of max density per A.A.S.T.H.O. T-180, furnish and constructing concrete sidewalk and driveway (6-inch min. concrete thickness for driveways), base material, sand, furnishing and setting for expansion joint material, disposal of excess material, densities passed, 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.

Sidewalk replacement shall proceed within the Drawings, unless otherwise directed and/or approved by the City/Owner/Engineer in writing. Prior to beginning sidewalk construction in any work area, Contractor shall request a sidewalk walkthrough to mark and identify limits of replacement in the field. Request shall be made a minimum of 5 business days in advance of requested start date. Contractor is aware that sidewalk replacement shall not be consolidated to nor concentrated in any single project area and that sidewalk replacement limits shall be scattered throughout the project area. Sidewalk replacement shall include varying lengths of replacement throughout the project area including both single and multi-flag replacement. Payment for sidewalk replacement within each area shall be made following completion of all sidewalk work within respective zone. No payment for partial completion of proposed sidewalk reconstruction within each zone shall be made.

This line item is intended for the removal and replacement of concrete within the project limits due to poor condition, cracks, and unacceptable slopes as identified by the Owner/Engineer. The Contractor shall be paid under these bid items only for quantities where concrete sidewalk is shown and delineated on the Drawings and/or identified/marked in the field by Owner/Engineer to be removed and replaced. Removal and replacement/restoration of concrete pathways/sidewalk required as part of installation of the new water mains, services, and other appurtenances, or due to damage to pavement during construction activities, shall be required 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 Owner.

AA. Bid Item 39: 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.

BB. Bid Item 40: Mill Existing Roadway/Driveway Asphalt

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, rights-of-way at the depth indicated 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, restoration of traffic loop detectors, temporary pavement markings, saw cutting of all pavement 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 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 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 Owner.

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

CC. Bid Item No. 41: Remove/Hand Work/Mill Existing Roadway Asphalt Adjacent to Existing Ornate Driveway

The Contractor's bid unit price per square yard (SY) shall include all labor, materials, equipment, and incidentals necessary for removing/hand working/milling of existing pavement adjacent to existing ornate driveways at the depth indicated in the Bid Form and specified herein, and as directed by the Engineer. This item includes, but is not limited to: working/milling, removal and disposal of hand worked/milled material without stockpiling at site milling, temporary pavement markings, saw cutting of all pavement 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.

Removal/Hand Working/Milling operation cannot progress more than 2,000 feet beyond the pavement restoration operation.

DD. Bid Item 42: Furnish and Place Asphalt/Driveway Overlay

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 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 a tack coat and furnishing, placing and compacting all asphalt surface, 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 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.

All replacement/restoration shall be to the pre-construction condition or better.

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 Owner.

EE. Bid Item 43: Repair Pavement Section

The Contractor's bid unit price per square yard (SY) shall include all labor, materials, equipment, and incidentals necessary to repair existing pavement section within City rights-of-way as 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: saw cutting, removal and disposal of existing asphalt and a minimum of 12" of underlying material, excavation, compaction of subgrade, furnishing and installing new limerock base, compacting of limerock base (LBR 100), and furnishing and placing One (1) lift of minimum

two inch (2") SP-12.5 asphalt over open-cut width (W+4"), tack coat, protection of existing utilities, structures, trees, shrubs, and lawns, and all other work required to repair the pavement section.

FF. Bid Item 44 through 45: Furnish and Install Thermoplastic Solid Traffic Stripe

The Contractor's bid unit price per linear foot (LF) shall include all labor, materials, equipment, and incidentals necessary for furnishing and placing thermoplastic pavement markings as determined by measurement along the centerline of the pavement markings in place and as detailed in FDOT Standard Specifications Section 711, as shown on the drawings, and as specified herein. This item includes, but is not limited to: temporary striping, temporary layout, final thermoplastic striping (solid and skip striping), removal of existing striping by means of water blasting, providing access to driveways and roadways at all times, protection of existing utilities, structures, trees, shrubs, and lawns, relocation/reinstallation of existing signs in accordance with FDOT Standard Specifications Section 700 as necessary to facilitate installation of crosswalks and/or shifting of existing stop bar locations, and all other work required for the complete installation. This item includes actual length of thermoplastic striping installed for a skip style striping.

GG. Bid Item 46: Furnish and Place Reflective Pavement Markers (RPM'S)

The Contractor's bid unit price per each (EA) shall include all labor, materials, equipment, and incidentals necessary for furnishing and placing thermoplastic pavement markings as detailed in FDOT Standard Specifications Section 711, as shown on the drawings, and as specified herein. This item includes, but is not limited to: temporary signals, temporary layout, final thermoplastic turn-lane, arrow, and bike-lane indicator signals, complete word signals, school zone signals, bus signals, removal of existing signals by means of water blasting, 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.

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

HH. Bid Item 47: 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, top soil, stone, filter fabric, 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 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, 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 and also by the Owner during construction. This line item also includes relocation of existing palm trees in conflict with the swale clearing and grading at the approval of Owner and Engineer.

Payment for this line item will be issued under the City Municipal Services Allowance below.

II. Bid Item 48: Clear and Grade Swale Allowance

Bid Item "Clear and Grade Swale Allowance" is an allowance item to be utilized only as authorized by the Owner. The allowance for Bid Item 48 applies to payment for increasing quantities for Bid Item 47 beyond what is shown in the bid schedule as required based on the determination of existing conditions determined during construction. Clearing and grading of swales under this allowance item shall be measured and paid for as described in Bid Item 47 and at a unit cost per square yard (SY) indicated in the Bid Form of Bid Item 47. 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 Owner.

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

JJ. Bid Item 49: Sidewalk Allowance

Bid Item "Sidewalk Allowance" is an allowance item to be utilized only as authorized by the Owner. The allowance for Bid Item 49 applies to payment for increasing quantities for Bid Items 37 through 39 beyond what is shown in the bid schedule as required based on the determination of existing conditions determined during construction. Removing & replacing, and furnishing & installing concrete sidewalk under this allowance item shall be measured and paid for as described in Bid Items 37 through 39 and at a unit cost per square yard (SY) indicated in the Bid Form of Bid Items 37 through 39. 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 Owner.

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

- 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
3301 Gun Club Rd
MSC 7210-1
West Palm Beach, FL 33406
561-681-6600

- 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:
 - 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 -

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 or by telecommunication at Owners request.
- 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 or by telecommunication at Owners request.
- 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 each group of work orders 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.
- B. 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 or in pdf format by e-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. Submittal of shop drawings in pdf format is the preferred method in lieu of hard copies. 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, pdf format 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 his warrantee for a minimum of a one year period or as otherwise specified upon approval and acceptance by the Owner. 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 sub schedules 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 -

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 01025: Measurement and 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 -

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.
- C. 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.
- D. 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.
- E. 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 -

SECTION 01505

MOBILIZATION & 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 without applying for and obtaining a fire hydrant meter rental/permit from the City. The City shall provide a meter and backflow assembly.
- 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.

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 -

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. The Owner shall have Contractor visually inspect all sewer lateral repairs before backfill and Contractor to provide TV inspection of repair.
- 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).
- 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 -

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

- A. 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 Engineer, Owner and authority having jurisdiction for approval. 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 in an area. 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 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 Engineer, Owner, and jurisdictional agency. 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 his review of the plan for the proposed installation of traffic control devices, warning devices or barriers.
- 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 -

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.
 - 1. It shall be the contractor's responsibility to provide a stockpile location prior the notice to proceed date and accepted by the Owner.
 - 2. The stockpile shall be secured and not exceed a height greater than six feet.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

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.

- F. Requests for substitution of specified product, material, and/or manufacturer, which in the sole opinion of the Engineer represent a substantial engineering deviation and/or change to the Contract Documents shall be submitted with updated/revised design plans and design calculations reviewed and signed and sealed by an active and licensed professional engineer in the State of Florida. Signed/sealed updated/revised plans shall detail that proposed substitution has been reviewed in accordance with the contract plans and specifications and is/are suitable for the Contract's proposed installation, design criteria, operation, and service life. Signed/Sealed plans shall include all pertinent data as requested by the Engineer.

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 -

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 -

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 and/or irrigation systems disturbed by Contractor's operations shall be repaired within three days with proper sod bed preparation, fertilizer, and sod. Sod shall match grass type to existing conditions or be Floratam Sod in irrigated areas and Bahia in non-irrigated areas.

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 surfaces and all work areas, to verify that the entire work is clean.

- END OF SECTION -

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. 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) or professional land surveyor (PLS), 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 mains and service laterals.
 3. The location (northing and eastings), elevation, size, and type of all valves, fittings, hydrants, tie-ins to existing mains, air release valves, RPZ/PVB backflow preventers, double detector check valves, line stops, insertion valves, corporation stop at saddle connections to new water mains, dual check valve, 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 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/ extents of grout fill and abandonment.
 7. Indicate the locations of existing facilities removed and disposed of including location (northing and eastings) of limits/ extents of removal.
 8. Indicate the locations (northing and eastings) of existing water mains where they are cut and abandoned in place including pictures of cut and plugged existing

water main.

9. Indicate the locations and top of pipe elevations of all water services on private property and the tie-in connection point location (northing and eastings) at the building/home.
 10. The locations (northing and eastings) and elevations of surface features (e.g., driveways, sidewalks, pavement, drainage swales, structures, etc.) installed during construction.
 11. Water main top of pipe elevations and locations (northing and eastings) at vertical deflection points and every fifty (50) linear feet.
 12. Crossing information between proposed water main and existing and proposed sewer main, force main, drainage, water main, and franchise utilities.
 13. All test hole or soft dig information obtained on existing utilities providing precise horizontal and vertical locations.
- 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 PLS/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(s) provided at the end of this section for existing and new water meters, air release valves, corporation stops, manholes, hydrants and underground isolation valves. The data shall be collected using the form(s) provided. Completed form(s) 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 or other storage device 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 -

Record Document for:
Golden Harbour
Date:
Field Rep:



Item No.	Address	GPS Coordinates				GPS Coordinates											
		Old Meter		New Meter		New Meter		Corp Stop		ARV		Manhole		Hydrants		Valves	
		Number	Reading	Number	Reading	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting
1	1555 NE 5th Ave	45-58954	85,000	90-44613	127,000	739486.17	958121.77	739486.17	958121.77	739486.17	958121.77	739486.17	958121.77	739486.2	958121.77	739486.17	958121.77
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Record Document for:
Golden Harbour
Date:
Field Rep:



Item No.	Address	GPS Coordinates															
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Record Document for:
Golden Harbour
Date:
Field Rep:



Item No.	Address	GPS Coordinates				GPS Coordinates											
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		Number	Reading	Number	Reading	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting
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Notes:

Record Document for:
Golden Harbour
Date:
Field Rep:



Item No.	Address	GPS Coordinates															
		Old Meter		New Meter		New Meter		Corp Stop		ARV		Manhole		Hydrants		Valves	
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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) 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.

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 (c) above, the Contractor is responsible for submitting a complete and accurate asbestos notification of demolition form titled "Notice of Demolition or Asbestos Renovation" [i.e., DEP Form 62-257-9000(1)], for each separate address to be demolished to the below listed agencies at least ten (10) business days prior to demolition. The contractor shall submit the "Notice of Demolition or Asbestos Renovation" form electronically on the Business Portal Guide located on the <https://floridadep.gov/> website. The form is available from the Department of Environmental Protection (FDEP) and Palm Beach County Department of Health (PBCDOH).

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 Department of Health.
- 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-

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, Paragraph 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. 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.
- C. The Engineer may require that the material used for this backfill be obtained from a source entirely apart from the location of the work.

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 been 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/DEWATERING

- 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. The Contractor may elect to place lifts of no more than 12 inches compacted thickness if they can demonstrate with a successful test section that the density specified in Article 3.07 can be achieved. Only hand operated mechanical compacting equipment shall be used within six inches of the installed pipe.
- 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 and shall be placed in horizontal layers, the depth of which shall not exceed the ability of the compaction equipment employed, and in no event shall exceed a depth of 6 inches. The Contractor may elect to place lifts of no more than 12 inches compacted thickness if they can demonstrate with a successful test section that the density specified in Article 3.07 can be achieved. 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 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.
- 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. Sheeting 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 Engineer. Trees shall be supported during excavation by any means previously reviewed and approved by the Engineer.

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 break out force rated at not less than 44,000 lbs. (Caterpillar 235D or equivalent), and occupying an original volume of at least 2 cubic yards.
- B. The Contractor shall immediately notify the Engineer and Owner should they encounter material considered rock during excavation and provide the necessary documentation to justify the material they encounter meets the definition of rock described above.

- END OF SECTION -

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 EXISTING IMPROVEMENTS

- 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 shall also include a 4" layer of topsoil.
 - 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. Applying Fertilizer: Prepare by loosening beds four (4) inches deep. Apply fertilizer at rate of twenty (20) pounds per one thousand (1,000) square feet. 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-Florata, Bermuda, Zoysia, and Bahia subject to the approval of the Engineer or Landscape Architect. St. Augustine-Florata 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 or 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 cut surfaces of one inch or more in diameter, above the ground, 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 home owner. 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 -

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 SP Asphaltic Concrete conforming to DOT Sections 330, 334, 337 and 916. 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. Meet the requirements for plant and equipment specified in Section 320. Meet the general construction requirements specified in Section 330.

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 -

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 ¼-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 -

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. 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-water stop 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, nongasliberating, 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 NON-SHRINK GROUT/FLOWABLE FILL FOR ABANDONING PIPELINES AND STRUCTURES

- A. Non-shrink grout/flowable fill shall meet the requirements of FDOT Standard Specifications Section 121. Non-shrink grout/flowable fill for pipe and structure abandoning shall have a minimum 28-day compressive strength of 75 psi and a maximum of 150 psi.

2.10 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.

2.11 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 screening | |

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 hair broom 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 -

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.
- 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 PRECAST CONCRETE STORM DRAINAGE STRUCTURES

- A. Precast structures and maintenance access structures sections shall conform to the plans or ASTM C-478, Specifications for Precast Reinforced Concrete Maintenance Access Structure Sections as modified thereto whichever is more restrictive. Concrete shall be Type II concrete and attain a minimum compressive strength of 4,000 psi at 28 days. Minimum wall thickness shall be 8 inches.
- B. Unless otherwise specified on the plans, all joints shall be made with neoprene or rubber "O" ring compression joints; mastic joint sealing compound or approved equal. After assembly, all joints shall be filled with mortar and pointed to provide a smooth surface without joint voids.
- C. The base and walls that compose the bottom section of precast structures and maintenance access structures shall be of monolithic construction, minimum 8 inches thick, and the edge of the base slab shall project a minimum 4 inches beyond the outside diameter of the wall.
- D. Holes for piping shall be 6 inches larger than the outside diameter of the respective pipe (not applicable to Sanitary Sewer M.A.S.). After the pipe is set, the void space between the pipe and the hole perimeter shall be completely filled with non-shrinking, quick-setting, waterproof cement mortar and struck smooth.
- E. The minimum height of precast base section shall be 36 inches from the outside bottom of the base slab; however, no holes for piping shall be cast less than 8 inches from the top of the base section or less than 2 inches from the top of the base slab.
- F. Brick shall be solid hard-burned clay conforming to ASTM Serial C-32-93, Grade SM. Concrete brick shall conform to ASTM Serial C-55-75, Grade P-I. Concrete block shall conform to ASTM Serial C-90-78, Grade PI.

- G. All brick or concrete block structures covered in this Section shall be plastered inside and outside with 1/2 inch of cement mortar. Inside surfaces shall be smooth and even.
- H. Base slabs and walls of concrete structures shall be constructed in a continuous pour between expansion joints.
- I. For each grate type inlet, two layers of Mirafi 140 fabric of "Poly Filter X" polypropylene material or approved equal, shall be sandwiched between 2 x 2 x 10/10 welded wire fabric cut to the grate size and attached to the underside of the grate. The sandwiched filter material shall be wired to the cross members of the grate each way on 4-inch centers. After inlet construction and the roadway construction is completed and the project site WORK (including landscaping) has been established, the filter material and fabric shall be removed with any retained silt or sand.

2.07 CASTINGS (INCLUDING FRAMES, COVERS AND GRATINGS)

- A. Iron castings shall conform to ASTM A-48, "Specifications for Gray Iron Castings", and shall be Class 30. Frames and grates may be Class 20.
- B. All castings shall be made of clean, even grain, tough grey cast iron. The castings shall be smooth, true to pattern and free from projections, sand holes, warp and other defects. The horizontal surface of the frame cover seats and the under surface of the frame cover seat which rests upon the cover seat shall be machined. After machining, it shall not be possible to rock any after it has been seated in any position in its associated frame.
- C. Bearing surfaces between cast frames, covers and grates shall be machined and fitted together to assure a true and even fit. Within areas of vehicular traffic, the frames, covers and gratings shall be machined-ground so that irregularity of contact will be reduced to a minimum and will be rattle-proof.
- D. All maintenance access structure covers shall be provided with concealed pick holes. Manufacturer's name and catalog number shall be cast on all frames, covers, grates, etc. Covers shall be lettered "Storm" "Storm Drain" or "Sanitary Sewer" as applicable and shall be plainly visible. The maintenance access structure frames and covers shall be flush with finished grade. Maintenance access structure covers shall bear the City of Boca Raton logo as manufactured by US Foundry or approved equal.
- E. The minimum height of precast base section shall be 36 inches from the outside bottom of the base slab; however, no holes for piping shall be cast less than 8 inches from the top of the base section or less than 2 inches from the top of the base slab.

2.08 BEDDING MATERIAL

- A. Bedding material shall conform to ASTM #67 aggregate free from debris, clay lumps, organic, or other deleterious material.

2.09 NEOPRENE

- A. Neoprene bearing pads shall conform to applicable standards.

2.10 PRECAST CONCRETE VAULT

- A. Precast concrete vaults for air release valves shall conform to the plans or ASTM C-478, Specifications for Precast Reinforced Concrete Maintenance Access Structure Sections as modified thereto whichever is more restrictive. Concrete shall be Type II concrete and attain a minimum compressive strength of 4,000 psi at 28 days. Minimum wall thickness shall be 8 inches.
- B. Unless otherwise specified on the plans, all joints shall be made with neoprene or rubber "O" ring compression joints; mastic joint sealing compound or approved equal. After assembly, all joints shall be filled with mortar and pointed to provide a smooth surface without joint voids.
- C. The base and walls that compose the bottom section of precast concrete vaults shall be of monolithic construction, minimum 8 inches thick, and the edge of the base slab shall project a minimum 4-inches beyond the outside diameter of the wall.
- D. The vault shall be accessible through a cast-iron ring and cover as indicated on the Drawing. The ring and cover shall comply with the requirements in the City of Boca Raton's Approved Products List.
- E. See requirements on the detail labeled "Sewage Air Release Valve Detail" on the Drawings.

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.

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 STRUCTURES AND MAINTENANCE ACCESS STRUCTURES

- A. All joints shall be finished watertight, all openings for sewers, frames, etc., in precast structures and maintenance access structures and catch basins shall be cast at time of manufacture. Spaces around all piping entering or leaving structures and maintenance access structures shall be completely filled with mortar or equal.
- B. All structures and maintenance access structures shall be set plumb to line and grade and shall rest on a firm carefully graded subgrade which shall provide uniform bearing under base.
- C. Grout for maintenance access structure bottoms shall consist of broken block, brick and 2:1 cement mortar.

3.04 STRUCTURES AND MAINTENANCE ACCESS STRUCTURES BEDDING

- A. Accurately cut trench for structures and provide bedding material 6 inches below the bottom of the structure. Compact trench bedding a minimum of 98 percent of the maximum density as determined by AASHTO T-180.
- B. Wrap bedding material with Filter Fabric: Mirafi 140 N, Mirafi 700 X, or equal.

3.05 CLEANING AND MAINTENANCE

- A. All structures shall be cleaned and maintained in workable condition until accepted by the Engineer.

3.06 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.

- END OF SECTION

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 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.

3.03 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.

3.04 THRUST/ PIPE RESTRAINT

- A. All joints shall be restrained per City Standard Detail "Mechanical Thrust Restraint minimum Pipe Lengths".

3.05 TESTING

- A. Field testing of pipelines shall conform to the requirements of the Section 15995- "Pipeline Testing and Disinfection".

- END OF SECTION -

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 C600	Installation of Ductile-Iron Water Mains and Appurtenances
SSPC - PA2	Measurement of Dry Paint Thickness with Magnetic Gages

PART 2 -- PRODUCTS

2.01 PIPE

- A. All ductile iron pipe 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 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 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 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 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.

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. 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.
- B. Sanitary Sewer Force Main: All ductile iron pipe and fittings for sanitary sewer service shall be Ceramic Epoxy Lined with Protecto 401 (40 mils) as required by the City of Boca Raton Approved Utility Product List.

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 fields 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.
- 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 -

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 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 -

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 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.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. All accessories and appurtenances shall be installed in accordance with the manufacturer's printed instructions.
- 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 –

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.

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. T.D. Williamson, Inc.
 - 3. EA Tapping

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 -

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 -

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 DUAL CHECK VALVES

- A. Dual check valves brand and model type shall be Watts LF7R (bronze) or approved equal meeting the requirements of NSF-61-G, U2x2 end, and a maximum working pressure of 175 psi.

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 counter clockwise 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 100 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. Contractor to prepare a disinfection and clearance plan for Owner and Engineer approval prior to starting disinfection.
- 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 -

APPENDIX A – TEST HOLES

**APPENDIX B – CITY OF BOCA RATON SHOP DRAWINGS
SUBMITTAL AND APPROVED UTILITY PRODUCTS LIST**

APPENDIX C – GEOTECHNICAL REPORT

APPENDIX D – PERMITS