Solicitation 473-11979

A-13 Sewer Redirection - 12133

Bid Designation: Public

CITY OF FORT LAUDERDALE

City of Fort Lauderdale

Bid 473-11979
A-13 Sewer Redirection - 12133

Bid Number	473-11979
Bid Title	A-**13 Sewer Redirection** - 12133
Bid Start Date	Jun 14, 2017 6:03:01 PM EDT
Bid End Date	Jul 17, 2017 2:00:00 PM EDT
Question & Answer End Date	Jul 10, 2017 5:00:00 PM EDT
Bid Contact	Althea Pemsel Sr. Procurement Specialist Finance apemsel@fortlauderdale.gov
Contract Duration	**300 days**
Contract Renewal	Not Applicable
Prices Good for	**120 days**
Pre-Bid Conference	**Jun 22, 2017 11:00:00 AM EDT** **Attendance is optional** **Location: City of Fort Lauderdale** **Engineering Department** **4th Floor Conference Room** **Fort Lauderdale, FL 33301** **Site Visit to Follow Pre-proposal Meeting**

Bid Comments

Sealed bids will be received electronically until 2:00 P.M., local time, on **July 10, 2017,** and opened immediately thereafter in the 5th Floor Conference Room, City Hall, City of Fort Lauderdale, Florida, 100 North Andrews Avenue, for **BID NO., 473-11979, PROJECT NO., 12133 for A-13 Sewer Redirection.**

This project consists of Drawing File No. 4-139-49, **(35)** sheets.

The work includes, but is not limited to, the construction of an 18" diameter gravity sanitary sewer system from an existing active sanitary sewer manhole located in the intersection of Federal Highway and Broward Boulevard to the proposed pump station site on the Southeast corner of S.E. 2nd Court and S.E.8th Avenue. The project also includes construction of a submersible triplex sewage pump station and valve vault with electrical control panels and appurtenances. The 12' diameter concrete wet well shall be supplied by the City of Fort Lauderdale. An alternate bid item has been included on Line 40 A for a contractor provided structure.

NOTE: Payment on this contract will be made by Visa or MasterCard.

Possession of a General Contractor License and/or Certified Underground Utility and Excavation Contractor's License is required for this project.

Pre-Bid Meeting/Site visit: - A pre-bid meeting and/or site visit will be held on June 22, 2017, at 11:00 a.m., local, time, at City of Fort Lauderdale, City Hall, 100 N. Andrews Avenue, 4th Floor Conference Room, Fort Lauderdale, Florida.

Added on Jun 15, 2017:

This Addendum Number #1 is *released to change the End Date* for Questions and Answers *FROM June 30, 2017 at 5:00pm TO READ: July 10, 2017 at 5:00pm.*

This Addendum also *changes the ITB Due Date* FROM July 10, 2017 at 2:00pm TO READ: July 17, 2017 at 2:00pm.

Addendum # 1

New Documents	**473-11979 A-13 Sewer Redirection East of Federal Highway 12 June.docx**		
Removed Documents	**473-11979 A-13 Sewer Redirection East of Federal Highway 12 June.docx**		
Previous End Date	Jul 10, 2017 2:00:00 PM EDT	New End Date	**Jul 17, 2017 2:00:00 PM EDT**
Previous Q & A End Date	Jun 30, 2017 5:00:00 PM EDT	New Q & A End Date	**Jul 10, 2017 5:00:00 PM EDT**
Previous Contract Renewal	Not Applicable	New Contract Renewal	Not Applicable

Item Response Form

Item	**473-11979--01-01 -** Base Bid 1: Mobilization (10 percent of total excluding MOT and MOB)
Lot Description	Base Bid 1
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
Payment for mobilization and demobilization will be made at the lump sum price developed from the cost of the unit price items. Mobilization includes, but is not limited to all required testing with passing results, all required bonds, video of existing site conditions and final completion, test holes for verification of existing utility/storm pipe sizes and elevations, insurance, site cleanup, sanitary facilities, labor associated with permit acquisition, contractor staging area, project signs, project coordination, and demobilization. See section 01025 for complete description.

Item	**473-11979--02-01 -** Base Bid 2: Maintenance of traffic (10 percent of total excluding MOT **and MOB)**
Lot Description	Base Bid 2
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
Payment for maintenance of traffic will be made at the lump sum price named in the Bid Schedule. Payment for maintenance of traffic will be made in equal monthly amounts during the duration of the contract time. Existing traffic signage shall be maintained and protected at all times. There shall be no additional payment for replacement. See section 01025 for complete description.

Item	**473-11979--03-01 -** Base Bid 3: Remove and dispose of existing asphalt pavement
Lot Description	Base Bid 3
Quantity	**3600 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 3600

Description
Payment for removal and disposal of existing pavement will be made at the unit price per square yard of pavement named in the Bid Schedule which price shall constitute full compensation for the removal and disposal of such pavement. See section 01025 for complete description.

Item	**473-11979--04-01 -** Base Bid 4: Remove and dispose of existing sidewalk and concrete **paving**
Lot Description	Base Bid 4
Quantity	**800 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 800

Description
Payment for removal and disposal of existing sidewalk or concrete driveway will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for the removal and disposal of all sidewalk, concrete driveway or curbing complete. See section 01025 for complete description.

Item	**473-11979--05-01 -** Base Bid 5: Remove and dispose of all types of existing curb and gutter
Lot Description	Base Bid 5
Quantity	**1030 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1030

Description
Payment for removal and disposal of existing curbing and gutter will be made at the unit price per linear foot named in the Bid Schedule which price shall constitute full compensation for the removal and disposal of all curbing complete. See section 01025 for complete description.

Item	**473-11979--06-01 -** Base Bid 6: Remove and dispose of existing pavers
Lot Description	Base Bid 6
Quantity	**190 square yard**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 190

Description
Payment for removal and disposal of existing pavers will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for the removal and disposal of all pavers complete. See section 01025 for complete description.

Item **473-11979--07-01 -** Base Bid 7: Remove and reinstall existing parking meters

Lot Description Base Bid 7

Quantity **10 each**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 10

Description
Payment for removal and reinstalling existing parking meters will be made at the unit price each named in the Bid Schedule which price shall constitute full compensation for the removal and reinstallation of all parking meters including but not limited to removal of existing meter, wiring, foundation, posts, etc. and reinstalling meter, new post, new foundation, new electric, new communications, etc. for a complete and functional removal and reinstallation acceptable to City. See section 01025 for complete description.

Item **473-11979--08-01 -** Base Bid 8: Remove and dispose of existing pipe (all types and sizes)

Lot Description Base Bid 8

Quantity **100 linear foot**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 100

Description
Payment for removal and disposal of existing pipe, storm. water, force main, etc. will be made at the unit price per linear foot of pipe named in the Bid Schedule which price shall constitute full compensation for the removal and disposal of such pipe, including excavation, removal of valves, fittings, valve boxes, backfilling trench, restoration for a complete and functional removal and disposal of existing pipe of various sizes and materials.

Item **473-11979--09-01 -** Base Bid 9: Furnish & install 1.5 inch type SP 9.5 asphalt friction course **US1/SE 6 Av**

Lot Description Base Bid 9

Quantity **1750 square yard**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications

See ITB Specifications
Fort Lauderdale FL 33301
Qty 1750

Description
Payment for restoration of asphalt pavement at the thickness indicated will be made at the unit price per square yard for such placement as named and at the thickness indicated in the Bid Item. See section 01025 for complete description.

Item	**473-11979--10-01 -** Base Bid 10: Furnish & install 2 inch type SP 12.5 1st asphalt structural **course US1/SE 6 Av**
Lot Description	Base Bid 10
Quantity	**1750 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1750

Description
Payment for restoration of asphalt pavement at the thickness indicated will be made at the unit price per square yard for such placement as named and at the thickness indicated in the Bid Item. See section 01025 for complete description.

Item	**473-11979--11-01 -** Base Bid 11: Furnish & install 2 inch type SP 12.5 2nd asphalt structural **course US1/SE 6 Av**
Lot Description	Base Bid 11
Quantity	**1750 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1750

Description
Payment for restoration of asphalt pavement at the thickness indicated will be made at the unit price per square yard for such placement as named and at the thickness indicated in the Bid Item. See section 01025 for complete description.

Item	**473-11979--12-01 -** Base Bid 12: Furnish & install 12 inch limerock base meeting LBR 100 **US1/SE 6 Av**
Lot Description	Base Bid 12
Quantity	**1900 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1900

Description
Payment for furnishing and placing of lime rock base material will be made at the unit price per square yard at the depth indicated and named in the Bid Item. See section 01025 for complete description.

Item	**473-11979--13-01 -** Base Bid 13: Furnish & install 12 inch stabilized subgrade meeting lbr **40 US1/SE 6 Av**
Lot Description	Base Bid 13
Quantity	**1900 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1900

Description
Payment for compacting/stabilizing of subgrade will be made at the unit price per square yard named in the Bid Item. See section 01025 for complete description.

Item	**473-11979--14-01 -** Base Bid 14: Furnish and inst 3**-1/8" conc. paver on 1" sand bed color-pattern US1**
Lot Description	Base Bid 14
Quantity	**200 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 200

Description
Payment for restoration of paver areas will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for completing said WORK, including all removal and disposal of existing material, earthwork, grading, construction of the area to the same depth and material as the existing one, sand, furnishing and setting for expansion joint material, disposal of excess material, densities passed, and the appurtenant items for which separate payment is not specifically included in the Bid Schedule. See section 01025 for complete description.

Item	**473-11979--15-01 -** Base Bid 15: Furnish & install 12 inch limerock base meeting LBR 100 **(restoration US 1)**
Lot Description	Base Bid 15
Quantity	**216 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 216

Description
Payment for furnishing and placing of lime rock base material will be made at the unit price per square yard at the depth indicated and named in the Bid Item. See section 01025 for complete description.

Item	**473-11979--16-01 -** Base Bid 16: Furnish & install 12 inch stabilized subgrade meeting LBR **40 (restoration US 1)**

Lot Description	Base Bid 16
Quantity	**216 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 216

Description
Payment for compacting/stabilizing of subgrade will be made at the unit price per square yard named in the Bid Item. See section 01025 for complete description.

Item	**473-11979--17-01 -** Base Bid 17: Concrete pavement croswalk restoration in US 1
Lot Description	Base Bid 17
Quantity	**15 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 15

Description
Payment for restoration of concrete will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for completing said WORK, including the removal and disposal of the existing concrete crosswalk, reinforcement, concrete, forms and all else necessary for a complete and functional restoration. See section 01025 for complete description.

Item	**473-11979--18-01 -** Base Bid 18: Furnish & install 12 inch limerock base meeting lbr 100 **(restoration US 1)**
Lot Description	Base Bid 18
Quantity	**20 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 20

Description
Payment for furnishing and placing of lime rock base material will be made at the unit price per square yard at the depth indicated and named in the Bid Item. See section 01025 for complete description.

Item	**473-11979--19-01 -** Base Bid 19: Furnish & install 12 inch stabilized subgrade meeting lbr 40 **(restoration US 1)**
Lot Description	Base Bid 19
Quantity	**20 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 20

Description
Payment for compacting/stabilizing of subgrade will be made at the unit price per square yard named in the Bid Item. See section 01025 for complete description.

Item	**473-11979--20-01 -** Base Bid 20: 6 inch thick concrete sidewalk (restoration in US 1 **- includes subgrade)**
Lot Description	Base Bid 20
Quantity	**550 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 550

Description
Payment for restoration of walk will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for completing said work, including all necessary material and compaction. See section 01025 for complete description.

Item	**473-11979--21-01 -** Base Bid 21: Mill existing asphalt 1.5 inch depth (milling US 1/6th Ave)
Lot Description	Base Bid 21
Quantity	**2100 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 2100

Description
Payment for milling and resurfacing of asphalt pavement at the minimum thickness of 1.5 inches indicated will be made at the unit price per square yard for such milling and resurfacing as named in the BidItem. See section 01025 for complete description.

Item	**473-11979--22-01 -** Base Bid 22: Furnish & install 1.5 inch type SP 9.5 asphalt friction course **US1/6 Av**
Lot Description	Base Bid 22
Quantity	**2100 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 2100

Description
Payment for restoration of asphalt pavement at the thickness indicated will be made at the unit price per square yard for such

placement as named and at the thickness indicated in the Bid Item. See section 01025 for complete description.

Item	**473-11979--23-01 -** Base Bid 23: Furnish & install 1 inch type S**-III 1st asphalt surface course SE 2 court**
Lot Description	Base Bid 23
Quantity	**1900 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1900

Description
Payment for restoration of asphalt pavement at the thickness indicated will be made at the unit price per square yard for such placement as named and at the thickness indicated in the Bid Item. See section 01025 for complete description.

Item	**473-11979--24-01 -** Base Bid 24: Furnish & install 1 inch type S**-III 2nd asphalt structural course SE 2 court**
Lot Description	Base Bid 24
Quantity	**1900 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1900

Description
Payment for restoration of asphalt pavement at the thickness indicated will be made at the unit price per square yard for such placement as named and at the thickness indicated in the Bid Item. See section 01025 for complete description.

Item	**473-11979--25-01 -** Base Bid 25: Furnish & install 16 inch limerock base meeting LBR 100 **(restoration SE 2nd CT)**
Lot Description	Base Bid 25
Quantity	**2050 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 2050

Description
Payment for furnishing and placing of lime rock base material will be made at the unit price per square yard at the depth indicated and named in the Bid Item. See section 01025 for complete description.

Item	**473-11979--26-01 -** Base Bid 26: 6 inch thick concrete walk restoration (includes compacted **subgrade - SE 2 court**
Lot Description	Base Bid 26

Quantity **350 square yard**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 350

Description
Payment for restoration of walk will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for completing said work, including all necessary material and compaction. See section 01025 for complete description.

Item **473-11979--27-01 -** Base Bid 27: Mill existing asphalt 1 inch depth (milling SE 2nd CT)

Lot Description Base Bid 27

Quantity **3500 square yard**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 3500

Description
Payment for milling and resurfacing of asphalt pavement at the minimum thickness of 1.0 inch indicated will be made at the unit price per square yard for such milling and resurfacing as named in the Bid Item. See section 01025 for complete description.

Item **473-11979--28-01 -** Base Bid 28: Furnish & install 1 inch type S**-III asphalt surface course (one lift resurfacing**

Lot Description Base Bid 28

Quantity **3500 square yard**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 3500

Description
Payment for milling and resurfacing of asphalt pavement at the minimum thickness of 1.0 inch indicated will be made at the unit price per square yard for such milling and resurfacing as named in the Bid Item. See section 01025 for complete description.

Item **473-11979--29-01 -** Base Bid 29: Construct type F curb and gutter D curb valley gutter

Lot Description Base Bid 29

Quantity **1050 linear foot**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301

Qty 1050

Description
Payment for furnishing and installing curb and gutter, valley gutter will be made at the unit price per linear foot of curb named in the Bid Schedule, which shall constitute full compensation for complete installation including grading, forming, saw cutting of pavement, 4 inch limerock pad, drop curb, and cleanup of all areas disturbed by this construction. See section 01025 for complete description.

Item	**473-11979--30-01 -** Base Bid 30: Curb ramps per fdot index 304 including detectable **surface warning**
Lot Description	Base Bid 30
Quantity	**10 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 10

Description
Payment for furnishing and installing curb ramps with truncated domes detectable warnings will be made at the unit price, each named in the Bid Item. See section 01025 for complete description.

Item	**473-11979--31-01 -** Base Bid 31: Furnish & install maintenance access structure (manhole **12 foot-14 foot depth)**
Lot Description	Base Bid 31
Quantity	**5 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 5

Description
Payment for furnishing and installing sanitary sewer maintenance access structures will be made at the unit price, each, named in the Bid Schedule. See section 01025 for complete description.

Item	**473-11979--32-01 -** Base Bid 32: Furnish & install 18 inch SDR 26 gravity sewer 8 foot**-10 foot depth**
Lot Description	Base Bid 32
Quantity	**340 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 340

Description
Payment for furnishing and installing sewer pipe shall constitute full compensation for the complete installation of the sewer pipe, including but not limited to pipe, excavation, dewatering (including cleaning adjacent discharge pipe), sheeting, backfill, by-pass pumping, cleaning, clearing and compaction, and supporting existing water main and all other existing utilities, including FPL poles, light poles, within trench excavation of proposed sewer pipe and connected manholes. See section 01025 for complete description.

Item	**473-11979--33-01 -** Base Bid 33: Furnish & install 18 inch SDR 26 gravity sewer 12 foot**-14 foot depth**
Lot Description	Base Bid 33
Quantity	**1250 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1250

Description
Payment for furnishing and installing sewer pipe shall constitute full compensation for the complete installation of the sewer pipe including but not limited to pipe, excavation, dewatering (including cleaning adjacent discharge pipe), sheeting, backfill, by-pass pumping, cleaning, clearing and compaction, and supporting existing water main and all other existing utilities, including FPL poles, light poles, within trench excavation of proposed sewer pipe and connected manholes. See section 01025 for complete description.

Item	**473-11979--34-01 -** Base Bid 34: Furnish**-install 18" DIP Gravity sewer 12-14 feet depth support ex. utilities**
Lot Description	Base Bid 34
Quantity	**35 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 35

Description
Payment for furnishing and installing sewer pipe shall constitute full compensation for the complete installation of the sewer pipe including but not limited to pipe, excavation, dewatering (including cleaning adjacent discharge pipe), sheeting, backfill, by-pass pumping, cleaning, clearing and compaction, and supporting existing water main and all other existing utilities, including FPL poles, light poles, within trench excavation of proposed sewer pipe and connected manholes. See section 01025 for complete description.

Item	**473-11979--35-01 -** Base Bid 35: Furnish & install furnish and install 14 inch DIP Force main
Lot Description	Base Bid 35
Quantity	**460 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 460

Description
Payment for furnishing and installing ductile iron pipe will be made at the unit price per linear foot of pipe named in the Bid Schedule which price shall constitute full compensation for the complete installation of ductile iron pipe, coatings, and restraints including excavation, dewatering, bedding, backfill, compaction, clearing, etc. and all else necessary for a complete and functional installation. Additionally, this work includes supporting existing water main and all other existing utilities within trench excavation of proposed ductile iron pipe. See section 01025 for complete description.

Item	**473-11979--36-01 -** Base Bid 36: Furnish & install DIP Fittings
Lot Description	Base Bid 36
Quantity	**2 ton**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 2

Description
Payment for furnishing and installing fittings shall be at the unit bid price per ton and shall include furnishing, coatings, complete installation including storing and transporting the fittings. See section 01025 for complete description.

Item	**473-11979--37-01 -** Base Bid 37: Furnish & install 48 inchx14inch tapping sleeve and 14 inch **tapping valve**
Lot Description	Base Bid 37
Quantity	**1 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
Payment for furnishing and installing tapping sleeves and valves will be made at the unit price each, named in the Bid Schedule which price shall constitute full compensation for the installation of the tapping sleeve, valve, valve extension, valve box, tanker truck and all else necessary for a complete and functional installation. See section 01025 for complete description.

Item	**473-11979--38-01 -** Base Bid 38: Furnish & install 14 inch force main plug valve
Lot Description	Base Bid 38
Quantity	**1 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
Payment for furnishing and installing valves and boxes will be made at the unit price each, named in the Bid Schedule which price shall constitute full compensation for the completed installation of the valve, including valve box, brass tag, and extension to finish grade and concrete collar installed in unpaved areas. See section 01025 for complete description.

Item	**473-11979--39-01 -** Base Bid 39: Connect to existing gravity sewage structure and rehab **existing Manhole**
Lot Description	Base Bid 39
Quantity	**1 each**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
Payment to connect to existing manhole will be made at the unit price, each, named in the bid schedule, which price shall constitute full compensation for the completed installation of the connection, including shutting down existing main, cutting main, by-pass pumping, caps and installation of the connection fittings and all else necessary for a complete and functional installation. See section 01025 for complete description.

Item **473-11979--40-01 -** Alternate Bid Item 40: Alternative Bid Item 40 Furnish & install lift **station Owner Provided Structure**

Lot Description Alternate Bid Item 40

Quantity **1 each**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
Payment for furnishing and installing a sanitary sewer lift station will be made at the unit price each, named in the Bid Schedule which price shall constitute full compensation for the completed installation of the structure including but not limited to furnishing sections of wet well and top slab not provided by OWNER, hauling/delivery of existing wet well section(s) supplied by OWNER, repairing liner of existing wet well section(s), clearing, earthwork, tree removal, landscape mitigation, excavation, dewatering (including cleaning adjacent discharge pipe), backfill and compaction, pavement restoration, assembly of all station parts, construction of the reinforced concrete structure, concrete pads, grading, panels, temporary fencing for safety and permanent replacement fence, gates, bollards & chain, all piping, valves, valve vaults, backflow preventer, fittings, couplings, pipe supports, ladder, electric services as noted on the plans, electrical work, connection panel, all other appurtenances, shutdown and all restoration WORK. Lift station shall be complete, energized and ready for service. See section 01025 for complete description.

Item **473-11979--40-02 -** Alternate Bid Item 40: Alternative Bid Item 40A Furnish**-install lift station Contractor Provided Struct**

Lot Description Alternate Bid Item 40

Quantity **1 each**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The proposed 12' diameter wet well structure shall be provided by the CONTRACTOR. Payment for furnishing and installing a sanitary sewer lift station will be made at the unit price each, named in the Bid Schedule which price shall constitute full compensation for the completed installation of the structure including but not limited to furnishing sections of wet well and top slab provided by the CONTRACTOR, clearing, earthwork, excavation, dewatering (including cleaning adjacent discharge pipe), backfill and compaction, pavement restoration, assembly of all station parts, construction of the reinforced concrete structure, concrete pads, grading, panels, temporary fencing for safety and permanent replacement fence, gates, bollards & chain, all piping, valves, valve vaults, backflow preventer, fittings, couplings, pipe supports, ladder, electric services as noted on the plans, electrical work, connection panel, all other appurtenances, shutdown and all restoration WORK. Lift station shall be complete, energized and ready for service. See section

01025 for complete description.

Item	**473-11979--41-01 -** Base Bid 41: Grout fill and abandon existing sewer pipe (18 inch**-24 inch)**
Lot Description	Base Bid 41
Quantity	**100 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 100

Description
Payment for grout filling and abandoning existing pipe will be made at the unit price per linear foot of pipe to be grout filled and abandoned as named in the Bid Schedule which price shall constitute full compensation for the work as required by the contract documents. See section 01025 for complete description.

Item	**473-11979--42-01 -** Base Bid 42: Furnish and Install sample points
Lot Description	Base Bid 42
Quantity	**2 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 2

Description
Payment for sample points will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for the complete installation of sample point and removal and disposal after sampling is complete. See section 01025 for complete description.

Item	**473-11979--43-01 -** Base Bid 43: Adjust existing utility lid and or valve lid to final grade
Lot Description	Base Bid 43
Quantity	**25 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 25

Description
Payment to adjust all types of utility lids will be based upon the actual quantity, each, of such adjustments made, all in accordance with the requirements of the governing utility authority and the Contract Documents. See section 01025 for complete description.

Item	**473-11979--44-01 -** Base Bid 44**-1: Furnish and install 6 inch striping both paint and thermoplastic**
Lot Description	**Base Bid 44-**1

Quantity	**3050 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 3050

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage. See section 01025 for complete description.

Item	**473-11979--45-01 -** Base Bid 44**-2: Furnish and install 12 inch solid white crosswalk striping both paint and thermo**
Lot Description	**Base Bid 44-**2
Quantity	**90 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 90

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage. See section 01025 for complete description.

Item	**473-11979--46-01 -** Base Bid 44**-3: Furnish and install 18 diagonal white in both paint and thermoplastic**
Lot Description	**Base Bid 44-**3
Quantity	**90 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 90

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the

striping and signage. See section 01025 for complete description.

Item	**473-11979--47-01 -** Base Bid 44**-4: Furnish and install 24 inch whitestop bar in both paint and thermoplastic**
Lot Description	**Base Bid 44-**4
Quantity	**130 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 130

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage. See section 01025 for complete description.

Item	**473-11979--48-01 -** Base Bid 44**-5: Furnish and install 6 inch double yellow in both paint and thermoplastic**
Lot Description	**Base Bid 44-**5
Quantity	**880 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 880

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage. See section 01025 for complete description.

Item	**473-11979--49-01 -** Base Bid 44**-6: Furnish and install white right turn arrow in both paint and thermoplastic**
Lot Description	**Base Bid 44-**6
Quantity	**4 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301

Qty 4

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage. See section 01025 for complete description.

Item	**473-11979--50-01 -** Base Bid 44**-7: Furnish and install white only message in both paint and thermoplastic**
Lot Description	**Base Bid 44-**7
Quantity	**4 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 4

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage. See section 01025 for complete description.

Item	**473-11979--51-01 -** Base Bid 44**-8: Furnish and install reflective pavement marker**
Lot Description	**Base Bid 44-**8
Quantity	**84 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 84

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage. See section 01025 for complete description.

Item	**473-11979--52-01 -** Base Bid 44**-9: Remove and replace existing signs per DOT and MUTCD (stop, tri-rail, no parking,**
Lot Description	**Base Bid 44-**9
Quantity	**8 each**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 8

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage. See section 01025 for complete description.

Item **473-11979--53-01 -** Base Bid 44**-10: Furnish and apply stamped asphalt streetbrick-xl/FDOT high fraction colors terra**

Lot Description **Base Bid 44-**10

Quantity **200 square yard**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 200

Description
Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage. See section 01025 for complete description.

Item **473-11979--54-01 -** Base Bid 45: Furnish and install lift station green screen fencing

Lot Description Base Bid 45

Quantity **55 linear foot**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 55

Description
Payment for furnishing and installing the Greenscreen fencing will be per linear foot of screen fence installed in accordance with the contract documents and including but not limited to the associated excavation, concrete footer work, metal work, and all other work required to properly complete the installation of the lift station Greenscreen fence. See section 01025 for complete description.

Item **473-11979--55-01 -** Base Bid 46: Furnish and install podocarpus macrophyllus (yew pine)

Lot Description Base Bid 46

Quantity	**30 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 30

Description
Payment for furnishing and installing trees and plants will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for the complete installation, watering for one year for establishment, guys, weed control, and planting soil. See section 01025 for complete description.

Item	**473-11979--56-01 -** Base Bid 47: Furnish and install pryostegia venusta (flame vine)
Lot Description	Base Bid 47
Quantity	**30 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 30

Description
Payment for furnishing and installing trees and plants will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for the complete installation, watering for one year for establishment, guys, weed control, and planting soil. See section 01025 for complete description.

Item	**473-11979--57-01 -** Base Bid 48: Furnish and install illex vomitoria nana (dwarf yaupon **holly)**
Lot Description	Base Bid 48
Quantity	**75 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 75

Description
Payment for furnishing and installing trees and plants will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for the complete installation, watering for one year for establishment, guys, weed control, and planting soil. See section 01025 for complete description.

Item	**473-11979--58-01 -** Base Bid 49: Furnish and place 3 inch topsoil
Lot Description	Base Bid 49
Quantity	**50 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications

Fort Lauderdale FL 33301
Qty 50

Description
Payment for furnishing and placing topsoil will be made at the unit price per square yard of topsoil placed named in the Bid Schedule which price shall constitute full compensation for furnishing and placing the topsoil in landscape median at lift station. See section 01025 for complete description.

Item	**473-11979--59-01 - Base Bid 50: Furnish and place 3 inch mulch**
Lot Description	Base Bid 50
Quantity	**50 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 50

Description
Payment for shredded mulch will be made at the unit price per square yard of mulch named in the Bid Schedule which price shall constitute full compensation for furnishing and installing a 3 thick layer of mulch. See section 01025 for complete description.

Item	**473-11979--60-01 - Base Bid 51: Furnish and install lift station screen irrigation**
Lot Description	Base Bid 51
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
Payment for landscape and irrigation restoration will be made at the lump sum price named in the Bid Schedule which price shall constitute full compensation for the complete restoration of the irrigation system including capping existing system during construction and installing new irrigation. See section 01025 for complete description.

Item	**473-11979--61-01 -** Base Bid 52: Furnish and place st augustine sod
Lot Description	Base Bid 52
Quantity	**215 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 215

Description
Payment for sod will be made at the unit price per square yard of sod has named in the Bid Schedule which price shall constitute full compensation for furnishing and installing the sod. Clearing of areas shall be included in the applicable item unit price requiring clearing. See section 01025 for complete description.

Item	**473-11979--62-01 -** Base Bid 53: Trench safety special shoring (will not exceed 1% work **order unit price cost)**
Lot Description	Base Bid 53
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

Payment for providing all labor, materials, and equipment for installing special shoring for this Project regardless of type will be paid for from this payment item, established by the CONTRACTOR for this purpose. Such an amount represent the amount the CONTRACTOR feels is necessary to comply with the Trench Safety Act. Payment for this item will be based upon the lump sum amount required to complete the work. See section 01025 for complete description.

CITY OF FORT LAUDERDALE
CONTRACT AND SPECIFICATIONS PACKAGE

BID NO. 473-11979

PROJECT NO. 12133

A-13 SEWER REDIRECTION

Issued on Behalf of: The Public Works Department
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

PROJECT MANAGER DIANA CARRILLO, P.E.
PROJECT MANAGER II

ALTHEA PEMSEL, MA, CPSM
SENIOR PROCUREMENT SPECIALIST
Telephone: (954) 828-5139 E-mail: apemsel@fortlauderdale.gov

TABLE OF CONTENTS

Description **Pages**

Note: The following documents are available electronically for completion and documents must be returned with your bid along with your bid security, proof of insurance, and proof of required licenses/certifications.

CITB Prime Contractor ID Form
CITB Questionnaire Sheets
CITB Trench Safety
CITB Non-Collusion Statement
CITB Contract Payment Method
CITB Construction Bid Certification

INVITATION TO BID

Sealed bids will be received electronically until 2:00 P.M., local time, on **July 17, 2017,** and opened immediately thereafter in the 5th Floor Conference Room, City Hall, City of Fort Lauderdale, Florida, 100 North Andrews Avenue, for **BID NO., 473-11979, PROJECT NO., 12133, for A-13 SEWER REDIRECTION.**

This project consists of Drawing File No. 4-139-49, **(35)** sheets.

The work includes, but is not limited to, the construction of an 18" diameter gravity sanitary sewer system from an existing active sanitary sewer manhole located in the intersection of Federal Highway and Broward Boulevard to the proposed pump station site on the Southeast corner of S.E. 2nd Court and S.E.8th Avenue. The project also includes construction of a submersible triplex sewage pump station and valve vault with electrical control panels and appurtenances. The 12' diameter concrete wet well shall be supplied by the City of Fort Lauderdale. An alternate bid item has been included on Line 40 A for a contractor provided structure.

NOTE: Payment on this contract will be made by Visa or MasterCard.

Possession of a General Contractor License and/or Certified Underground Utility and Excavation Contractor's License is required for this project.

Pre-Bid Meeting/Site visit: - A pre-bid meeting and/or site visit will be held on June 22, 2017, at 11:00 a.m., local time, at City of Fort Lauderdale, City Hall, 100 N. Andrews Avenue, 4th Floor Conference Room, Fort Lauderdale, Florida.

It is strongly suggested that all Contractors attend the pre-proposal conference and/or site visit since tours at other times might not be available.

While attendance is not mandatory, it will be the sole responsibility of the bidder to inspect the City's location(s)/facilities **OR** /and become familiar with the scope of the City's requirements and systems prior to submitting a proposal. No variation in price or conditions shall be permitted based upon a claim of ignorance. It is strongly suggested that all Contractors attend the pre-bid meeting and/or site visit.

Bidding blanks may be obtained **free of charge** at BIDSYNC.COM. Drawing Plans are on file in the Public Works Department, City of Fort Lauderdale at 100 North Andrews Avenue, 4th floor, (Monday thru Friday 8:00 am to 4:30 pm) at a **NON-REFUNDABLE cost of $25.00 (including sales tax per set)**. Only cash or cashier's check made payable to the City of Fort Lauderdale are accepted.

It will be the sole responsibility of the bidder to ensure that his bid is submitted prior to the bid opening date and time listed. **PAPER BID SUBMITTALS WILL NOT BE ACCEPTED. BIDS MUST BE SUBMITTED ELECTRONICALLY VIA BIDSYNC.COM**

Bid Security: A certified check, cashier's check, bank officer's check or bid bond for **FIVE** percent **(5%)** of the bid amount, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal.

INVITATION TO BID (continued)

Bid Bonds:

Bidders can submit bid bonds for projects four different ways:

1) BidSync allows bidders to submit bid bonds electronically directly through their system using **Surety 2000**. For more information on this feature and to access it, contact BIDSYNC customer care department.

2) Bidders may **upload** their original executed bid bond on BIDSYNC to accompany their bids with the electronic proposal, and deliver, upon request, the original, signed and sealed hard copy within five (5) business days after bid opening, with the company name, bid number and title clearly indicated.

3) Bidders can **hand deliver** their bid bond in a sealed envelope to the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, before time of bid opening, with the company name, bid number and title clearly indicated on the envelope.

4) Bidders can **mail** their bid bond to the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, before time of bid opening, with the company name, bid number and title clearly indicated on the envelope.

Certified Checks, Cashier's Checks and Bank Drafts
These **cannot** be submitted via BIDSYNC, nor are their images allowed to be uploaded and submitted with your electronic bid. These forms of securities, as well as hard copy bid bonds, must be received on or before the Invitation to Bid (ITB) opening date and time, at the Finance Department, Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, with the bid number and title clearly indicated on the envelope.

It is the bidder's sole responsibility to ensure that his bid bond or other bid security is received by the Procurement Services Division before time of bid opening. Failure to adhere to this requirement may be grounds to consider the bid as non-responsive.

The City of Fort Lauderdale reserves the right to waive any informality in any or all bids and to reject any or all bids.

For information concerning technical specifications, please utilize the question/answer feature provided by BIDSYNC at www.bidsync.com. Questions of a material nature must be received prior to the cut-off date specified in the solicitation. Material changes, if any, to the scope of services or bidding procedures, will only be transmitted by written addendum. (See addendum section of BIDSYNC Site). **Contractors please note:** No part of your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Contractor has familiarized himself with the nature and extent of the work, equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this solicitation.

Information on bid results and projects currently out to bid can be obtained on the City's website – http://www.fortlauderdale.gov/departments/finance/procurement-services. For general inquiries, please call (954) 828-5933.

INSTRUCTIONS TO BIDDERS

The following instructions are given for the purpose of guiding bidders in properly preparing their bids or proposals. These directions have equal force and weight with the specifications and strict compliance is required with all of these provisions.

QUALIFICATIONS OF BIDDERS – No proposal will be accepted from, nor will any contract be awarded to, any person who is in arrears to the CITY OF FORT LAUDERDALE, upon any debt or contract, or who has defaulted, as surety or otherwise, upon any obligation to the City, or who is deemed irresponsible or unreliable by the City Commission of Fort Lauderdale.

PERSONAL INVESTIGATION - Bidders shall satisfy themselves by personal investigation, and by such other means as they may think necessary or desirable, as to the conditions affecting the proposed work and the cost. No information derived from maps, plans, specifications, or from the Engineer, City Manager, or their assistants shall relieve the Contractor from any risk or from fulfilling all terms of the contract.

INCONSISTENCIES – Any seeming inconsistency between different provisions of the plans, specifications, proposal or contract, or any point requiring explanation must be inquired into by the bidder, in writing, at least ten (10) days prior to the time set for opening proposals. After proposals are opened, the bidders shall abide by the decision of the Engineer as to such interpretation.

ADDENDA AND INTERPRETATIONS - No interpretations of the meaning of the plans, specifications or other contract documents will be made orally to any bidder. Prospective bidders must request such interpretation in writing as instructed in the bid package. To be considered, such request must be received by the Questions and Answers deadline as indicated in BIDSYNC.COM. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. **It is the bidder's responsibility to verify if addendums have been issued in BIDSYNC.COM.** Failure of any bidder to receive any such addenda or interpretation shall not relieve any bidder from any obligation under his bid as submitted. All addenda so issued shall become a part of the contract document. **Bidder** shall verify **in BIDSYNC.COM** that he has all addenda before submitting a bid.

LEGAL CONDITIONS - Bidders are notified to familiarize themselves with the provisions of the laws of the State of Florida relating to hours of labor on municipal work, and with the provisions of the laws of the State of Florida and the Charter and the ordinances of the City of Fort Lauderdale.

PUBLIC ENTITY CRIMES - A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a Contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, Florida Statutes, for CATEGORY TWO for a period of thirty-six (36) months from the date of being placed on the convicted vendor list.

FORMS OF PROPOSALS - Each proposal and its accompanying statements must be made on the blanks provided. THE FORMS MUST BE SUBMITTED ELECTRONICALLY, IN GOOD ORDER WITH ALL BLANKS COMPLETED, and must show the name of the bidder and a statement as to its contents.

INSTRUCTIONS TO BIDDERS (continued)

FORMS OF PROPOSALS (CONTINUED) - The proposal must be signed by one duly authorized to do so, and in case signed by a deputy or subordinate, the principal's properly written authority to such deputy or subordinate must accompany the proposal. No proposal will be accepted, for any reason whatsoever, which is not submitted to the City as stated above, within the specified time.

INSURANCE - Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below. Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida.

BID BOND - A certified check, cashier's check or bank officer's check, for the sum set forth in the advertisement, made payable to the City of Fort Lauderdale, Florida, or bid bond in such amount, shall accompany each proposal as evidence of the good faith and responsibility of the bidder. The check or bond shall be retained by the City as liquidated damages should the bidder refuse to or fail to enter into a contract for the execution of the work embraced in this proposal, in the event the proposal of the bidder is accepted. Retention of such amount shall not be construed as a penalty or forfeiture.

The above bond or check shall be a guarantee that the bidder will, if necessary, promptly execute a satisfactory contract and furnish good and sufficient bonds. As soon as a satisfactory contract has been executed and the bonds furnished and accepted, the check or bond accompanying the proposal of the successful bidder will be returned to him. The certified or other checks or bid bonds of the unsuccessful bidders will be returned to them upon the acceptance of the bid of the successful bidder. If the successful bidder shall not enter into, execute, and deliver such a contract and furnish the required bonds within ten (10) days after receiving notice to do so, the certified or other check or bid bond shall immediately become the property of the City of Fort Lauderdale as liquidated damages. Retention of such amount shall not be construed as a penalty or forfeiture.

FILLING IN BIDS - All prices must be electronically submitted in the proposal pages, and all proposals must fully cover all items for which proposals are asked and no other. Bidders are required to state the names and places of residence of all persons interested, and if no other person is interested, the bidder shall distinctly state such fact and shall state that the proposal is, in all respects, fair and without collusion or fraud. Where more than one person is interested, it is required that all persons interested or their legal representative make all verification and subscribe to the proposal.

PRICES QUOTED: Deduct any discount offered and quote firm net unit prices. In the case of a discrepancy in computing the amount of the bid, the unit price quoted will govern. All prices quoted shall be F.O.B. destination, freight prepaid (Bidder pays and bears freight charges, Bidder owns goods in transit and files any claims), unless otherwise stated in Special Conditions. Each item must be bid separately. No attempt shall be made to tie any item or items contained in the ITB with any other business with the City.

BIDS FIRM FOR ACCEPTANCE: Bidder warrants, by virtue of bidding, that his bid and the prices quoted in his bid will be firm for acceptance by the City for a period of one hundred and twenty (120) days from the date of bid opening unless otherwise stated in the ITB. The City shall award contract within this time period or shall request to the recommended awarded vendor an extension to hold pricing, until products/services have been awarded.

ADDITIONAL ITEMS OR SERVICES: The City may require additional items or services of a similar nature, but not specifically listed in the contract. The Contractor agrees to provide such items or

INSTRUCTIONS TO BIDDERS (continued)

services, and shall provide the City prices on such additional items or services. If the price(s) offered are not acceptable to the City, and the situation cannot be resolved to the satisfaction of the City, the City reserves the right to procure those items or services from other vendors, or to cancel the contract upon giving the Contractor thirty (30) days written notice.

DELETION OR MODIFICATION OF SERVICES: The City reserves the right to delete any portion of the Contract at any time without cause, and if such right is exercised by the City, the total fee shall be reduced in the same ratio as the estimated cost of the work deleted bears to the estimated cost of the work originally planned. If work has already been accomplished on the portion of the Contract to be deleted, the Contractor shall be paid for the deleted portion on the basis of the estimated percentage of completion of such portion.

If the Contractor and the City agree on modifications or revisions to the task elements, after the City has approved work to begin on a particular task or project, and a budget has been established for that task or project, the Contractor will submit a revised budget to the City for approval prior to proceeding with the work.

CAUSES FOR REJECTION - No proposal will be canvassed, considered or accepted which, in the opinion of the City Commission, is informal or unbalanced, or contains inadequate or unreasonable prices for any items; each item must carry its own proportion of the cost as nearly as is practicable. Any alteration, erasure, interlineation, or failure to specify bids for all items called for in the schedule shall render the proposal informal.

REJECTION OF BIDS - The City reserves the right to reject any bid if the evidence submitted by the bidder, or if the investigation of such bidder, fails to satisfy the City that such bidder is properly qualified to carry out the obligations and to complete the work contemplated. Any or all proposals will be rejected, if there is reason to believe that collusion exists among bidders. A proposal will be considered irregular and may be rejected, if it shows serious omissions, alterations in form, additions not called for, conditions or unauthorized alternates, or irregularities of any kind. The City reserves the right to reject any or all proposals and to waive such technical errors as may be deemed best for the interests of the City.

BID PROTEST PROCEDURE: Any proposer or bidder who is not recommended for award of a contract and who alleges a failure by the City to follow the City's procurement ordinance or any applicable law may protest to the Procurement Division – Procurement Manager, by delivering a letter of protest within five (5) days after a Notice of Intent to award is posted on the City's website at the following link: http://www.fortlauderdale.gov/purchasing/notices_of_intent.htm. The complete protest ordinance may be found on the City's website at the following link: http://www.fortlauderdale.gov/purchasing/protestordinance.pdf

WITHDRAWALS - Any bidder may, without prejudice to himself, withdraw his proposal at any time prior to the expiration of the time during which proposals may be submitted. Such request for withdrawal must be in writing and signed in the same manner and by the same person who signed the proposal. After expiration of the period for receiving proposals, no proposal can be withdrawn, modified, or explained.

CONTRACT - The bidder to whom award is made shall execute a written contract to do the work and maintain the same in good repair until final acceptance by the proper authorities, and shall furnish

INSTRUCTIONS TO BIDDERS (continued)

good and sufficient bonds as specified within ten (10) days after receiving such contract for execution. If the bidder to whom the first award is made fails to enter into a contract as provided, the award may be annulled and the contract let to the next lowest bidder who is reliable, responsible, and responsive in the opinion of the City Commission, and that bidder shall fulfill every stipulation and obligation as if such bidder were the original party to whom award was made.

The contract shall provide that the Contractor agrees to correct any defective or faulty work or material, which may appear within one (1) year after completion of the work and receipt of final payment.

ENFORCEMENT OF SPECIFICATIONS - Copies of the specifications will be placed in the hands of all the assistants to the Engineer and Inspectors employed on the work, who shall enforce each and every requirement of the contract. Such assistants shall have no authority to vary from such requirements.

COPIES OF DRAWING PLANS - Copies of the drawing plans are on file in the Public Works Department, City Hall, 4th Floor, 100 N. Andrews Avenue, Fort Lauderdale, Florida 33301.

SURETY BOND – The Contractor shall execute and record in the public records of Broward County, Florida, a payment and performance bond in an amount at least equal to the Contract Price with a surety insurer authorized to do business in the State of Florida as surety, ("Bond"), in accordance with Section 255.05, Florida Statutes (2014), as may be amended or revised, as security for the faithful performance and payment of all of the Contractor's obligations under the Contract Documents.

The successful bidder shall furnish a performance and payment bond in compliance with Section 255.05, Florida Statutes, written by a Corporate Surety company, holding a Certificate of Authority from the Secretary of the Treasury of the United States as acceptable sureties on federal bonds, in an amount equal to the total amount payable by the terms of the contract, executed and issued by a Resident Agent licensed by and having an office in the State of Florida, representing such Corporate Surety, conditioned for the due and faithful performance of the work, and providing in addition to all other conditions, that if the Contractor, or his or its subcontractors, fail to duly pay for any labor, materials, or other supplies used or consumed by such Contractor, or his or its subcontractor or subcontractors, in performance of the work contracted to be done, the Surety will pay the same in the amount not exceeding the sum provided in such bonds, together with interest at the rate of fifteen percent (15%) per annum, and that they shall indemnify and save harmless the City of Fort Lauderdale to the extent of any and all payments in connection with carrying out of the contract, which the City may be required to make under the law.

The Contractor is required at all times to have a valid surety bond in force covering the work being performed. A failure to have such bond in force at any time shall constitute a default on the part of the Contractor. A bond written by a surety, which becomes disqualified to do business in the State of Florida, shall automatically constitute a failure on the part of the Contractor to meet the above requirements.

Such bond shall continue in effect for one (1) year after completion and acceptance of the work with liability equal to at least twenty-five percent (25%) of contract price, or an additional bond shall be conditioned that the Contractor will correct any defective or faulty work or material which appear within one (1) year after completion of the contract, upon notification by the City, except in contracts which are concerned solely with demolition work, in which cases twenty-five percent (25%) liability will not be applicable.

INSTRUCTIONS TO BIDDERS (continued)

AUDIT OF CONTRACTOR'S RECORDS - Upon execution of the Contract, the City reserves the right to conduct any necessary audit of the Contractor's records. Such an audit, or audits, may be conducted by the City or its representatives at any time prior to final payment, or thereafter, for a period up to three (3) years. The City may also require submittal of the records from either the Contractor, the Subcontractor, or both. For the purpose of this Section, records shall include all books of account, supporting documents and papers deemed necessary by the City to assure compliance with the contract provisions.

Failure of the Contractor or Subcontractor to comply with these requirements may result in disqualification or suspension from bidding for future contracts or disapproval as a Subcontractor at the option of the City.

The Contractor shall assure that each of its Subcontractors will provide access to its records pertaining to the project upon request by the City.

PERIODIC ESTIMATE FOR PARTIAL PAYMENT - After the Contractor has submitted a periodic estimate for partial payment, approved and certified by the Public Works Department, the City shall make payment in the manner provided in the Contract Documents and in accordance with Florida's Prompt Payment Act, Section 218, Florida Statutes.

RESERVATION FOR AWARD AND REJECTION OF BIDS - The City reserves the right to accept or reject any or all bids, part of bids, and to waive minor irregularities or variations to specifications contained in bids, and minor irregularities in the bidding process. The City also reserves the right to award the contract on a split order basis, lump sum basis, individual item basis, or such combination as shall best serve the interest of the City. The City reserves the right to make an award to the responsive and responsible bidder whose product or service meets the terms, conditions, and specifications of the ITB and whose bid is considered to best serve the City's interest. In determining the responsiveness of the offer and the responsibility of the Bidder, the following shall be considered when applicable: the ability, capacity and skill of the Bidder to perform as required; whether the Bidder can perform promptly, or within the time specified, without delay or interference; the character, integrity, reputation, judgment, experience and efficiency of the Bidder; the quality of past performance by the Bidder; the previous and existing compliance by the Bidder with related laws and ordinances; the sufficiency of the Bidder's financial resources; the availability, quality and adaptability of the Bidder's supplies or services to the required use; the ability of the Bidder to provide future maintenance, service or parts; the number and scope of conditions attached to the bid.

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION AND BUSINESS - It is the desire of the City of Fort Lauderdale to increase the participation of minority (MBE) and women-owned (WBE) businesses in its contracting and procurement programs. While the City does not have any preference or set aside programs in place, it is committed **to a policy of equitable participation for these firms.** The City of Fort Lauderdale wants to increase the participation of Minority Business Enterprises (MBE), Women Business Enterprises (WBE), and Small Business Enterprises (SBE) in its procurement activities. If your firm qualifies in accordance with the below definitions please indicate in the space provided in this ITB.

Minority Business Enterprise (MBE) "A Minority Business" is a business enterprise that is owned or controlled by one or more socially or economically disadvantaged persons. Such disadvantage may arise from cultural, racial, chronic economic circumstances or background or other similar cause. Such persons include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

INSTRUCTIONS TO BIDDERS (continued)

The term “Minority Business Enterprise” means a business at least fifty-one percent (51%) of which is owned by minority group members or, in the case of a publicly owned business, at least fifty-one percent (51%) of the stock of which is owned by minority group members. For the purpose of the preceding sentence, minority group members are citizens of the United States who include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

Women Business Enterprise (WBE) a “Women Owned or Controlled Business” is a business enterprise at least fifty-one percent (51%) of which is owned by females or, in the case of a publicly owned business, at least fifty-one percent (51%) of the stock of which is owned by females.

Small Business Enterprise (SBE) “Small Business” means a corporation, partnership, sole proprietorship, or other legal entity formed for the purpose of making a profit, which is independently owned and operated, has either fewer than 100 employees or less than $1,000,000 in annual gross receipts.

BLACK includes persons having origins in any of the Black racial groups of Africa.

WHITE includes persons whose origins are Anglo-Saxon and Europeans and persons of Indo-European decent including Pakistani and East Indian.

HISPANIC includes persons of Mexican, Puerto Rican, Cuban, Central and South American, or other Spanish culture or origin, regardless of race.

NATIVE AMERICAN includes persons whose origins are American Indians, Eskimos, Aleuts, or Native Hawaiians.

ASIAN AMERICAN includes persons having origin in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.

DEBARRED OR SUSPENDED BIDDERS OR PROPOSERS - The bidder or proposer certifies, by submission of a response to this solicitation, that neither it nor its principals and subcontractors are presently debarred or suspended by any Federal department or agency.

LOBBYING ACTIVITIES - ALL CONTRACTORS PLEASE NOTE: Any contractor submitting a response to this solicitation must comply, if applicable, with City of Fort Lauderdale Ordinance No. C-00-27 & Resolution No. 07-101, Lobbying Activities. Copies of Ordinance No., C-00-27, and Resolution No. 07-101, may be obtained from the City Clerk’s Office on the 7th Floor of City Hall, 100 N. Andrews Avenue, Fort Lauderdale, Florida. The ordinance may also be viewed on the City's website at http://www.fortlauderdale.gov/clerk/LobbyistDocs/lobbyist_ordinance.pdf.

SPECIAL CONDITIONS

01. PURPOSE

The City of Fort Lauderdale, Florida (City) is seeking bids from qualified bidders, hereinafter referred to as the Contractor, to provide general contractor services for the City's Public Works Department, in accordance with the terms, conditions, and specifications contained in this Invitation To Bid (ITB).

02. TRANSACTION FEES

The City of Fort Lauderdale uses BidSync (www.bidsync.com) to distribute and receive bids and proposals. There is no charge to vendors/contractors to register and participate in the solicitation process, nor will any fees be charged to the awarded contractor.

03. SUBMISSION OF BIDS

It is the sole responsibility of the Contractor to ensure that their bid is submitted electronically through BidSync at www.bidsync.com and that any bid security not submitted via BidSync reaches the City of Fort Lauderdale City Hall, Procurement Services Division, 6th floor, Room 619, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301 in a sealed envelope marked on the outside with the ITB solicitation number and Contractor's name, no later than the time and date specified in this solicitation. **PAPER BID SUBMITALS WILL NOT BE ACCEPTED. PLEASE SUBMIT YOUR BID RESPONSE ELECTRONICALLY.**

04. INFORMATION OR CLARIFICATION

For information concerning procedures for responding to this solicitation, contact **Althea Pemsel**, **Senior Procurement Specialist**, at (954) 828-5139 or email at apemsel@fortlauderdale.gov. Such contact shall be for clarification purposes only.

For information concerning technical specifications please utilize the question/answer feature provided by BidSync at www.bidsync.com. Questions of a material nature must be received prior to the cut-off date specified in the solicitation. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. (See addendum section of BidSync Site). **Contractors please note**: No part of your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Contractor has familiarized himself with the nature and extent of the work, and the equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this solicitation. The questions and answers submitted in BidSync shall become part of any contract that is created from this ITB.

05. CONTRACT TIME

5.1 The Contractor recognizes that TIME IS OF THE ESSENCE. The Work shall commence within 40 calendar days of the date of the Notice to Proceed.

5.2 The Work shall be Substantially Completed within 255 calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

SPECIAL CONDITIONS (continued)

5.3 The Work shall be finally completed on the Final Completion Date and ready for final payment in accordance with this Agreement within 300 calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

The City of Fort Lauderdale reserves the right to waive any informality in any bid and to reject any or all bids. The City of Fort Lauderdale reserves the right to reduce or delete any of the bid items.

At time of award of contract, the City reserves the right to set a maximum dollar limit that may be expended on this project. Contract quantities of any or all items may be increased, reduced, or eliminated to adjust the contract amount to coincide with the amount of work necessary or to bring the contract value to within the established limit. All quantities are estimated and the City reserves the right to increase, reduce, or eliminate the contract quantities in any amount.

The undersigned bidder affirms that he has or will obtain all equipment necessary to complete the work described, that he has or will obtain all required permits and licenses from the appropriate agencies, and that his firm is authorized to do business in the State of Florida.

06. BID SECURITY

A certified check, cashier's check, bank officer's check or bid bond for **FIVE** percent **(5%)** of the bid amount, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal.

07. REQUIRED LICENSES/CERTIFICATIONS

Contractor must possess the following licenses/certifications to be considered for award.
General Contractor's License and/or
Certified Underground Utility and Excavation Contractor

Note: Contractor must have proper licensing and be able to provide evidence of same, if requested, at time of award.

08. SPECIFIC EXPERIENCE REQUIRED

The following expertise is required to be considered for this contract. Specific references attesting to this expertise must be submitted with bid.

The contractor must have previous experience in constructing sewer collection systems infrastructure, including sewage lift stations ranging between 40HP – 100HP, in the state of Florida within the last ten (10) years. Bidder shall submit proof of construction experience for a minimum of three (3) projects of similar scope and scale (or larger). For each project listed; identify the location, dates of construction, project names and overall scope, the scope of work that was self-performed by Contractor, and Client's name, address, phone number, and email address.

References Should Not Include City Of Fort Lauderdale Employees Or Work Performed For The City.

By signing this bid solicitation, contractor is affirming that this expertise will be provided for this contract at no additional charge.

SPECIAL CONDITIONS (continued)

09. BID ALLOWANCE

Allowance for permits: Payments will be made to the contractor based on the actual cost of permits upon submission of paid permit receipts. The City shall not pay for other costs related to obtaining or securing permits.

The amount indicated is intended to be sufficient to cover the entire project. If the City Permit fees exceed the allowance indicated, the City will reimburse the contractor the actual amount of City Permit Fees required for project completion.

Allowance	**$**
Utility Conflict Allowance	$25,000.00
Contaminated Site Dewatering Allowance	$50,000.00
Landscape and Irrigation Restoration in US 1 R.O.W Allowance	$10,000.00
Permit Fees City of Fort Lauderdale Building Department Allowance	$50,000.00
Permit Fees Broward County Department of Environmental Protection and Growth Management Allowance	$1,500.00
Tree Removal Allowance	$30,000.00
FPL Service Allowance	$50,000.00
Other:	
TOTAL	

Note: The City will add this allowance to your bid.

10. INSURANCE REQUIREMENTS *(See Article 10, Bonds and Insurance, of the Contract for details)*

Insurance

10.1 Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below, as well

Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida. **A Sample Insurance Certificate shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.**

A. The City is required to be named as additional insured on the Commercial General Liability insurance policy. BINDERS ARE UNACCEPTABLE. The insurance coverage required shall include those classifications, as listed in standard liability insurance manuals, which most nearly reflect the operations of the Contractor. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for the work contemplated in this Agreement shall be deemed unacceptable, and shall be considered a breach of contract.

SPECIAL CONDITIONS (continued)

B. The Contractor shall provide the City an original Certificate of Insurance for policies required by Article 10. All certificates shall state that the City shall be given ten (10) days' notice prior to expiration or cancellation of the policy. The insurance provided shall be endorsed or amended to comply with this notice requirement. In the event that the insurer is unable to accommodate, it shall be the responsibility of the Contractor to provide the proper notice. Such notification will be in writing by registered mail, return receipt requested and addressed to the Finance Department. Such policies shall: (1) name the insurance company or companies affording coverage acceptable to the City, (2) state the effective and expiration dates of the policies, (3) include special endorsements where necessary. Such policies provided under Article 10 shall not be affected by any other policy of insurance, which the City may carry in its own name.

C. Contractor shall as a condition precedent of this Agreement, furnish to the City of Fort Lauderdale, c/o Project Manager, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301, Certificate(s) of Insurance upon execution of this Agreement, which indicate that insurance coverage has been obtained which meets the requirements as outlined below:

10.2 Property Insurance (Builder's Risk): The Contractor shall purchase and maintain property insurance upon the Work at or off the site of 100% of the contract completed value. These policies shall insure the interest of the owner, contractor and subcontractors in the Work, and shall insure against "all risks" of physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage. All such insurance required by this paragraph shall remain in effect until the Work is completed and accepted by the City.

10.3 Commercial General Liability

A. Limits of Liability:
Bodily Injury and Property Damage - Combined Single Limit

Each Occurrence	$1,000,000
Project Aggregate	$1,000,000
General Aggregate	$2,000,000
Personal Injury	$1,000,000
Products/Completed Operations	$1,000,000

B. Endorsements Required:
City of Fort Lauderdale included as an Additional Insured
Broad Form Contractual Liability
Waiver of Subrogation
Premises/Operations
Products/Completed Operations
Independent Contractors
Owners and Contractors Protective Liability

10.4 Business Automobile Liability

A. Limits of Liability:
Bodily Injury and Property Damage - Combined Single Limit
All Autos used in completing the contract

SPECIAL CONDITIONS (continued)

Including Hired, Borrowed or Non-Owned Autos
Any One Accident $1,000,000

B. Endorsements Required:

Waiver of Subrogation

10.5 Workers' Compensation and Employer's Liability Insurance

Limits: Workers' Compensation – Per Florida Statute 440
Employers' Liability - $500,000

Any firm performing work on behalf of the City of Fort Lauderdale must provide Workers' Compensation insurance. Exceptions and exemptions can only be made if they are in accordance with Florida Law.

Contractor must be in compliance with all applicable State and Federal workers' compensation laws, including the U.S. Longshore Harbor Workers' Act or Jones Act.

10.6 Umbrella/Excess Liability: The Contractor shall provide umbrella/excess coverage with limits of no less than $2,000,000 excess of Commercial General Liability, Automobile Liability and Employer's Liability.

10.7 All insurance policies required above shall be issued by companies authorized to do business under the laws of the State of Florida, with the following qualifications:

The Contractor's insurance must be provided by an A.M. Best's "A-" rated or better insurance company authorized to issue insurance policies in the State of Florida, subject to approval by the City's Risk Manager. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for work contemplated in this project shall be deemed unacceptable, and shall be considered breach of contract.
NOTE: CITY PROJECT NUMBER MUST APPEAR ON EACH CERTIFICATE.

A Sample Insurance Certificate shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.

Compliance with the foregoing requirements shall not relieve the Contractor of their liability and obligation under this section or under any other section of this Agreement.

The Contractor shall be responsible for assuring that the insurance certificates required in conjunction with this Section remain in force for the duration of the Project. If insurance certificates are scheduled to expire during the contractual period, the Contractor shall be responsible for submitting new or renewed insurance certificates to the City at a minimum of thirty (30) calendar days in advance of such expiration. In the event that expired certificates are not replaced with new or renewed certificates that cover the contractual period, the City shall:

SPECIAL CONDITIONS (continued)

a) Suspend the Agreement until such time as the new or renewed certificates are received by the City.

b) The City may, at its sole discretion, terminate the Agreement for cause and seek damages from the Contractor in conjunction with the violation of the terms and conditions of the Agreement.

11. PERFORMANCE AND PAYMENT BOND: _____100%_____
Number of awards anticipated: _____**1**_____

12. CITY PROJECT MANAGER
The Project Manager is hereby designated by the City as Diana Carrillo, P.E., whose address is 100 North Andrews, 4th Floor, Fort Lauderdale, FL 33301, telephone number: (954) 828-6134, and email address is dcarrillo@fortlauderdale.gov. The Project Manager will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the Contract Documents in connection with completion of the Work in accordance with this Agreement.

13. LIQUIDATED DAMAGES *(See Article 16, Liquidated Damages, of the Contract for details)*
Upon failure of the Contractor to complete the Work within the time specified for completion, the Contractor shall pay to the City the sum of **Five Hundred Dollars ($500.00)** for each and every calendar day that the completion of the Work is delayed beyond the time specified in this Agreement for completion, as fixed and agreed liquidated damages and not as a penalty, so long as the delay is caused by the Contractor. (See Article 16, Liquidated Damages Clause, of the Contract)

14. PAYMENT (*See Article 7, Payment, of the Contract for other details*)
The City has implemented a Purchasing Card (P-Card) Program utilizing both VISA and MASTERCARD networks. Purchases from this contract will be made utilizing the City's Purchasing Card. Contractor will receive payment from the purchasing card in the same manner as other credit card purchases. Accordingly, bidders must presently have the ability to accept these credit cards or take whatever steps necessary to implement the ability before the start of the contract term, or contract award by the City. The City reserves the right to revise this program as necessary.

15. WORK SCHEDULE (including overtime hours): ____8:00am to 5:00 pm.__

Regular work hours: **8:00 am to 5:00 pm, Monday through Friday.**
City Inspector Hours: **8:00 am to 4:30 pm, Monday through Friday.**

Any inspection requested by the contractor outside those hours will be considered overtime to be paid by the Contractor.

16. INSPECTION OVERTIME COST: $219.00_____

CITY OF FORT LAUDERDALE
CONSTRUCTION AGREEMENT

THIS AGREEMENT made and entered into this _____ day of _____, 20__, by and between the City of Fort Lauderdale, a Florida municipal corporation (City) and _____, (Contractor), (parties);

WHEREAS, the City desires to retain a contractor for the Project as expressed in its Invitation to Bid No., _____, Project Number, _____, which was opened on _____; and,

WHEREAS, the Contractor has expressed its willingness and capability to perform the necessary work to accomplish the Project.

NOW, THEREFORE, the City and the Contractor, in consideration of the mutual covenants and conditions contained herein and for other good and valuable consideration, the receipt and sufficiency is hereby acknowledged, agree as follows:

ARTICLE 1 – DEFINITIONS

Whenever used in this Agreement or in other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural forms:

1.1 Agreement – This written Agreement between the City and the Contractor covering the work to be performed including other Contract Documents that are attached to or incorporated in the Agreement.

1.2 Application for Payment – The form accepted by the City which is to be used by the Contractor in requesting progress or final payment and which is to include such supporting documentation as is required by the Contract Documents

1.3 Approve – The word approve is defined to mean review of the material, equipment or methods for general compliance with design concepts and with the information given in the Contract Documents. It does not imply a responsibility on the part of the City to verify in every detail conformance with plans and specifications.

1.4 Bid – The offer or Bid of the Contractor submitted on the prescribed form setting forth the total prices for the Work to be performed.

1.5 Bid Documents –This Agreement, advertisement for Invitation to Bids, the Instructions to Bidders, the Bid Form (with supplemental affidavits and agreements), the Contract Forms, General Conditions, the Supplementary Conditions, the Specifications, and the Plans, which documents all become an integral part of the Contract Documents.

1.6 Certificate of Substantial Completion - Certificate provided by the City certifying that all Work, excluding the punch list items, has been completed, inspected, and accepted by the City.

1.7 Change Order - A change order is defined as a written order to a contractor approved by the City, authorizing a revision of an underlying agreement between the City and a contractor that is directly related to the original scope of work or an adjustment in the original contract price or the contract time directly related to the original scope of work, issued on or after the effective date of the contract.

1.8 City – The City of Fort Lauderdale, Florida, including but not limited to its employees, agents, officials, representatives, contractors, subcontractors, volunteers, successors and assigns, with whom the Contractor has entered into the Agreement and for whom the Work is to be provided.

1.9 Contract Documents – The Contract Documents shall consist of this Agreement, Exhibits to this Agreement, Public Construction Bond, Performance Bond, Payment Bond and Certificates of Insurance, Notice of Award and Notice to Proceed, General Conditions as amended by the Special Conditions, Technical Specifications, Plans/Drawings, Addenda, Bid Form and supplement Affidavits and Agreements, all applicable provisions of State and Federal Law and any modification, including Change Orders or written amendments duly delivered after execution of Agreement, Invitation to Bid, Instructions to Bidders and Bid Bond, Contractor's response to the City's Invitation to Bid, Schedule of Completion, Schedule of Values, all amendments, modifications and supplements, change orders and work directive changes issued on or after the Effective Date of the Agreement, as well as any additional documents that are required to be submitted under the Agreement.

Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Agreement. A copy of all permits shall be given to the City for inclusion in the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

1.10 Contract Price – The monies payable to the Contractor by the City under the Contract Documents and in accordance with the line item unit prices listed in the Bid.

1.11 Contract Time – The number of calendar days stated in the Agreement for the completion of the Work. The dates on which the work shall be started and shall be completed as stated in the Notice to Proceed.

1.12 Contractor – The person, firm, company, or corporation with whom the City has entered into the Agreement, including but not limited to its employees, agents, representatives, contractors, subcontractors, their subcontractors and their other successors and assigns.

1.13 Day – A calendar day of twenty-four (24) hours ending at midnight.

1.14 Defective – An adjective which when modifying the word "Work" refers to work that is unsatisfactory, faulty, or deficient, or does not conform to the Contract Documents or does not meet the requirements of any inspection, test or approval referred to in the Contract Documents, or has been damaged prior to the Project Manager's recommendation of final payment.

1.15 Effective Date of the Agreement – The effective date of the agreement shall be the date the City Commission approves the work. The contractor shall provide all required payment and performance bonds and insurances to the City within ten (10) Calendar days following the City Commission approval. Upon verification of all bonds and insurances, the City will issue a notice to proceed (NTP) to the Contractor. Contract time will commence on the date when the Notice to Proceed is issued. The Contractor shall commence the work immediately upon receipt of the Notice to Proceed. Failure of the contractor to proceed with the work will constitute non-performance of the Contractor and would be ground for termination of the contract per ARTICLE 17 of the Agreement.

1.16 Final Completion Date – The date the Work is completed, including completion of the final punch list, and delivered along with those items specified in the Contract Documents and is accepted by the City.

1.17 Hazardous Materials (HAZMAT) - Any solid, liquid, or gaseous material that is toxic, flammable, radioactive, corrosive, chemically reactive, or unstable upon prolonged storage in quantities that could pose a threat to life, property, or the environment defined in Section 101(14) of Comprehensive Environmental Response, Compensation and Liability Act of 1980 and in 40 CFR 300.6. Also defined by 49 CFR 171.8 as a substance or material designated by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce and which has been so designated.

1.18 Hazardous Substance - As defined by Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act; any substance designated pursuant to Section 311(b) (2) (A) of the Clean Water Act; any element, compound, mixture, solution or substance designated pursuant to Section 102 identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act {but not including any waste listed under Section 307[a] of the Clean Water Act}; any hazardous air pollutant listed under Section 112 of the Clean Air Act; and any imminently hazardous chemical substance or mixture pursuant to Section 7 of the Toxic Substances Control Act. The term does not include petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance in the first sentence of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

1.19 Hazardous Waste - Those solid wastes designated by OSHA in accordance with 40 CFR 261 due to the properties of ignitability, corrosivity, reactivity, or toxicity. Any material that is subject to the Hazardous Waste Manifest requirements of the EPA specified in 40 CFR Part 262.

1.20 Holidays - Those designated non-work days as established by the City Commission of the City of Fort Lauderdale.

1.21 Inspection – The term “inspection” and the act of inspecting as used in this Agreement is defined to mean the examination of construction to ensure that it conforms to the design concept expressed in the plans and specifications. This term shall not be construed to mean supervision, superintending and/or overseeing.

1.22 Notice of Award - The written notice by City to the Contractor stating that upon compliance by the Contractor with the conditions precedent enumerated therein, within the time specified that the City will sign and deliver this Agreement.

1.23 Notice to Proceed – A written notice given by the City to the Contractor fixing the date on which the Contract Time will commence to run and on which the Contract Time will end.

1.24 Plans - The drawings which show the character and scope of the work to be performed and which have been prepared or approved by the City and are referred to in the Contract Documents.

1.25 Premises (otherwise known as Site or Work Site) – means the land, buildings, facilities, etc. upon which the Work is to be performed.

1.26 Project – The total construction of the Work to be provided as defined in the Contract Documents.

1.27 Project Manager - The employee of the City, or other designated individual who is herein referred to as the Project Manager, will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the contract Documents in connection with completion of the Work in accordance with this Agreement. The Project Manager, or designee, shall be the authorized agent for the City unless otherwise specified.

1.28 Punch List - The City's list of Work yet to be done or be corrected by the Contractor, before the Final Completion date can be determined by the City.

1.29 Record Documents - A complete set of all specifications, drawings, addenda, modifications, shop drawings, submittals and samples annotated to show all changes made during the construction process.

1.30 Record Drawings or "As-Builts" - A set of drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor. These documents will be signed and sealed by the Engineer of Record or a Professional Land Surveyor licensed in the State of Florida.

1.31 Substantially Completed Date – A date when the Contractor has requested in writing, stating that the Work is substantially completed and is ready for an inspection and issuance of a final punch list for the Project.

1.32 Work – The entire completed delivered product or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating material and equipment into the product, all as required by the Contract Documents.

ARTICLE 2 – SCOPE OF WORK

2.1 The Contractor shall complete all work as specified or indicated in the Contract Documents. The Project for which the Work under the Contract Documents may be the whole or only part is generally described as follows:

A-13 Sewer Redirection
ITB #473-11979 PROJECT #12133

2.2 All Work for the Project shall be constructed in accordance with the Drawings and Specifications. The Work generally involves:

PROJECT DESCRIPTION

This project is located within the east half right-of-way of Federal Highway from Broward Boulevard to S.E. 2nd Court, and the right–of-way of S.E. 2nd Court from Federal Highway to S.E. 9th Avenue. in the City of Fort Lauderdale. It is primarily for the construction of Lift Station A-13 located on the southeast corner of S.E. 2nd Court and S.E. 8th Avenue, within the parking lot owned by the City of Fort Lauderdale. The work includes, but is not limited to, the construction of an 18" diameter gravity sanitary sewer system from an existing active sanitary sewer manhole located in the intersection of Federal Highway and Broward Boulevard, to the proposed pump station site on the Southeast corner of S.E. 2nd Court and S.E.8th Avenue. The project also includes construction of a submersible triplex sewage pump station and valve vault with electrical control panels and appurtenances, and construction of a 14" diameter force main within the right-of-way of S.E. 2nd Court from the proposed pump station to the existing 48" force main at the intersection of S.E. 2nd Court and S.E. 9th Avenue. The 12' diameter concrete wet well shall be supplied by the City of Fort Lauderdale. The existing wet well structure(s) is located at the Prospect Well Field for pick-up delivery to the project site. The pump station also includes a "Living Wall" located on the north, west and east sides of the pump station site, the removal of two existing trees, a few shrubs, and the restoration of the existing irrigation system.

2.3 Within ten (10) days of the execution of this Agreement, the Contractor shall submit a Construction Schedule, Schedule of Values and a listing of those subcontractors that will be utilized by the Contractor. The general sequence of the work shall be submitted by the Contractor and approved by the City before any work commences. The City reserves the right to issue construction directives necessary to facilitate the Work or to minimize any conflict with operations.

ARTICLE 3 – PROJECT MANAGER

3.1 The Project Manager is hereby designated by the City as Diana Carrillo, P.E., whose address is 100 N. Andrews Avenue, 4th Floor, Fort Lauderdale, FL 33301, telephone number: (954) 828-6134, and email address is dcarrillo@fortlauderdale.gov. The Project Manager will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the Contract Documents in connection with completion of the Work in accordance with this Agreement.

ARTICLE 4 – CONTRACT DOCUMENTS

The Contract Documents which comprise the entire Agreement between the City and Contractor are attached to this Agreement, are made a part hereof and consist of the following:

4.1 This Agreement.

4.2 The Contract Documents may only be altered, amended, or repealed in accordance with the specific provisions of the terms of this Agreement.

4.3 Exhibits to this Agreement: (Plans sheets [ ] to [ ] inclusive).

4.4 Public Construction Bond, Performance Bond, Payment Bond and Certificates of Insurance.

4.5 Notice of Award and Notice to Proceed.

4.6 General Conditions as amended by the Special Conditions.

4.7 Technical Specifications.

4.8 Plans/Drawings.

4.9 Addenda number _____ through _____, inclusive.

4.10 Bid Form and supplement Affidavits and Agreements.

4.11 All applicable provisions of State and Federal Law.

4.12 Invitation to Bid No., _____, Instructions to Bidders, and Bid Bond.

4.13 Contractor's response to the City's Invitation to Bid No., _____, dated _____.

4.14 Schedule of Completion and Schedule of Values.

4.15 All amendments, modifications and supplements, change orders and work directive changes issued on or after the Effective Date of the Agreement.

4.16 Any additional documents that are required to be submitted under the Agreement.

4.17 Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Agreement. A copy of all permits shall be given to the City for inclusion in the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

In the event of any conflict between the documents or any ambiguity or missing specification or instruction, the following priority is established:

a. Specific direction from the City Manager (or designee).

b. Approved change orders, addenda or amendments.

c. Specifications (quality) and Drawings (location and quantity).

d. Supplemental conditions or special terms.

e. General Terms and Conditions.

f. This Agreement dated _____ and any attachments.

g. Invitation to Bid No., _____, and the specifications prepared by the City.

h. Contractor's response to the City's Invitation to Bid No., _____, dated _____.

i. Schedule of Values.

j. Schedule of Completion.

If during the performance of the Work, Contractor finds a conflict, error or discrepancy in the Contract Documents, Contractor shall so report to the Project Manager, in writing, at once and before proceeding with the Work affected shall obtain a written interpretation or clarification from the City.

It is the intent of the specifications and plans to describe a complete Project to be constructed in accordance with the Contract Documents. Any Work that may reasonably be inferred from the specifications or plans as being required to produce the intended result shall be supplied whether or not it is specifically called for. When words which have a well-known technical or trade meaning are used to describe Work, materials, or equipment, such works shall be interpreted in accordance with such meaning. Reference to standard specifications, manuals or codes of any technical society, organization or associations, or to the code of any governmental authority whether such reference be specific or implied, shall mean the latest standard specification, manual or code in effect as of the Effective Date of this Agreement, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall change the duties and responsibilities of the City, the Contractor, or any of their agents or employees from those set forth in the Contract Documents.

ARTICLE 5 – CONTRACT TIME

5.1 The Contractor recognizes that **TIME IS OF THE ESSENCE**. The Work shall commence within _40_ calendar days of the date of the Notice to Proceed.

5.2 The Work shall be Substantially Completed within _255_ calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

5.3 The Work shall be finally completed on the Final Completion Date and ready for final payment in accordance with this Agreement within _300_ calendar days after the date when the Contract Time commences to run as provided in the Notice to Proceed.

ARTICLE 6 – CONTRACT PRICE

6.1 City shall pay Contractor for performance of the Work in accordance with Article 7, subject to additions and deletions by Change Order, as provided for in this Agreement.

6.2 The parties expressly agree that the Contract Price, which shall not exceed the amount of $_____, constitutes the total maximum compensation payable to Contractor for performing the Work, plus any Work done pursuant to a Change Order. The Contract Price is in accordance with the line item unit prices listed in the Bid. Line items are based on a unit price cost multiplied by a defined quantity. Any additional duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change to the Contract Price.

6.3 The Contract Price constitutes the compensation payable to Contractor for performing the Work plus any Work done pursuant to a Change Order. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change in the Contract price.

ARTICLE 7 – PAYMENT

7.1 Contractor shall submit Applications for Payment in accordance with the Contract Documents. Applications for Payment will be processed by City as provided in the General Conditions.

7.2 Progress Payments. City shall make progress payments on account of the Contract Price on the basis of Contractor's monthly Applications for Payment, which shall be submitted by the Contractor between the first (1st) and the tenth (10th) day after the end of each calendar month for which payment is requested. All progress payments will be made on the basis of the progress of the Work completed.

7.3 Prior to Final Completion, progress payments will be made in an amount equal to ninety percent (90%) of the value of Work completed less in each case the aggregate of payments previously made.

7.4 Final Payment. Upon final completion of the Work in accordance with the General Conditions, as may be supplemented, the City shall pay Contractor an amount sufficient to increase total payments to one-hundred percent (100%) of the Contract Price. However, not less than ten percent (10%) of the Contract Price shall be retained until Record Drawings (as-builts), specifications, addenda, modifications and shop drawings, including all manufacturers' instructional and parts manuals are delivered to and accepted by the City.

7.5 City may withhold, in whole or in part, payment to such extent as may be necessary to protect itself from loss on account of:

7.5.1 Defective work not remedied.
7.5.2 Claims filed or reasonable evidence indicating probable filing of claims by other parties against Contractor or City because of Contractor's performance.
7.5.3 Failure of Contractor to make payments properly to Subcontractors or for material or labor.

7.5.4 Damage to another contractor not remedied.
7.5.5 Liquidated damages and costs incurred by Consultant for extended construction administration, if applicable.
7.5.6 Failure of Contractor to provide any and all documents required by the Contract Documents.

When the above grounds are removed or resolved satisfactory to the Project Manager, payment shall be made in whole or in part.

7.6 The City shall make payment to the Contractor in accordance with the Florida Prompt Payment Act, Section 218.70, Florida Statutes.

7.7 The City shall make payment to the Contractor through utilization of the City's P-Card Program.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

In order to induce the City to enter into this Agreement, Contractor makes the following representations upon which the City has relied:

8.1 Contractor is qualified in the field of public construction and in particular to perform the Work and services set forth in this Agreement.

8.2 Contractor has visited the Work Site, has conducted extensive tests, examinations and investigations and represents and warrants a thorough familiarization with the nature and extent of the Contract Documents, the Work, locality, soil conditions, moisture conditions and all year-round local weather and climate conditions (past and present), and, in reliance on such tests, examination and investigations conducted by Contractor and the Contractor's experts, has determined that no conditions exist that would in any manner affect the Proposed Price and that the project can be completed for the Proposed Price submitted within the Contract Time as defined in this Agreement. Furthermore, Contractor warrants and confirms that he is totally familiar with, understands and obligates Contractor to comply with all federal, state and local laws, ordinances, rules, regulations and all market conditions that affect or may affect the cost and price of materials and labor needed to fulfill all provisions of this Agreement or that in any manner may affect cost, progress or performance of the Work.

8.3 The Contractor has satisfied itself as to the nature and location of the Work under the Contract Documents, the general and local conditions of the Project, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, and roads, the conformation and conditions at the ground based on City provided reports, the type of equipment and facilities needed preliminary to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under the Contract Documents.

8.4 The Contractor has also studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Works, and finds and has further determined that no conditions exist that would in any manner affect the Proposed Price and that the project can be completed for the Proposed Price submitted.

8.5 Contractor has made or caused to be made examinations, investigations, tests and studies of such reports and related data in addition to those referred to in Paragraphs 8.2, 8.3 and 8.4 above as he deems necessary for the performance of the Work at the Contract Prices, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by Contractor for such purposes.

8.6 Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

8.7 Contractor has given City written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution by City is acceptable to the Contractor.

8.8 Labor

8.8.1 The Contractor shall provide competent, suitable qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. The Contractor shall at all times maintain good discipline and order at the site.

8.8.2 The Contractor shall, at all times, have a competent superintendent, capable of reading and thoroughly understanding the drawings and specifications, as the Contractor's agent on the Work, who shall, as the Contractor's agent, supervise, direct and otherwise conduct the Work.

8.8.3 The Contractor shall designate the superintendent on the job to the City, in writing, immediately after receipt of the Notice to Proceed. The Contractor understands and agrees that the superintendent's physical presence on the job site is indispensable to the successful completion of the Work. If the superintendent is frequently absent from the job site, the Project Manager may deliver written notice to the Contractor to stop work or terminate the Contract in accordance with Article 17.

8.8.4 The Contractor shall assign personnel to the job site that have successfully completed training programs related to trench safety, confined space and maintenance of traffic. A certified "competent person" shall be assigned to the job site. Personnel certified by the International Municipal Signal Associations with Florida Department of Transportation qualifications are required relative to maintenance of traffic. Failure to pursue the Work with the properly certified supervisory staff may result in notice to stop work or terminate the Contract in accordance with Article 17.

8.9 Materials:

8.9.1 The Contractor shall furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities and all other facilities and

8.9.2 incidentals necessary for the execution, testing, initial operation and completion of Work.

8.9.3 All material and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. Suppliers shall be selected and paid by the Contractor; the City reserves the right to approve all suppliers and materials.

8.10 Work Hours: Except in connection with the safety or protection of persons, or the Work, or property at the site or adjacent thereto, and except as otherwise indicated in the Supplementary Conditions, all work at the site shall be performed during regular working hours between 7 a.m. and 6:00 p.m., Monday through Friday. The Contractor will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday (designated by the City of Fort Lauderdale) without the Project Manager's written consent at least seventy-two (72) hours in advance of starting such work. If the Project Manager permits overtime work, the Contractor shall pay for the additional charges to the City with respect to such overtime work. Such additional charges shall be a subsidiary obligation of the Contractor and no extra payment shall be made to the Contractor for overtime work. It shall be noted that the City's Inspector work hours are from 8:00 a.m. to 4:30 p.m. and any Work requiring inspection oversight being performed outside of this timeframe shall be paid for by the Contractor as Inspector overtime. The cost to the Contractor to reimburse the City for overtime inspection is established at direct-labor and overtime costs for each person or inspector required. Incidental overtime costs for engineering, testing and other related services will also be charged to the Contractor at the actual rate accrued.

8.11 Patent Fee and Royalties: The Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work, or any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. The Contractor hereby expressly binds himself or itself to indemnify and save harmless the City from all such claims and fees and from any and all suits and action of every name and description that may be brought against City on account of any such claims, fees, royalties, or costs for any such invention or patent, and from any and all suits or actions that may be brought against said City for the infringement of any and all patents or patent rights claimed by any person, firm corporation or other entity.

8.12 Permits: The Contractor shall obtain and pay for all permits and licenses. There shall be no allowance for Contractor markup, overhead or profit for permits and licenses. The Contractor shall pay all government charges which are applicable at the time of opening of proposals. It shall be the responsibility of the Contractor to secure and pay for all necessary licenses and permits of a temporary nature necessary for the prosecution of Work.

8.13 Law and Regulations: The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the Work. If the Contractor observes that the specifications or plans are at variance therewith, the Contractor shall give the Project Manager prompt written notice thereof, and any necessary changes shall be adjusted by any appropriate modifications. If the Contractor performs any work knowing or having reason to know that it is contrary to such laws, ordinances, rules and regulations, and without such notice to the Project Manager, the Contractor shall bear all costs arising therefrom; however, it shall not be the Contractor's primary

8.14 responsibility to make certain that the specifications and plans are in accordance with such laws, ordinances, rules and regulations.

8.15 Taxes: The Contractor shall pay all sales, consumer, use and other similar taxes required to be paid by him in accordance with the laws of the City of Fort Lauderdale, County of Broward, State of Florida.

8.16 Contractor Use of Premises: The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workmen to areas permitted by law, ordinances, permits and/or the requirements of the Contract Documents, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment.

The Contractor shall not enter upon private property for any purpose without first securing the permission of the property owner in writing and furnishing the Project Manager with a copy of said permission. This requirement will be strictly enforced, particularly with regard to such vacant properties as may be utilized for storage or staging by the Contractor.

The Contractor shall conduct his work in such a manner as to avoid damage to adjacent private or public property. Any damage to existing structures of work of any kind, including permanent reference markers or property corner markers, or the interruption of a utility service, shall be repaired or restored promptly at no expense to the City or property owner.

The Contractor will preserve and protect all existing vegetation such as trees, shrubs and grass on or adjacent to the site which do not reasonably interfere with the construction, as determined by the Project Manager. The Contractor will be responsible for repairing or replacing any trees, shrubs, lawns and landscaping that may be damaged due to careless operation of equipment, stockpiling of materials, tracking of grass by equipment or other construction activity. The Contractor will be liable for, or will be required to replace or restore at no expense to the City all vegetation not protected or preserved as required herein that may be destroyed or damaged.

During the progress of the work, the Contractor shall keep the premises free from accumulations of waste materials, rubbish and debris resulting from the Work. At the completion of the Work, the Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials and shall leave the site clean and ready for occupancy by the City. The Contractor shall restore to their original condition those portions of the site not designated for alteration by the Contract Documents at no cost to the City.

8.17 Project Coordination: The Contractor shall provide for the complete coordination of the construction effort. This shall include, but not necessarily be limited to, coordination of the following:

8.17.1 Flow of material and equipment from suppliers.
8.17.2 The interrelated work with affected utility companies.

8.17.3 The interrelated work with the City where tie-ins to existing facilities are required.
8.17.4 The effort of independent testing agencies.
8.17.5 Notice to affected property owners as may be directed by the Project Manager.

8.18 Project Record Documents and Final As-Builts (Record Drawings): Contractor shall be responsible for maintaining up-to-date redline as-built drawings, on site, at all times during construction. All as-built information shall be surveyed and verified by a professional land surveyor registered in the State of Florida. Contractor shall provide the City with a minimum of three (3) sets of signed and sealed record drawings (Final As-Builts) and a CD of the electronic drawings files created in AutoCad 2014 or later. All costs associated with survey work required for construction layout and as-built preparation shall be the responsibility of the Contractor.

8.19 Safety and Protection:

8.19.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

8.19.1.1 All employees working on the project and other persons who may be affected thereby.
8.19.1.2 All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site.
8.19.1.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

8.19.2 The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and utilities when execution of the Work may affect them at least seventy-two (72) hours in advance (unless otherwise required). All damage, injury or loss to any property caused, directly or indirectly, in whole or in part by the Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by the Contractor. The Contractor's duties and responsibilities for safety and protection of the Work shall continue until such time as all the Work is completed and accepted by the City.

8.20 Emergencies: In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the City is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the Project Manager prompt written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby.

8.20 Risk of Loss: The risk of loss, injury or destruction shall be on the Contractor until acceptance of the Work by the City. Title to the Work shall pass to the City upon acceptance of the Work by the City.

8.21 Environmental: The Contractor has fully inspected the Premises and agrees, except as to the presence of any asbestos, to accept the Premises in an "as is" physical condition, without representation or warranty by the City of any kind, including, without limitation, any and all existing environmental claims or obligations that may arise from the presence of any "contamination" on, in or about the Premises. Further, Contractor and all entitles claiming by, through or under the Contractor, releases and discharges the City, from any claim, demand, or cause of action arising out of or relating to the Contractor's use, handling, storage, release, discharge, treatment, removal, transport, decontamination, cleanup, disposal and/or presence of any hazardous substances including asbestos on, under, from or about the Premises. The Contractor shall have no liability for any pre-existing claims or "contamination" on the Premises.

The Contractor shall not use, handle, store, discharge, treat, remove, transport, or dispose of Hazardous Substances including asbestos at, in, upon, under, to or from the Premises until receipt of instructions from the City. At such time, a City approved Change Order, which shall not include any profit, shall authorize the Contractor to perform such services.

The Contractor shall immediately deliver to the Project Manager complete copies of all notices, demands, or other communications received by the Contractor from any governmental or quasi-governmental authority or any insurance company or board of fire underwriters or like or similar entities regarding in any way alleged violations or potential violations of any Environmental Law or otherwise asserting the existence or potential existence of any condition or activity on the Premises which is or could be dangerous to life, limb, property, or the environment.

For other and additional consideration, the Contractor hereby agrees, at its sole cost and expense, to indemnify and protect, defend, and hold harmless the City and its respective employees, agents, officials, officers, representatives, contractors and subcontractors, successors, and assigns (hereafter the "City") from and against any and all claims, demands, losses, damages, costs, expenses, including but not limited to mitigation, restoration, and natural restoration expenses, liabilities, assessments, fines, penalties charges, administrative and judicial proceedings and orders, judgments, causes of action, in law or in equity, remedial action requirements and/or enforcement actions of any kind (including, without limitation, attorneys' fees and costs) directly or indirectly arising out of or attributable to, in whole or in part, the Contractor's use, handling, storage, release, threatened release, discharge, treatment, removal, transport, decontamination, cleanup, disposal and/or presence of a Hazardous Substance (excluding asbestos) on, under, from, to or about the Premises or any other activity carried on or undertaken on or off the Premises by the Contractor or its employees, agents or subcontractors, in connection with the use, handling, storage, release, threatened release, discharge, treatment, mitigation, natural resource restoration, removal, transport, decontamination, cleanup, disposal and/or presence or any Hazardous Substance including asbestos located, transported, or present on, undue, from, to, or about the Premises. This indemnity is intended to be operable under 42 U.S.C. sections 9607, as amended, and any successor section.

The scope of the indemnity obligations includes, but is not limited to: (a) all consequential damages; (b) the cost of any required or necessary repair, cleanup, or detoxification of the applicable real estate and the preparation and implementation of any closure, remedial or other required plan, including without limitation; (i) the costs of removal or remedial action incurred by the United States government or the State of Florida or response costs incurred by any other person, or damages from injury to destruction of, or loss of, natural resources, including the cost of assessing such injury, destruction, or loss, incurred pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, as amended; (ii) the clean-up costs, fines, damages, or penalties incurred pursuant to any applicable provisions of Florida law; and (iii) the cost and expenses of abatement, correction or cleanup, fines, damages, response costs, or penalties which arise from the provisions of any other statute, law, regulation, code ordinance, or legal requirement state or federal; and (c) liability for personal injury or property damage arising under any statutory or common law tort theory, including damages assessed for the maintenance of a public private nuisance, response costs, or for the carrying on of an abnormally dangerous activity.

8.22 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any other reason or allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

8.23 No Liens: If any Subcontractor, supplier, laborer, or materialmen of Contractor or any other person directly or indirectly acting for or through Contractor files or attempts to file a mechanic's or construction lien against the real property on which the work is performed or any part or against any personal property or improvements or claim against any monies due or to become due from the City to Contractor or from Contractor to a Subcontractor, for or on account of any work, labor, services, material, equipment, or other items furnished in connection with the Work or any Change Order, Contractor agrees to satisfy, remove, or discharge such lien or claim at its own expense by bond, payment, or otherwise within twenty (20) days of the filing or from receipt of written notice from the City.

Additionally, until such time as such lien or claim is satisfied, removed or discharged by Contractor, all monies due to Contractor, or that become due to Contractor before the lien or claim is satisfied, removed or otherwise discharged, shall be held by City as security for the satisfaction, removal and discharge of such lien and any expense that may be incurred while obtaining such. If Contractor shall fail to do so, City shall have the right, in addition to all other rights and remedies provided by this Agreement or by law, to satisfy, remove, or discharge such lien or claim by whatever means City chooses at the entire and sole cost and expense of Contractor which costs and

expenses shall, without limitation, include attorney's fees, litigation costs, fees and expenses and all court costs and assessments.

8.24 Weather Emergencies: Upon issuance of a Hurricane Watch by the National Weather Service, the Contractor shall submit to the City a plan to secure the work area in the event a Hurricane Warning is issued. The plan shall detail how the Contractor will secure the Premises, equipment and materials in a manner as to prevent damage to the Work and prevent materials and equipment from becoming a hazard to persons and property on and around the Premises. The plan shall include a time schedule required to accomplish the hurricane preparations and a list of emergency contacts that will be available and in the City before, during and immediately after the storm.

Upon issuance of a Hurricane Warning by the National Weather Service, if the Contractor has not already done so, the Contractor shall implement its hurricane preparedness plan. Cost of development and implementation of the hurricane preparedness plan shall be considered as incidental to construction. Cost of any clean up and rework required after the storm will be considered normal construction risk within Florida and shall not entitle the Contractor to any additional compensation. Contractor shall be entitled to request an extension in time for completion of the Work, in accordance with the provisions of Article 15 of this Agreement, equal to the time he is shut down for implementation of the preparedness plan, the duration of the storm and a reasonable period to restore the Premises.

8.25 Force Majeure: No Party shall hold the other responsible for damages or for delays in performance caused by force majeure, acts of God, or other acts or circumstances beyond the control of the other party or that could not have been reasonably foreseen and prevented. For this purposes, such acts or circumstances shall include, but not be limited to weather conditions affecting performance, floods, epidemics, war, riots, strikes, lockouts, or other industrial disturbances, or protest demonstrations. Should such acts or circumstances occur, the parties shall use their best efforts to overcome the difficulties arising therefrom and to resume the Work as soon as reasonably possible with the normal pursuit of the Work.

Inclement weather, continuous rain for less than three (3) days or the acts or omissions of subcontractors, third-party contractors, materialmen, suppliers, or their subcontractors, shall not be considered acts of force majeure.

No Party shall be liable for its failure to carry out its obligations under the Agreement during a period when such Party is rendered unable by force majeure to carry out its obligation, but the obligation of the Party or Parties relying on such force majeure shall be suspended only during the continuance of the inability and for no longer period than the unexpected or uncontrollable event.

The Contractor further agrees and stipulates, that its right to excuse its failure to perform by reason of force majeure shall be conditioned upon giving written notice of its assertion that a Force Majeure delay has commenced within 96 hours after such an occurrence. The CONTRACTOR shall use its reasonable efforts to minimize such delays. The CONTRACTOR shall promptly provide an estimate of the anticipated additional time required to complete the Project.

8.26 Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assisted Contracts: The recipient shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any DOT-assisted contract or in the administration of its DBE program or the requirements of 49 CFR part 26. The recipient shall take all necessary and reasonable steps under 49 CFR part 26 to ensure nondiscrimination in the award and administration of DOT-assisted contracts. The recipient's DBE program, as required by 49 CFR part 26 and as approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the recipient of its failure to carry out its approved program, the Department may impose sanctions as provided for under part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 *et eq.*).

Additionally, the contractor assures that they, the sub recipient or the subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate. (This additional language must be included in each subcontract the prime contractor signs with a subcontractor.)

ARTICLE 9 – CITY'S RESPONSIBILITIES

9.1 The City shall furnish the data required of the City under the Contract Documents promptly and shall make payments to the Contractor promptly after they are due as provided in Article 7.

9.2 The City's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in the Contract Documents.

9.3 Technical Clarifications and Interpretations:

9.3.1 The City shall issue, with reasonable promptness, such written clarifications or interpretations of the Contract Documents as it may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. Should the Contractor fail to request interpretation of questionable items in the Contract Documents, the City shall not entertain any excuse for failure to execute the Work in a satisfactory manner.

9.3.2 The City shall interpret and decide matters concerning performance under the requirements of the Contract Documents, and shall make decisions on all claims, disputes or other matters in question. Written notice of each claim, dispute or other matter will be delivered by claimant to the other Party but in no event later than five (5) days after the occurrence of event, and written supporting date will be submitted to the other Party within five (5) days after such occurrence. All written decisions of the City on any claim or dispute will be final and binding.

9.4 The Contractor shall perform all Work to the reasonable satisfaction of the City in accordance with the Contract Documents. In cases of disagreement or ambiguity, the City shall decide all questions, difficulties, and disputes of whatever nature, which may arise under or by reason of this Agreement or the quality, amount and value of the Work, and the City's decisions on all claims, questions and determination are final.

ARTICLE 10 – BONDS AND INSURANCE

10.1 Public Construction and Other Bonds: The Contractor shall furnish Public Construction or Performance and Payment Bonds ("Bond"), each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all the Contractor's obligations under the Contract Documents. These Bonds shall remain in effect until at least one (1) year after the date of final payment, except as otherwise provided by law. All Bonds shall be furnished and provided by the surety and shall be in substantially the same form as prescribed by the Contract Documents and be executed by such sureties as (i) are licensed to conduct business in the State of Florida, and (ii) are named in the current list of Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department and (iii) otherwise meet the requirements set forth herein that apply to sureties. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

10.1.1 Performance Bond: A Corporate Surety Bond legally issued, meeting the approval of, and running to the City in an amount not less than the Contract Price of such improvements, conditioned that the Contractor shall maintain and make all repairs to the improvements constructed by the Contractor at their own expense and free of charge to the City, for the period of one (1) year after the date of acceptance of the Work within such period by reason of any imperfection of the material used or by reason of any defective workmanship, or any improper, imperfect or defective preparation of the base upon which any such improvement shall be laid.

The Contractor shall execute and record in the public records of Broward County, Florida, a payment and performance bond in an amount at least equal to the Contract Price with a surety insurer authorized to do business in the State of Florida as surety, ("Bond"), in accordance with Section 255.05, Florida Statutes (2014), as may be amended or revised, as security for the faithful performance and payment of all of the Contractor's obligations under the Contract Documents.

10.2 Disqualification of Surety: If the Surety on any Bond furnished by the Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Florida or it ceases to meet the requirements of clauses (i) and (ii) of Paragraph 10.1, the Contractor shall within five (5) days thereafter substitute another Bond and Surety, both of which shall be acceptable to the City.

10.3 Insurance

10.3.1 Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the

Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below, as well as Professional Liability insurance in the amount of $1,000,000 for any Architectural and or Engineering requirements associated with the fulfillment of the contract if required. Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida. **A <u>Sample Insurance Certificate</u> shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.**

A. The City is required to be named as additional insured on the Commercial General Liability insurance policy. <u>BINDERS ARE UNACCEPTABLE</u>. The insurance coverage required shall include those classifications, as listed in standard liability insurance manuals, which most nearly reflect the operations of the Contractor. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for the work contemplated in this Agreement shall be deemed unacceptable, and shall be considered a breach of contract.

B. The Contractor shall provide the City an original Certificate of Insurance for policies required by Article 10. All certificates shall state that the City shall be given ten (10) days' notice prior to expiration or cancellation of the policy. The insurance provided shall be endorsed or amended to comply with this notice requirement. In the event that the insurer is unable to accommodate, it shall be the responsibility of the Contractor to provide the proper notice. Such notification will be in writing by registered mail, return receipt requested and addressed to the Finance Department. Such policies shall: (1) name the insurance company or companies affording coverage acceptable to the City, (2) state the effective and expiration dates of the policies, (3) include special endorsements where necessary. Such policies provided under Article 10 shall not be affected by any other policy of insurance, which the City may carry in its own name.

C. Contractor shall as a condition precedent of this Agreement, furnish to the City of Fort Lauderdale, c/o Project Manager, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301, Certificate(s) of Insurance upon execution of this Agreement, which indicate that insurance coverage has been obtained which meets the requirements as outlined below:

10.3.2 <u>Property Insurance (Builder's Risk):</u> The Contractor shall purchase and maintain property insurance upon the Work at or off the site of 100% of the contract completed value. These policies shall insure the interest of the owner, contractor and subcontractors in the Work, and shall insure against "all risks" of physical loss and damage including theft, vandalism, and malicious mischief, collapse and water damage. All such insurance required

by this paragraph shall remain in effect until the Work is completed and accepted by the City.

10.3.3 Commercial General Liability

A. Limits of Liability:
Bodily Injury and Property Damage - Combined Single Limit

Each Occurrence	$1,000,000
Project Aggregate	$1,000,000
General Aggregate	$2,000,000
Personal Injury	$1,000,000
Products/Completed Operations	$1,000,000

B. Endorsements Required:
City of Fort Lauderdale included as an Additional Insured
Broad Form Contractual Liability
Waiver of Subrogation
Premises/Operations
Products/Completed Operations
Independent Contractors
Owners and Contractors Protective Liability
Contractor's Pollution Liability

10.3.4 Business Automobile Liability

A. Limits of Liability:
Bodily Injury and Property Damage - Combined Single Limit
All Autos used in completing the contract including Hired, Borrowed or Non-Owned Autos
Any One Accident $1,000,000

B. Endorsements Required:
Waiver of Subrogation

10.3.5 Workers' Compensation and Employer's Liability Insurance

Limits: Workers' Compensation – Per Florida Statute 440
Employers' Liability - $500,000

Any firm performing work on behalf of the City of Fort Lauderdale must provide Workers' Compensation insurance. Exceptions and exemptions can only be made if they are in accordance with Florida Law.

Contractor must be in compliance with all applicable State and Federal workers' compensation laws, including the U.S. Longshore Harbor Workers' Act or Jones Act.

10.3.6 Umbrella/Excess Liability: The Contractor shall provide umbrella/excess coverage with limits of no less than $2,000,000 excess of Commercial General Liability, Automobile Liability and Employer's Liability.

10.3.7 All insurance policies required above shall be issued by companies authorized to do business under the laws of the State of Florida, with the following qualifications:

The Contractor's insurance must be provided by an A.M. Best's "A-" rated or better insurance company authorized to issue insurance policies in the State of Florida, subject to approval by the City's Risk Manager. Any exclusions or provisions in the insurance maintained by the Contractor that precludes coverage for work contemplated in this project shall be deemed unacceptable, and shall be considered breach of contract.

NOTE: CITY PROJECT NUMBER MUST APPEAR ON EACH CERTIFICATE.

A Sample Insurance Certificate shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.

Compliance with the foregoing requirements shall not relieve the Contractor of their liability and obligation under this section or under any other section of this Agreement.

The Contractor shall be responsible for assuring that the insurance certificates required in conjunction with this Section remain in force for the duration of the Project. If insurance certificates are scheduled to expire during the contractual period, the Contractor shall be responsible for submitting new or renewed insurance certificates to the City at a minimum of thirty (30) calendar days in advance of such expiration. In the event that expired certificates are not replaced with new or renewed certificates that cover the contractual period, the City shall:

A. Suspend the Agreement until such time as the new or renewed certificates are received by the City.

B. The City may, at its sole discretion, terminate the Agreement for cause and seek damages from the Contractor in conjunction with the violation of the terms and conditions of the Agreement.

ARTICLE 11- WARRANTY AND GUARANTEE, TESTS AND INSPECTIONS, CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

11.1 Warranty: The Contractor warrants and guarantees to the City that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to the Contractor. All defective work, whether or not in place, may be rejected, corrected or accepted as provided in this Article.

11.1.1 Warranty of Title: The Contractor warrants to the City that it possesses good, clear and marketable title to all equipment and materials provided and that there

are no pending liens, claims or encumbrances against the equipment and materials.

11.1.2 Warranty of Specifications: The Contractor warrants that all equipment, materials and workmanship furnished, whether furnished by the Contractor, its subcontractors or suppliers, will comply with the specifications, drawings and other descriptions supplied or adopted and that all services will be performed in a workmanlike manner.

11.1.3 Warranty of Merchantability: The Contractor warrants that any and all equipment to be supplied pursuant to this Agreement is merchantable, free from defects, whether patent or latent in material or workmanship, and fit for the ordinary purposes for which it is intended.

11.2 Tests and Inspections: Contractor shall retain the services of an independent, certified, testing lab to perform all testing as required by the specifications, Contract drawings, and any applicable permitting agency. Contractor shall provide evidence of certification to the City before the work and testing is done. Testing results shall be submitted to the Engineer for review and approval at the time the results are provided to the Contractor. The Contractor shall give the Project Manager and City Inspector a minimum of twenty-four (24) hours' advanced notice of readiness of the Work for all required inspections, tests, or approvals and shall notify all applicable permitting agencies in a timely manner based on requirements set forth in the permit documents.

11.2.1 Neither observations by the Project Manager nor inspections, tests or approvals by others shall relieve the Contractor from its obligations to perform the Work in accordance with the Contract Documents.

11.3 Uncovering Work: If any work that is to be inspected, tested or approved is covered without approval or consent of the Project Manager, it must, if requested by the Project Manager, be uncovered for observation and/or testing. Such uncovering and replacement shall be at the Contractor's sole expense unless the Contractor has given the Project Manager timely notice of the Contractor's intention to cover such Work and the Project Manager has not acted with reasonable promptness in response to such notice.

11.3.1 If the Project Manager considers it necessary or advisable that Work covered in accordance with Paragraph 11.2.1, 11.2.2 and 11.2.3 be observed by the City or inspected or tested by others, the Contractor at the City's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the Project Manager may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, the Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services, and an appropriate deductive Change Order shall be issued. If, however, such work is not found to be defective, the Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection testing and reconstruction if he makes a claim therefore as provided in Articles 14 and 15.

11.4 City May Stop the Work: If the Work is defective, or the Contractor fails to supply sufficient skilled supervisory personnel or workmen or suitable materials or equipment or the work area is deemed unsafe, the City may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the City to stop the Work shall not give rise to any duty on the part of the City to exercise this right for the benefit of the Contractor or any other party. The City will not award any increase in Contract Price or Contract Time if the Work is stopped due to the circumstances described herein.

11.5 Correction or Removal of Defective Work Before Final Payment: If required by the Project Manager, the Contractor shall promptly, without cost to the City and as Specified by the Project Manager, either correct any defective Work, whether or not fabricated, installed or completed, or if the Work has been rejected by the City remove it from the site and replace it with non-defective Work.

11.6 One Year Correction Period After Final Payment: If within one (1) year after the date of final acceptance, or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any work is found to be defective, the Contractor shall promptly, without cost to the City and in accordance with the City's written instructions, either correct such defective Work, or, if it has been rejected by the City, remove it from the site and replace it with non-defective Work.

If The Contractor does not promptly comply with the terms of such instructions or in an emergency where delay would cause serious risk of loss or damage, the City may have the defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs for such removal and replacement, including compensation for additional professional services, shall be paid by the Contractor.

11.7 Acceptance of Defective Work, Deductions: If, instead of requiring correction or removal and replacement of defective Work, the City, at the city's sole option, prefers to accept it, the City may do so. In such a case, if acceptance occurs prior to the Project Manager's recommendation of final payments, a Change Order shall be issued incorporating the necessary revisions in the Contracts Documents, including appropriate reduction in the Contract Price; or if the acceptance occurs after such recommendation, an appropriate amount shall be paid by the Contractor to the City.

11.8 City May Correct Defective Work: If the Contractor fails within a reasonable time after written notice of the Project Manager to proceed to correct defective Work or to remove and replace rejected Work as required by the Project Manager in accordance with Paragraph 11.5, or if the Contractor fails to perform the Work in accordance with the Contract Documents, the City may, after seven (7) days written notice to the Contractor, correct and remedy any such deficiency. In exercising its rights under this paragraph, the City shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the City may exclude the Contractor from all or part of the site, take possession of all or part of the Work, suspend the Contractor's services related thereto and take possession of the Contractor's tools, construction equipment and materials stored at the site or elsewhere. The Contractor shall allow the City's representative agents and employees such access to the site as may be necessary to enable the City to exercise its rights under this paragraph. All direct and indirect costs of the City in exercising such rights shall be charged against the Contractor in an

amount verified by the Project Manager, and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents and a reduction in the Contract Price. Such direct and indirect costs shall include, in particular but without limitation, compensation for additional professional services required and costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of the Contractor's defective Work. The Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the City of the City's right hereunder.

ARTICLE 12 – INDEMNIFICATION

12.1 Disclaimer of Liability: The City shall not at any time, be liable for injury or damage occurring to any person or property from any cause, whatsoever, arising out of Contractor's construction and fulfillment of this agreement.

12.2 Indemnification: For other, additional good valuable consideration, the receipt and sufficiency of which is hereby acknowledged:

12.2.1 Contractor shall, at its sole cost and expense, indemnify and hold harmless the City, its representatives, employees and elected and appointed officials from or on account of all claims, damages, losses, liabilities and expenses, direct, indirect or consequential including but not limited to fees and charges of engineers, architects, attorneys, consultants and other professionals and court costs arising out of or in consequence of the performance of this Agreement at all trial and appellate levels. Indemnification shall specifically include but not be limited to claims, damages, losses, liabilities and expenses arising out of or from (a) the negligent or defective design of the project and Work of this Agreement; (b) any act, omission or default of the Contractor, its Subcontractors, agents, servants or employees; (c) any and all bodily injuries, sickness, disease or death; (d) injury to or destruction of tangible property, including any resulting loss of use; (e) other such damages, liabilities, or losses received or sustained by any person or persons during or on account of any operations connected with the construction of this Project including the warranty period; (f) the use of any improper materials; (g) any construction defect including both patent and latent defects; (h) failure to timely complete the work; (i) the violation of any federal, state, county or city laws, ordinances or regulations by Contractor, its subcontractors, agents, servants, independent contractors or employees; (j) the breach or alleged breach by Contractor of any term of the Agreement, including the breach or alleged breach of any warranty or guarantee.

12.2.2 Contractor agrees to indemnify, defend, save and hold harmless the City, its officers, agents and employees, from all damages, liabilities, losses, claims, fines and fees, and from any and all suits and actions of every name and description that may be brought against City, its officers, agents and employees, on account of any claims, fees, royalties, or costs for any invention or patent and/or for the infringement of any and all copyrights or patent rights claimed by any person, firm, or corporation.

12.2.3 Contractor shall pay all claims, losses, liens, settlements or judgments of any nature in connection with the foregoing indemnifications including, but not limited to, reasonable attorney's fees and costs for trails and appeals.

12.2.4 If any Subcontractor, supplier, laborer, or materialmen of Contractor or any other person directly or indirectly acting for or through Contractor files or attempts to file a mechanic's or construction lien against the real property on which the work is performed or any part or against any personal property or improvements thereon or make a claim against any monies due or to become due from the City to Contractor or from Contractor to a Subcontractor, for or on account of any work, labor, services, material, equipment, or other items furnished in connection with the Work or any change order, Contractor agrees to satisfy, remove, or discharge such lien or claim at its own expense by bond, payment, or otherwise within five (5) days of the filing or from receipt of written notice from the City.

Additionally, until such time as such lien or claim is satisfied, removed or discharged by Contractor, all monies due to Contractor, or that become due to Contractor before the lien or claim is satisfied, removed or otherwise discharged, shall be held by City as security for the satisfaction, removal and discharge of such lien and any expense that may be incurred while obtaining the discharge. If Contractor shall fail to do so, City shall have the right, in addition to all other rights and remedies provided by this Agreement or by law, to satisfy, remove, or discharge such lien or claim by whatever means City chooses at the entire and sole cost and expense of Contractor which costs and expenses shall, without limitation, include attorney's fees, litigation costs, fees and expenses and all court costs and assessments, and which shall be deducted from any amount owing to Contractor. In the event the amount due Contractor is less than the amount required to satisfy Contractor's obligation under this, or any other article, paragraph or section of this Agreement, the Contractor shall be liable for the deficiency due the City.

12.2.5 The Contractor and the City agree that Section 725.06(2), Florida Statutes controls the extent and limits of the indemnification and hold harmless provisions of this Agreement, if any, and that the parties waive any defects in the wording of this Article that runs afoul of said statutory section.

ARTICLE 13 – CHANGES IN THE WORK

13.1 Without invalidating this Agreement, the City may, at any time or from time to time order additions, deletions or revisions in the Work through the issuance of Change Orders. Upon receipt of a Change Order, the Contractor shall proceed with the Work involved. All Work shall be executed under the applicable conditions of the Contract Documents. If any Change Order causes an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, an equitable adjustment will be made as provided in Article 14 or Article 15 on the basis of a claim made by either Party.

13.2 The Project Manager may authorize minor changes in the work not involving an adjustment in the Contract Price or the Contract Time, which are consistent with the

overall intent of the Contract Documents. Such changes must be in writing and signed by the City and the Contractor.

13.3 If notice of any change affecting the general scope of the Work or change in the Contract Price is required by the provisions of any Bond to be given to the Surety, it will be the Contractor's responsibility to so notify the Surety, and the amount of each applicable Bond shall be adjusted accordingly. The Contractor shall furnish proof of such adjustment to the City.

ARTICLE 14 – CHANGE OF CONTRACT PRICE

Change of Contract Price, approved by City, shall be computed as follows:

14.1 Cost of the Work: The term "Cost of the Work" means the sum of all direct costs necessarily incurred and paid by Contractor in the proper performance of the Work. Except as otherwise may be agreed to in writing by the City, these costs shall be in amounts no higher than those prevailing in the City and shall include only the following items and shall not include any of the costs itemized in Paragraph 14.3:

14.1.1 Payroll costs for employees in the direct employ of the Contractor in the performance of the Work under schedules of job classifications agreed upon by the City and the Contractor. 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 and cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, worker's compensation, health and retirement benefits, bonuses, sick leave, vacation and applicable holiday pay.

14.1.2 Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage, and required suppliers and field services. All cash discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to the City, and the Contractor shall make provisions so that they may be obtained.

14.1.3 Supplemental costs including the following:

14.1.3.1 Cost, including transportation and maintenance of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work.

14.1.3.2 Rentals of all construction equipment and machinery and the parts whether rented from the Contractor or others in accordance with rental agreements approved by the City, and the costs of transporting, loading, unloading, installation, dismantling and removal. The rental of any such equipment, machinery or parts shall cease when the use is no longer necessary for the Work.

14.1.3.3 Sales, consumer, use or similar taxes related to the Work and for which the Contractor is liable, imposed by laws and regulations.

14.1.3.4 Royalty payments and fees for permits and licenses.

14.1.3.5 The cost of utilities, fuel and sanitary facilities at the Work site.

14.1.3.6 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

14.1.3.7 Cost of premiums for additional bonds and insurance required because of changes in the Work.

14.2 The Contract Price may only be increased by a Change Order when Work is modified in accordance with Article 13 and approved by the City in writing. Any claim for an increase in the Contract Price resulting from a Change Order shall be based on written notice delivered to the Project Manager within ten (10) days of the occurrence of the Change Order giving rise to the claim. Notice of the amount of the claim with supporting data shall be included in the Change Order and delivered within twenty (20) days of such occurrence unless Project Manager allows an additional period of time to ascertain accurate cost data. Any change in the Contract Price resulting from any such claim shall be incorporated in the Change Order. **IT IS EXPRESSLY AND SPECIFICALLY AGREED THAT ANY AND ALL CLAIMS FOR CHANGES TO THE CONTRACT PRICE SHALL BE WAIVED IF NOT SUBMITTED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION.**

14.3 Not Included in the Cost of the Work: The term "cost of the Work" shall not include any of the following:

14.3.1 Payroll costs and other compensation of the Contractor's officers executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditor, accountants, purchasing and contracting agents, expediters, timekeepers, clerks and other personnel employed by the Contractor whether at the site or in the 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 to in Paragraph 14.1.1, all of which are to be considered administrative costs covered by the Contractor's fee.

14.3.2 Expenses of the Contractor's principal and branch offices other than the Contractor's office at the site.

14.3.3 Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Work and charges against the Contractor for delinquent payments.

14.3.4 Cost of premiums for all bonds and for all insurance whether or not the Contractor is required by the Contract Documents to purchase and maintain the same.

14.3.5 Costs due to the negligence of the 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.

14.3.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 14.1

14.4 Basis of Compensation: The Contractor's compensation, allowed to the Contractor for overhead and profit, shall be determined as follows:

14.4.1 A mutually acceptable negotiated fee:

14.4.1.1 For costs incurred under Paragraphs 14.1.1 and 14.1.2, the Contractor's fee shall not exceed five percent (5%).

14.4.1.2 No fee shall be payable on the basis of costs itemized under Paragraphs 14.1.3.1, 14.1.3.2, 14.1.3.3, 14.1.3.4, 14.1.3.5, 14.1.3.6, 14.1.3.7, 14.3.1, 14.3.2, 14.3.3, 14.3.4, 14.3.5 and 14.3.6.

14.4.1.3 The amount of credit to be allowed by the Contractor to the City for any such change which results in a net decrease plus a deduction in the Contractor's fee by an amount equal to five percent (5%) for the net decrease.

14.4.1.4 When both additions and credits are involved in any one change the combined overhead and profit shall be figured on the basis of net increase if any, however, not to exceed five percent (5%) of the agreed compensation. Profit will not be paid on any Work not performed.

14.5 Cost Breakdown Required: Whenever the cost of any Work is to be determined pursuant to this Article, the Contractor will submit in form acceptable to the City an itemized cost breakdown together with supporting documentation. Whenever a change in the Work is to be based upon mutual acceptance of a lump sum, whether the amount is an addition, credit, or no-charge-in-cost, the Contractor shall submit an estimate substantiated by a complete itemized breakdown:

14.5.1 The breakdown shall list quantities and unit prices for materials, labor, equipment and other items of cost.

14.5.2 Whenever a change involves the Contractor and one (1) or more subcontractors and the change is an increase in the agreed compensation, the overhead and profit percentage for the Contractor and each subcontractor shall be itemized separately.

14.6 Time for the City to Approve Extra Work: Any Extra Work in an amount up to and not exceeding a cumulative amount of $25,000 for a specific project can be approved by the City Manager and shall require a written Change Order proposal to be submitted to the Public Works Director for submittal and approval by the City Manager. Extra Work exceeding the cumulative amount of $25,000 for a specific project must be approved by the City Commission and a written Change Order proposal must be submitted to the Public Works Director for submittal and approval by the City Manager and City

Commission. No financial or time claim for delay to the project resulting from the Change Order approval process outlined above under Section 14.6 will be allowed.

ARTICLE 15 – CHANGE OF THE CONTRACT TIME

15.1 The Contract Time may only be changed by a Change Order. Any claim for an extension in the Contract Time shall be based on written notice delivered to the Project Manager within five (5) days of the occurrence of the event giving rise to the claim. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order.

15.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of the Contractor if a claim is made there for as provided in Paragraph 15.1. Such delays shall include but not be limited to, acts or neglect by the City, or to fires, floods, labor disputes, epidemics, abnormal weather conditions, or acts of God.

15.3 All time limits stated in the Contract Documents are of the essence. The provisions of this Article 15 shall not exclude recovery for damages for delay by the Contractor.

15.4 Delays caused by or resulting from entities, contractors or subcontractors who are not affiliated with the CONTRACTOR (non-affiliated Contractors) shall not give rise to a claim by the CONTRACTOR for damages for increases in material and/or labor costs. Such entities, contractors and subcontractors include, but are not limited to, the City's contractors and subcontractors, Florida Power and Light Company, AT&T and Florida East Coast Railway, LLC.

15.5 Rights of Various Interests: Whenever work being done by City's forces or by other contractors is contiguous to or within the limits of work covered by this Contract, the respective rights of the various interests involved shall be established by the Project Manager to secure the completion of the various portions of the work in general harmony.

ARTICLE 16 – LIQUIDATED DAMAGES

16.1 Upon failure of the Contractor to complete the Work within the time specified for completion, the Contractor shall pay to the City the sum of **Five Hundred Dollars ($500.00)** for each and every calendar day that the completion of the Work is delayed beyond the time specified in this Agreement for completion, as fixed and agreed liquidated damages and not as a penalty, so long as the delay is caused by the Contractor. Should an act of God or the acts or omissions of the City, its agents or representatives, in derogation to the terms of this Agreement cause the delay, the Contractor shall not be responsible for the delay nor liquidated damages. Liquidated damages are fixed and agreed upon between the Parties, recognizing the impossibility of precisely ascertaining the amount of damages that will be sustained by the City as a consequence of such delay and both parties desiring to obviate any question of dispute concerning the amount of damages and the cost and effect of the failure of the Contractor to complete the Work on time. Liquidated damages shall apply separately to each portion of the Work for which a time of completion is given. The City shall have the right to deduct from or retain any compensation which may be due or which may become due and payable to the Contractor the amount of liquidated damages,

and if the amount retained by the City is insufficient to pay in full such liquidated damages, the Contractor shall pay all liquidated damages in full. The Contractor shall be responsible for reimbursing the City, in addition to liquidated damages or other damages for delay, for all costs of engineering, architectural fees, and inspection and other costs incurred in administering the construction of the Project beyond the completion date specified or beyond an approved extension of time granted to the Contractor whichever is later. Delays caused by or resulting from entities, contractors or subcontractors who are not affiliated with the Contractor shall not give rise to a claim by Contractor for damages for increase in material and/or labor costs. Such entities, contractors and subcontractors include, but are not limited to, the City's contractors and subcontractors, Florida Power and Light Company, AT&T, and Florida East Coast Railway, LLC.

16.2 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any reason, allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

ARTICLE 17 – SUSPENSION OF WORK AND TERMINATION

17.1 City May Suspend Work: The City may, at any time and without cause, suspend the Work or any portion of the Work for a period of not more than ninety (90) days by notice in writing to the Contractor which shall fix the date on which Work shall be resumed. The Contractor shall resume the Work on the date fixed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension, if the Contractor makes a claim as provided in Articles 14 and 15.

17.2 City's Right to Terminate Contract: The City may terminate this Agreement upon fifteen (15) calendar days' written notice upon the occurrence of any one or more of the following events:

17.2.1 If the Contractor commences a voluntary case or a petition is filed against the Contractor, under any chapter of the Bankruptcy Code, or if the Contractor takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency.

17.2.2 If the Contractor makes a general assignment for the benefit of creditors.

17.2.3 If a trustee, receiver, custodian or agent of the Contractor is appointed under applicable law or under Contract, whose appointment or authority to take charge of property of the Contractor is for the purpose of enforcing a lien against such property or for the purpose of general administration of such property for the benefit of the Contractor's creditors.

17.2.4 If Contractor fails to begin the Work within fifteen (15) calendar days after the Project Initiation Date, or fails to perform the Work with sufficient workers and equipment or with sufficient materials to ensure the prompt completion of the Work, or shall perform the Work unsuitably, or cause it to be rejected as defective and unsuitable, or shall discontinue the prosecution of the Work pursuant to the accepted schedule or if Contractor shall fail to perform any material term set forth in the Contract Documents, or from any other cause whatsoever shall not carry on the Work in an acceptable manner, Project Manager may give notice in writing to Contractor and its Surety of such delay, neglect or default, specifying the same.

17.2.5 If the Contractor repeatedly fails to make prompt payments to subcontractors or for labor, material or equipment.

17.2.6 If the Contractor repeatedly disregards proper safety procedures.

17.2.7 If the Contractor disregards any local, state or federal laws or regulations.

17.2.8 If the Contactor otherwise violates any provisions of this Agreement.

17.3 If Contractor, within a period of ten (10) calendar days after such notice, shall not proceed in accordance therewith, the City may exclude the Contractor from the Work site and take the prosecution of the Work out of the hands of the Contractor, and take possession of the Work and all of the Contractor's tools, appliances, construction equipment and machinery at the site and use them without liability to the City for trespass or conversion, incorporate in the Work all materials and equipment stored at the site or for which the City has paid the Contractor but which are stored elsewhere, and finish the Work as the City may deem expedient. In this instance, the Contractor shall not be entitled to receive any further compensation until the Work is finished.

17.3.1 If after notice of termination of Contractor's right to proceed, it is determined for any reason that Contractor was not in default, the rights and obligations of City and Contractor shall be the same as if the notice of termination had been issued pursuant to the Termination for Convenience clause as set forth in Section 17.5 below.

17.3.2 Upon receipt of Notice of Termination pursuant to Sections 17.2 or 17.5, Contractor shall promptly discontinue all affected work unless the Notice of Termination directs otherwise and deliver or otherwise make available to City all data, drawings, specifications, reports, estimates, summaries and such other information as may have been required by the Contract Documents whether completed or in process.

17.4 If the Contractor commits a default due to its insolvency or bankruptcy, the following shall apply:

17.4.1 Should this Agreement be entered into and fully executed by the parties, funds released and the Contractor (Debtor) files for bankruptcy, the following shall occur:

17.4.1.1 In the event the Contactor files a voluntary petition under 11 U.S.C. 301 or 302, or an order for relief is entered under 11 U.S.C. 303, the Contractor shall acknowledge the extent, validity, and priority of the lien recorded in favor of the City. The Contractor further agrees that in the event of this default, the City shall, at its option, be entitled to seek relief from the automatic stay pursuant to 11 U.S.C. 362. The City shall be entitled to relief from the automatic stay pursuant to 11 U.S.C. 362(d) (1) or (d) (2), and the Contactor agrees to waive the notice provisions in effect pursuant to 11 U.S.C. 362 and any applicable Local Rules of the United States Bankruptcy Court. The Contactor acknowledges that such waiver is done knowingly and voluntarily.

17.4.1.2 Alternatively, in the event the City does not seek stay relief, or if stay relief is denied, the City shall be entitled to monthly adequate protection payments within the meaning of 11 U.S.C. 361. The monthly adequate protection payments shall each be in an amount determined in accordance with the Note and Mortgage executed by the Contractor in favor of the City.

17.4.1.3 In the event the Contractor files for bankruptcy under Chapter 13 of Title 11, United States Code in additional to the foregoing provisions, the Contractor agrees to cure any amounts in arrears over a period not to exceed twenty-four (24) months from the date of the confirmation order, and such payments shall be made in addition to the regular monthly payments required by the Note and mortgage. Additionally, the Contractor shall agree that the City is over secured and, therefore, entitled to interest and attorney's fees pursuant to 11 U.S.C. 506(b). Such fees shall be allowed and payable as an administrative expense. Further, in the event the Contractor has less than five (5) years of payments remaining on the Note, the Contractor agrees that the treatment afforded to the claim of the City under any confirmed plan of reorganization shall provide that the remaining payments shall be satisfied in accordance with the Note, and that the remaining payments or claim shall not be extended or amortized over a longer period than the time remaining under the Note.

17.4.2 Should this Agreement be entered into and fully executed by the parties, and the funds have not been forwarded to Contractor, the following shall occur:

17.4.2.1 In the event the Contractor files a voluntary petition pursuant to 11 U.S.C. 301 or 302, or an order for relief is entered under 11 U.S.C. 303., the Contractor acknowledges that the commencement of a bankruptcy proceeding constitutes an event of default under the terms of this Agreement. Further, the Contractor acknowledges that this Agreement constitutes an executory contract within the meaning of 11 U.S.C. 365. The Contractor acknowledges that this Agreement is not capable of being assumed pursuant to 11 U.S.C. 365(c)(2), unless the

City expressly consents in writing to the assumption. In the event the City consents to the assumption, the Contractor agrees to file a motion to assume this Agreement within ten (10) days after receipt of written consent from the City, regardless of whether the bankruptcy proceeding is pending under Chapter 7, 11, or 13 of Title 11 of the United States Code. The Contractor further acknowledges that this Agreement is not capable of being assigned pursuant to 11 U.S.C. 365(b)(1).

17.5 Termination for Convenience: This Contract may be terminated for convenience in writing by City upon thirty (30) days written notice to Contractor (delivered by certified mail, return receipt requested) of intent to terminate and the date on which such termination becomes effective. In such case, Contractor shall be paid for all work executed and expenses incurred prior to termination in addition to termination settlement costs reasonably incurred by Contractor relating to commitments which had become firm prior to the termination. Payment shall include reasonable profit for work/services satisfactorily performed. No payment shall be made for profit for work/services which have not been performed.

17.6 Where the Contractor's service have been so terminated by the City, the termination shall not affect any rights of the City against the Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due the Contractor by the City will not release the Contractor from liability.

17.7 The Contractor has no right, authority or ability to terminate the Work except for the wrongful withholding of any payments due the Contractor from the City.

ARTICLE 18 – DISPUTE RESOLUTION

18.1 Resolution of Disputes: Questions, claims, difficulties and disputes of whatever nature which may arise relative to the technical interpretation of the Contract Documents and fulfillment of this Agreement as to the character, quality, amount and value of any work done and materials furnished, or proposed to be done or furnished under or, by reason of, the Contract Documents which cannot be resolved by mutual agreement of Contract Administrator and Contractor shall be submitted to the Consultant for resolution. When either party has determined that a disputed question, claim, difficulty or dispute is at an impasse, that party shall notify the other party in writing and submit the question, claim, difficulty or dispute to the Consultant for resolution. The parties may agree to a proposed resolution at any time without the involvement and determination of the Consultant.

18.1.1 Consultant shall notify Contract Administrator and Contractor in writing of Consultant's decision within twenty-one (21) calendar days from the date of the submission of the question, claim, difficulty or dispute, unless Consultant requires time to gather information or allow the parties to provide additional information.

18.1.2 In the event the determination of a dispute by the Consultant under this Article is unacceptable to any of the parties hereto, the party objecting to the determination must notify the other party and the City Manager, in writing within ten (10) days after receipt of the determination. The notice must state

the basis of the objection and the proposed resolution. Final resolution of such dispute shall be made by the City Manager. The City Manager's decision shall be final and binding on the parties.

18.1.3 All non-technical administrative disputes (such as billing and payment) shall be determined by Contract Administrator.

18.1.4 During the pendency of any dispute and after a determination thereof, Contractor, Consultant, and Contract Administrator shall act in good faith to mitigate any potential damages including utilization of construction schedule changes and alternate means of construction. During the pendency of any dispute arising under this Agreement, other than termination herein, Contractor shall carry on the Work and adhere to the progress schedule. The Work shall not be delayed or postponed pending resolution of any disputes or disagreements.

18.1.5 For any disputes which remain unsolved, within sixty (60) calendar days after Final Completion of the Work, the parties shall participate in mediation to address all unresolved disputes. A mediator shall be mutually agreed upon by the parties. Should any objection not be resolved in mediation, the parties retain all their legal rights and remedies under applicable law. If a party objecting to a determination, fails to comply in strict accordance with the requirements of this Article, said party specifically waives all of its rights provided hereunder, including its rights and remedies under applicable law.

ARTICLE 19 – NOTICES

19.1 All notices required by any of the Contract Documents shall be in writing and shall be deemed delivered upon mailing by certified mail, return receipt requested to the following:

To the City:

City Manager
City of Fort Lauderdale
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

with copy to the:

Project Manager and City Attorney
City of Fort Lauderdale
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

To the Contractor:

_____
_____
_____
_____

ARTICLE 20 – LIMITATION OF LIABILITY

20.1 The City desires to enter into this Agreement only if in so doing the City can place a limit on the City's liability for any cause of action arising out of this Agreement, so that the City's liability for any breach never exceeds the sum of $1,000. For other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Contractor expresses its willingness to enter into this Agreement with the knowledge that the Contractor's recovery from the City to any action or claim arising from the Agreement is limited to a maximum amount of $1,000, which amount shall be reduced by the amount actually paid by the City to the Contractor pursuant to this Agreement, for any action or claim arising out of this Agreement. Nothing contained in this paragraph or elsewhere in this Agreement is in any way intended either to be a waiver of the limitation placed upon the City's liability as set forth in Section 768.28, Florida Statutes, or to extend the City's liability beyond the limits established in said Section 768.28; and no claim or award against the City shall include attorney's fees, investigative costs, expert fees, suit costs or pre-judgment interest.

20.2 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any reason, allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

ARTICLE 21 – GOVERNING LAW

21.1 This Agreement shall be governed by the laws of the State of Florida. Both Parties agree that the courts of the State of Florida shall have jurisdiction of any claim arising in connection with this Agreement. Venue for any claim, objection or dispute arising out of this Agreement shall be in Broward County, Florida. **By entering into this Contract, Contractor and City hereby expressly waive any rights either party may have to a trial by jury or any civil litigation related to, or arising out of the Project. Contractor shall specifically bind all subcontractors to the provisions of this Contract.**

ARTICLE 22 – MISCELLANEOUS

22.1 The duties and obligations imposed by this Agreement and the rights and remedies available to the parties and, in particular but without limitation, the warranties, guaranties and obligations imposed upon the Contractor and all of the rights and remedies available to the City, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are

otherwise imposed or available by laws or regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents, and the provisions of this Paragraph will survive final payment and termination or completion of this Agreement.

22.2 The Contractor shall not assign or transfer this Agreement or its rights, title or interests. The obligations undertaken by the Contractor pursuant to this Agreement shall not be delegated or assigned to any other person or firm. Violation of the terms of this Paragraph shall constitute a material breach of Agreement by the Contractor and the City any, at its discretion, cancel this Agreement and all rights, title and interest of the Contractor which shall immediately cease and terminate.

22.3 The Contractor and its employees, volunteers and agents shall be and remain an independent contractors and not agents or employees of the City with respect to all of the acts and services performed by and under the terms of this Agreement. This Agreement shall not in any way be constructed to create a partnership, association or any other kind of joint undertaking or venture between the Parties.

22.4 The City reserves the right to audit the records of the Contractor relating in any way to the Work to be performed pursuant to this Agreement at any time during the performance and term of this Agreement and for a period of three (3) years after completion and acceptance by the City. If required by the City, the Contractor agrees to submit to an audit by an independent certified public accountant selected by the City. The Contractor shall allow the City to inspect, examine and review the records of the Contractor at any and all times during normal business hours during the term of this Agreement.

22.5 The remedies expressly provided in this Agreement to the City shall not be deemed to be exclusive but shall be cumulative and in addition to all other remedies in favor of the City now or later existing at law or in equity.

22.6 Should any part, term or provisions of this Agreement be decided by the courts to be invalid, illegal or in conflict with any state or federal law, the validity of the remaining portion or provision shall not be affected.

22.7 <u>Scrutinized Companies</u>: Subject to *Odebrecht Construction, Inc., v. Prasad*, 876 F.Supp.2d 1305 (S.D. Fla. 2012), *affirmed*, *Odebrecht Construction, Inc., v. Secretary, Florida Department of Transportation*, 715 F.3d 1268 (11th Cir. 2013), with regard to the "Cuba Amendment," the Contractor certifies that it is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section 215.4725, Florida Statutes (2016), that it is not engaged in a boycott of Israel, and that it does not have business operations in Cuba or Syria, as provided in section 287.135, Florida Statutes (2016), as may be amended or revised. The City may terminate this Agreement at the City's option if the Contractor is found to have submitted a false certification as provided under subsection (5) of section 287.135, Florida Statutes (2016), as may be amended or revised, or been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section

215.4725, Florida Statutes (2016), or is engaged in a boycott of Israel or has been engaged in business operations in Cuba or Syria, as defined in Section 287.135, Florida Statutes (2016), as may be amended or revised.

22.8 Public Entity Crimes: In accordance with the Public Crimes Act, Section 287.133, Florida Statutes, a person or affiliate who is a contractor, consultant or other provider, who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to the City, may not submit a bid on a contract with the City for the construction or repair of a public building or public work, may not submit bids on leases of real property to the City, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with the City, and may not transact any business with the City in excess of the threshold amount provided in Section 287.017, Florida Statutes, for category two purchases for a period of thirty-six (36) months from the date of being placed on the convicted vendor list. Violation of this section by Contractor shall result in cancellation of the City purchase and may result in Contractor debarment.

22.9 Attorney Fees: If CITY or CONSULTANT incurs any expense in enforcing the terms of this Agreement through litigation, the prevailing party in that litigation shall be reimbursed for all such costs and expenses, including but not limited to court costs, and reasonable attorney fees incurred during litigation.

22.10 Public Records

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT PRRCONTRACT@FORTLAUDERDALE.GOV, 954-828-5002, CITY CLERK'S OFFICE, 100 N. ANDREWS AVENUE, FORT LAUDERDALE, FLORIDA 33301.

Contractor shall:

1. Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service.

2. Upon request from the City's custodian of public records, provide the City with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes (2016), as may be amended or revised, or as otherwise provided by law.

3. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of this contract if the Contractor does not transfer the records to the City.

4. Upon completion of the Contract, transfer, at no cost, to the City all public records in possession of the Contractor or keep and maintain public records required by the

City to perform the service. If the Contractor transfers all public records to the City upon completion of this Contract, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the Contractor keeps and maintains public records upon completion of this Contract, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the City, upon request from the City's custodian of public records, in a format that is compatible with the information technology systems of the City.

A-13 Sewer Redirection
(Contractor)
Project 12133

CITY

IN WITNESS OF THE FOREGOING, the parties have set their hands and seals the day and year first above written.

CITY OF FORT LAUDERDALE, a municipal corporation of the State of Florida

By: _____
LEE R. FELDMAN, City Manager

(CORPORATE SEAL)

ATTEST:

By: _____
JEFFREY A. MODARELLI
City Clerk

Approved as to Legal Form:

By:_____
RHONDA MONTOYA HASAN
Assistant City Attorney

CONTRACTOR

WITNESSES:

CONTRACTOR.,
a Florida corporation.

_____ By_____

_____ _____ _____
Print Name PRINT NAME Title

_____ ATTEST:

_____ BY: _____
Print Name

_____ _____
PRINT NAME Secretary

(CORPORATE SEAL)

STATE OF FLORIDA:
COUNTY OF BROWARD:

The foregoing instrument was acknowledged before me this _____ day of _____, 2017, by _____ (Name), as _____ (Title) of _____ (CONTRACTOR), a Florida corporation, on behalf of the Corporation.

SEAL

_____
Notary Public, State of Florida

_____
Name of Notary Typed, Printed or Stamped

☐ Personally Known or ☐ Produced Identification:

Type of Identification Produced: _____

GENERAL CONDITIONS

Unless otherwise modified in the projects special conditions, the following General Conditions shall be part of the Contract:

GC - 01 - DEFINITIONS - The following words and expressions, or pronouns used in their stead, shall wherever they appear in the Contract and the Contract Documents, be construed as follows:

"Addendum" or "Addenda" - shall mean the additional Contract provisions issued in writing, by the Engineer, prior to the receipt of bids.

"Bid" – shall mean the offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

"Bidder" – shall mean any person, firm, company, corporation or entity submitting a Bid for the Work.

"Bonds" –shall mean Bid, performance and payment bonds and other instruments of security, furnished by Contractor and his surety in accordance with the Contract Documents.

“City” – shall mean the City of Fort Lauderdale, Florida, a Florida municipal corporation. In the event the City exercises its regulatory authority as a government body, the exercise of such regulatory authority and the enforcement of any rules, regulations, codes, laws and ordinances shall be deemed to have occurred pursuant to City’s authority as a governmental body and shall not be attributable in any manner to the City as a party to this Contract. For the purpose of this Contract, “City” without modification shall mean the City Commission, and/or City Manager or his/her designee(s) as applicable.

“Construction Manager” - shall mean the Public Works Director or his/her designee.

“Construction Project Manager” - shall mean the Public Works Director or his/her designee.

"Consultant" – shall mean a person, firm, company, corporation or other entity employed by the City to perform the professional services for the project.

“Contract Work” - shall mean everything expressed or implied to be required to be furnished and furnished by the Contractor by any one or more of the parts of the Contract Documents referred to in the Contract hereof except Extra Work as hereinafter defined, it being understood that, in case of any inconsistency in or between any part or parts of this Contract, the Public Works Director shall determine which shall prevail.

“Design Documents” – shall mean the construction plans and specifications included as part of a Bid/Proposal Solicitation prepared either by the City or by the Consultant under a separate Agreement with the City.

“Engineer” - shall mean the Public Works Director or his/her designee.

"Extra Work" - shall mean work other than that required by the Contract.

"Inspector" – shall mean an authorized representative of the City assigned to make necessary inspections of materials furnished by Contractor and of the Work performed by Contractor.

"Notice" - shall mean written notice sent by certified United States Mail, return receipt requested, or sent by commercial express carrier with acknowledgement of delivery, or via fax or email, or by hand delivery with a request for a written receipt of acknowledgment of delivery and shall be served upon the Contractor either personally or to its place of business listed in the Bid.

“Owner” - shall mean the City of Fort Lauderdale.

“Project Manager” - shall mean the Public Works Director or his/her designee.

"Public Works Director" –shall mean the Public Works Director of the City of Fort Lauderdale, Florida or his/her designee(s).

"Site" - shall mean the area upon or in which the Contractor's operations are carried out and such other areas adjacent thereto as may be designated as such by the Public Works Director.

"Subcontractor" - shall mean any person, firm, company, corporation or other entity, other than employees of the Contractor, who or which contracts with the contractor, to furnish, or actually furnishes labor and materials, or labor and equipment, or labor, materials and equipment at the site.

"Surety" - shall mean any corporation or entity that executes, as Surety, the Contractor's performance and payment bond securing the performance of this Contract.

GC - 02 - SITE INVESTIGATION AND REPRESENTATION - The Contractor acknowledges that it has satisfied itself as to the nature and location of the Work under the Contract Documents, the general and local conditions of the Site, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, and roads, the conformation and conditions at the ground based on City provided reports, the type of equipment and facilities needed preliminary to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under the Contract Documents.

The Contractor acknowledges that it has conducted extensive tests, examinations and investigations and represents and warrants a thorough familiarization with the nature and extent of the Contract Documents, the Work, locality, soil conditions, moisture conditions and all year-round local weather and climate conditions (past and present), and, in reliance on such tests, examination and investigations conducted by Contractor and the Contractor’s experts, has determined that no conditions exist that would in any manner affect the Bid Price and that the project can be completed for the Bid Price submitted.

The Contractor, on its own, has made or caused to be made examinations, investigations, tests and studies of reports and related data in addition to those referred above, as Contractor deemed necessary to perform the Work at the Bid price set by the Contractor, within the contract time and in accordance with the other terms and conditions of the Contract Documents and the Bid made by the Contractor; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by Contractor to assure that the Work can be done at the Bid price set by the Contractor.

The Contractor further acknowledges that it has satisfied itself based on any geotechnical reports the City may provide and inspection of the project Site as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site and from evaluating information derived from exploratory work that may have been done by the City or included in the

Contract Documents and finds and has further determined that no conditions exist that would in any manner affect the Bid price and that the project can be completed for the Bid price submitted..

Any failure by the Contractor to acquaint itself with all the provided information and information obtained by visiting the project Site will not relieve Contractor from responsibility for properly estimating the difficulty or cost thereof under the Contract Documents. In the event that the actual subsurface conditions vary from the actual City provided reports, the Contractor shall notify the City and the Contract amount may be adjusted depending on the conditions, at the approval of the City.

GC - 03 - SUBSTITUTIONS - If the Contractor desires to use materials and/or products of manufacturer's names different from those specified in the Contract Documents, the Bidder requesting the substitution shall make written application as described herein. The burden of proving the equality of the proposed substitution rests on the Bidder making the request. To be acceptable, the proposed substitution shall meet or exceed all expressed requirements of the Contract Documents and shall be submitted upon the Contractor's letterhead, in addition to the "Contractor's Request for Substitution" form provided by the Public Works Director. The following requirements shall be met in order for the substitution to be considered:

1. Requests for substitution shall reach the Public Works Director no less than ten (10) Working Days prior to the date set for opening of Bids; and

2. Requests for substitution shall be accompanied by such technical data, as the party making the request desires to submit. The Public Works Director will consider reports from reputable independent testing laboratories, verified experience records from previous users and other written information valid in the circumstances; and

3. Requests for substitution shall completely and clearly indicate in what respects the materials and/or products differ from those indicated in the Contract Documents; and

4. Requests for substitution shall be accompanied by the manufacturer's printed recommendations clearly describing the installation, use and care, as applicable, of the proposed substitutions; and

5. Requests for substitution shall be accompanied by a complete schedule of changes in the Contract Documents, if any, which must be made to permit the use of the proposed substitution; and

If a proposed substitution is approved by the Public Works Director, an Addendum will be issued to prospective bidders not less than three (3) working days prior to the date set for opening of Bids. Unless substitutions are received and approved as described above, the successful Bidder shall be responsible for furnishing materials and products in strict accordance with the Contract Documents.

GC - 04 - CONTROL OF THE WORK - The Public Works Director shall have full control and direction of the Work in all respects. The Public Works Director and/or his authorized designee(s) shall, at all times, have the right to inspect the Work and materials. The Contractor shall furnish all reasonable facilities for obtaining such information, as the Public Works Director may desire respecting the quality of the Work and materials and the manner of conducting the Work. Should the Contractor be directed or permitted to perform night Work, or to vary the period which work is ordinarily carried on in the daytime, he shall give ample notice to the Public Works Director so that proper and adequate inspection may be provided. Such Work shall be done only under such regulations as are furnished in writing by the Public Works Director, and no extra compensation shall be allowed to the Contractor therefore. In the event of night work, the Contractor shall furnish

such light, satisfactory to the Public Works Director, as will insure proper inspection. Nothing herein contained shall relieve the Contractor from compliance with any and all City ordinances relating to noise or Work during prohibited hours.

The Contractor shall keep the Public Works Director informed, a reasonable time in advance, as to his need for grades and lines in order that the same may be furnished and all necessary measurements made for records and for payment with the minimum of inconvenience to the Public Works Director or of delay to the Contractor. The Contractor shall submit to the Public Works Director or Inspector on the job a written request outlining the streets, etc., for which the Contractor desires lines and grades. It is the intention not to delay the Work for the giving of lines and grades, but when necessary, work operations shall be suspended for such reasonable time as the Public Works Director may require for this purpose. However, such cost increases shall be authorized either by the City Manager and/or designee, or the City Commission based upon the purchasing threshold amounts provided for in Chapter 2 of the City of Fort Lauderdale's Code of Ordinances.

GC - 05 - SUBCONTRACTOR - The Contractor shall not sublet, in whole or any part of the Work without the written consent and approval of the Public Works Director. Within ten (10) days after official notification of starting date, the Contractor must submit in writing, to the Public Works Director, a list of all Subcontractors. No Work shall be done by any Subcontractor until such Subcontractor has been officially approved by the Public Works Director. A subcontractor not appearing on the original list will not be approved without written request submitted to the Public Works Director and approved by the Public Works Director. In all cases, the Contractor shall give his personal attention to the Work of the Subcontractors and the Subcontractor is liable to be discharged by the Contractor, at the direction of the Public Works Director, for neglect of duty, incompetence or misconduct.

Acceptance of any Subcontractor, other person, or organization by the Public Works Director shall not constitute a waiver of any right of Public Works Director to reject defective Work or Work not in conformance with the Contract Documents.

Contractor shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between City and any Subcontractor or other person or organization having a direct contract with Contractor, nor shall it create any obligation on the part of City to pay or to see to the payment of any moneys due to any Subcontractor or other person, or organization, except as may otherwise be required by law.

GC – 06 - **QUANTITIES** - It is mutually agreed that the proposal shows the approximate amounts only along with the Plans and the general location. It is also mutually agreed that no change will be made involving any departure from the general scheme of the Work and that no such change involving a material change in cost, either to the City or Contractor, shall be made, except upon written permission of the City. However, the Public Works Director shall have the right to make minor alternations in the line, grade, plan, form or materials of the Work herein contemplated any time before the completion of the same. That if such alterations shall diminish the quantity of the Work to be done, such alterations shall not constitute a claim for damages or anticipated profits. That if such alterations increase the amount of the Work to be done, such increase shall be paid for according to the quantity actually performed and at the unit price or prices stipulated therefore in the Contract.

The City shall, in all cases of dispute, determine the amount or quantity of the several kinds of Work which are to be paid for under this Contract, and shall decide all questions relative to the execution of the same, and such estimates and decisions shall be final and binding.

Any Work not herein specified, which might be fairly implied as included in the Contract, of which the City shall judge, shall be done by the Contractor without extra charge. However, such cost increases shall be authorized either by the City Manager and/or designee, or the City Commission based upon the purchasing threshold amounts provided for in Chapter 2 of the City of Fort Lauderdale's Code of Ordinances.

GC–07 - NO ORAL CHANGES - Except to the extent expressly set forth in the Contract, no change in or modification, termination or discharge of the Contract in any form whatsoever, shall be valid or enforceable unless it is in writing and signed by the parties charged, therewith or their duly authorized representative.

GC - 08 - PERMITS AND PROTECTION OF PUBLIC – Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Contract. A copy of all permits shall be given to the City and become part of the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

The Contractor shall be required to observe all the ordinances in relation to obtaining permits for occupying, excavating, or in any way obstructing the streets and alleys. He shall erect and maintain barricades and sufficient safeguards around all excavations, embankments or obstructions; he shall place sufficient warning lights at or near the Work; keep the same burning from sunset to sunrise, employ watchmen, and strictly obey all laws and ordinances controlling or limiting those engaged in similar work.

Where there are telephones, light or power poles, water mains, conduits, pipes or drains or other construction, either public or private, in or on the streets or alleys, the Work shall be so conducted that no interruption or delay will be caused in the operation or use of the same. Proper written notice shall be given, and all the facilities, afforded the owners of such construction encountered or likely to be encountered, as will enable them to preserve the same from injury.

The Contractor shall not be permitted to interfere with public travel and convenience by grading or tearing up streets indiscriminately, but the Work of constructing the various items in this contract shall proceed in an orderly, systematic and progressive manner.

Contractor shall not load nor permit any part of any structure to be loaded with weights that will endanger the structure, nor shall he subject any part of the Work to stresses or pressures that will endanger it.

Where lifting operations involving the use of specialized cranes are required as part of construction, Contractor must make undertake the following investigation and submit the results and documentation to the Engineer prior to commencing any lifting operations: marking a very specific area in the field for the placement of the crane; a drawing showing the limitations of the job operation (i.e. not over adjacent properties or pedestrian and high vehicular traffic areas);underground utility exploration in the vicinity of the crane location, which may include ground penetrating radar to identify voids or old pipe or other subsurface features that could lead to sudden failure; assessment of the underlying soil and roadway materials and a worst case analysis based on entire load being distributed on just one or two outriggers; provision of properly sized pads under the outriggers; loading charts from manufacturer showing allowable configurations/loads; and inspection to make sure crane operation is in accordance with the permit conditions.

GC - 09 - DISEASE REGULATIONS - The Contractor shall enforce all sanitary regulations and take all precautions against infectious diseases as the Public Works Director may deem necessary. Should any infectious or contagious diseases occur among his employees, he shall arrange for the immediate removal of the employee from the Site and isolation of all persons connected with the Work.

GC - 10 - CONTRACTOR TO CHECK PLANS, SPECIFICATIONS, AND DATA - The Contractor shall verify all dimensions, quantities, and details shown on the plans, supplementary drawings, schedules, or other data received from the Public Works Director, and shall notify the Public Works Director of all errors, omissions, conflicts and discrepancies found therein within three (3) working days of discovery. Failure to discover or correct errors, conflictions, or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory Work, faulty construction, or improper operation resulting there from nor from rectifying such condition at his own expense.

GC - 11 - SUPPLEMENTARY DRAWINGS - When, in the opinion of the Public Works Director, it becomes necessary to explain more fully the Work to be done, or to illustrate the work further, or to show any changes which may be required, drawings, known as supplementary drawings, with specifications pertaining thereto, will be prepared by the Public Works Director and copies will be given to the Contractor.

The supplementary drawings shall be binding upon the Contractor with the same force as the original Plans. Where such supplementary drawings require either less or more than the estimated quantities of work, credit to the City or compensations therefore to the Contractor shall be subject to the terms of the Contract.

GC - 12 - MATERIALS AND WORKMANSHIP - All material and workmanship shall, in every respect, be in conformity with approved modern practice and with prevailing standards of performance and quality. In the event of dispute the Public Works Director's decision shall be final. Wherever the Plans, specifications, Contract Documents, or the directions of the Public Works Director are unclear as to what is permissible and/or fail to note the quality of any Work, that interpretation will be made by the Public Works Director, which is in accordance with approved modern practice, to meet the particular requirements of the Contract.

In all cases, new materials shall be used, unless this provision is waived by notice from the City in writing.

GC - 13 - SAFEGUARDING MARKS - The Contractor shall safeguard all points, stakes, grade marks, monuments, and bench marks made or established on the Work, bear the cost of re-establishing same if disturbed, or bear the entire expense of rectifying Work improperly installed due to not maintaining or protecting or for removing without authorization, such established points, stakes and marks. The Contractor shall safeguard all existing and known property corners, monuments and marks not related to the Work and, if required, shall bear the cost of having them re-established by a licensed surveyor if disturbed or destroyed during the course of construction.

GC - 14 - EXISTING UTILITY SERVICE - All existing utility service shall be maintained with a minimum of interruption at the expense of the Contractor.

GC - 15 - JOB DESCRIPTION SIGNS – Contractor, at Contractor's expense, shall furnish, erect, and maintain suitable weatherproof signs on jobs over $100,000 containing the following information:

1. City Seal (in colors)

2. Project or Improvement Number
3. Job Description
4. Estimated Cost
5. Completion Date

Minimum size of sign shall be four feet high, eight feet wide and shall be suitably anchored. The entire sign shall be painted and present a pleasing appearance. Exact location of signs will be determined in the field. Two (2) signs will be required, one at each end of the job. All costs of this work shall be included in other parts of the work.

GC - 16 - FLORIDA EAST COAST RIGHT-OF-WAY - Whenever a City contractor is constructing within the Florida East Coast Railway Company's Right-of-Way, it will be mandatory that the contractor carry separate bodily injury and property damage insurance in the amounts as stated below. This insurance shall be taken out and maintained during the life of the Contract.

Bodily injury insurance in an amount not less than $500,000.00 for injuries, including wrongful death to any one person, and subject to the same limit for each person, in an amount not less than $1,000,000.00 on account of any one occurrence, and

Property damage insurance in an amount not less than $500,000.00 for damages on account of any one occurrence and in an amount not less than $1,000,000.00 for damages on account of all occurrences.

GC - 17 - ACCIDENTS - The Contractor shall provide such equipment and facilities as are necessary and/or required, in the case of accidents, for first aide services to be provided to a person who may be injured during the project duration. The Contractor shall also comply with the OSHA requirements as defined in the United States Labor Code 29 CFR 1926.50.

In addition, the Contractor must report immediately to the Public Works Director every accident to persons or damage to property, and shall furnish in writing full information, including testimony of witnesses regarding any and all accidents.

GC - 18 - SAFETY PRECAUTIONS - Contractor must adhere to the applicable environmental protection guidelines for the duration of a project. If hazardous waste materials are used, detected or generated at any time, the Project Manager must be immediately notified of each and every occurrence. The Contractor shall comply with all codes, ordinances, rules, orders and other legal requirements of public authorities (including OSHA, EPA, DERM, the City, Broward County, State of Florida, and Florida Building Code), which bear on the performance of the Work.

The Contractor shall take the responsibility to ensure that all Work is performed using adequate safeguards, including but not limited to: proper safe rigging, safety nets, fencing, scaffolding, barricades, chain link fencing, railings, barricades, steel plates, safety lights, and ladders that are necessary for the protection of its employees, as well as the public and City employees. All riggings and scaffolding shall be constructed with good sound materials, of adequate dimensions for their intended use, and substantially braced, tied or secured to ensure absolute safety for those required to use it, as well as those in the vicinity. All riggings, scaffolding, platforms, equipment guards, trenching, shoring, ladders and similar actions or equipment shall be OSHA approved, as applicable, and in accordance with all Federal, State and local regulations.

GC - 19 - DUST PREVENTION - The Contractor shall, by means of a water spray, or temporary asphalt pavement, take all necessary precautions to prevent or abate a dust nuisance arising from dry weather or Work in an incomplete stage. All costs of this Work shall be included in cost of other parts of the Work.

Should the Contractor fail to abate a dust nuisance by the above methods, and then he will be required to immediately construct temporary patches per City standards.

GC - 20 - PLACING BARRICADES AND WARNING LIGHTS - The Contractor shall furnish and place, at his own expense, all barricades, warning lights, automatic blinker lights and such devices necessary to properly protect the work and vehicular and pedestrian traffic. Should the Contractor fail to erect or maintain such barricades, warning lights, etc., the Public Works Director may, after 24 hours' notice to the Contractor, proceed to have such barricades and warning lights placed and maintained by City or other forces and all costs incurred thereof charged to the Contractor and may be retained by the City from any monies due, or to become due, to the Contractor.

GC - 21 - TRAFFIC CONTROL - The Contractor shall coordinate all Work and obtain, through the Engineering Department, any permits required to detour traffic or close any street before starting to work in the road. The following section: Part VI Traffic Controls for Street and Highway Construction and Maintenance Operations, MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, U.S. Department of Transportation Federal Highway Administration, 2009, or current edition, shall be used as a guide for requirement and placement of traffic control devices, signs and barricades. The Public Works Director shall determine requirements for the above. The above publication is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. In the event that a Maintenance of Traffic (MOT) Plan is required, the Plan shall be prepared by an A.A.S.T.A. certified technician.

All traffic control devices, flashing lights, signs and barricades shall be maintained in working condition at all times.

GC - 22 - COORDINATION - The Contractor shall notify all utilities, transportation department, etc., in writing, with a copy to the Public Works Director before construction is started and shall coordinate his Work with them. The Contractor shall cooperate with the owners of any underground or overhead utility lines in their removal, construction and rearrangement operations in order that services rendered by these parties will not be unnecessarily interrupted.

The Contractor shall arrange his Work and dispose of his materials so as to not interfere with the operation of other Contractors engaged upon adjacent work and to join his Work to that of others in a proper manner and to perform his Work in the proper sequence in relation to that of other Contractors all as may be directed by the Public Works Director.

Each Contractor shall be responsible for any damage done by him or his agents to the work performed by another Contractor.

The Contractor shall contact the Broward County Transportation Department and the Florida Department of Transportation, as applicable, to verify and obtain location of any and all traffic conduits, loops, and street light underground services.

GC - 23 - WATER - Bulk water used for construction, flushing pipelines, and testing shall be obtained from fire hydrants. Contractor shall make payment for hydrant meter at Treasury Billing Office, 1st Floor, City Hall, 100 N. Andrews Avenue. With the paid receipt, contractor can pick up hydrant meter at the utility location office. No connection shall be made to a fire hydrant without a meter connected.

GC - 24 - PROHIBITION AGAINST CONTRACTING WITH SCRUTINIZED COMPANIES - Subject to *Odebrecht Construction, Inc., v. Prasad*, 876 F.Supp.2d 1305 (S.D. Fla. 2012), *affirmed*, *Odebrecht Construction, Inc., v. Secretary, Florida Department of Transportation*, 715 F.3d 1268 (11th Cir. 2013), with regard to the "Cuba Amendment," the Contractor certifies that it is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section 215.4725, Florida Statutes (2016), that it is not engaged in a boycott of Israel, and that it does not have business operations in Cuba or Syria, as provided in section 287.135, Florida Statutes (2016), as may be amended or revised. The City may terminate this Agreement at the City's option if the Contractor is found to have submitted a false certification as provided under subsection (5) of section 287.135, Florida Statutes (2016), as may be amended or revised, or been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section 215.4725, Florida Statutes (2016), or is engaged in a boycott of Israel or has been engaged in business operations in Cuba or Syria, as defined in Section 287.135, Florida Statutes (2016), as may be amended or revised.

GC - 25 - LOCATION OF UNDERGROUND FACILITIES - If the Proposer, for the purpose of responding to this solicitation, requests the location of underground facilities through the Sunshine State One-Call of Florida, Inc. notification system or through any person or entity providing a facility locating service, and underground facilities are marked with paint, stakes or other markings within the City pursuant to such a request, then the Proposer shall be deemed non-responsive to this solicitation in accordance with Section 2-184(5) of the City of Fort Lauderdale Code of Ordinances.

GC - 26 – USE OF FLORIDA LUMBER TIMBER AND OTHER FOREST PRODUCTS - In accordance with Florida Statute 255.20 (3), The City specifies that lumber, timber, and other forest products used for this project shall be produced and manufactured in the state of Florida if such products are available and their price, fitness, and quality are equal. This requirement does not apply to plywood specified for monolithic concrete forms, if the structural or service requirements for timber for a particular job cannot be supplied by native species, or if the construction is financed in whole or in part from federal funds with the requirement that there be no restrictions as to species or place of manufacture.

The Bidder affirms by submitting a bid response to this solicitation that they will comply with section 255.20 (3) Florida Statutes.

GC – 27 – PUBLIC RECORDS/TRADE SECRETS/COPYRIGHT: The Proposer's response to the Solicitation is a public record pursuant to Florida law, which is subject to disclosure by the City under the State of Florida Public Records Law, Florida Statutes Chapter 119.07 ("Public Records Law"). The City shall permit public access to all documents, papers, letters or other material submitted in connection with this Solicitation and the Contract to be executed for this Solicitation, subject to the provisions of Chapter 119.07 of the Florida Statutes.

Any language contained in the Proposer's response to the Solicitation purporting to require confidentiality of any portion of the Proposer's response to the Solicitation, except to the extent that certain information is in the City's opinion a Trade Secret pursuant to Florida law, shall be void. If a Proposer submits any documents or other information to the City which the Proposer

claims is Trade Secret information and exempt from Florida Statutes Chapter 119.07 ("Public Records Laws"), the Proposer shall clearly designate that it is a Trade Secret and that it is asserting that the document or information is exempt. The Proposer must specifically identify the exemption being claimed under Florida Statutes 119.07. The City shall be the final arbiter of whether any information contained in the Proposer's response to the Solicitation constitutes a Trade Secret. The City's determination of whether an exemption applies shall be final, and the proposer agrees to defend, indemnify, and hold harmless the City and the City's officers, employees, and agent, against any loss or damages incurred by any person or entity as a result of the City's treatment of records as public records. Proposals purporting to be subject to copyright protection in full or in part will be rejected.

EXCEPT FOR CLEARLY MARKED PORTIONS THAT ARE BONA FIDE TRADE SECRETS PURSUANT TO FLORIDA LAW, DO NOT MARK YOUR RESPONSE TO THE SOLICITATION AS PROPRIETARY OR CONFIDENTIAL. DO NOT MARK YOUR RESPONSE TO THE SOLICITATION OR ANY PART THEREOF AS COPYRIGHTED.

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT:

Telephone Number: **(954) 828-5002**

Mailing Address: **City Clerk's Office**
100 N. Andrews Avenue
Fort Lauderdale, FL 33301

E-mail: **prrcontract@fortlauderdale.gov**

Contractor shall:

1. Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service.

2. Upon request from the City's custodian of public records, provide the City with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes (2016), as may be amended or revised, or as otherwise provided by law.

3. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of this contract if the Contractor does not transfer the records to the City.

4. Upon completion of the Contract, transfer, at no cost, to the City all public records in possession of the Contractor or keep and maintain public records required by the City to perform the service. If the Contractor transfers all public records to the City upon completion of this Contract, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure

requirements. If the Contractor keeps and maintains public records upon completion of this Contract, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the City, upon request from the City's custodian of public records, in a format that is compatible with the information technology systems of the City.

CITY OF FORT LAUDERDALE CONTRACT AND SPECIFICATIONS PACKAGE

BID SET

PROJECT NO. 12133

A-13 NEW PUMP STATION, SEWER REDIRECTION-EAST OF FEDERAL HIGHWAY

BID DOCUMENTS

Issued on Behalf of: The Public Works Department
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

DIANA CARRILLO, P.E.
PROJECT MANAGER II

ALTHEA PEMSEL, MA, CPSM, C.P.M.
SENIOR PROCUREMENT SPECIALIST
Telephone: (954) 828-5140
E-mail:apemsel@fortlauderdale.gov

ROBERT MICHAEL CONNORS
LICENSE
No 41863
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Robert M. Connors, P.E.
Florida P.E. #41863
May 4, 2017

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SECTION 01001
GENERAL REQUIREMENTS

PART 1 - PROJECT DESCRIPTION

1.01 GENERAL

A. A brief description of the Work is stated in the INVITATION TO BID. To determine the full scope of the Project or any particular part of the Project, coordinate the applicable information in these Contract Documents and review the available project drawings.

B. The Work under this Contract shall be performed by the CONTRACTOR as required by the OWNER. Work will be authorized by a Notice to Proceed issued to the CONTRACTOR. The CONTRACTOR shall complete all work within the number of calendar days stipulated in the Contract unless an extension in the time of completion is granted by the ENGINEER. Upon satisfactory completion of the work and compliance with applicable provisions in the Contract Documents, the CONTRACTOR will receive final payment for all work done.

C. The following additional information, though not all-inclusive, is given to assist CONTRACTORs in their evaluation of the work required to meet the project objectives.

D. The CONTRACTOR shall become familiar with the existing operating conditions of the OWNER'S water system, sewage transmission system and pumping stations and take such into consideration in planning and scheduling work. No extra claims shall be made for work required to achieve conditions beyond those obtainable under normal operation of the existing transmission, collection and pumping facilities necessary to accomplish the Work.

1.02 DOT SPECIFICATIONS

A. Portions of The Florida Department of Transportation Standard Specifications for Road and Bridge Construction and their Roadway and Traffic Design Standards, hereinafter referred to as the DOT Standard Specifications, are referred to herein and amended, in part, and the same 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. Such reference shall mean the current edition, including all supplements. In case of a conflict in the requirements of the DOT Specifications and the requirements stated herein, the requirements herein shall prevail.

B. CONTRACTOR shall be required to submit Maintenance of Traffic Plans (MOT) for work in the County and State and City Roadways. CONTRACTOR shall coordinate with MOTs for nearby or highway work and obtain approval for all traffic control as required by the permits contained elsewhere in this Section.

PART 2 - SEQUENCE OF OPERATIONS

2.01 SCHEDULING

A. General: Prepare and submit schedule in accordance with the provisions of Section 01311, Construction Schedules.

B. Plan the Work and carry it out with minimum interference to the operation of the existing facilities. Prior to starting the work, confer with the ENGINEER to develop an approved work schedule which will permit the facilities to function normally as practical. It may be necessary to do certain parts of the construction work outside normal working hours in order to avoid undesirable conditions. The CONTRACTOR shall do this work at such times, and at no additional cost to the OWNER. Do not make connections between existing work and new work until necessary inspection and tests have been completed on the new work and it is found to conform in all respects to the requirements of the Contract Documents.

C. No work shall be started until the CONTRACTOR has received approved shop drawings, established material/delivery dates for all equipment, and received approval of the construction schedule from the ENGINEER. The CONTRACTOR shall have sufficient manpower, equipment, and material to complete the project.

D. No work shall commence without express consent of the ENGINEER.

E. If a privately owned staging area is required, no work shall commence until approval of the facility is obtained from City Planning and Zoning in accordance with Section 47-19.2 of the Unified Land Development Regulations. Submit a copy of the approval and agreement to the ENGINEER.

2.02 MOBILIZATION AND DEMOBILIZATION

A. CONTRACTOR shall be responsible for mobilization and demobilization of labor, materials and equipment. Payment for mobilization and demobilization shall be included in the lump sum price indicated in the Proposal for the Project.

2.03 COORDINATION

A. CONTRACTOR shall cooperate in the coordination of separate activities in a manner that will provide the least interference with the OWNER'S operations and other contractors and utility companies working in the area, and in the interfacing and connection of the separate elements of the overall project work.

B. If any difficulty or dispute should arise in the accomplishment of the above, the problem shall be brought immediately to the attention of the ENGINEER.

2.04 SHUTDOWN OF EXISTING OPERATIONS OR UTILITIES

A. Continuous operation of the OWNER'S service functions is of critical importance. The CONTRACTOR'S work shall not result in the interruption of sewage, water, or solid waste service to any customers.

B. Minimizing conflicts with the ongoing area-wide commercial activities is of critical importance. The CONTRACTOR'S work shall minimize the interruption of operations at any facility or business.

C. Connections to existing services or utilities, or other work that requires the temporary shutdown of any existing operations or utilities shall be planned in detail with appropriate scheduling of the work and coordinated with the ENGINEER. Two business days advanced notice shall be given in order that the ENGINEER may witness the shutdown, tie-in, and startup. The temporary shutdown must be approved by the OWNER. All tie-in and bypass operations shall be the responsibility of the CONTRACTOR and are considered incidental to the cost of construction and provided at no additional cost to the OWNER.

D. All materials and equipment (including emergency equipment) necessary to expedite the tie-in shall be on hand and in proper working order prior to the shutdown of existing services or utilities.

2.05 OPERATION OF EXISTING SYSTEM PROHIBITED

A. At no time undertake to close off any utility lines or open valves or take any other action which would affect the operation of existing systems. The OWNER'S forces will operate all valves. Provide at least one business day notice to OWNER prior to any operations.

2.06 BYPASS PUMPING

A. Wastewater flows shall be controlled through the manholes and pipeline sections where work is being performed. The CONTRACTOR shall be responsible to assess conditions and capacities of the existing sewer lines and pump stations and accommodate it in the project work plan in order to implement an acceptable bypass plan at no additional cost to the OWNER. Bypass pumping will be required for all sewer reconstruction that would result in shutdown of existing facilities. The CONTRACTOR shall supply the necessary pumps, conduits, and other equipment to not only divert flow around the manhole or pipe section in which work is to be performed, but also to transmit the flow in downstream sewer lines and/or pump stations without surcharge. The bypass systems shall be of sufficient capacity to handle existing flows plus additional flows that may occur during periods of high tide or rainfall. Emergency backup pumping capability must be available in addition to the primary bypass system. The CONTRACTOR will be responsible for furnishing the necessary labor, power, and supervision to set up and operate the pumping and bypass systems. When pumping is in operation, all engines shall be equipped in a manner to keep the pump noise to a minimum and comply with the City noise ordinances.

B. Bypass pumping operations shall comply with all applicable City ordinances.

C. The CONTRACTOR shall be responsible for any damage to properties or buildings connected to the sewer system, and to the pipeline, which result from the flow control activities.

D. The CONTRACTOR shall submit a bypass pumping plan for all proposed bypass pumping operations. Bypass pumping plan must be approved by CITY and ENGINEER prior to commencement.

PART 3 - SITE CONDITIONS

3.01 SITE INVESTIGATION AND REPRESENTATION

A. The CONTRACTOR acknowledges satisfaction as to the general nature and location

of the work, the general and local conditions, particularly those bearing upon availability of transportation, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

A1. Site has overhead electric and other utility lines. All work to be accomplished without removal/relocation of these lines.

B. Failure by the CONTRACTOR to become acquainted with the physical conditions and all the available information will not relieve the CONTRACTOR from responsibility for properly estimating the difficulty or cost of successfully performing the Work.

C. The CONTRACTOR warrants that as a result of examination and investigation of all the aforesaid data, the CONTRACTOR can perform the work in a good and workmanlike manner and to the satisfaction of the OWNER. The OWNER assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the OWNER.

3.02 INFORMATION ON SITE CONDITIONS

A. General: Information obtained by the ENGINEER regarding site conditions, subsurface information, groundwater elevations, existing construction of site facilities as applicable are contained in the project documents. The ENGINEER does not assume any responsibility for the completeness or interpretation of the information.

3.03 UTILITIES

A. The CONTRACTOR shall be responsible for determining and/or confirming, at his cost, the locations of all utilities within the project area, and shall be responsible for contacting each utility for location and notification prior to commencing work.

B. The CONTRACTOR shall contact potentially affected utilities as provided in Section 01040, Coordination.

C. The CONTRACTOR shall contact Sunshine 811 or visit http://www.sunshine811.com at least 2 business days (10 business days for water crossings) prior to any excavation and make arrangements for locating all utilities in the project area.

3.04 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

A. Where the CONTRACTOR'S operations could cause damage or inconvenience to utilities, telephone, television, power, water, or sewer systems, the operations shall be suspended until all arrangements necessary for the protection of these utilities and services have been made by the CONTRACTOR with the OWNER of the utility affected.

B. Notify all utility offices which are affected by the construction operation at least 2 business days in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground

utilities.

C. 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.

D. 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.

E. 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.

F. In the event the CONTRACTOR encounters water service lines or sewer laterals that interfere with trenching, he may, by obtaining prior approval of the property owner, the ENGINEER, cut the service, dig through, and restore the service with similar and equal materials at the CONTRACTOR'S expense.

G. The CONTRACTOR shall replace, at his own expense, all existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract documents or ordered by the ENGINEER.

H. Telephone and communications drops and signal systems may extend throughout the project area. Properly located cable, conduit, interface equipment, pull or junction boxes and other signal or systems equipment damaged by the CONTRACTOR shall be replaced at the CONTRACTOR'S expense.

1. Damaged cable shall be replaced as an entire run, from junction box to junction box.
2. Notify Broward County Engineering two business days in advance of the need to remove traffic detection loops.
3. CONTRACTOR shall verify marked cables and signal systems prior to excavation.

3.05 <u>INTERFERING STRUCTURES</u>

A. Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground.

B. Protect underground and aboveground existing structures from damage, whether or not they lie within the limits of the easements obtained by the OWNER. Where such existing fences, gates, sheds, buildings, or any other structure must be removed in order to properly carry out the construction, or are damaged during construction, restore to their original condition to the satisfaction of the property owner involved at the CONTRACTOR'S own expense. Notify the ENGINEER of any damaged underground structure, and make repairs or replacements before backfilling.

C. Without additional compensation, the CONTRACTOR may remove and shall replace in a condition as good as or better than original, such small miscellaneous structures as fences, mailboxes, and signposts that interfere with the CONTRACTOR'S operations.

3.06 EASEMENTS AND WORK ON PRIVATE PROPERTY

A. Where portions of the work are located on public or private property, easements and permits will be obtained by the OWNER, except as otherwise noted in these Specifications. Easements will provide for the use of property for construction purposes to the extent indicated on the easements. Copies of these easements and permits are available upon request to the OWNER. It shall be the CONTRACTOR'S responsibility to determine the adequacy of the easement obtained in every case and to abide by all requirements and provisions of the easement. The CONTRACTOR shall confine his construction operations to within the easement limits or street right-of-way limits or make special arrangements with the property owners or appropriate public agency for the additional area required. Any damage to property, either inside or outside the limits of the easements provided by the OWNER or street rights-of-way, shall be the responsibility of the CONTRACTOR as specified herein. The CONTRACTOR shall provide immediate notice to the OWNER of any damage to fencing and provide temporary fencing as required to provide a functionally similar level of security. The CONTRACTOR shall remove, protect, and replace all fences or other items encountered on public or private property. Before final payment will be authorized by the ENGINEER, the CONTRACTOR will be required to furnish the OWNER with written releases from property owners or public agencies where side agreements or special easements have been made by the CONTRACTOR or where the CONTRACTOR'S operations, for any reason, have not been kept within the construction right-of-way obtained by the OWNER or the street right-of-way.

B. The CONTRACTOR shall be responsible for all damage to private property where work related activities have occurred without proper easement or authorization. The CITY may withhold payment to the CONTRACTOR pending resolution of any claims by private owners.

C. It is anticipated that the required easements and permits will be obtained before construction is started. However, should the procurement of any easement or permit be delayed, the CONTRACTOR shall schedule and perform the work around these areas until such a time as the easement or permit has been secured.

D. Prior to removing an existing structure or item, provide written notice to the OWNER at least 14 days in advance of the anticipated removal.

E. The CONTRACTOR shall not engage in private construction activities within the project area without the presence of a contract with the private owner of the property containing a hold harmless clause protecting the CITY from any and all damages that occur during the performance of the privately authorized work.

PART 4 - SAFETY AND CONVENIENCE

4.01 SAFETY AND ACCESS

A. The CONTRACTOR shall do all work necessary to protect the general public from hazards, including, but not limited to, surface irregularities or unramped grade changes in pedestrian sidewalk or walkway, and trenches or excavations in roadway.

Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work. All barricades and signs shall be clean and serviceable, in the opinion of the ENGINEER.

B. During construction, the CONTRACTOR shall construct and at all times maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable, at all openings, obstructions, or other hazards in streets, sidewalks, floors, roofs, and walkways. All such barriers shall have adequate warning lights as necessary, or required, for safety. All lights shall be regularly maintained, and in a fully operational state at all times.

C. The CONTRACTOR shall notify all residences and businesses of planned construction at least 5 (five) business days prior to the start of work in the block where they are located. In this case, all residents and/or business of the area shall be notified. Such notices shall be brochures or door-hangers with sufficient information to describe the extent and duration of the planned work. Notification activities shall be coordinated with the ENGINEER.

D. Homeowners and business owners shall be provided reasonable access. The CONTRACTOR shall provide temporary sidewalks, bridges or driveway access, including safe passage over open excavations as required.

4.02 ACCIDENT REPORTS

A. In addition, the CONTRACTOR must promptly report in writing to the ENGINEER all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the ENGINEER.

B. If a claim is made by anyone against the CONTRACTOR or any subcontractor on account of any accident, the CONTRACTOR shall promptly report the facts in writing to the ENGINEER, giving full details of the claim.

4.03 SAFE ACCESS BY FEDERAL, STATE, AND LOCAL GOVERNMENT OFFICIALS, CITY WORKERS

A. Authorized representatives of the state, federal, or local governmental agencies, shall at all times have safe access to the work, and the CONTRACTOR shall provide proper facilities for such access and inspection.

4.04 PROTECTION OF PROPERTY

A. Protect stored materials located adjacent to the proposed work. Notify property owners affected by the construction at least two business days in advance of the time construction begins. During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his residence or place of business for a period exceeding 2 hours, unless the CONTRACTOR has made special arrangements with the affected persons.

B. The CONTRACTOR shall identify and isolate his active work zone in such a manner as to exclude all personnel not employed by him, the ENGINEER, and the OWNER.

4.05 FIRE PREVENTION AND PROTECTION

A. The CONTRACTOR shall perform all work in a fire-safe manner. He shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The CONTRACTOR shall comply with applicable federal, state, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

4.06 ACCESS FOR POLICE, FIRE, AND POSTAL SERVICE

A. Notify the fire department and police department before closing any street or portion thereof. No closing shall be made without the OWNER'S approval of MOT plan. Notify said departments when the streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without special written permission from the fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. MOT plans that result in restricted access for emergency vehicles must be submitted and approved 2 weeks prior to the proposed closing with separate and specific notification made to the ENGINEER to provide for appropriate agency coordination.

B. The CONTRACTOR shall leave a night emergency telephone number or numbers with the police department, the ENGINEER, and the OWNER, so that contact may be made easily at all times in case of barricade and flare trouble or other emergencies.

C. Maintain postal service facilities in accordance with the requirements of the U.S. Postal Service. Move mailboxes to temporary locations designated by the U.S. Postal Service, and at the completion of the work in each area, replace them in their original location and in a condition satisfactory to the U.S. Postal Service.

PART 5 - PRESERVATION, RESTORATION, AND CLEANUP

5.01 SITE RESTORATION AND CLEANUP

A. At all times during the work, keep the premises clean and orderly, and upon completion of the Work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.

B. Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, or fences, regardless of whether these are on private property, or on state, county, or CITY rights-of-way. Remove all excavated materials from grassed and planted areas, and leave these surfaces in a condition equivalent to their original condition. Replace excavated areas as specified in Section 02320, Trench Backfill, raked and graded to conform to their original contours.

5.02 FINISHING OF SITE, BORROW, AND STORAGE AREAS

A. Upon completion of the project, all areas used by the CONTRACTOR shall be properly cleared of all temporary structures, rubbish, and waste materials and properly graded to drain and blend in with the abutting property. Areas used for the deposit of waste materials shall be finished to properly drain and blend with the surrounding terrain. Grassed areas shall be restored as specified.

5.03 HISTORIC PRESERVATION

A. If the project work should uncover prehistoric or historic artifacts associated with Native American cultures, early colonial cultures, or American settlements, all project activities in the area shall cease immediately.

B. All such discoveries shall be reported to the Division of Historical Resources. Review and Compliance Section at (800) 847-7278.

C. Project activities in the affected area cannot resume without authorization from the Division of Historic Resources.

PART 6 - PERMITS

A. Permits To Be Obtained by the OWNER Include the Following:

1. BCEPGMD: Collection/transmission system and pump station construction.
2. FDOT: Utility Permit

B. OWNER has prepared the following application for the CONTRACTOR to submit and pull a permit:

1. City of Fort Lauderdale Building Permit.

C. Permits to be Obtained by the CONTRACTOR Include, but are not limited to the following:

1. Local and County Building permits.
2. Local, County, and State contracting licenses.
3. MOT approval from local, county, and state agencies as required.
4. Tree removal and trimming permits.
5. BCEPGMD/SFWMD/FDEP: Dewatering permit, including NPDES permit if required.
6. Asphalt driveway permit
7. BCEPGMD: Environmental permits.

D. The CONTRACTOR shall comply with all applicable permit conditions.

END OF SECTION

Project No. 12133

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Project No. 12133

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 SCOPE

A. City of Fort Lauderdale

1. CITY's Representative/Engineer: Diana Carrillo, P.E., Project Manager II
2. Project Description: This project consists of the construction of an 18" diameter gravity sanitary sewer main redirection with a triplex sewage pump station and 14" diameter force main. Craven Thompson & Associates is the Design Consultant for this project.
3. Project Location: The project is located within the east half right-of-way of Federal Highway from Broward Boulevard to S.E. 2nd Court and the right–of-way of S.E. 2nd Court from Federal Highway to S.E. 9th Avenue. The triplex pump station site is located on the southeast corner of S.E. 2nd Court and S.E. 8th Avenue, within the parking lot owned by the City of Fort Lauderdale.
4. DESCRIPTION OF WORK
   The following is a general list of the work included. It is not intended to be complete. Consult the contract drawings and specifications for all contract requirements.
   a.) The project consists of constructing an 18" diameter gravity sanitary sewer system from an existing active sanitary sewer manhole located in the intersection of Federal Highway and Broward Boulevard to the proposed pump station site on the Southeast corner of S.E. 2nd Court and S.E.8th Avenue.
   b.) The project also includes construction of a submersible triplex sewage pump station and valve vault with electrical control panels and appurtenances. The 12' diameter concrete wet well shall be supplied by the City of Fort Lauderdale or can be also provided by the CONTRACTOR if alternative option for CONTRACTOR to provide structures is accepted. The existing wet well structure(s) is located at the Prospect Well Field for pick-up and delivery to the project site. The pump station also includes a "Living Wall" located on the north, west and east sides of the pump station site, the removal of two existing trees, a few shrubs, and the restoration of the existing irrigation system.
   c.) The project also includes construction of a 14" diameter force main within the Right-of-Way of S.E. 2nd Court from the proposed pump station to the existing 48" force main at the intersection of S.E. 2nd Court and S.E. 9th Avenue.

1.02 NOTICE TO BIDDERS

A. The successful bidder, in order to be considered responsive, must possess the appropriate License as described in the Contract Documents.

B. It should also be noted that the successful bidder will, at the time of the pre-construction conference, be required to show that each of the CONTRACTOR'S subcontractors is in compliance with the CITY's Code of Ordinances.

1.03 SITE INVESTIGATION

A. The CONTRACTOR, by virtue of signing the Contract and any associated Task Orders, acknowledges that CONTRACTOR and all subcontractors have satisfied themselves to the nature and location of the work, the general and local conditions including, but not restricted to: those bearing upon transportation; disposal, handling and storage of materials; access roads to the site; the conformation and conditions of the work area; and the character of equipment and facilities needed preliminary to and during the performance of the work. Failure on the part of the CONTRACTOR to completely or properly evaluate the site conditions shall not be grounds for additional compensation.

B. The CONTRACTOR, by virtue of signing the Contract and associated Task Orders, acknowledges that CONTRACTOR and subcontractors have satisfied themselves as to the nature and extent of soil and (underground) water conditions on the project site. No additional payment will be made to the CONTRACTOR because of differences between actual conditions and those shown by the boring logs.

C. Existing conditions shown in the plans for SE 2nd Court between SE 6th Avenue and SE 8th Avenue do not reflect actual current conditions. Roadway improvements have recently been constructed within the right of way of SE 2nd Court and the intersection of SE 2nd Court and SE 8th Avenue that are not depicted on the plans. The contractor shall visit the site and become familiar with the current conditions in SE 2nd Court right of way between SE 6th Avenue and SE 8th Avenue.

1.04 WORK BY OTHERS

A. Concurrent Work by Other CONTRACTORS: The CONTRACTOR'S attention is directed to the fact that other contractors may conduct work at the site during the performance of the WORK under this Contract. The CONTRACTOR shall conduct its operations so as to cause little or no delay to WORK of such other contractors, and shall cooperate fully with such contractors to provide continued safe access to their respective portions of the site, as required to perform work under their respective contracts.

B. Interference with Work on Utilities: The CONTRACTOR shall cooperate fully with all utility forces of the OWNER or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the WORK, and shall schedule the WORK so as to minimize interference with said relocation, altering, or other rearranging of facilities.

1.05 WORK SEQUENCE

The CONTRACTOR shall schedule and perform the work in such a manner as to result in the least possible disruption to the public's use of any parking lot, roadways, driveways, and utilities. Utilities shall include but not be limited to water, sewerage, drainage structures, ditches and canals, gas, electric, television, fiber optic lines, and telephone. Prior to commencing with the WORK, the CONTRACTOR shall perform a location investigation of existing underground utilities and facilities, and shall have obtained all required permits and permissions, the CONTRACTOR shall also deliver written notice to the CITY'S ENGINEER, and property occupants (private and public) of all planned disruption to roadway, driveways, temporary displacement of fences, mailboxes, street signs and traffic signs, and utilities 72 hours in advance of disruption.

1.06 WORK SCHEDULE

A. Time is of the essence in completing this project and each associated Task Order. Because time is of the essence the CONTRACTOR shall commit the necessary resources to this project to complete it in a timely manner. Those resources may include multiple working crews, working overtime, etc. Because time is of the essence, the CONTRACTOR'S construction progress will be monitored closely on a weekly basis. The Construction progress will be measured with the approved construction schedule submitted by the CONTRACTOR. If the CITY'S ENGINEER determines that the CONTRACTOR is behind schedule based on the approved schedule's critical path, or if the schedule does not meet the Critical Path Method (CPM) requirements as specified in Section 01311, the CONTRACTOR will be required to commit those resources necessary to ensure the completion of the project in a timely manner including working overtime, adding other work crews, etc. All costs incurred to implement measures to complete the work in timely manner, including any overtime or other fees associated with required inspections, will be borne by the CONTRACTOR at no additional cost to the OWNER.

B. REQUIRED PERIODS OF WORK SUSPENSION

1. CONTRACTOR shall shut down operations for all City Holidays, terminating production work by noon on the day preceding the holiday (or the weekend before said holiday) and not resuming operations until the start of the following week (or the day after the holiday, whichever is later). The CONTRACTOR shall ensure that the site is restored per Sections 01001 and 01010 and all areas that are off limits to the public will be clearly delineated and protected. For a full list of holidays, please refer to the CITY's website, however these include, but are not limited to New Year's Eve and Day, Martin Luther King's Birthday, Memorial Day, the 4th of July, Labor Day, Thanksgiving Day and the day after Thanksgiving Day, Christmas Eve and Christmas.
2. The CONTRACTOR shall include these provisions in the schedule required in 01311 and there shall be no additional time granted for these work suspensions.
3. No additional compensation shall be granted for demobilization, cleaning and remobilization as a result of these work suspensions.
4. During the work suspensions, the CONTRACTOR shall remain liable for the safety and security of the project site and be available 24 hours per the Contract Documents. CONTRACTOR shall have personnel visit the site daily during these suspensions to ensure the safety and security of the site.

C. SCHEDULE

1. CONTRACTOR shall submit scheduling information for the work noted in the Contract and/or each associated Task Order.
2. No separate payment shall be made for preparation and/or revision of the schedule.

D. Work Hours: Except in connection with the safety or protection of persons, or the Work, or property at the site or adjacent thereto, and except as otherwise indicated in the Supplementary Conditions, all work at the site shall be performed during regular working hours between 8 a.m. and 5:00 p.m., Monday through Friday. The CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday (designated by the City of Fort Lauderdale) without the Project Manager's written consent at least seventy two (72) hours in advance of starting such work. If the

Project Manager permits overtime work, the CONTRACTOR shall pay for the additional charges to the CITY with respect to such overtime work. Such additional charges shall be a subsidiary obligation of the CONTRACTOR and no extra payment shall be made to the CONTRACTOR for overtime work. It shall be noted that the CITY'S Inspector work hours are from 8:00 AM to 4:30 PM and any Work requiring inspection oversight being performed outside of this timeframe shall be paid for by the CONTRACTOR as Inspector overtime. The cost to the CONTRACTOR to reimburse the CITY for overtime inspection is established at direct-labor and overtime costs for each person or inspector required. Incidental overtime costs for engineering, testing and other related services will also be charged to the CONTRACTOR at the actual rate accrued

1.07 COMPUTATION OF CONTRACT TIME

A. It is the CONTRACTOR'S responsibility to provide clear and convincing documentation to the ENGINEER as to the effect additional work will have with respect to additional contract time extension that may be justified. If additional quantities of work can be carried out concurrent with other existing construction activities without disrupting the critical path of the project then no contract time extension will be granted. The CONTRACTOR is obligated to provide documentation to the CITY if additional elements of work affect the critical path of the project. If work set forth in the original scope of the project is deleted, the contract time may be reduced. This contract is a calendar day contract. While the CONTRACTOR may be granted time to suspend work operations for vacations or holidays, contract time will not be suspended. During suspensions, the CONTRACTOR shall be responsible for all maintenance of traffic and liability without additional compensation from the CITY.

1.08 CONTRACTOR USE OF PREMISES

A. The CONTRACTOR's use of the project site shall be limited to its construction operations. The CONTRACTOR will arrange for storage of materials and a copy of an agreement for use of other property shall be furnished to the ENGINEER.

1.09 POST AWARD KICK-OFF MEETING

A. After the award of the Contract, a Post Award Kick-Off Meeting will be held between the CONTRACTOR, the CITY'S ENGINEER, CITY Staff and other interested parties. The ENGINEER will set the time and place of the conference. The purpose of this meeting is to communicate administrative and operational requirements of the Contract. The requirements for construction mobilization, quality, safety, and execution of the project will be explained and documented. Submittal requirements, project communications, schedule, quality and safety requirements will be outlined and dates set for submission of pre-construction submittals.

1.10 PRE-CONSTRUCTION CONFERENCE

A. After the award of Contract, a Pre-construction Work Conference will be held between the CONTRACTOR, the ENGINEER, the CITY, other interested Agencies, representatives of Utility Companies and others affected by the work. The ENGINEER will set the time and place of this conference. The CONTRACTOR shall bring to the conference a copy of the proposed work schedule for the approval by the ENGINEER of the proposed methods and manner of executing the work including sequences of operation and time schedule. The work shall be performed in accordance with such schedule or approved amendments thereto.

1.11 UTILITY LOCATIONS

A. As far as possible, all existing utility lines in the project area have been shown on the plans. However, the CITY does not guarantee that all lines are shown, or that said lines are in their true location. It shall be the CONTRACTOR'S responsibility to identify and locate all underground or overhead utility lines or equipment affected by the project. No additional payment will be made to the CONTRACTOR because of discrepancies in actual and plan location of utilities and damages suffered as a result thereof.

B. The CONTRACTOR shall notify each utility company involved at least thirty (30) days prior to the start of construction to arrange for positive underground location, relocation or support of its utility where that utility may be in conflict with or endangered by the proposed construction. The CONTRACTOR shall pay for relocation of water mains or other utilities for the convenience of the CONTRACTOR. The CONTRACTOR shall pay for all charges by utility companies for temporary support of its utilities. All costs of permanent utility relocations to avoid conflict shall be the responsibility of the CONTRACTOR and the utility company involved.

C. The CONTRACTOR shall schedule and coordinate their work in such a manner that they are not delayed by the utility companies relocating or supporting their utilities. No compensation will be paid to the CONTRACTOR for any loss of time or delay.

D. All overhead, surface, and underground structures and/or utilities encountered are to be carefully protected from damage or displacement. All damage to said structures and/or utilities is to be completely repaired within a reasonable time; needless delay will not be tolerated. The CITY reserves the right to remedy any damage by ordering outside parties to make repairs at the expense of the CONTRACTOR. All repairs made by the CONTRACTOR are to be made to the satisfaction of the utility owner and shall be inspected by a representative of the utility owner and the ENGINEER.

E. The CONTRACTOR should be aware of the Sunshine 811, which has a free locating service for CONTRACTORS and excavators. Within forty-eight hours before excavating, dial toll free 1-800-432-4770 (or local 811), and a locator will be dispatched to the work location. CONTRACTOR shall reasonably notify other utility companies not notified by Sunshine 811.

F. The permits listed below will be obtained for the project by the CITY prior to beginning construction (when applicable). The CONTRACTOR is responsible for compliance with any and all permit conditions. In the event that the CITY must obtain permits in addition to those listed below, the CONTRACTOR shall not have any claim for damages arising from any delay caused by the CITY'S obtaining said additional permits.

- Wastewater/Force Main Permits: Broward County Environmental Protection & Growth Management Department and Florida Department of Environmental Protection.
- Utility Permit: Florida Department of Transportation

G. CONTRACTOR shall obtain applicable construction permits with Local, County, and State prior to commencement of work.

1.12 LINE AND GRADE N/A

1.13 PROTECTION AND RESTORATION OF SURVEY MONUMENTS

A. The CONTRACTOR shall carefully protect from disturbance all survey monuments, stakes and bench marks, whether or not established by CONTRACTOR, and shall not remove or destroy any surveying point until it has been properly witnessed by the ENGINEER. All major survey monuments that have been damaged by the CONTRACTOR such as section corners, 1/4 section corners, property corners or block control points shall be replaced at the CONTRACTOR'S expense with markers of a size and type approved by the ENGINEER. The replacement shall be under the supervision of a Florida Registered Land Surveyor where directed by the ENGINEER.

1.14 EQUIPMENT

A. All equipment necessary and required for the proper construction of all facilities shall be on the construction site, in first-class working condition.

1.15 STORAGE SITES

A. The CONTRACTOR shall furnish, at CONTRACTOR's expense, properly zoned areas suitable for field office, material storage and equipment service and storage. No material may be stored in the public right of way without prior authorization by the agency having jurisdiction. The CONTRACTOR shall keep these areas in a clean and orderly condition so as not to cause a nuisance or sight obstruction to motorists or pedestrians.

1.16 OWNERSHIP OF EXISTING MATERIALS

A. All materials removed or excavated from the job site shall remain the property of the CITY until released by the Contract Administrator, at which time it shall become the property of the CONTRACTOR, who shall dispose of it in a manner satisfactory to the ENGINEER.

1.17 EXCESS MATERIAL

A. Upon direction of the ENGINEER, all vegetation, debris, concrete or other unsuitable materials shall be disposed of in areas provided by the CONTRACTOR and approved by the ENGINEER. Any excess material desired to be retained by the CITY shall be delivered by the CONTRACTOR to a designated area within a 5-mile radius of the project, at no extra cost to the CITY.

1.18 AUDIO-VISUAL PRECONSTRUCTION RECORD

A. General:

1. Prior to beginning any Contract or Task Order work, the CONTRACTOR shall thoroughly photograph or have a continuous color audio-video recording taken along the entire length of the project to serve as a record of preconstruction conditions.

1.19 ENVIRONMENTAL PROTECTION

A. The CONTRACTOR shall furnish all labor and equipment and perform all work required for the prevention of environmental pollution during and as a result of the work

under this contract. For the purpose of this contract, 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 recreational purposes. The control of environmental pollution requires consideration of air, water, land and involves noise, solid waste management and management of radiant energy and radioactive materials, as well as other pollutants. Environmental pollution prevention shall be in accordance with NPDES requirements with no additional cost to the CITY.

1.20 MAINTENANCE AND PROTECTION OF TRAFFIC

A. The CONTRACTOR shall provide all necessary traffic control devices in order to redirect, protect, warn or maintain existing vehicular and pedestrian traffic during the course of construction.

B. TRAFFIC CONTROL

The CONTRACTOR is required to submit a conceptual Traffic Control Plan at the Pre-Construction Conference. This preliminary plan should identify the phases of construction that the CONTRACTOR plans to proceed with and identify traffic flows during each phase. The ENGINEER will have ten (10) days to notify the CONTRACTOR of any comments. Once the conceptual plan for maintaining traffic has been approved, the CONTRACTOR will be required to submit a detailed plan showing each phase's Maintenance and Protection Plan prior to starting construction of any phase.

- The "Maintenance of Traffic" plan shall include pedestrian traffic as well as vehicular traffic.

  It shall be the responsibility of the CONTRACTOR for any necessary Construction, Pavement Marking and Signage or any Pedestrian Signalization and/or Signal Modification to accommodate an alternate safe walk route.

- The CONTRACTOR, at all times, shall conduct the work in such a manner as to insure the least obstruction to traffic as is practical. Convenience of the general public and of the residents adjacent to the work shall be provided for in a satisfactory manner, as determined by the CITY'S ENGINEER.

- Sidewalks, gutters, drains, fire hydrants and private drives shall, insofar as practical, be kept in condition for their intended uses. Fire hydrants on or adjacent to the work shall be kept accessible to fire apparatus at all times, and no material or obstruction shall be placed within twenty (20) feet of any such hydrant.

- All existing stop and street name signs will be maintained as long as deemed necessary by the CITY'S ENGINEER.

- The CONTRACTOR shall furnish a sufficient number of protective devices to protect and divert the vehicular and pedestrian traffic from working areas closed to traffic, or to protect any new work. Failure to comply with this requirement will result in the ENGINEER shutting down the work until the CONTRACTOR provides the necessary protection.

- Any time traffic is diverted for a period of time that will exceed one-work day temporary pavement markings will be required. Existing pavement markings that conflict with the new work zone traffic pattern must be obliterated. Painting over existing pavement markings (black out) is not permitted.

1.21 MAINTENANCE AND PROTECTION OF EXISTING DRAINAGE SYSTEM

A. It shall be the responsibility of the CONTRACTOR to maintain positive drainage on the surface and to ensure that the existing underground drainage system continues to function as intended during the construction. The CONTRACTOR shall follow the plans to ensure that existing catch basins and manholes are being protected during the entire phase of construction.

1.22 APPLICATION FOR PAYMENT FOR STORED MATERIALS

A. Application for payment for stored materials may not be made by the CONTRACTOR.

1.23 SPECIAL CONDITIONS FOR CONSTRUCTION BY OTHER AGENCIES

A. It will be the CONTRACTOR'S responsibility to coordinate construction schedules with other contractors so as to minimize disruptions, and inconveniences. The project site shall be safe at all times for construction workers and marina visitors.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

Project No. 12133

SECTION 01025
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SUBMITTALS

A. Informational:

1. Submit schedule on OWNER's form.
2. Application for Payment.
3. Final Application for Payment.

1.02 SCHEDULE

A. Prepare a schedule for the Work in accordance with the requirements of Section 01311.

B. Unit Price Work: Reflect unit price quantity and price breakdown from the conformed Bid Form.

C. Lump Sum Work:

1. Reflect schedule format included in conformed Bid Form.
2. List Bonds and insurance premiums, mobilization, demobilization, facility startup, allowance items and contract closeout separately.
3. Break down by Divisions 2 through 16 with appropriate subdivision of each Specification.

D. An unbalanced or front-end loaded schedule will not be acceptable.

E. Summation of all the Work shall equal the Contract Price.

1.03 APPLICATION FOR PAYMENT

A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment. Execute certification by authorized officer of CONTRACTOR.

B. Use detailed Application for Payment Form provided by ENGINEER.

C. Include each portion of Work and the unit price breakdown for the Work to be paid on unit price basis, and a listing of OWNER selected equipment, if applicable, and allowances, as appropriate.

D. Preparation:

1. Round values to nearest dollar.
2. List each Change Order and Written Amendment executed prior to date of submission as separate line item. Totals to equal those shown on the Transmittal Summary Form.

3. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form, (4 copies), a listing of materials on hand as applicable, and such supporting data as may be requested by ENGINEER.

1.04 MEASUREMENT - GENERAL

A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and Specifications as specified in National Institute of Standards and Technology, Handbook 44.

B. Whenever pay quantities of material are determined by weight, material shall be weighed on scales furnished by CONTRACTOR and certified accurate by state agency responsible. Weight or load slip shall be obtained from weigher and delivered to ENGINEER or OWNER's representative at point of delivery of material.

C. If material is shipped by rail, car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through mixing plants.

D. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by ENGINEER. Each vehicle shall bear a plainly legible identification mark.

E. Materials that are specified for measurement by the cubic yard measured in the vehicle shall be hauled in vehicles of such type and size that actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. Vehicles not meeting above requirements or loads of quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

F. Where measurement of quantities depends on elevation of existing ground, elevations obtained during construction will be compared with those shown on Drawings. Variations of 1 foot or less will be ignored, and profiles shown on Drawings will be used for determining quantities.

G. Units of measure shown on Bid Form shall be as follows, unless specified otherwise. All methods of measurement shall be approved by the ENGINEER.

ITEM	METHOD OF MEASUREMENT
AC	Acre – Field Measure
AL	Allowance
CY	Cubic Yard – Field Measure within limits specified or shown, or measured in vehicle by volume, as specified
EA	Each – Field Count
GAL	Gallon – Field Measure
HR	Hour
LB	Pound(s) – Weight Measure by Scale
LF	Linear Foot – Field Measure
LS	Lump Sum – Unit is one; no measurement will be made
SF	Square Foot
SY	Square Yard
TON	Ton - Weight Measure by Scale (2,000 pounds)

1.05 PAYMENT

A. General:

1. Progress payments will be made monthly.

2. The date for CONTRACTOR's submission of monthly Application for Payment shall be established at the Preconstruction Conference.

3. The CONTRACTOR shall be solely and directly responsible to the OWNER and operators of utilities, telephone, television, power, water, or sewer systems 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.

4. 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.

5. 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.

6. In the event the CONTRACTOR encounters water service lines or sewer laterals that interfere with trenching, he may, by obtaining prior approval of the property owner, the ENGINEER and the OWNER, cut the service, dig through, and restore the service with similar and equal materials at the CONTRACTOR's expense.

7. The CONTRACTOR shall replace, at his own expense, all existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract documents or ordered by the CITY.

8. Telephone and communication drops and systems may extend throughout the project area. Properly located cable, conduit, interface equipment, pull or junction boxes and other signal or systems equipment damaged by the CONTRACTOR shall be replaced at the CONTRACTOR's expense. Damaged cable shall be replaced as an entire run, from junction box to junction box.

9. Protect underground and aboveground existing structures from damage, whether or not they lie within the limits of the easements obtained by the OWNER. Where such existing fences, gates, sheds, buildings, or any other structure must be removed in order to properly carry out the construction, or are damaged during construction, restore to their original condition to the satisfaction of the property owner involved at the CONTRACTOR's own expense. Notify the ENGINEER of any damaged underground structure, and make repairs or replacements before backfilling.

10. Without additional compensation, the CONTRACTOR may remove and shall replace in a condition as good as or better than original, such small miscellaneous structure as fences, irrigation systems, mailboxes, and signposts that interfere with the CONTRACTOR's operations.

11. Any damage to property, either inside or outside the limits of the easements provided by the OWNER or street rights-of-way, shall be the responsibility of the CONTRACTOR as specified herein. The CONTRACTOR shall provide immediate notice to the OWNER of any damage to fencing and provide temporary fencing as required to provide a functionally similar level of security. The CONTRACTOR shall remove, protect and replace all fences or other items encountered on public or private property. Before final payment will be authorized by the ENGINEER, the CONTRACTOR will be required to furnish the OWNER with written releases from property owners or public agencies where side agreements or special easements have been made by the CONTRACTOR or where the CONTRACTOR's operations, for any reason, have not been kept within the construction right-of-way obtained by the OWNER or the street right-of-way.

12. The CONTRACTOR shall be responsible for all damage to private property where work related activities have occurred without proper easement or authorization. The CITY may withhold payment to the CONTRACTOR pending resolution of any claims by private owners.

B. General:

No material price increases will be allowed, including gasoline, diesel, asphalt cement, or other materials.

C. Payment for Lump Sum Work covers all Work specified or shown for all specification items within the contract documents.

1.06 MOBILIZATION (Bid Item No. 1)

A. Mobilization and Demobilization (not to exceed 10% of same of project cost excluding mobilization and MOT permit fees.

B. Payment for mobilization and demobilization will be made at the lump sum price developed from the cost of the unit price items. Mobilization includes, but is not limited to all required testing with passing results, all required bonds, video of existing site conditions and final completion, test holes for verification of existing utility/storm pipe sizes and elevations, insurance, site cleanup, sanitary facilities, labor associated with permit acquisition, CONTRACTOR staging area, project signs, project coordination, and demobilization. Partial payments for mobilization and demobilization will be made as follows:

- 25% at the beginning of the work
- 50% at 10% complete
- 75% at 25% complete
- 100% at 100% complete

Mobilization shall additionally include verifying size and elevations of existing FDOT drainage pipes in US 1 crossing the proposed sewer main, televising the entire length of proposed gravity sewer main upon completion, temporary pavement marking, and all asbuilts in a form acceptable to all governing agencies requiring asbuilts. Payment for verifying drainage pipe size and elevations, temporary marking, televising of pipe, and asbuilts shall be paid under mobilization.

1.07 MAINTENANCE OF TRAFFIC (Bid Item No.2)

A. Maintenance of traffic (not to exceed 10% of project cost excluding MOT and MOB).

B. Payment for maintenance of traffic will be made at the lump sum price named in the Bid Schedule. Payment for maintenance of traffic will be made in equal monthly amounts during the duration of the contract time. Existing traffic signage shall be maintained and protected at all times. There shall be no additional payment for replacement.

1.08 REMOVE & DISPOSE OF EXISTING ASPHALT PAVEMENT (Bid Item No. 3)

A. Measurement for payment to remove and dispose of existing pavement will be based upon the actual number of square yards of such pavement actually removed, all in accordance with the Contract Documents.

B. Payment for removal and disposal of existing pavement will be made at the unit price per square yard of pavement named in the Bid Schedule which price shall constitute full compensation for the complete removal and disposal of pavement.

1.09 REMOVE & DISPOSE OF EXISTING SIDEWALK/ CONCRETE PAVING (Bid Item No. 4)

A. Measurement for payment to remove and dispose of existing sidewalk, concrete paving, or pavers will be based upon the actual number of square yards of sidewalk or concrete paving actually removed and disposed all in accordance with the Contract Documents.

B. Payment for removal and disposal of existing sidewalk or concrete driveway will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for the complete removal and disposal of all sidewalk or concrete pavement.

1.10 REMOVE & DISPOSE OF ALL TYPES OF EXISTING CURB AND GUTTER (Bid Item No. 5)

A. Measurement for payment to remove and dispose of existing curbing and gutters (all types) will be based upon the actual number of linear feet of curbing actually removed and disposed all in accordance with the Contract Documents.

B. Payment for removal and disposal of existing curb and gutter will be made at the unit price per linear foot named in the Bid Schedule which price shall constitute full compensation for the complete removal and disposal of all curbing.

1.11 REMOVE & DISPOSE OF EXISTING PAVERS (Bid Item No. 6)

A. Measurement for payment to remove and dispose of existing pavers will be based upon the actual number of square yards of pavers actually removed and disposed all in accordance with the Contract Documents.

B. Payment for removal and disposal of existing pavers will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for the complete removal and disposal of all pavers.

1.12 REMOVE & REINSTALL EXISTING PARKING METERS (Bid Item No. 7)

A. Measurement for payment to remove and reinstall existing parking meters will be based upon the actual number of parking meters relocated in a manner satisfying all required governing departments within the City of Fort Lauderdale including but not limited to the City of Fort Lauderdale Department of Sustainable Development, Public Works Department, and Transportation and Mobility Department.

B. Payment for removal and reinstalling existing parking meters will be made at the unit price each named in the Bid Schedule which price shall constitute full compensation for the removal and reinstallation of all parking meters including but not limited to removal of existing meter, wiring, foundation, posts, etc. and reinstalling meter, new post, new foundation, new electric, new communications, etc. for a complete and functional removal and reinstallation acceptable to City.

1.13 REMOVE AND DISPOSE OF EXISTING PIPE (ALL TYPES AND SIZES) (Bid Item No. 8)

A. Measurement for payment to remove and dispose of existing pipe, storm, water main, force main, etc. will be based upon the actual number of linear feet of such pipe actually removed and disposed of all in accordance with the Contract Documents.

B. Payment for removal and disposal of existing pipe, storm. water, force main, etc. will be made at the unit price per linear foot of pipe named in the Bid Schedule which price shall constitute full compensation for the removal and disposal of such pipe, including excavation, removal of valves, fittings, valve boxes, backfilling trench, restoration for a complete and functional removal and disposal of existing pipe of various sizes and materials..

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

1.14 ASPHALT PAVEMENT SECTION RESTORATION (Bid Item Nos. 9-11 & 23-24)

A. Measurement for payment of asphalt pavement restoration will be based upon the number of square yards of such asphalt actually furnished and placed as detailed in the DRAWINGS, all in accordance with the requirements of the Contract Documents.

B. Payment for restoration of asphalt pavement at the thickness indicated will be made at the unit price per square yard for such placement as named and at the thickness indicated in the Bid Schedule which price will constitute full compensation for applying a tack coat and furnishing, placing and compacting all asphalt surface (including asphalt overlay), complete in place to the cross section and thickness shown on the DRAWINGS; including restoration of traffic loop detectors, saw cutting of all pavement and all cleanup of the area disturbed by this construction.

C. No payment will be made for restoration of areas outside the limits shown on the drawings or not approved by the ENGINEER. Restoration on private property shall be performed as depicted on the drawings and as approved by the ENGINEER, to accommodate grade changes

1.15 FURNISH & PLACE LIMEROCK BASE MATERIAL (Bid Item No. 12,15,18 & 25)

A. Measurement for payment for furnishing and placing lime rock base material will be based upon the number of square yards of such materials actually compacted in place at the depth indicated, densities passed, and primed all in accordance with the requirements of the Contract Documents.

B. Payment for furnishing and placing of lime rock base material will be made at the unit price per square yard at the depth indicated and named in the Bid Schedule, which price shall constitute full compensation for applying prime coat and furnishing all such material, in place, including all transportation, handling, cleaning, positioning and compacting of said bedding to a LBR 100 and disposal of waste or unsuitable material.

1.16 COMPACTION/STABILIZATION OF SUBGRADE (Bid Item No. 13, 16 &19)

A. Measurement for payment for compaction/stabilization of subgrade will be based upon the number of square yards of such materials actually compacted, all in accordance with the requirements of the Contract Documents.

B. Payment for compacting/stabilizing of subgrade will be made at the unit price per square yard named in the Bid Schedule, which price shall constitute full compensation for handling, cleaning, positioning and compacting of said bedding to a LBR of 40, importing fill material and disposal of excess waste or unsuitable material.

1.17 PAVER RESTORATION IN US 1 (Bid Item Nos. 14)

A. Measurement for payment for restoration of concrete pavers and sand will be based upon the actual number of square yards of such Textured Concrete or Paver drive areas restored as shown in the DRAWINGS, all in accordance with the requirements of the Contract Documents.

B. Payment for restoration of paver areas will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for completing said WORK, including all removal and disposal of existing material, earthwork, grading, construction of the area to the same depth and material as the existing one, sand, furnishing and setting for expansion joint material, disposal of excess material, densities passed, and the appurtenant items for which separate payment is not specifically included in the Bid Schedule.

C. No payment will be made for restoration of paver areas outside the limits shown on the DRAWINGS or not approved by the ENGINEER.

1.18 CONCRETE PAVEMENT CROSSWALK RESTORATION IN US 1 (Bid Item Nos. 17)

A. Measurement for payment for restoration of concrete paved crosswalk will be based upon the actual number of square yards of such areas restored as shown in the DRAWINGS, all in accordance with the requirements of the Contract Documents.

B. Payment for restoration of concrete will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for completing said WORK, including the removal and disposal of the existing concrete crosswalk, reinforcement, concrete, forms and all else necessary for a complete and functional restoration.

C. No payment will be made for restoration of paved areas outside the limits shown on the DRAWINGS or not approved by the ENGINEER.

1.19 CONCRETE SIDEWALK RESTORATION IN US 1 (Bid Item Nos. 20)

A. Measurement for payment for restoration of concrete walk (6” depth) will be based upon the actual number of square yards of such walk areas restored as shown in the DRAWINGS, all in accordance with the requirements of the Contract Documents.

B. Payment for restoration of walk will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for completing said WORK,

including all necessary removal and disposal, material, compaction, testing, forms, finishes, etc. for a complete and functional restoration.

C. No payment will be made for restoration of areas outside the limits shown on the DRAWINGS or not approved by the ENGINEER.

1.20 MILLING & RESURFACING IN US 1 / SE 6TH AVENUE (Bid Item Nos. 21 & 22)

A. Measurement for payment of milling and resurfacing will be based upon the number of square yards of such asphalt pavement actually milled and resurfaced, as detailed in the Drawings, all in accordance with the requirements of the Contract Documents.

B. Payment for milling and resurfacing of asphalt pavement at the minimum thickness of 1.5" indicated will be made at the unit price per square yard for such milling and resurfacing as named in the Bid Schedule which price will constitute full compensation for milling and disposal of existing asphalt to a minimum depth of 1.5", applying a tack coat and furnishing, placing and compacting a minimum 1.5" thick SP 9.5 Friction Course, complete in place to the full lane width of existing Federal Highway (US 1) / SE 6TH Avenue, including milling and saw cutting of all pavement and all cleanup of the area disturbed by this construction.

C. Milling and resurfacing shall comply with FDOT specifications. Asphalt shall be placed to assure a minimum 2% cross slope is maintained throughout the resurfacing area of the roadway.

1.21 CONCRETE WALK RESTORATION IN SE 2ND COURT (Bid Item No. 26)

A. Measurement for payment for restoration of concrete walk will be based upon the actual number of square yards of such walk areas restored as shown in the DRAWINGS, all in accordance with the requirements of the Contract Documents.

B. Payment for restoration of walk will be made at the unit price per square yard named in the Bid Schedule which price shall constitute full compensation for completing said WORK, including all necessary material and compaction.

C. No payment will be made for restoration of areas outside the limits shown on the DRAWINGS or not approved by the ENGINEER.

1.22 MILLING & RESURFACING IN SE 2nd COURT (Bid Item No. 27-28)

A. Measurement for payment of milling and resurfacing will be based upon the number of square yards of such asphalt pavement actually milled and resurfaced, as detailed in the Drawings, all in accordance with the requirements of the Contract Documents.

B. Payment for milling and resurfacing of asphalt pavement at the minimum thickness of 1.0" indicated will be made at the unit price per square yard for such milling and resurfacing as named in the Bid Schedule which price will constitute full compensation for milling and disposal of existing asphalt to a minimum depth of 1.0", applying a tack coat and furnishing, placing and compacting a minimum 1.0" thick Type S-III, complete in place, including milling and saw cutting of all pavement and all cleanup of the area disturbed by this construction.

C. Milling and resurfacing shall comply with FDOT specifications. Asphalt shall be placed to assure a minimum 2% cross slope is maintained throughout the resurfacing area of the roadway.

1.23 CONSTRUCT TYPE "F" CURB AND GUTTER / “D” CURB / VALLEY GUTTER (Bid Item No. 29)

A. Measurement for payment for furnishing and installing curb and gutter / valley gutter / will be based upon the number of linear feet of such curb and gutter / valley gutter actually constructed as determined by measurement along the centerline of the curb in place, all in accordance with the requirements of the Contract Documents.

B. Payment for furnishing and installing curb and gutter / valley gutter will be made at the unit price per linear foot of curb named in the Bid Schedule, which shall constitute full compensation for complete installation including grading, forming, saw cutting of pavement, 4" limerock pad, drop curb, and cleanup of all areas disturbed by this construction.

1.24 CURB RAMPS PER FDOT (Bid Item No. 30)

A. Measurement for payment for furnishing and installing curb ramps including detectable warnings will be based upon the actual number each of such curb ramps removed and replaced to current FDOT standards.

B. Payment for furnishing and installing curb ramps with truncated domes detectable warnings will be made at the unit price, each named in the Bid Schedule which price shall constitute full compensation for completing said WORK, including all earthwork, clearing, grading, compaction of subgrade, detectable warning installation, furnishing and setting for expansion joint material, disposal of excess material, and the appurtenant items for which separate payment is not specifically included in the Bid Schedule.

1.25 FURNISH & INSTALL SANITARY SEWER MAINTENANCE ACCESS STRUCTURES (MANHOLE) (Bid Item No 31)

A. Measurement for payment to furnish and install sanitary sewer maintenance access structures will be based upon the actual quantity, each, of such maintenance access structures constructed, all in accordance with the requirement of the Contract Documents.

B. Payment for furnishing and installing sanitary sewer maintenance access structures will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for the completed installation of the structure including but not limited to excavation, dewatering (including cleaning adjacent discharge pipe), backfill and compaction, and construction of the reinforced concrete structure including frame seal precast bench, invert system, coatings, ring and cover, .

1.26 FURNISH & INSTALL SANITARY SEWER PIPE (Bid Item Nos. 32-34)

A. Measurement for payment for furnishing and installing sewer pipe will be based upon the number of linear feet of such pipe actually constructed as determined by measurement along the centerline of the pipe in place, not including through structures, all in accordance with the requirements of the Contract Documents.

B. Payment for furnishing and installing sewer pipe shall constitute full compensation for the complete installation of the sewer pipe including but not limited to pipe, excavation, dewatering (including cleaning adjacent discharge pipe), sheeting, backfill, by-pass pumping, cleaning, clearing and compaction, and supporting existing water main and all other existing utilities, including FPL poles, light poles, within trench excavation of proposed sewer pipe and connected manholes. CONTRACTOR must maintain existing water main service at all times during construction of sewer piping. Sewer pipe must meet strict CITY standards for line and grade.

C. Video Inspection & Records drawings are required for all sanitary sewer piping and must be acceptable to CITY and ENGINEER.

1.27 FURNISH & INSTALL 14 INCH DIP FORCE MAIN – INCLUDES SUPPORT EXIST. UTILITIES (Bid Item No. 35)

A. Measurement for payment for furnishing and installing ductile iron pipe will be based upon the number of linear feet of such pipe actually constructed as determined by measurement along the centerline of the pipe in place, inclusive of valve structures, vaults and casings, megalugs, restraints all in accordance with the requirements of the Contract Documents.

B. Payment for furnishing and installing ductile iron pipe will be made at the unit price per linear foot of pipe named in the Bid Schedule which price shall constitute full compensation for the complete installation of ductile iron pipe, coatings, and restraints including excavation, dewatering, bedding, backfill, compaction, clearing, etc. and all else necessary for a complete and functional installation Additionally, this work includes supporting existing water main and all other existing utilities within trench excavation of proposed ductile iron pipe. CONTRACTOR must maintain existing water main service at all times during construction of piping.

C. Record Drawings are required for all piping and must be acceptable to CITY and ENGINEER.

1.28 FURNISH & INSTALL DIP FITTINGS (Bid Item No. 36)

A. Measurement for payment to furnish and install fittings shall be based upon the unit bid price per ton named in the Bid Schedule for such fittings furnished all in accordance with the Contract Documents. Weight will be based on compact fitting weight only not including megalugs.

B. Payment for furnishing and installing fittings shall be at the unit bid price per ton and shall include furnishing, coatings, complete installation including storing and transporting the fittings.

1.29 FURNISH & INSTALL TAPPING SLEEVE AND VALVE (Bid Item No. 37)

A. Measurement for payment to furnish and install tapping sleeve and valve will be based upon actual quantity, each, of such tapping sleeves and valves furnished and installed, all in accordance with the requirements of the Contract Documents.

B. Payment for furnishing and installing tapping sleeves and valves will be made at the unit price each, named in the Bid Schedule which price shall constitute full compensation for the installation of the tapping sleeve, valve, valve extension, valve box, tanker truck and all

else necessary for a complete and functional installation. Tapping Sleeve shall be full body type and must be acceptable to the CITY and ENGINEER.

C. No separate payment will be made for connection to existing pipe, it is included in this line item.

1.30 FURNISH & INSTALL VALVE WITH BOX (Bid Item No. 38)

A. Measurement for payment to furnish and install valves will be based upon actual quantity, each, of such valves and boxes furnished and installed, all in accordance with the requirements of the Contract Documents. Additional valves incorporated for testing purposes shall be paid at the unit price.

B. Payment for furnishing and installing valves and boxes will be made at the unit price each, named in the Bid Schedule which price shall constitute full compensation for the completed installation of the valve, including valve box, brass tag, and extension to finish grade and concrete collar installed in unpaved areas. Test valves shall be constructed with a riser to ground level, and be marked, tagged, and photographed.

1.31 CONNECT TO EXISTING MANHOLE INCLUDING REHABILITATION (Bid Item No. 39)

A. Measurement for payment to connect to existing sanitary sewer manhole will be based upon actual quantity, each, of such connections made in accordance with the contract document.

B. Payment to connect to existing manhole will be made at the unit price, each, named in the bid schedule, which price shall constitute full compensation for the completed installation of the connection, including shutting down existing main, cutting main, by-pass pumping, caps and installation of the connection fittings and all else necessary for a complete and functional installation. This work also includes rehabilitation of the existing manhole being connected to, if applicable, which includes but is not limited to reworking the flow channels at the bottom of the existing manhole as required by proposed connection, plugging existing invert, cleaning structure, coating interior and all necessary for a complete and functional connection and rehab.

1.32 FURNISH & INSTALL 12’ DIAMETER SANITARY SEWER LIFT STATION, STATION PAD, PANELS, AND ASSOCIATED FEATURES) (Bid Item No. 40)

A. Measurement for payment to furnish and install a sanitary sewer lift station including control panels, will be based upon the actual quantity, each, of such sanitary sewer lift stations constructed, all in accordance with the requirements of the Contract Documents, including associated work as described below.

B. The proposed 12’ diameter wet well structure shall be provided by the CITY, with the exception of the one 7’-10” deep structure of wet well and the top slab to be provided by the CONTRACTOR. The existing wet well structure (four segments ranging from 4 to 8 feet in length) is located at the Prospect Well Field, located on the north side of Prospect Road west of NW 31st Avenue in Fort Lauderdale (west of the Executive Airport). The CONTRACTOR is responsible for transporting the existing structures from the Prospect Well Field to the project site. Each of the four structure segments is lined with Agru-Grip liner system. CONTRACTOR shall be responsible for welding all liner joints as part of the installation and shall repair damaged liner on any of the existing structure segments, and installation of liner for bottom of wet well. CONTRACTOR is also responsible to plug any

existing openings and core drill any new openings required to make the existing wet well fit the proposed influent pipe elevation and any other pipe or conduit wet well penetrations. See **Appendix "E"** for a copy of the original wet well shop drawing and recent photographs of the existing wet well structure.

Payment for furnishing and installing a sanitary sewer lift station will be made at the unit price each, named in the Bid Schedule which price shall constitute full compensation for the completed installation of the structure including but not limited to furnishing sections of wet well and top slab not provided by OWNER, hauling/delivery of existing wet well section(s) supplied by OWNER, repairing liner of existing wet well section(s), clearing, earthwork, tree removal, landscape mitigation, excavation, dewatering (including cleaning adjacent discharge pipe), backfill and compaction, pavement restoration, assembly of all station parts, construction of the reinforced concrete structure, concrete pads, grading, panels, temporary fencing for safety and permanent replacement fence, gates, bollards & chain, all piping, valves, valve vaults, backflow preventer, fittings, couplings, pipe supports, ladder, electric services as noted on the plans, electrical work, connection panel, all other appurtenances, shutdown and all restoration WORK. Lift station shall be complete, energized and ready for service.

FURNISH & INSTALL 12' DIAMETER SANITARY SEWER LIFT STATION, STATION PAD, PANELS, AND ASSOCIATED FEATURES (INCLUDES ALL TREE REMOVAL AND GRUBBING REQUIRED FOR SITE AND FPL RELOCATION AND COORDINATION) (Bid Item No. 40 A)

A. Measurement for payment to furnish and install a sanitary sewer lift station including control panels, will be based upon the actual quantity, each, of such sanitary sewer lift stations constructed, all in accordance with the requirements of the Contract Documents, including associated work as described below.

B. The proposed 12' diameter wet well structure shall be provided by the CONTRACTOR. Payment for furnishing and installing a sanitary sewer lift station will be made at the unit price each, named in the Bid Schedule which price shall constitute full compensation for the completed installation of the structure including but not limited to furnishing sections of wet well and top slab provided by the CONTRACTOR, clearing, earthwork, excavation, dewatering (including cleaning adjacent discharge pipe), backfill and compaction, pavement restoration, assembly of all station parts, construction of the reinforced concrete structure, concrete pads, grading, panels, temporary fencing for safety and permanent replacement fence, gates, bollards & chain, all piping, valves, valve vaults, backflow preventer, fittings, couplings, pipe supports, ladder, electric services as noted on the plans, electrical work, connection panel, all other appurtenances, shutdown and all restoration WORK. Lift station shall be complete, energized and ready for service.

When using this item, all reference made in plans and specifications about owner provided structures will be replaced with Contractor provided structures.

1.33 <u>GROUT FILL AND ABANDON EXISTING SEWER PIPE</u> (Bid Item No. 41)

A. Measurement for payment for grout fill and abandon existing pipe will be based upon the number of linear feet of such pipe actually grout filled and abandoned as determined by measurement along the centerline of the pipe in place, inclusive of plugs at manholes and other associated work all in accordance with the requirements of the Contract Documents.

B. Payment for grout filling and abandoning existing pipe will be made at the unit price per linear foot of pipe to be grout filled and abandoned as named in the Bid Schedule which price shall constitute full compensation for the work as required by the contract documents.

1.34 FURNISH & INSTALL SAMPLE POINTS (Bid Item No. 42)

A. Measurement for payment for sample points will be based upon the actual number, each, of such sample points furnished and installed, all in accordance with requirements of the Contract Documents.

B. Payment for sample points will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for the complete installation of sample point and removal and disposal after sampling is complete.

1.35 ADJUST EXISTING UTILITY LIDS/VALVE COVERS TO FINISHED GRADE (Bid Item No. 43)

A. Measurement for payment to adjust all types of utility lids will be based upon the actual quantity, each, of such adjustments made, all in accordance with the requirements of the governing utility authority and the Contract Documents. Each adjustment includes but is not limited to all work required to adjust lid top to appropriate elevation including but not limited to excavation, structure modification, frame adjustment, and associated concrete work.

B. Payment for connections to adjustment will be made at the price bid, each, named in the Bid Schedule which price shall constitute full compensation for the adjustment to the existing utility feature lid, including but not limited to excavation, backfill, dewatering, structure modification, metal work, concrete work, all other appurtenances, and all restoration WORK and all else necessary for a complete and functional adjustment.

1.36 REPLACE OF PAVEMENT MARKING AND SIGNAGE (Bid Item Nos. 44-1 - 44-10)

A. Measurement for payment for replacing all pavement marking and signage will be based upon replacing all existing stamped asphalt, striping, signage, and reflective pavement markers removed as a result of installation of pipe and paving and shall be replaced in accordance with the most recent municipal, county, state and federal codes and shall be paid for based upon the unit price per LF, SY, or Each as applicable and as described in the bid form for items 44-1 through 45-10. Additionally, the replacement of pavement marking and signage item shall include temporary pavement marking for each asphalt lift in paint type of the same quantity of pavement markings as the final pavement markings that will ultimately be all thermoplastic are also required as part of this work. If necessary the project pre construction video should be used to confirm the existing condition of the striping and signage.

1.37 FURNISH & INSTALL LIFT STATION GREENSCREEN FENCING (Bid Item No. 45)

A. Measurement for payment for furnishing and installing Greenscreen fencing will be based upon the actual linear footage of green screen fencing installed.

B. Payment for furnishing and installing the Greenscreen fencing will be per linear foot of screen fence installed in accordance with the contract documents and including but not

limited to the associated excavation, concrete footer work, metal work, and all other work required to properly complete the installation of the lift station Greenscreen fence.

1.38 FURNISH & INSTALL LANDSCAPE (Bid Item Nos. 46-48)

A. Measurement for payment for furnishing and installing trees and plants will be based upon the actual number, of each tree or plant installed all in accordance with requirements of the Contract Documents.

B. Payment for furnishing and installing trees and plants will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for the complete installation, watering for one year for establishment, guys, weed control, and planting soil.

C. Trees shall be guyed and protected as shown on the DRAWINGS. Trees shall be warranted for one year after substantial completion issuance in accordance with the requirements of the Contract Documents.

1.39 FURNISH & PLACE 3" TOPSOIL (Bid Item No. 49)

A. Measurement for payment for furnishing and placing topsoil will be based upon the number of square yards of topsoil actually installed at the thickness shown on the drawings, all in accordance with the requirements of the Contract Documents. (Payment will not be made for placing topsoil in swales).

B. Payment for furnishing and placing topsoil will be made at the unit price per square yard of topsoil placed named in the Bid Schedule which price shall constitute full compensation for furnishing and placing the topsoil in landscape median at lift station.

1.40 FURNISH & PLACE 3" SHREDDED MULCH (Bid Item No. 50)

A. Measurement for payment for furnishing and installing shredded mulch will be based upon the number of square yards of 3" thick mulch actually installed, all in accordance with the requirements of the Contract Documents.

B. Payment for shredded mulch will be made at the unit price per square yard of mulch named in the Bid Schedule which price shall constitute full compensation for furnishing and installing a 3" thick layer of mulch.

1.41 FURNISH & INSTALL LIFT STATION SCREEN IRRIGATION (Bid Item No. 51)

A. Measurement for payment for furnish and install irrigation system restoration will be based upon the lump sum cost as identified in the bid schedule to replace systems located in landscaped areas in the right of way as well as the cost of landscaping replaced quantified by plant/tree quantity and type, all in accordance with requirements of the Contract Documents.

B. Payment for landscape and irrigation restoration will be made at the lump sum price named in the Bid Schedule which price shall constitute full compensation for the complete restoration of the irrigation system including capping existing system during construction and installing new irrigation. New irrigation system shall be connected to existing private property irrigation systems. Irrigation systems shall provide full coverage/heads prior to construction.

C. Irrigation systems shall be restored with pipe matching the size of the existing pipe and necessary adapters and coupling at each end splicing the restored pipe in place. All WORK shall meet the approval of the ENGINEER.

1.42 FURNISH & PLACE ST. AUGUSTINE SOD (Bid Item No. 52)

A. Measurement for payment for furnishing and installing sod will be based upon the number of square yards of sod actually installed, and area graded including private WORK all in accordance with the requirements of the Contract Documents.

B. Payment for sod will be made at the unit price per square yard of sod has named in the Bid Schedule which price shall constitute full compensation for furnishing and installing the sod. Clearing of areas shall be included in the applicable item unit price requiring clearing.

1.43 TRENCH SAFETY SPECIAL SHORING REQUIREMENTS (WILL NOT EXCEED 1% OF THE WORK ORDER UNIT PRICE COST AS REQUIRED) (Bid Item No. 53)

A. Payment for providing all labor, materials, and equipment for installing special shoring for this Project regardless of type will be paid for from this payment item, established by the CONTRACTOR for this purpose. Such an amount represent the amount the CONTRACTOR feels is necessary to comply with the Trench Safety Act. Payment for this item will be based upon the lump sum amount required to complete the work.

Payment under this item will be made in accordance with the approved cost loaded schedule, based on the Work completed. No request for additional reimbursement will be approved.

1.44 UTILITY CONFLICT ALLOWANCE (Bid Item No. 54)

A. Measurement and payment for utility conflict work will be based upon the all furnishing, installing, and completing of the items and actual work required to address unforeseen conflicts. Prior to purchasing products for and performing unforeseen utility conflict construction the CONTRACTOR shall make the CITY and Engineer of Record aware of the conflict and provide a field plan and cost for the work to be performed for the OWNER and Engineers review prior to proceeding with utility conflict work. Payment for work shall only be made for the amount agreed upon for work the ENGINEER deems acceptable.

1.45 CONTAMINATED SITE DEWATERING ALLOWANCE (Bid Item No. 55)

A. See Paragraph 3.01.L of Section 02240 "Dewatering".

B. Measurement and payment for Dewatering in contaminated areas will be based upon the actual Dewatering Consultant Fees paid for by the CONTRACTOR, monitoring wells, and upon the actual cost of Disposal of Contaminated Materials or other measures necessary to address contaminated areas only. The allowance for Dewatering fee shown on the Bid Schedule is an estimate of Contaminated Site Dewatering Services fees required for the project and is a cost pass-through item. The OWNER will reconcile the actual cost with the CONTRACTOR by change order. The CONTRACTOR shall produce documentation verifying actual cost from subconsultants as required, or for time and material. Only

Dewatering fees substantiated and approved by the ENGINEER will be paid as part of this bid item.

C. Payment shall include, but is not limited to hiring a dewatering consultant as necessary, obtaining licenses/permits from regulatory agencies, providing all labor and equipment for Contaminated Site Dewatering Services, monitoring wells, testing and providing for disposal of contaminated material as required by FDEP, SFWMD, BCEPGMD, or other regulatory agencies.

D. Contaminated sites are known to exist near the project. The CONTRACTOR shall coordinate special dewatering measures as needed.

1.46 LANDSCAPE AND IRRIGATION RESTORATION IN US 1 R.O.W ALLOWANCE (Bid Item No. 56)

A. Payment for providing all labor, materials, and equipment complete for removing, relocating, trimming and replanting in-kind any landscape feature, fencing or tree canopy related items that interfere with the Work, regardless of type will be paid for from this payment item. Only costs and fees substantiated by the CONTRACTOR and authorized and approved by the ENGINEER will be paid as part of this bid item. Any balance in this item at the end of the project shall be credited back to the OWNER.

1.47 PERMIT FEES ALLOWANCE (Bid Item No. 57, 58)

A. Payment for permit fees will be based upon the actual permit fees required by the CONTRACTOR from the various agencies having jurisdiction for construction of the project, in accordance with the Contract Documents.

B. The allowance amount shown on the contract is an estimate for the project and is a cost pass through item and no markups will be added to this item. The CONTRACTOR shall submit documentation with pay request verifying actual cost. Only permit fees substantiated by the CONTRACTOR and approved by the ENGINEER will be paid as part of this bid item. Any balance in this item at the end of the project shall be credited back to the OWNER.

1.48 TREE REMOVAL ALLOWANCE (Bid Item No. 59)

A. Payment for providing all labor, materials, and equipment complete for removing trees and paying penalties, relocating, trimming and replanting in-kind any landscape feature, fencing or tree canopy related items that interfere with the Work, regardless of type will be paid for from this payment item. Only costs and fees substantiated by the CONTRACTOR and authorized and approved by the ENGINEER will be paid as part of this bid item. Any balance in this item at the end of the project shall be credited back to the OWNER.

1.49 FPL SERVICE ALLOWANCE (Bid Item No. 60)

A. Payment for electrical service modifications and utility relocations, excluding any modifications specifically shown in the contract documents, will be based upon the actual costs incurred by the contractor to modify the electrical service as required by Florida Power and Light (FP&L), in accordance with the contract documents. The allowance amount shown on the bid schedule is an estimate of electrical service modification required for the project and is a cost pass-through item and no markups will be added to this item. The contractor shall produce documentation upon request verifying actual cost. Only electrical service

modifications costs substantiated by the contractor and approved by the engineer will be paid as part of this bid item.

1.50 PAYMENT / ALLOWANCES

A. Nonpayment for Rejected or Unused Products

1. Payment will not be made for the following:

a. Loading, hauling, and disposing of rejected material.
b. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
c. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.
d. Material not unloaded from transporting vehicle.
e. Defective Work not accepted by OWNER.
f. Material remaining on hand after completion of Work.

B. Partial Payment for Stored Materials and Equipment

1. Partial Payment: No partial payments will be made for stored materials.

C. Allowances

1. The allowances shall be used only at the discretion of and as ordered by the OWNER.

2. Any portion of these allowances that remain after all authorized payments have been made, will be withheld from contract payments and will remain with the OWNER.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

Project No. 12133

SECTION 01040
COORDINATION

PART 1 - GENERAL

1.01 SUBMITTALS

A. Informational:

1. Statement of Qualification (SOQ) for land surveyor or civil engineer.
2. Statement of Qualification (SOQ) for professional videographer.
3. Photographs as per Section 01380

1.02 UTILITY NOTIFICATION AND COORDINATION

A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work.

1. Contact the City of Fort Lauderdale Public Services Department at 954-828-8000 for water and sewer utility locations.
2. Contact Sunshine State One Call at 1-800-432-4770 at least 2 business days prior to any excavation.

B. If damage occurs, or if conflicts or emergencies arise during Work, contact the appropriate utility.

1. Electricity Company: Florida Power and Light.
   a. Contact Person: Trouble Center (or police/fire – 911).
   b. Telephone: 954-797-5000.
2. Telephone Company: BellSouth.
   a. Contact Person: Jason Boschen.
   b. Telephone: 954-316-4005 or 954-605-1121.
3. Water and Sewer Department: Fort Lauderdale Public Services Department.
   a. Contact Person: Emergency Hotline.
   b. Telephone: 954-828-8000.
4. Gas Company: TECO Peoples Gas.
   a. Contact Person: Dispatch.
   b. Telephone: 305-957-3857, ext. 7490 or 1-877-832-6747.
5. Telecom: AT&T – Broadband/Comcast.
   a. Contact: Andy Vaspasiano.
   b. Telephone: 954-266-6589 or 954-444-2833.
6. Telecom: FP&L FiberNet.
   a. Contact: Noel R. Reese.
   b. Telephone: 305-552-3249 or 305-205-1283.
7. Broward County Traffic Engineering Division (For Traffic Signal Communications Systems Underground Cable and Traffic Loops):
   a. Contact: Bob Blount.
   b. Telephone: 954-847-2745.

1.03 PROJECT MEETINGS

A. Description

1. The Contractor shall schedule and administer preconstruction meetings, periodic progress meetings, and specially called meetings throughout the progress of work.. The Contractor shall:

   a. Prepare agenda for meetings.
   b. Make physical arrangements for meetings.
   c. Preside at meetings.
   d. Record in writing the minutes; include significant proceedings and decisions and submit to Engineer for approval prior to distribution.
   e. Record the meeting with an audio recording device.
   f. Reproduce and distribute copies of minutes within five working days after each meeting:
      1) To participants in the meeting.
      2) To parties affected by decisions made at the meeting.
2. Representatives of contractor, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
3. The Contractor shall attend meetings to assure that work is executed consistent with Contract Documents and construction schedules.

B. Preconstruction Meeting

1. Schedule a preconstruction meeting no later than 15 days after date of Notice to Proceed.
2. Location: A central site, convenient for all parties designated by the Owner.
3. Attendance:
   a. Owner's Representative.
   b. Engineer and his Professional Consultants.
   c. Resident Project Representative.
   d. Contractor's Superintendent.
   e. Major Subcontractors.
   f. Major Suppliers.
   g. Utilities.
   h. Others as appropriate.
4. Suggested Agenda:
   a. Distribution and discussion of:
      1) List of major subcontractors and suppliers.
      2) Projected Construction Schedule.
   b. Critical work sequencing/critical path scheduling.
   c. Major equipment deliveries and priorities.
   d. Project Coordination.
      1) Designation of responsible personnel.
   e. Procedures and processing of:
      1) Field decisions.
      2) Proposal requests.
      3) Submittals.
      4) Change Orders.
      5) Applications for Payments.
   f. Adequacy of Distribution of Contract Documents.
   g. Procedures for maintaining Record Documents.

h. Use of Premises:
   1) Office, Work and Storage Areas.
   2) Owner's Requirements.
i. Construction facilities, controls, and construction aids.
j. Temporary Utilities.

C. Progress Meetings

1. Schedule regular periodic meetings. The progress meetings will be held on a monthly basis.
2. Hold called meetings as required by progress of the work.
3. Location of the meetings: Project field office of the Contractor or Engineer.
4. Attendance:
   a. Engineer, and his professional consultants as needed.
   b. Subcontractors as appropriate to the agenda.
   c. Suppliers as appropriate to the agenda.
   d. Others as appropriate.
5. Suggested Agenda:
   a. Review, approval of minutes of previous meeting.
   b. Review of work progress since previous meeting.
   c. Field observations, problems, and conflicts.
   d. Problems which impede Construction Schedule.
   e. Review of offsite fabrication, delivery schedule.
   f. Corrective measures and procedures to regain projected schedule.
   g. Revisions to Construction Schedule.
   h. Progress, schedule, during succeeding work period.
   i. Coordination of schedules.
   j. Review submittal schedules; expedite as required.
   k. Maintenance of quality standards.
   l. Pending changes and substitutions.
   m. Review proposed changes for:
      1) Effect on Construction Schedule and on a completion date.
      2) Effect on other contracts of the Project.
   n. Other business.
   o. Construction schedule.
   p. Critical/long lead items.
6. 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 work, etc.
7. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section 01340.

1.04 FACILITY OPERATIONS

A. Continuous operation of OWNER'S facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.

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

C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of OWNER'S facilities.

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

E. Provide **7** days advance written request for approval of need to shut down a process or facility to OWNER and CITY ENGINEER.

F. Power outages will be considered upon 48 hours written request to OWNER and CITY ENGINEER. Describe the reason, anticipated length of time, and areas affected by the outage. Provide temporary provisions for continuous power supply to critical facility components.

G. Do not proceed with Work affecting a facility's operation without obtaining OWNER'S and CITY ENGINEER's advance approval of the need for and duration of such Work.

H. Relocation of Existing Facilities:

1. During construction, it is expected that minor relocations of Work will be necessary.
2. If CONTRACTOR determines that in order to expedite construction of new water and or sewer mains it would be necessary to temporarily remove and replace existing water services and/or sewer service connections, he will be responsible for the removal and replacement of such service connections at his own cost and effort. The CITY will not provide additional compensation for any costs associated with such effort. All labor and material costs associated with means and methods of construction will be compensated as part of the bid item(s) cost submitted by the CONTRACTOR. Additionally, the CONTRACTOR will have to coordinate and inform utility owner(s) and any CITY resident(s) impacted by such activities and must repair such utilities in a timely manner to minimize disruption of service.
3. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, traffic loop detectors and other necessary items.
4. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
5. Perform relocations to minimize downtime of existing facilities.
6. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by CITY ENGINEER.

1.05 BYPASS PUMPING

A. Where the Work includes connections or modifications to existing sanitary sewer systems, wastewater flows shall be controlled through the pipeline sections and pump stations where work is being performed. Under no circumstances, can portions of the system be removed from service for periods of time in excess of that approved by the OWNER. The CONTRACTOR shall be responsible to assess

conditions and capacities of the existing sewer lines and pump stations in order to implement an acceptable bypass plan at no additional cost to the OWNER. Bypass pumping will be required for all sewer and pump station construction that would result in shutdown of existing facilities. The CONTRACTOR shall supply the necessary pumps, conduits, and other equipment to not only divert flow around the pump station, manhole, or pipe section in which work is to be performed, but also to transmit the flow in downstream sewer lines and/or pump stations without surcharge. The bypass systems shall be of sufficient capacity to handle existing flows plus additional flows that may occur during periods of high tide or rainfall. Primary bypass pumping system shall be electric driven. Emergency backup pumping capability must be available in addition to the primary bypass system. The CONTRACTOR will be responsible for furnishing the necessary labor, power, and supervision to set up and operate the pumping and bypass systems. When pumping is in operation, all engines shall be equipped in a manner to keep the pump noise to a minimum and to comply with applicable noise ordinances.

B. CONTRACTOR shall be responsible for any damage to properties or buildings connected to the sewer system, and to the pipeline, which result from the flow control activities.

C. CONTRACTOR shall submit a bypass pumping plan for all proposed bypass pumping operations.

1.06 PHYSICAL CONDITIONS

A. Exercise reasonable care to verify locations of existing subsurface structures and underground facilities.

B. Thoroughly check immediate and adjacent areas subject to excavation by visual examination (and by electronic metal and pipe detection equipment, as necessary) for indications of subsurface structures and underground facilities.

C. Make exploratory excavations where existing underground facilities or structures may potentially conflict with proposed underground facilities or structures. Conduct exploratory excavations in presence of ENGINEER and sufficiently ahead of construction to avoid possible delays to CONTRACTOR'S Work.

1.07 ADJACENT FACILITIES AND PROPERTIES

A. Examination:

1. After Effective Date of the Agreement and before Work at site is started, CONTRACTOR, CITY ENGINEER, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations, including neighboring properties.
2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

B. Documentation:

1. Record and submit documentation of observations made on examination inspections in accordance with paragraphs Construction Photographs and

Audio-Video Recordings.

2. Upon receipt, ENGINEER will review, sign, and return one record copy of documentation to CONTRACTOR to be kept on file in field office.
3. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of CONTRACTOR'S operations, and is for the protection of adjacent property owners, CONTRACTOR, and OWNER.

1.08 CONSTRUCTION PHOTOGRAPHS

A. Description

1. The Contractor shall employ a professional photographer to take digital construction record photographs for pre-construction conditions periodically during course of Work and post-construction.

B. Related Sections

1. As applicable.

C. Photography Required

1. View and Quantities Required:
   a. Take a minimum of 24 images of the site and adjacent property at the following intervals:
      a) Pre-construction
      b) Monthly, or other interval, at the cut-off date in accordance with Applications for Payment.
      c) At construction events or discoveries as directed by the Owner or Engineer.
      d) At post-construction.
2. Aerial photography shall be required in addition to ground level images for items out of sight of ground level photography.
3. Photograph from locations to adequately illustrate condition of construction and state of progress.
4. At successive periods of photography, take at least one photograph from the same overall view as previously.
5. Consult with the Owner and Engineer at each period of photography for instructions concerning views required.

D. Camera requirement

1. A Digital Single Lens Reflex (DLSR) is required.
2. Point and shoot, mobile phones and disposal cameras are not acceptable.

E. Photographs

1. The minimum file size is 6.0 megapixels per image.
2. All images shall be color and in RGB format.
3. Acceptable file formats include:
   a. Tagged Information File Format (TIFF)
   b. Joint Photographic Experts Group 2000 (JPEG2000)
   c. Digital Negative (DGN)
4. Unacceptable file formats include:

a. Bitmap (BMP)
b. Graphics Interchange Format (GIFF)
c. Portable Network Graphic (PNG)
d. RAW format.

F. Metadata

1. Each image must contain descriptive metadata as follows:
   a. Name of Project
   b. Orientation of View
   c. Date and time of image
   d. Name and address of photographer
   e. Photographer's numbered identification of image.
   f. Meaningful and descriptive filenames unique to each image.

G. Copyright

1. No copyrighted photographs will be accepted.

H. Editing

1. Images shall not be edited in any way.

I. Technique

1. Factual presentation
2. Magnification commensurate with the level of detail required.
3. Correct image and focus
   a. High resolution and sharpness
   b. Maximum depth-of-field
   c. Minimum distortion

J. Delivery of Images

1. Deliver electronic image file to the Owner and Engineer to accompany each Application for Payment or as directed.
2. Electronic file storage media shall be a durable, commercial quality USB memory device of sufficient capacity to store the intended contents.
3. Electronic file storage media shall be labeled and identified by project title and project number.
4. The photographer shall keep electronic copies for a minimum of two years from Owner acceptance.

1.09 AUDIO/VIDEO PRE-CONSTRUCTION RECORD

A. Description

1. The Contractor shall provide a continuous color video with audio of the entire project prior to construction and at Owner acceptance.

B. Related Sections

1. As applicable.

C. Schedule Required

1. Video recordings shall not be made more than 30 days prior to construction. No construction shall begin prior to review and approval of the videos by the Engineer and the Owner.
2. Videos not conforming to the Specifications shall be resubmitted at no additional charge.

D. Professional Videographers

1. The Contractor shall engage the services of a professional videographer. The color audio-visual tapes shall be prepared by a responsible commercial firm known to be skilled and regularly engaged in the business of pre-construction color audio-visual documentation.

E. General

1. The finished product shall be a bright, sharp, clear picture free of distortion and show in sufficient detail acceptable to the Owner and Engineer.
2. All videos shall be color and in RGB format.
3. The Contractor shall furnish to the Engineer and the Owner two (2) copies each of the electronic file, which becomes a project record document.
4. Electronic file storage media shall be a durable, commercial quality USB memory device or compact disc of sufficient capacity to store the intended contents.
5. Electronic file storage media shall be labeled and identified by project title and project number.
6. The videographer shall keep electronic copies for a minimum of two years from Owner acceptance.

F. Metadata

1. Each video must contain descriptive metadata as follows:
   a. Name of Project
   b. Direction and road names
   c. Date and time of image
   d. Name and address of videographer
   e. Meaningful and descriptive filenames unique to each image.

G. Copyright

1. No copyrighted videos will be accepted.

H. Editing

1. Videos shall not be edited in any way

I. Execution

1. The video recording shall show all surface features located within the construction zone. These features shall include, but not be limited to, roadways, sidewalks, outside of houses (front and sides), driveways, culverts, walls, fences, and landscaping. Recording shall zoom and or have high enough definition to clearly show any existing damage, cracking, deterioration, etc.
2. Where station numbering is used, coverage shall begin at the lowest station number and be continuous until the highest station number is reached. Otherwise, the entire length of the project shall be documented including each plan sheet.
3. Provide magnification (zoom) where appropriate to properly display details germane to the subject matter.
4. Maintain camera speed slow enough to achieve detail acceptable to the Owner and Engineer.
   a. Videos with unacceptable camera speed will not be accepted.
   b. Videographer shall be responsible to meet all traffic laws at the time of video including all necessary and appropriate safety measures.

1.10 REFERENCE POINTS, SURVEYS, AND RECORD DRAWINGS

A. Location and elevation of benchmarks are shown on Drawings.

B. CONTRACTOR'S Responsibilities:

1. Provide additional survey and layout required to layout the Work.
2. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
3. In event of discrepancy in data or benchmarks, request clarification before proceeding with Work.
4. Retain professional land surveyor or civil engineer registered in state of Florida who shall perform or supervise engineering surveying necessary for additional construction staking and layout.
5. Maintain complete accurate log of survey Work as it progresses as a Record Document. The CONTRACTOR is responsible for the quality control of horizontal location and vertical elevations of the installed project.
6. On request of CITY ENGINEER, submit documentation.
7. Provide competent employee(s), tools, stakes, and other equipment and materials as CITY ENGINEER may require to:
   - Establish control points, lines, and easement boundaries.
   - Check layout, survey, and measurement Work performed by others.
   - Measure quantities for payment purposes.
8. CONTRACTOR shall be responsible for performing survey and preparing "as-built" drawings for the pump station construction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CUTTING, FITTING, AND PATCHING

A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.

B. Obtain prior written authorization of ENGINEER before commencing Work to cut or otherwise alter:

1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
2. Weather- or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Work of others.

C. Refinish surfaces to provide an even finish.

1. Refinish continuous surfaces to nearest intersection.
2. Refinish entire assemblies.
3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and Work is evident in finished surfaces.

D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown.

E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.

F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.

G. Remove specimens of installed Work for testing when requested by CITY ENGINEER

END OF SECTION

Project No. 12133

SECTION 01300
SUBMITTALS

PART 1 – GENERAL

1.01 DEFINITIONS

A. Action Submittal: Written and graphic information submitted by CONTRACTOR, that requires ENGINEER'S approval.

B. Informational Submittal: Information submitted by CONTRACTOR, that does not require the City of Fort Lauderdale Project Construction Manager's (PCM's) approval. Submittals not meeting conditions of the Contract will be returned.

1.02 PROCEDURES

A. The CONTRACTOR shall prepare and submit select construction related correspondence, (transmittals, RFIs, proposals, etc.) to the PCM. During the preconstruction meeting, the CONTRACTOR shall be instructed by the PCM on the details for submitting correspondence for this Contract.

B. Direct submittals to the PCM at the following address, unless specified otherwise:

1. City of Fort Lauderdale, 100 N Andrews Avenue, 4th Floor – Engineering, Fort Lauderdale, FL 33301;

C. Transmittal of submittal:

1. The CONTRACTOR shall:
   a. Review each submittal and check for compliance with the Contract Documents.
   b. Stamp each submittal with the uniform approval stamp before submitting to the PCM.
      1) The stamp shall include the Project Name, submittal number, specification section number, CONTRACTOR's reviewer name, date of CONTRACTOR's approval, and a statement certifying that the submittal have been reviewed, checked and approved for compliance with the Contract Documents.
      2) The PCM will not review submittals that do not bear the CONTRACTOR's approval stamp and will return them without action.
2. Complete, sign and transmit with each submittal package, one Transmittal of CONTRACTOR's Submittal form attached at the end of this section.
3. Identify each submittal with the following:
   a. Numbering and Tracking System:
      1) Sequentially number each submittal
      2) Resubmission of submittal shall have the original number with sequential alphabetic suffix.

b. Specification section and paragraph to which submittal applies.
c. Project title and CITY project number
d. Names of the CONTRACTOR, subcontractor or supplier, and manufacturer as appropriate.

4. Identify and describe each deviation or variation from the Contract Documents.

D. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.
2. Package submittal information by individual specification section. Do not combine different specification sections together in the submittal package unless otherwise directed to in the specifications.
3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials and devices, and compliance with the Contract Documents.
4. Index with labeled tab dividers in an orderly manner.

E. Timeliness: Schedule and submit in accordance with schedule of shop drawing and sample submittals, and requirements of individual specification sections.

F. Processing time:

1. Time for review shall commence on the PCM's receipt of submittal.
2. The PCM will act upon the CONTRACTOR's submittal and transmit the response to the CONTRACTOR not later than 21 days after receipt, unless otherwise specified.
3. Resubmittals will be subject to the same review time.
4. No adjustment of contract times or price will be allowed due to delays in the progress of the work caused by rejection and subsequent resubmittals.

G. Resubmittals: Clearly identify each correction or change made.

H. Incomplete submittals:

1. The PCM will return the entire submittal for CONTRACTOR's revision if a preliminary review deems it incomplete.
2. When any of the following are missing, submittal shall be deemed incomplete:
   a. The CONTRACTOR's review stamp, completed and signed.
   b. Transmittal of the CONTRACTOR's Submittal, completed and signed.
   c. Insufficient number of copies.

I. Submittals not required by the Contract Documents:

1. Will not be reviewed and will be returned stamped, "Not Subject to Review."
2. The PCM will keep one copy and return all remaining copies to the CONTRACTOR.

1.03 ACTION SUBMITTALS

A. Prepare and submit Action Submittals required by individual Specification sections.

B. Shop Drawings:

1. Copies: Six
2. Identify and Indicate:
   a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
   b. Equipment and Component Title: Identical to title shown on Drawings.
   c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
   d. Project-specific information drawn accurately to scale.
3. Manufacturer's Standard Schematic Drawings and Diagrams as follows:
   a. Modify to delete information that is not applicable to the Work.
   b. Supplement standard information to provide information specifically applicable to the Work.
4. Product Data: Provide as specified in individual Specification sections.
5. Foreign Manufacturers: When proposed, include following additional information:
   a. Names and addresses of at least two companies that maintain technical service representatives close to the Project.
   b. Complete list of spare parts and accessories for each piece of equipment.

C. Samples:

1. Copies: 3, unless otherwise specified in individual Specification sections.
2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
   a. Manufacturer name.
   b. Model number.
   c. Material.
   d. Sample source.
3. Manufacturer’s Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
4. Full-size Samples:
   a. Size as indicated in individual Specification section.
   b. Prepared from same materials to be used for the Work.
   c. Cured and finished in manner specified.
   d. Physically identical with product proposed for use.

D. Action Submittal Dispositions: PCM will review, mark, stamp as appropriate and distribute marked up copies as noted:

1. **No Exceptions Taken**:
   a. CONTRACTOR may incorporate product(s) or implement Work covered by submittal.
   b. Distribution:
      1) One copy retained by the PCM.
      2) One copy furnished to the City Inspector.
      3) One copy retained in CITY’S Project file.

4) Remaining copies returned to CONTRACTOR appropriately annotated.

2. **Note Comments**:
   a. CONTRACTOR may incorporate product(s) or implement Work covered by submittal, in accordance with ENGINEER'S notations.
   b. Distribution:
      1) One copy retained by the PCM.
      2) One copy furnished to the CITY Inspector.
      3) One copy retained in CITY'S Project file.
      4) Remaining copies returned to CONTRACTOR appropriately annotated.
3. **Resubmit**:
   a. Make corrections or obtain missing portions, and resubmit.
   b. Except for portions indicated, may begin to incorporate product(s) or implement Work covered by submittal, in accordance with ENGINEER'S notations.
   c. Distribution:
      1) One copy retained by the PCM.
      2) One copy furnished to the CITY Inspector.
      3) One copy retained in CITY's Project file.
      4) Remaining copies returned to CONTRACTOR appropriately annotated.
4. **Rejected**:
   a. CONTRACTOR may not incorporate product(s) or implement Work covered by submittal.
   b. Distribution:
      1) One copy retained by the PCM.
      2) One copy furnished to the CITY Inspector.
      3) One copy retained in CITY'S Project file.
      4) Remaining copies returned to CONTRACTOR appropriately annotated.
5. Not Subject to Review: Information received is not required by the Contract.

1.04 INFORMATIONAL SUBMITTALS

A. General:

1. Copies: Submit 3 copies, unless otherwise indicated in individual Specification section.
2. Refer to individual Specification sections for specific submittal requirements.
3. The PCM will review each submittal. If submittal meets conditions of the Contract, The PCM will forward copies to appropriate parties. If the PCM determines that the submittal does not meet conditions of the Contract and is therefore considered unacceptable, the PCM will retain one copy and return remaining copies with review comments to the CONTRACTOR, and require that the submittal be corrected and resubmitted.

B. Application for Payment: In accordance with Section 01025, Measurement and Payment.

C. Certificates:

1. General:
   a. Provide notarized statement that includes signature of entity responsible for preparing certification.
   b. Signed by officer or other individual authorized to sign documents on behalf of that entity.
2. Welding: In accordance with individual Specification sections.
3. Installer: Prepare written statements on manufacturer's letterhead certifying that installer complies with requirements as specified in individual Specification sections.
4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual Specification sections.
6. Manufacturer's Certificate of Compliance: In accordance with Section 01640, Manufacturers' Services.
7. Manufacturer's Certificate of Proper Installation: In accordance with Section 01640, Manufacturers' Services.

D. Construction photographs and video: In accordance with Section 01040, Coordination, and as may otherwise be required in Contract Documents**.**

E. Contract Closeout Submittals: In accordance with Section 01780, Contract Closeout.

F. CONTRACTOR-Design Data:

1. Written and graphic information.
2. List of assumptions.
3. List of performance and design criteria.
4. Summary of loads or load diagram, if applicable.
5. Calculations.
6. List of applicable codes and regulations.
7. Name and version of software.
8. Information requested in individual Specification section.

G. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification sections.

H. Operation and Maintenance Data: As required in Section 01430, Operation and Maintenance Data.

I. Schedules:

1. Schedule of Shop Drawing and Sample Submittals: Prepare separately or in combination with Construction Schedule as specified in Section 01311, Construction Schedules.
   a. Show for each, at a minimum, the following:
      1) Specification section number.
      2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.

3) Estimated date of submission to PCM including reviewing and processing time.

b. On a monthly basis, submit an updated schedule to the PCM if changes have occurred or resubmittals are required.

2. Schedule of Values: In accordance with Section 01025, Measurement and Payment.
3. Schedule of Estimated Progress Payments: In accordance with Section 01311, Construction Schedules.
4. Progress Schedules: In accordance with Section 01311, Constructions Schedules.

J. Special Guarantee: Supplier's written guarantee as required in individual Specification sections.

K. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, ENGINEER, materials testing laboratory, specialty Sub, trade, Specialist, consultant, installer, and other professionals.

L. Submittals Required by Laws, Regulations, and Governing Agencies:

1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
2. Transmit to PCM one copy of correspondence and transmittals (to include enclosures and attachments) between the CONTRACTOR and governing agency.

M. Test and Inspection Reports:

1. General: Shall contain signature of person responsible for test or report.
2. Factory:
   a. Identification of product and Specification section, type of inspection or test with referenced standard or code.
   b. Date of test, Project title and number, and name and signature of authorized person.
   c. Test results.
   d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
   e. Provide interpretation of test results, when requested by ENGINEER.
   f. Other items as identified in individual Specification sections.
3. Field: As a minimum, include the following:
   a. Project title and number.
   b. Date and time.
   c. Record of temperature and weather conditions.
   d. Identification of product and Specification section.
   e. Type and location of test, sample, or inspection, including referenced standard or code.
   f. Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
   g. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
   h. Provide interpretation of test results, when requested by

ENGINEER.

i. Other items as identified in individual Specification sections.

N. Testing and Startup Data: In accordance with Section 01810, Equipment Testing and Facility Startup.

O. Training Data: In accordance with Section 01640, Manufacturers' Services.

1.05 SUPPLEMENTS

A. The supplement listed below, following “END OF SECTION,” is part of this Specification.

1. Forms: Transmittal of CONTRACTOR's Submittal.

1.06 CONTRACTOR CORRESPONDENCE

A. The CONTRACTOR shall submit selected construction related correspondence. During the pre-construction meeting, the CONTRACTOR shall be instructed by the PCM (phone 954-828-5071) on the details of processing such documents for this Project.

B. The CONTRACTOR shall be required to track, at a minimum, the following documents:

1. RFIs
2. CCIRs
3. Daily Reports

1.07 SUPPLEMENTS

A. The supplement listed below, following “END OF SECTION,” is part of this specification.

1. Forms: Transmittal of CONTRACTOR’s Submittal.

1.08 PROGRESS PAYMENTS/REQUISITIONS FOR PAYMENT

A. The CONTRACTOR is responsible for creating the initial payment requisition. Each requisition shall be produced from updated progress data contained in the schedule and updated progress data. On a monthly basis, the CONTRACTOR shall meet with the PCM to discuss and agree on the progress of the work. Failure of the CONTRACTOR to maintain record documents and submit project schedule updates may result in a delay in processing monthly or final payment requisitions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

Project No. 12133

City of Fort Lauderdale

Transmittal of Contractor's Submittal

TO: *City of Fort Lauderdale*
100 North Andrews Avenue
4th Floor Engineering
Fort Lauderdale, FL 33301
Attn: (Project Construction Manager)

FROM: _____
Contractor

Submittal No.: _____
☐ New Submittal ☐ Resubmittal
Project: _____
Project No.: _____
Specification Section No.: _____
(Cover only one section with each transmittal)
Schedule Date of Submittal: _____

SUBMITTAL TYPE: ☐ Shop Drawing ☐ Sample ☐ Informational

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Project No. 12133

The CONTRACTOR hereby certifies that (i) CONTRACTOR has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By:_____

CONTRACTOR (Authorized Signature)

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Project No. 12133

SECTION 01311
CONSTRUCTION SCHEDULES

PART 1 -- GENERAL

1.01 SUBMITTALS

A. The CONTRACTOR shall provide a detailed Construction Schedule showing the CONTRACTOR's plan for completing the Work as required by the Contract Documents within the contract completion time. The format of the schedule shall be a bar chart (Gantt Chart). The schedule shall include the time from the date on the Notice to Proceed to the date for final completion. The date for final completion can be less than or equal to the date calculated from the contract time.

B. The CONTRACTOR's Construction Schedule shall show activities including, but not limited to the following:

1. Notice to Proceed
2. Permits (Application preparation, submittal and review)
3. Submittals, with review time
4. Early procurement activities for long lead equipment and materials
5. Mobilization summary
6. Initial site work
7. Specified Work sequences and construction constraints
8. Major equipment design, fabrication, factory testing, and delivery dates
9. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.
10. The work required by the contract and not covered in the previous items
11. Shutdowns of CITY facilities
12. Access restrictions to CITY facilities, roadways or private property
13. System startup summary
14. Contract Milestone and Completion Dates
15. Substantial Completion
16. Project closeout summary
17. Demobilization summary
18. Final Completion

C. The CONTRACTOR shall show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by the CONTRACTOR.

D. The procedure for approval of the Construction Schedule is as follows:

1. The CONTRACTOR shall submit a Preliminary Construction Schedule within fourteen (14) days after Notice to Proceed.
2. The CITY shall provide comments within ten (10) working days of receipt of the Preliminary Construction Schedule.

3. The CONTRACTOR shall address the CITY's comments and submit the initial Construction Schedule within ten (10) working days after receiving CITY review comments.
4. After the CITY accepts the initial Construction Schedule, it will be used to track the Work. The Construction Schedule will be submitted to CITY Management, residents and entities having jurisdiction in or near the project area, as appropriate.
5. The CONTRACTOR shall provide for each Construction Schedule submission four (4) legible color copies, or one emailed copy in PDF.
6. For unacceptable Construction Schedule Submittals the CONTRACTOR shall make requested corrections and resubmit within seven (7) days.

E. The CONTRACTOR shall update the schedule periodically to depict the progress of the work. Updated schedules will be required:

1. For every progress meeting
2. At the written request of the CITY

The CONTRACTOR shall not change the completion time or other key durations in updated schedules without providing a written explanation to the CITY and obtaining written approval for the change from the CITY. The CONTRACTOR shall not provide an updated schedule showing a completion time greater than the contract time. Approved change orders are required to move the contract time, and the completion time shall not exceed the approved contract time. If it is absolutely necessary to show non approved adjustments to the completion time, non approved adjustments shall be shown as additional lines in the Gantt Chart below and separate from the approved progress schedule. In addition, the CONTRACTOR shall add the heading, "Non Approved Adjustments" above the lines added to the Gantt Chart. Despite being shown on the schedule, non approved adjustments shall not be construed to indicate approval of a change to the project completion time.

F. If the CONTRACTOR fails to complete an activity by its latest scheduled completion date and this failure is anticipated to extend Contract Times (or Milestones), the CONTRACTOR shall, within seven (7) days of such failure, submit a written statement as to how the CONTRACTOR intends to correct nonperformance and return to acceptable current progress schedule. Actions by the CONTRACTOR to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.

G. If the progress of the Work does not appear sufficient to complete the work within the contract time, the CONTRACTOR shall provide a recovery schedule at the request of the CITY. The recovery schedule shall show completion within the contract time and shall include descriptions of the changes the CONTRACTOR will make to meet the contract completion time.

1.02 APPROVED CONSTRUCTION SCHEDULE

A. When accepted by the CITY, the initial Construction Schedule will replace the Preliminary Construction Schedule. Subsequent revisions will be considered as Updated Construction Schedules.

1.03 CONSTRUCTION SCHEDULE – FORMAT

A. General: The Progress Schedule shall be a bar chart (Gantt Chart). Computer generated schedules are preferred, but hand drawn schedules are acceptable as long as the appearance is very similar for all submitted schedules and updates.

B. The Construction Schedule and Updates shall:

1. Show days as the unit of measure
2. Show all project-related activities reasonably required to complete the Work
3. Show interdependence and sequence of construction
4. Identify the Work of separate stages and other logically grouped activities, and clearly identify critical path of activities.

C. For submittal of Construction Schedules and Updates, the CONTRACTOR shall:

1. Provide the schedule printed on paper not greater than 11 inches by 17 inches or smaller than 8 1/2 inches by 11 inches, unless otherwise approved. If necessary, the schedule shall be printed in color.
   Include a title block on each page of the schedule showing the name of the Project, CITY, date submitted, revision or update number, and the name of the scheduler. Updated schedules shall indicate the current data date. If the schedule has more than one page, all pages shall be numbered.
2. Identify horizontally across top of the schedule the timeframe by year, month, and day.
3. Identify each activity with a descriptive title. If necessary, the CONTRACTOR shall add notes at the bottom of the schedule with brief descriptions of the Work associated with that activity.
4. Indicate the critical path on the schedule.
5. Provide notes below the bar chart schedule to describe any controlling relationships between activities.
6. Plot activities on a time-scaled basis, with the length of each activity proportional to the current estimate of the duration.
7. Provide a legend to describe standard and special symbols used.

1.04 CONSTRUCTION SCHEDULE UPDATES

A. Updated Construction Schedules Shall Reflect:

1. Progress of Work to within two (2) working days prior to submission
2. Approved changes in Work scope and activities modified since the schedule or last update was accepted.
3. Delays in Submittals or resubmittals, deliveries, or Work
4. Adjusted or modified sequences of Work
5. Other identifiable changes
6. Revised projections of progress and completion

B. The CONTRACTOR shall produce detailed sub-schedules during the Project, upon request of the CITY to further define critical portions of the Work such as facility shutdowns.

C. The CONTRACTOR shall produce a highlighted 4-week Look Ahead Schedule for construction meetings as determined by the CITY, with schedule information compiled from the latest DETAILED PROGRESS SCHEDULE update.

D. CITY may direct the 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 CITY.

1.05 SCHEDULE ACCEPTANCE

A. The CITY's Acceptance will demonstrate agreement that:

1. The 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 sequences and constraints are shown as specified.
   c. Specified CITY-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. Startup testing duration is as specified and timing is acceptable
2. In all other respects, CITY's acceptance of the CONTRACTOR's schedule indicates that, in the CITY's judgment, the schedule represents a reasonable plan for constructing the Work in accordance with the Contract Documents. The CITY's review will not make any change in the Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not indicate acceptance of that change.
3. The Schedule remains the CONTRACTOR's responsibility and the CONTRACTOR retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct the Work in accordance with the Contract Documents.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

END OF SECTION

SECTION 01430
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Detailed information for the preparation, submission, and ENGINEER'S review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.

1.02 DEFINITIONS

A. Preliminary Data: Initial and subsequent submissions for ENGINEER'S review.

B. Final Data: Engineer-accepted data, submitted as specified herein.

C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.03 SEQUENCING AND SCHEDULING

A. Equipment and System Data:

1. Preliminary Data:
   a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by ENGINEER.
   b. Submit prior to shipment date.
2. Final Data: Submit Compilation Formatted and Electronic Media Formatted data prior to Substantial Completion of project.

B. Materials and Finishes Data:

1. Preliminary Data: Submit at least 15 days prior to request for final inspection.
2. Final Data: Submit within 10 days after final inspection.

1.04 DATA FORMAT

A. Prepare preliminary data in the form of an instructional manual. Prepare final data in data compilation format and on electronic media, as specified herein.

B. Instructional Manual Format:

1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.

2. Size: 8-1/2 inches by 11 inches, minimum.
3. Cover: Identify manual with typed or printed title “OPERATION AND MAINTENANCE DATA” and list:
   a. Project title.
   b. Designate applicable system, equipment, material, or finish.
   c. Identity of separate structure as applicable.
   d. Identity of equipment name, number and Specification section.
4. Title Page:
   a. CONTRACTOR Name, address, and telephone number.
   b. Subcontractor, Supplier, installer, or maintenance contractor’s name, address, and telephone number, as appropriate.
      1) Identify area of responsibility of each.
      2) Provide name and telephone number of local source of supply for parts and replacement.
5. Table of Contents:
   a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
   b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
6. Paper: 20-pound minimum, white for typed pages.
7. Text: Manufacturer's printed data, or neatly typewritten.
8. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
9. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.

C. Data Compilation Format:

1. Compile all ENGINEER-accepted preliminary O&M data into a hard-copy, hard-bound set.
2. Each set shall consist of the following:
   a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
   b. Cover: Identify each volume with typed or printed title “OPERATION AND MAINTENANCE DATA, VOLUME NO. __ OF __,” and list:
      1) Project title.
      2) CONTRACTOR’s name, address, and telephone number.
      3) If entire volume covers equipment or system provided by one Supplier include the following:
         a) Identity of general subject matter covered in manual.
         b) Identity of equipment number and Specification section.
   c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.

d. Table of contents neatly typewritten, arranged in a systematic order:
   1) Include list of each product, indexed to content of each volume.
   2) Designate system or equipment for which it is intended.
   3) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.

e. Section Dividers:
   1) Heavy, 80 pound cover weight tabbed with numbered plastic index tabs.
   2) Fly-Leaf:
      a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
      b) List with Each Product:
         (1) Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.
         (2) Identify area of responsibility of each.
         (3) Provide local source of supply for parts and replacement.
      c) Identity of separate structure as applicable.

f. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

D. Electronic Media Format**:**

1. Operation and Maintenance Data Summary:
   a. After all data has been found to be acceptable to ENGINEER, submit Operation and Maintenance summary data in electronic format on CD.
   b. Data shall include the information included on the Maintenance Summary Forms and other summary information as defined by the OWNER.
2. Electronic format shall be Microsoft Excel or similar as specified by the OWNER.

1.05 <u>SUBMITTALS</u>

A. Informational:

1. Data Outline: Submit 2 copies of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.
2. Preliminary Data:
   a. Submit 4 copies for ENGINEER'S review.
   b. If data meets conditions of the Contract:
      1) One copy will be returned to CONTRACTOR.

2) One copy will be forwarded to Resident Project Representative.
3) One copy will be retained in ENGINEER'S file.
4) One copy will be retained by the CITY.

c. If data does not meet conditions of the Contract:
1) All copies will be returned to CONTRACTOR with ENGINEER'S comments (on separate document) for revision.
2) ENGINEER'S comments will be retained in CITY's and ENGINEER's files.
3) Resubmit 4 copies revised in accordance with ENGINEER'S comments.

3. Final Data: Submit 3 copies in format specified herein.

1.06 DATA FOR EQUIPMENT AND SYSTEMS

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

1. Product Data:
a. Include only those sheets that are pertinent to specific product.
b. Clearly annotate each sheet to:
1) Identify specific product or part installed.
2) Identify data applicable to installation.
3) Delete references to inapplicable information.
c. Function, normal operating characteristics, and limiting conditions.
d. Performance curves, engineering data, nameplate data, and tests.
e. Complete nomenclature and commercial number of replaceable parts.
f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
g. Spare parts ordering instructions.
h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).
2. As-installed, color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
a. Format:
1) Provide reinforced, punched, binder tab; bind in with text.
2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.

4) Identify Specification section and product on Drawings and envelopes.

b. Relations of component parts of equipment and systems.

c. Control and flow diagrams.

d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.

5. Instructions and Procedures: Within text, as required to supplement product data.

a. Format:

1) Organize in consistent format under separate heading for each different procedure.

2) Provide logical sequence of instructions for each procedure.

3) Provide information sheet for OWNER'S personnel, including:

a) Proper procedures in event of failure.

b) Instances that might affect validity of guarantee or Bond.

c) Warranty.

b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.

c. Operating Procedures:

1) Startup, break-in, routine, and normal operating instructions.

2) Test procedures and results of factory tests where required.

3) Regulation, control, stopping, and emergency instructions.

4) Description of operation sequence by control manufacturer.

5) Shutdown instructions for both short and extended duration.

6) Summer and winter operating instructions, as applicable.

7) Safety precautions.

8) Special operating instructions.

d. Maintenance and Overhaul Procedures:

1) Routine maintenance.

2) Guide to troubleshooting.

3) Disassembly, removal, repair, reinstallation, and re- assembly.

6. Guarantee, Bond, and Service Agreement: In accordance with Section 01780, Contract Closeout.

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

1. Description of Unit and Component Parts:

a. Function, normal operating characteristics, and limiting conditions.

b. Performance curves, engineering data, nameplate data, and tests.

c. Complete nomenclature and commercial number of replaceable parts.

d. Interconnection wiring diagrams, including control and lighting systems.

2. Circuit Directories of Panelboards:

a. Electrical service.

b. Controls.
c. Communications.

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

C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format:
   a. Use Maintenance Summary Form bound with this Section or electronic facsimile of such.
   b. Each Maintenance Summary may take as many pages as required.
   c. Use only 8-1/2-inch by 11-inch size paper.
   d. Complete using typewriter or electronic printing.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
   a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
   b. “Unit” is the unit of measure for ordering the part.
   c. “Quantity” is the number of units recommended.
   d. “Unit Cost” is the current purchase price.

1.07 DATA FOR MATERIALS AND FINISHES

A. Content for Architectural Products, Applied Materials, and Finishes:

1. Manufacturer's data, giving full information on products:
   a. Catalog number, size, and composition.
   b. Color and texture designations.

c. Information required for reordering special-manufactured products.

2. Instructions for Care and Maintenance:
   a. Manufacturer's recommendation for types of cleaning agents and methods.
   b. Cautions against cleaning agents and methods that are detrimental to product.
   c. Recommended schedule for cleaning and maintenance.

B. Content for Moisture Protection and Weather Exposed Products:

1. Manufacturer's data, giving full information on products:
   a. Applicable standards.
   b. Chemical composition.
   c. Details of installation.
2. Instructions for inspection, maintenance, and repair.

1.08 SUPPLEMENTS

A. The supplements listed below, following “END OF SECTION,” are part of this Specification.

1. Forms: Maintenance Summary Form.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

Project No. 12133

CITY OF FORT LAUDERDALE WATER AND WASTEWATER CAPITAL IMPROVEMENTS PROGRAM

MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____
2. MANUFACTURER _____
3. EQUIPMENT/TAG NUMBER(S) _____
4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____
5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____
6. MANUFACTURER'S LOCAL REPRESENTATIVE _____
   a. Name_____ Telephone No. _____
   b. Address _____
7. MAINTENANCE REQUIREMENTS

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

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8. LUBRICANT LIST

Reference Symbol	Shell	Standard Oil	Gulf	Arco	Or Equal
List symbols used in No. 7. above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

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SECTION 01500
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. American Association of Nurserymen: American Standards for Nursery Stock.
2. U.S. Weather Bureau, "Rainfall-Frequency Atlas of the U.S. for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years."
3. U.S. Department of Agriculture, "Urban Hydrology for Small Watersheds."
4. Federal Emergency Management Agency.
5. NFPA, National Fire Prevention Standard for Safeguarding Building Construction Operations.
6. Florida Department of Law Enforcement – Domestic Terrorism Task Force for Code Orange Conditions.

1.02 SUBMITTALS

A. Informational Submittals:

1. Copies of permits and approvals for construction as required by laws and regulations and governing agencies.
2. Temporary Utility Submittals: Dewatering well locations.
3. Temporary Construction Submittals:
   a. Access Roads: Routes, cross-sections, and drainage facilities.
   b. Parking area plans.
   c. CONTRACTOR's field office, storage yard, and storage building plans, including gravel surfaced area.
   d. Fencing and protective barrier locations and details.
   e. Staging area location plan and permits as required.
   f. Maintenance of Traffic (MOT) Plans: As specified herein, and proposed revisions thereto.
   g. Plan for maintenance of existing sanitary sewer and potable water services and systems.

1.03 MOBILIZATION

A. Mobilization includes, but not be limited to:

1. Obtaining required permits.
2. Moving CONTRACTOR's field office and equipment required for operations onto site.
3. Installing temporary construction power, wiring, and lighting facilities.
4. Providing onsite communication facilities as required.
5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
6. Arranging for and erection of CONTRACTOR's work and storage yard.
7. Posting OSHA required notices and establishing safety programs and procedures.

8. Having CONTRACTOR's superintendent at site full time.

B. CONTRACTOR is responsible for finding a suitable location for a project staging and material storage area, as required.

C. CONTRACTOR is responsible for finding a suitable location for the project field office as well as the ENGINEER'S field office if required by the project. Field offices may be stand-alone facilities or suitable, existing commercial office space.

1.04 PERMITS

A. Permits, Licenses, or Approvals: Obtain in accordance with the OWNER'S construction standards and Specifications and as otherwise required for completion of the Work.

1.05 PROTECTION OF WORK AND PROPERTY

A. Comply with OWNER'S safety rules while on OWNER'S project.

B. Keep OWNER informed of serious onsite accidents and related claims.

1.06 VEHICULAR TRAFFIC

A. Maintenance of Traffic Plans (MOTs):

1. Adhere to MOTs reviewed and accepted by the PCM, and approved by the appropriate agency. Changes to this plan shall be made only by written approval of appropriate public authority and the PCM. Secure approvals for necessary changes so as not to delay progress of the Work.
2. Traffic Routing: In MOT, show sequences of construction affecting use of roadways, time required for each phase of the Work, provisions for decking over excavations and phasing of operations to provide necessary access, and plans for signing, barricading, and striping to provide passages for pedestrians and vehicles.

B. Preparation of MOTs: CONTRACTOR shall be prepare and submit MOTs where required by federal, state, county, or local agencies having jurisdiction. CONTRACTOR shall obtain all required approvals and permits associated with the MOTs.

1. Traffic control on all city, county, and state highway rights-of-way shall meet the requirements of the City of Fort Lauderdale, where applicable, and the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, as well as FDOT standard details for maintenance of traffic, in accordance with the Manual for Uniform Traffic Control and Safe Practices.
2. Traffic control on all county rights-of –way shall meet the additional requirements of the Broward County Engineering Department including but not limited to:
   a. Notification of intent to commence construction activities in a county right of way shall be provided to the CITY no less than 10 business days prior to the start of construction.
   b. The use of solid barriers to separate construction from adjacent traffic lanes where the difference in grade is greater than 12 inches.
   c. Plating or backfilling of all nonprotected excavations at the close of

each working day.

d. Broward County shall be named as an additional insured on Surety Bonds for any projects requiring work within County rights-of-way.

3. Temporary traffic control on City streets shall utilize barrels in lieu of folding barricades. CONTRACTOR is to submit a sample or detail of proposed barrel to be used as part of the MOT submittal.
4. Traffic control on all FDOT and Broward County highways shall include flagmen during all periods of active construction.
5. CONTRACTOR shall submit copies of all MOT's to the CITY concurrent with submittal to the approving authority.
6. CONTRACTOR shall submit three copies of the agency-approved MOT prior to initiation of construction or as required by specific permits contained herein.
7. All MOTs shall be ATS certified.

1.07 PEDESTRIAN TRAFFIC

A. The "MAINTENANCE OF TRAFFIC" Plan, provided by the CONTRACTOR, shall include provisions for pedestrian and transit vehicular traffic where applicable. The following are minimum requirements:

1. The CONTRACTOR shall be responsible for providing a safe and adequate walking surface applicable to the Americans with Disabilities Act (ADA) for pedestrians. Safe walk routes for all pedestrians and transit users within the vicinity of the construction zone shall be maintained throughout construction. This includes safe walk routes/access to and from existing bus stops and transit vehicles. If the current walking surface and access to and from transit vehicles at bus stops cannot be maintained, then a temporary road-rock 4-foot walk way shall be created. The safe walk route shall be separated from the construction activity by the 4-foot high orange construction fence for the entire length of the project or the length of the walk route, whichever is less.
2. Pedestrian walkways, bus stops and pedestrian access to transit vehicles should be maintained free of any obstructions and hazards such as holes, debris, mud, construction equipment, stored materials, etc. Any hazards near or adjacent to walkways, bus stops and access to transit vehicles should be clearly delineated.
3. Where street closures do not allow access for scheduled garbage and refuse removal, the CONTRACTOR shall provide for moving residential containers to a suitable collection point on regular pick-up days.
4. Where safe pedestrian access/walkways cannot be provided, pedestrians should be directed to alternative routes by appropriate traffic control devices. Pedestrian, bicycle, and wheelchair traffic shall be guided and maintained (special attention is directed to the existing bus stop location access) using approved warning lights, signing, and channelization devices. Such control devices shall be installed and maintained in accordance with the MUTCD sections on work zone traffic control for pedestrians and Chapter 6D. Pedestrian and Worker Safety.
5. Where construction activities involve consecutive bus stops, access to and from all bus stops should be maintained. If access to and from all bus stops cannot be maintained, then a bus stop may be temporarily relocated or removed. However, no two consecutive bus stop shall be affected in this manner. If a stop requires temporary removal or relocation, then the Transit

Superintendent at the Broward County Mass Transit Division, (954) 357-8381, should be notified 10 days prior to the occurrence so that appropriate notification can be completed by the Mass Transit Division.

6. 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.
7. Thirty days prior to the beginning of construction the CONTRACTOR shall notify the Transit Superintendent at the Broward county Mass Transit Division, (954) 357-8381, to arrange a pre-construction - transit route/pedestrian access safety meeting. This meeting is to determine all bus routes affected and to make any necessary arrangements for rerouting and temporary signing.

PART 2 - PRODUCTS

2.01 PROJECT SIGN

A. Refer to attached Project Sign Detail, provided as a supplement to this Section.

B. Two required; placement as directed by OWNER.

PART 3 - EXECUTION

3.01 TEMPORARY UTILITIES

A. Power:

1. Electric power will be available at or near site. Determine type and amount available and make arrangements for obtaining temporary electric power service, metering equipment, and pay all costs for the electric power used during contract period, except for portions of the Work designated in writing by Engineer as substantially complete.
2. Cost of electric power used in performance and acceptance testing will be borne by CONTRACTOR.

B. Lighting: Provide temporary lighting to meet all applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.

C. Heating, Cooling, and Ventilating:

1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage due to temperature or humidity.
2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
3. Pay all costs of installation, maintenance, operation, removal, and fuel consumed.
4. Provide portable unit heaters, complete with controls, oil- or gas-fired, and suitably vented to outside as required for protection of health and property.

5. If permanent natural gas piping is used for temporary heating units, do not modify or reroute gas piping without approval of utility company. Provide separate gas metering as required by utility.

D. Water:

1. Hydrant Water:
   a. Is available from nearby hydrants. Secure written permission for connection, meter installation, and use from water department and meet requirements for use. Notify fire department before obtaining water from fire hydrants.
   b. Use only special hydrant-operating wrenches to open hydrants. Make certain that hydrant valve is open full, since cracking the valve causes damage to the hydrant. Repair damaged hydrants and notify appropriate agency as quickly as possible. Hydrants shall be completely accessible to fire department at all times.
   c. Include costs to connect and transport water to construction areas in Contract Price.

E. Sanitary and Personnel Facilities: Provide and maintain facilities for CONTRACTOR's employees, Subcontractors, and all other onsite employer's employees. Service, clean, and maintain facilities and enclosures.

F. Fire Protection: Furnish and maintain on site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241).

3.02 PROTECTION OF WORK AND PROPERTY

A. General:

1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
2. No residence or business shall be cut off from vehicular traffic for a period exceeding 2 hours, unless special arrangements have been made.
3. Maintain in continuous service all existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and all other utilities encountered along line of the Work, unless other arrangements satisfactory to OWNERs of said utilities have been made.
4. Where completion of the Work requires temporary or permanent removal and/or relocation of existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.
5. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
6. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
7. In areas where CONTRACTOR's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by CONTRACTOR .

8. Notify property owners and utility offices that may be affected by construction operation at least 5 working days in advance.
   a. All homes and businesses affected by construction activities shall be notified by use of a “doorhanger” type announcement describing at a minimum, the nature of the Work, the proposed schedule and the CONTRACTOR’s contact information. An example doorhanger is provided as a supplement to this Section.
      1) The doorhangers shall be attached to the door, fence or other suitable location.
      2) The doorhanger shall be enclosed in an 8-½ -inch by 11-inch, weather resistant clear plastic bag with the notification information clearly visible from the outside.
   b. Before exposing a utility, obtain utility OWNER’s permission. Should service of utility be interrupted due to CONTRACTOR's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
9. Do not impair operation of existing utility systems. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, storm drains, pump stations, or other sewer structures.
10. Maintain original site drainage wherever possible.

B. Traffic Signal Communications Systems:

1. Maintain in continuous operation all existing traffic signal communication systems located within the Project limits for the duration of the Project. Maintenance of the traffic signal communication systems may entail the use of leased facilities, temporary splices, or the provision of alternate or replacement facilities as proposed by the CONTRACTOR and approved by the Broward County Traffic Engineering Division.
   a. Online communication of existing or temporary signalization shall be maintained by interconnect cable or phone lines during construction.
   b. A time based coordination (TBC) system may be used only if either of the above is not feasible. TBC systems shall be developed by a traffic engineer registered in the State of Florida subject to County approval.
   c. All reported malfunctions of traffic control systems shall be responded to by the CONTRACTOR within 2 hours and repaired within 24 hours.
2. In the event of a failure in the continuous operation of the traffic signal communication system, prepare a Remedial Action Plan that has been coordinated with the Broward County Traffic Engineering Division to determine the nature of the failure. The Remedial Action Plan shall be documented in a written report and submitted within one calendar day of the notification of the discontinuous operation of the traffic signal communication system.
3. Complete the implementation of the Remedial Action Plan within two calendar days upon receipt of approval of the Plan by the Broward County Traffic Engineering Division. Reworking of the Plan shall be required if the minimum system communication requirements are not met, as determined by the Broward County Traffic Engineering Division, as a

result of a given Remedial Action Plan.

4. In the event that the traffic signal communication systems are damaged, a temporary splice to a damaged copper communications cable shall be accomplished by using approved splice material for connecting the bare wires. For damaged fiber optic communication systems, mechanical splicing of the fiber to achieve a maximum loss of 0.20 dB is acceptable. A junction box shall be installed over the splice on a temporary basis for access, unless a new cable is installed as per specifications.
5. Any material furnished and installed for the replacement of existing traffic communications infrastructure shall meet Broward County standards.
6. All traffic signal communication systems that were temporarily spliced shall be removed and replaced in kind with new cable, subject to approval by the Broward County Traffic Engineering Division, prior to final acceptance of the Project. Replacement shall be from junction box to junction box with no intermediate splices.

C. Site Security:

1. General – Code Yellow or Less:
   a. All Sites: Provide and maintain temporary security fences as necessary to protect the Work and CONTRACTOR-furnished products not yet installed.
   b. Secure sites include, but are not limited to, water treatment plants, wastewater treatment plants, wellfields, water booster pump stations, storage facilities, and master lift stations.
   c. All employees shall have a company or CITY provided photo identification badge to be worn at all times while on a secure project site.
   d. Visitors shall be required to obtain daily visitor badges and vehicle access.
   e. Obtain approval in writing from the OWNER for work on secure sites outside of normal working hours. Approval must be available for inspection while working on the site after hours.
2. Code Orange Conditions for Work on Secure Sites:
   a. The CONTRACTOR shall provide a list, to be updated weekly or whenever employees are added or removed, of all employees and subcontractor employees to be provided site access. Access for employees or visitors cannot be guaranteed and is subject to the discretion of security personnel.
   b. All employees shall wear badges and sign-in daily.
   c. The CONTRACTOR shall provide advance notice and coordinate with the OWNER for screening and delivery of all materials and supplies, including FedEx, US Postal Service, UPS, and all general delivery items.
      1) All packages for water treatment plant sites will be delivered through the central depot.
      2) All packages shall have the name of a CONTRACTOR's employee stationed at the jobsite.
      3) All delivery drivers shall have suitable photo identification and will be required to go through security procedures.
      4) No delay claims will be allowed for failure to obtain clearance for deliveries or to delays associated with the above processes.
3. Code Red Conditions:
   a. Work on secure sites will be stopped for the duration of code red

conditions. No access by CONTRACTOR or subcontractor personnel will be permitted until clearance has been granted by the OWNER.

D. Barricades and Lights:

1. Provide as necessary to prevent unauthorized entry to construction areas and affected roads, streets, and alleyways, inside and outside of fenced area, and as required to ensure public safety and the safety of CONTRACTOR's employees, other employer's employees, and others who may be affected by the Work.
2. Provide to protect existing facilities and adjacent properties from potential damage.
3. Locate to enable access by facility operators and property owners.
4. Protect streets, roads, highways, and other public thoroughfares that are closed to traffic by effective barricades with acceptable warning signs.
5. Locate barricades at the nearest intersecting public thoroughfare on each side of the blocked section.

E. Signs and Equipment:

1. Conform to requirements of manual published by the FDOT.
2. Barricades: Provide as required by the FDOT Vehicle Code and in sufficient quantity to safeguard public and Work.
3. Portable TOW-AWAY-NO STOPPING Signs: Place where approved by police department and OWNER.
4. Traffic Cones: Provide to delineate traffic lanes to guide and separate traffic movements.
5. High-Level Warning Flag Units: Provide two in advance of traffic approaching the Work, each displaying three flags mounted at a height of 9 feet.
6. ROAD CONSTRUCTION AHEAD Signs: Provide four, size 48 inches by 48 inches. Place in conspicuous locations, approximately 200 feet in advance of the Work, and facing approaching traffic.
7. DETOUR Signs: Provide two, right arrow or left arrow, placed as approved by the PCM.
8. RIGHT or LEFT LANE CLOSED AHEAD Signs: Provide two, place in advance of lane to be closed.
9. Provide at obstructions, such as material piles and equipment.
10. Illuminate barricades and obstructions with warning lights from sunset to sunrise.
11. Use to alert general public of construction hazards, which would include surface irregularities, unramped walkways, grade changes, and trenches or excavations in roadways and in other public access areas.
12. Submit proposed signage to the PCM for prior approval.

F. Existing Structures: Where CONTRACTOR contemplates removal of small structures such as mailboxes, signposts, and culverts that interfere with CONTRACTOR's operations, obtain approval of property owner and CITY. Replace those removed in a condition equal to or better than original.

G. Finished Construction: Protect finished floors and concrete floors exposed as well as those covered with composition tile or other applied surfacing.

H. Waterways: Keep ditches, culverts, and natural drainages continuously free of

construction materials and debris.

I. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.

3.03 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Minimize air pollution from construction operations.
2. Burning: Of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust as needed up to daily, as directed by the OWNER. Strictly adhere to applicable environmental regulations for dust prevention.

B. Noise Control:

1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.
2. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments.

C. Water Pollution Control:

1. Divert sanitary sewage and nonstorm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to existing waterway.
2. Prior to commencing excavation and construction, obtain CITY'S agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and stormwater flow, including dewatering pump discharges.
3. Comply with procedures outlined in U.S. Environmental Protection Agency manuals entitled, "Guidelines for Erosion and Sedimentation Control Planning," and "Implementation, Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity," and "Erosion and Sediment Control-Surface Mining in Eastern United States."
4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

D. Erosion, Sediment, and Flood Control: Provide, maintain, and operate temporary facilities to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period. Meet all local, state, and Federal requirements and obtain necessary permits and approvals as required. Discharges to stormdrains, including discharge from dewatering systems, will not be permitted without the installation of a sediment removal system approved by the

OWNER.

1. The CONTRACTOR shall be responsible for maintaining all erosion and sediment control facilities to insure that they continue to function as intended and do not create a health or environmental hazard.
2. In the event of expected precipitation events, the CONTRACTOR shall remove all erosion or sediment barriers blocking CITY drains or inlets.
3. All sediment barriers installed on City drains and inlets shall be removed immediately upon installation of the final pavement and cleanup.

3.04 STORAGE YARDS AND BUILDINGS

A. Coordinate requirements with Section 01600, Material and Equipment.

B. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.

C. Temporary Storage Buildings:

1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.
2. Arrange or partition to provide security of contents and ready access for inspection and inventory.
3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

D. Storage and staging facilities are permitted on private property subject to the review and approval of the Planning and Zoning Department and the issuance of a permit under the provisions of Section 47-19.2 of the Unified Land Development Regulations.

1. Notice to Proceed will not be issued until the final approval is obtained.
2. Staging area sign requirements are provided at the end of this Section.

3.05 ACCESS ROADS AND DETOURS

A. Construct access roads as shown and within easements, rights-of-way, or Project limits. Utilize existing roads where shown. Alignments for new routes must be approved by CITY or OWNER.

B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.

C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.

D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.

E. Coordinate with CITY detours and other operations affecting traffic and access. Provide at least 72 hours' notice to PUBLIC WORKS DIRECTOR of operations that will alter access to the site and adjacent private properties.

F. Where access road crosses existing fences, install and maintain gates.

G. Upon completion of construction, restore ground surface disturbed by access road construction to original grade. Replace damaged or broken culverts with new culvert pipe of same diameter and material.

3.06 PARKING AREAS

A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, OWNER'S operations, or construction operations.

B. Provide parking facilities for personnel working on the Project. No employee or equipment parking will be permitted on OWNER'S existing paved areas, except as specifically designated for CONTRACTOR's use.

3.07 VEHICULAR TRAFFIC

A. Comply with Laws and Regulations regarding closing or restricting use of public streets or highways. No public or private road shall be closed, except by written permission of proper authority. Assure the least possible obstruction to traffic and normal commercial pursuits.

B. For Project Sections that Pass through a Broward County School Zone:

1. No work is permitted in a school zone while school is in session.
2. CONTRACTOR shall plan work accordingly – no delay time will be granted to comply with this requirement.

C. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian:

1. No two adjacent roadways can be under construction at the same time.
2. At least 75 percent of all roadways shall have a maintained trench surface as described below at all times during the project.
3. Construction in affected roadways shall be completed in sequence so that all improvements are completed, except for final pavement restoration during one continuous period. This includes water and sewer services to the edge of the right-of-way.

D. Whenever it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.

E. Road Closures: Maintain satisfactory means of exit for persons residing or having occasion to transact business along route of the Work. If it is necessary to close off roadway or alley providing sole vehicular access to property for periods greater than 2 hours, provide written notice to each OWNER so affected 3 days prior to such closure. In such cases, closings of up to 4 hours may be allowed. Closures of up to 10 hours may be allowed if a week's written notice is given and undue hardship does not result.

F. CONTRACTOR shall submit MOT forms and/or applications as required by the agency with jurisdiction. The Temporary Modification of Traffic Form provided as a supplement to this Section shall be submitted to the PCM for <u>all</u> requested MOT's in accordance with the provisions of this Section. The form is required for MOT's in streets under CITY jurisdiction.

G. Maintenance of traffic is not required if CONTRACTOR obtains written permission from OWNER and tenant of private property, or from authority having jurisdiction over public property involved, to obstruct traffic at designated point.

H. In making street crossings, do not block more than one-half the street at a time. Whenever possible, widen shoulder on opposite side to facilitate traffic flow. Provide temporary surfacing on shoulders as necessary.

I. Maintain top of backfilled trenches, before they are paved, to allow normal vehicular traffic to pass over.

1. Trench maintenance will consist of compacted sub-base with asphalt prime, temporary asphalt, or flowable fill as described in Section 02575, Surface Restoration.
2. Provide temporary access driveways where required.
3. Cleanup operations shall follow immediately behind backfilling.
4. Watering of untreated backfill shall be utilized to control dust as directed by the ENGINEER until such time as adequate trench maintenance has been achieved.

J. When flaggers and guards are required by regulation or when deemed necessary for safety, furnish them with approved orange wearing apparel and other regulation traffic control devices.

K. Notify fire department and police department before closing street or portion thereof. Notify said departments when streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without written permission from fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. Furnish CONTRACTOR's night emergency telephone numbers to police department.

L. Move mailboxes to temporary locations accessible to postal service, and on completion of Work in each area, replace them in their original location and in a condition equal to or better than original.

M. Remove or relocate barricades on designated trash collection days to allow access for trash pickup. If access is completely blocked, the CONTRACTOR shall move the affected trash containers to an accessible location and return them after pickup. Mark each container to ensure return to the proper location.

N. Temporary Bridges:

1. Construct temporary bridges at all points where maintenance of traffic across pipeline construction is necessary.
2. Make bridges over public streets, roads, and highways acceptable to authority having jurisdiction thereover.
3. Bridges erected over private roads and driveways shall be adequate for service to which they will be subjected.
4. Provide substantial guardrails and suitably protected approaches.
5. Provide foot bridges not less than 4 feet wide with handrails and uprights of dressed lumber.
6. Maintain bridges in place as long as conditions of the Work require their use for safety of public, except that when necessary for proper prosecution of the Work in immediate vicinity of bridge. Bridge may be relocated or

temporarily removed for such period as ENGINEER may permit.

O. Detours: Where authority having jurisdiction requires that traffic be maintained over construction work in a public street, road, or highway, and traffic cannot be maintained on original roadbed or pavement, construct and maintain detour around the Work.

P. Coordinate traffic routing with that of others working in same or adjacent areas.

3.08 CLEANUP PROCEDURES FOR HURRICANE WARNINGS AND WATCHES

A. In the event that the National Oceanographic and Atmospheric Administration (NOAA) issues a hurricane watch for the Fort Lauderdale area, the CITY will contact the CONTRACTOR informing him that the watch has been established. Once notified of a hurricane watch, the CONTRACTOR will remove all unnecessary items from the work area and tie down all remaining supplies, barricades, and movable (under 200 pounds) objects. The CITY will determine "necessary" items. If a warning is issued, the CONTRACTOR shall complete the clean-up and evacuate the area the same day. The OWNER shall not be liable for any costs or delays caused as a result of demobilization or remobilization due to the above.

3.09 CLEANING DURING CONSTRUCTION

A. In accordance with General Conditions, as may be specified in Specification sections, and as required herein.

B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep all floors (basins, tunnels, platforms, walkways, sidewalks, driveways, roof surfaces), and pick up all debris and dispose.

C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.

D. Thoroughly clean all spilled dirt, gravel, or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation. Sidewalks, unless under construction, shall be kept clear of material, and available for pedestrian use at all times.

3.10 PROJECT SIGNS

A. Provide two project signs, painted and mounted as shown on the Drawings and in the following section, at locations to be determined by the OWNER or ENGINEER.

B. Sign Dimensions:

1. The project sign shall be dimensioned as shown on the Drawings.
2. The staging area sign shall be limited to overall dimensions of 48 inches by 48 inches.

3.11 SUPPLEMENTS

A. The supplements listed below, following “END OF SECTION,” are part of this Specification.

Project No. 12133

1. Supplement -1, Project Sign Detail, (2 required).
2. Supplement - 2, Staging Area Sign Detail.
3. Supplement - 3, Temporary Modification of Traffic (MOT) Routing Form.
4. Supplement - 4, Door Hanger Notification Template.

END OF SECTION

ORDINANCE NO. C-02-

AN ORDINANCE AMENDING THE UNIFIED LAND DEVELOPMENT REGULATIONS OF THE CITY OF FORT LAUDERDALE, FLORIDA, AMENDING SECTION 47-19.2, ACCESSORY BUILDINGS AND STRUCTURES, GENERAL, TO ADD A NEW SUBSECTION ENTITLED "CONSTRUCTION STAGING AREAS" TO PERMIT PROPERTY TO BE USED AS A STAGING AREA IN CONNECTION WITH PUBLIC CONSTRUCTION PROJECTS AS A TEMPORARY USE IN ANY ZONING DISTRICT AND PROVIDING REQUIREMENTS AND A PROCESS FOR REVIEW, APPROVAL AND TERMINATION OF APPROVAL.

BE IT ORDAINED BY THE CITY COMMISSION OF THE CITY OF FORT LAUDERDALE, FLORIDA:

SECTION 1. That Section 47-19.2, Accessory buildings and structures, general, of the Unified Land Development Regulations (hereinafter referred to as "ULDR") of the City of Fort Lauderdale, Florida, is hereby amended to add a new subsection FF as follows:

Sec. 47-19.2. Accessory buildings and structures, general

FF. Construction staging areas. The staging of public purpose construction projects including but not limited to the construction of public rights-of-way, utilities and facilities, may be permitted in all zoning districts as a temporary use, in order to allow for the safe, efficient completion of the project with minimal disruption to existing residents, businesses, and traffic, and to ensure that public services and facilities are available. Construction staging materials shall include the parking and placing and storing of construction materials, vehicles, equipment and support facilities required for the construction of a public project. Construction staging areas shall be permitted subject to the following review processes and conditions:

1. Application. An application shall, in addition to the requirements provided in Section 47-24,

Development Permits and Procedures, include the following:

a. A description and sketch dimensioned to scale of the proposed use of the subject property as a construction staging area, including such information as the location and type of construction materials, equipment, support facilities, vehicles, trailers or other construction equipment, storage areas for materials, traffic circulation plan to and from the site, access to the site, location, type of materials and details of any required sign and fencing.

b. A sketch of the proposed site signage, including all contact information; and the proposed location of the sign.

c. The time required to complete the public construction project.

d. A statement signed by the property owner stating that the property owner shall consent to the temporary use of the property for construction staging as provided in the temporary construction permit application and acknowledging that the property owner shall be held responsible for the removal of construction staging materials and debris if the applicant fails to do so upon termination of the temporary public purpose construction staging permit.

2. Standards.

a. A fence of a material, design, and construction that meets Building Code requirements and precludes visibility through the fence, shall be erected around the

perimeter of the site. The fence shall have a minimum height of 6.5 feet and a maximum height of 10 feet; such height to be determined as part of the Site Plan Level I permit based on what height is necessary to protect adjacent properties.

b. The site shall be posted with a sign 16 square feet in size adjacent to the street, clearly visible from the right-of-way identifying the project by name, the name of the contractor, and the engineer responsible for construction management, and shall provide 24-hour phone contact information.

c. Movement of vehicles, storage materials or other activities at the site shall be limited to the hours of 7:30 A.M. to 5:30 P.M. Monday through Friday, unless otherwise specifically approved as provided in the Site Plan Level I permit.

d. Construction staging areas at the site shall be limited to the activities approved as part of the Site Plan Level I permit and no other activities shall be permitted except as approved by amendment of the Site Plan Level I permit.

e. Conditions of approval may be imposed if necessary to mitigate the impact on adjacent property such as temporary paving, landscaping, and watering, all in accordance with engineering standards.

f. A termination date for the temporary construction permit shall be established by the department based on the information provided by the applicant, but an extension of such termination date may be granted if good

perimeter of the site. The fence shall have a minimum height of 6.5 feet and a maximum height of 10 feet; such height to be determined as part of the Site Plan Level I permit based on what height is necessary to protect adjacent properties.

b. The site shall be posted with a sign 16 square feet in size adjacent to the street, clearly visible from the right-of-way identifying the project by name, the name of the contractor, and the engineer responsible for construction management, and shall provide 24-hour phone contact information.

c. Movement of vehicles, storage materials or other activities at the site shall be limited to the hours of 7:30 A.M. to 5:30 P.M. Monday through Friday, unless otherwise specifically approved as provided in the Site Plan Level I permit.

d. Construction staging areas at the site shall be limited to the activities approved as part of the Site Plan Level I permit and no other activities shall be permitted except as approved by amendment of the Site Plan Level I permit.

e. Conditions of approval may be imposed if necessary to mitigate the impact on adjacent property such as temporary paving, landscaping, and watering, all in accordance with engineering standards.

f. A termination date for the temporary construction permit shall be established by the department based on the information provided by the applicant, but an extension of such termination date may be granted if good

cause is shown by filing an amendment to the Site Plan Level I permit.

3. Review process.

a. Approval of a Site Plan Level I permit as described in Section 47-24.2.

b. In addition to the review process applicable to a Site Plan Level I permit, the application shall be forwarded to and reviewed by the City's Public Services Department and the Property and Right-of-way Committee.

A recommendation from both entities shall be forwarded to the department and included as part of the review of the Site Plan Level I application.

4. Review Criteria. In addition to the review criteria for a Site Plan Level I permit, the following shall apply:

a. The proposed plan meets the standards provided in this Section 47-19.2; and

b. The plan includes measures to insure there is minimal disruption to existing residents, businesses and traffic in the area.

5. Effective date of approval. The approval of a temporary construction staging area application by the department shall not take effect nor shall a permit be issued any sooner than thirty (30) days after approval and then only if no motion is adopted by the city commission seeking to review the application or no appeal is filed as provided in Section 47-26B, Appeals.

6. Appeal. If a temporary construction staging permit is denied or is approved with conditions

unacceptable to the applicant, the applicant may appeal the decision in accordance with the procedures provided in Section 47-26B., Appeals.

7. If, during the course of the construction of the public purpose construction project it is found that activities on the construction staging area site are detrimental to the health, safety and welfare of the public as determined by the City Engineer, the applicant shall be given notice of additional measures that must be taken in order to mitigate the negative impact. If the applicant fails to institute such measures within five (5) calendar days of notice, notice shall be given of a hearing to be held before the City Commission and applicant shall be required to address the impacts associated with the staging area site. If the applicant fails to demonstrate how the negative impacts will be mitigated or fails to institute the measures within the time required by the City Commission, the City Commission may terminate the permit.

8. Termination of permit. The temporary construction staging permit shall terminate on the date established by the department or the City Commission as provided in this subsection FF. Upon termination of a temporary construction staging permit the site applicant or property owner shall have thirty (30) days from termination to restore the site to a clean and safe condition with all construction staging materials and debris removed.

SECTION 2. That Table 1 of Section 47-24, Development Permits and Procedures, is hereby amended to add "public project construction staging area" as a Site Plan Level I review, as shown on the Exhibit attached hereto and made a part hereof.

SECTION 3. That if any clause, section or other part of this Ordinance shall be held invalid or unconstitutional by any court of competent jurisdiction, the remainder of this Ordinance shall not be affected thereby, but shall remain in full force and effect.

SECTION 4. That all ordinances or parts of ordinances in conflict herewith, be and the same are hereby repealed.

SECTION 5. That this Ordinance shall be in full force and effect ten days from the date of final passage.

PASSED FIRST READING this the day of _____, 2002.
PASSED SECOND READING this the day of _____, 2002

_____
Mayor
JIM NAUGLE

ATTEST

_____
City Clerk
LUCY MASLIAH

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Chart 3

SECTION 47-24. DEVELOPMENT PERMITS AND PROCEDURES

TABLE 1. DEVELOPMENT PERMITS AND PROCEDURES

Permit	Department	Development Review Committee	Planning & Zoning Board (Local Planning Agency)	Historic Preservation Board	City Commission	Board of Adjustment	Criteria for Review
CENTRAL BEACH AREA DISTRICTS - see Section 47-12 and other regulations provided in this Table 1.	–	–	–	–	–	–	1. Adequacy Review Sec. 47-25.2 2. Neighborhood Compatibility Review Sec. 47-25.3
SITE PLAN–LEVEL I DEPARTMENT							
1. Sidewalk cafe	DP		A		CRR/PZ		1. Adequacy Review Sec. 47-25.2 2. Outdoor Uses, Sidewalk Cafe Sec. 47-19.9
2. Mobile vendor	DP		A		CRR/PZ		1. Adequacy Review Sec. 47-25.2 2. Mobile Vendor, Sec. 47-18.22
3. Residential–less than 5 units	DP		A		CRR/PZ		Adequacy Review Sec. 47-25.2
4. New nonresidential construction–5,000 square feet or less	DP		A		CRR/PZ		Adequacy Review Sec. 47-25.2
5. Modification of waterway lot widths in RS-4.4 & RS-8 Districts	DP		A		CRR/PZ		1. Adequacy Review Sec. 47-25.2 2. Modification of Lot Width, Sec. 47-23.10
6. Change of use–different operation but does not involve development which requires a Site Plan Level II or higher permit–See Sec. 47-3.5.B.a	DP		A		CRR/PZ or Dept.		Nonconforming Uses, Section 47-3

7. Reuse of nonconforming structure	DP		A		CRR/PZ or Dept.		1. Adequacy Review Sec. 47-25.2, and 2. Neighborhood Compatibility Review Sec. 47-25.3 3. Nonconforming Uses, Section 47-3
8. Continuation of nonconforming status	DP		A		CRR/PZ or Dept.		Nonconforming Uses, Section 47-3
9. Approval of off-site parking	DP		A		CRR/PZ or Dept.		Parking and Loading Sec. 47-20.18
10. Temporary Construction Staging	DP				A		Section 47-19.2.FF.
...							
SITE PLAN–LEVEL II DEVELOPMENT REVIEW COMMITTEE							

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City of Fort Lauderdale Public Works Department Utilities Engineering Division

Project Name: Sanitary Sewer Pump Station D-37 Replacement

Project No: 11766

Project Cost:

Contractor:

Engineer:

Start Date:

Planned Completion Date:

Customer Service: 954/828-8000

CITY COMMISSION

John P. "Jack" Seiler – Mayor

Bruce G. Roberts – District I

Dean J. Trantalis – District II

Bobby B. DuBose – District III

Romney Rogers – District IV

City Manager–Lee R. Feldman, ICMA-C

GNW01500SUP1&SUP2/021610010

City of Fort Lauderdale
Infrastructure Rehabilitation Program

Project Name: Sanitary Sewer Pump Station D-37 Replacement, #11766

Planned Completion Date: _____

Contractor: _____

24-Hour Emergency Contact: _____

City Public Works Department Customer Service Office 954-828-8000

GNV/01500SUP1&SUP2/030760076

TEMPORARY MODIFICATION OF TRAFFIC (MOT) ROUTING FORM

DATE:

APPLICANT/ADDRESS/PHONE:
_____
_____
_____
_____

PERMIT NO. _____

(PROVIDED BY CITY AT TIME OF PERMIT APPLICATION)

PROJECT NAME/ADDRESS: _____

- This routing form should be completed and submitted as an attachment to the above-referenced permit (hereinafter "PERMIT").
- Obtaining signatures on this routing form does not constitute any approvals by the City. The MOT may be implemented only after issuance of the PERMIT, subject to satisfaction of all prerequisite conditions.
- This form is for MOT's within rights-of-way under City of Fort Lauderdale's jurisdiction. If the MOT or detour routes affect rights-of-way under Broward County jurisdiction, the County's form (available on the City website) should also be completed with the required signatures and attached. If the detours affect FDOT right-of-way, a permit from FDOT must be attached.
- If work is taking place in County or FDOT R/W, an MOT permit is not required from the City. However, PERMIT applicant (hereinafter APPLICANT) is asked to provide two weeks advance notice of any closures or detours to the City's Public Information Office.

Specific dates and times requested for MOT implementation:

Begin _____ End _____

Describe Work, including location of site and address, names of affected streets, why MOT is necessary, nature of the construction, deliveries, staging areas, if cranes will be used, etc. (staging and storage of materials/equipment are not permitted in the right-of-way). Please note if additional sheets have been attached for the description of work.

_____
_____
_____

Describe MOT, the number of lanes affected on each street, if metered parking spaces will be displaced, if detours are necessary, if flagmen will be provided, if MOT will be full-time (or times of day the MOT is to be in effect) and any other special considerations related to this request. Please note if additional sheets have been attached for the description of MOT.

_____
_____
_____

Attach: MOT plan prepared by a certified worksite traffic control technician or traffic control supervisor (as appropriate for the complexity of the job), with a copy of current certification.

If implementation of an approved PERMIT is found to adversely affect public safety and/or public convenience or there is a conflict with a higher public purpose, the APPLICANT may be required to modify the MOT plan or the PERMIT may be temporarily suspended or permanently revoked at any time with reasonable notice from the City.

The MOT plan shall be in accordance with provisions of the latest edition of Part IV of the Manual of Uniform Traffic Control Devices for Streets and Highways and FDOT Design Standards. Compliance with the requirements of the approved plan shall be the responsibility of the APPLICANT.

_____ _____
(APPLICANT) (Print Name/Title)

As a consideration for the permission granted herein, _____(APPLICANT) agrees to indemnify and hold harmless the City of Fort Lauderdale for any damages, claims or injuries that may result from the MOT plan approved under the PERMIT.

_____ By: _____
(Name of Company) (Company Officer, President, or Authorized Agent)

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Exhibit 3
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Project Name: _____ **PERMIT NUMBER:** _____

Applicant should collect the signatures in this section (if required). To expedite processing, signatures may be requested concurrently via fax or pdf and provided on separate copies of this page.

_____ (Date)

Police Department (Patrol Secretary Office)
(Required only if MOT includes a detour for any direction of travel)
1300 West Broward Boulevard
Tel.: (954) 828-5477 (call for appointment)

_____ (Date)

Fire-Rescue Department
(Required only if MOT includes a detour for any direction of travel)
Bill Findland, Assistant Chief
528 NW 2nd Street
Tel.: (954) 828-4351 (call for appointment); Fax: (954) 828-6843

_____ (Date)

Maj Shakib/ Studies Section
(Required only if MOT/detour affects County road or intersection)
2300 W. Commercial Boulevard
(Please call (954) 847-2655 for appt. Walk-ins NOT accepted)

After above signatures are collected, Applicant should forward the MOT Plan and this routing form to the person listed below.

_____ (Date)

Transportation and Mobility
Heslop Daley, Project Engineer
290 NE 3rd Avenue
Tel: (954) 828-5734 Fax: (954) 828-3734

City Manager's signature to be requested by City Staff only (if signature is required)

_____ (Date)

City Manager's Office
Lee R. Feldman, ICMA-CM, City Manager
100 N. Andrews Avenue, 7th Floor
Tel.: (954) 828-5013 or Fax: (954) 828-5I21

A copy of the PERMIT, this routing form and MOT shall be kept on-site and made available to the City inspector at all times.

This form is for MOT plans associated with private utility projects and private development projects. MOT plans for City Capital Improvement Projects shall be coordinated through Engineering Inspection or the Project Manager. Traffic modifications required for special events shall be arranged through the City's Special Events Coordinator, Jeff Meehan at (954) 828-6705.

Rev. 6-8-12

[CONTRACTOR'S NAME]

[CONTRACTOR'S STREET ADDRESS]

[CONTRACTOR'S CITY, STATE AND ZIP]

[CONTRACTOR'S TELEPHONE NUMBER]

[CONTRACTOR'S FAX NUMBER]

MEMORANDUM

TO: RESIDENTS OF [LOCATION OF CONSTRUCTION]

DATE: [CURRENT DATE]

RE: CONSTRUCTION IN YOUR AREA

FROM: [CONTRACTOR'S NAME]

Construction in your area will commence on [date of construction commencement].

The construction area is from [boundary #1] to [boundary #2].

Access to the area will be limited at certain times due to the construction activities. We apologize for any inconvenience and we will do our best to accommodate access to residents.

Thank You,

[Contractor Name]

CITY OF FORT LAUDERDALE PUBLIC WORKS CUSTOMER SERVICE DIVISION – CONTACT: (954)828-8000

Project No. 12133

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Project No. 12133

SECTION 01590
PROJECT SIGN

PART 1 - GENERAL

CONTRACTOR shall furnish and install a **4' x 8'** sign (with white painted posts) prior to start of construction. A sample sign template is below but is not specific to the project. The exact style and design of the sign will be provided by the CITY to the CONTRACTOR during the preconstruction meeting in PDF format.

END OF SECTION

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SECTION 01600
MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 DEFINITIONS

A. Products:

1. New items for incorporation in the Work, whether purchased by CONTRACTOR or OWNER for the Project, or taken from previously purchased stock and may also include existing materials or components required for reuse.

2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.

3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 DESIGN REQUIREMENTS

A. Provide systems, equipment, and components, including supports and anchorages, in accordance with provisions of latest edition of the Florida Building Code. Wind: 150 mph, with exposure condition and an importance factor of 1.15.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions near sea level.

B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 30 degrees F to 110 degrees F.

1.04 PREPARATION FOR SHIPMENT

A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.

B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and CONTRACTOR, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.

C. Extra Materials, Special Tools, Test Equipment, and Expendables:

1. Furnish as required by individual Specifications.
2. Schedule:
   a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
   b. Transfer to OWNER shall occur immediately subsequent to CONTRACTOR's acceptance of equipment from Supplier.
3. Packaging and Shipment:
   a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
   b. Prominently Displayed on Each Package, the Following:
      1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
      2) Applicable equipment description.
      3) Quantity of parts in package.
      4) Equipment manufacturer.
4. Deliver Materials to the agreed upon address.
5. Notify ENGINEER upon arrival.
6. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to OWNER.

D. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify ENGINEER of anticipated date and place of arrival**.**

E. Factory Test Results: Reviewed and accepted by ENGINEER before product shipment as required in individual Specification sections.

1.05 DELIVERY AND INSPECTION

A. Deliver products in accordance with accepted current progress schedule and coordinate to avoid conflict with the Work and conditions at site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.

B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable. Include UL labels on products so specified.

C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at site. Inspect for completeness and evidence of damage during shipment.

D. Remove damaged products from site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.06 HANDLING, STORAGE, AND PROTECTION

A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01500, Construction Facilities and Temporary Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by OWNER.

B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.

C. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulation against moisture, water, and dust damage. Connect and operate continuously all space heaters furnished in electrical equipment.

D. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

E. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.

F. Hazardous Materials: Prevent contamination of personnel, storage building, and site. Meet requirements of product specification, codes, and manufacturer's instructions.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.

B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.

C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.

D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.

F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.

G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.

H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.

I. Provide materials and equipment listed by UL wherever standards have been established by that agency.

J. Equipment Finish:

1. Provide manufacturer's standard finish and color, except where specific color is indicated.
2. If manufacturer has no standard color, provide equipment with finish as approved by ENGINEER.

K. Special Tools and Accessories: Furnish to OWNER, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.

L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by OWNER.

2.02 FABRICATION AND MANUFACTURE

A. General:

1. Manufacture parts to U.S.A. standard sizes and gauges.
2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
3. Design structural members for anticipated shock and vibratory loads.
4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
5. Modify standard products as necessary to meet performance Specifications.

B. Lubrication System:

1. Require no more than weekly attention during continuous operation.
2. Convenient and accessible. Oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
3. Provide constant-level oilers or oil level indicators for oil lubrication systems.
4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

2.03 SOURCE QUALITY CONTROL

A. Where Specifications call for factory testing to be witnessed by ENGINEER, notify ENGINEER not less than 14 days prior to scheduled test date, unless otherwise specified.

B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).

C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within CONTRACTOR's control.

3.02 INSTALLATION

A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

B. No shimming between machined surfaces is allowed.

C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.

D. Repaint painted surfaces that are damaged prior to equipment acceptance.

E. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at site, available for review at all times.

F. For material and equipment specifically indicated or specified to be reused in the Work:

1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.03 FIELD FINISHING

A. In accordance with individual Specification sections.

3.04 ADJUSTMENT AND CLEANING

A. Perform required adjustments, tests, operation checks, and other startup activities.

3.05 LUBRICANTS

A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by OWNER.

END OF SECTION

Project No. 12133

SECTION 01640
MANUFACTURERS' SERVICES

PART 1 - GENERAL

1.01 DEFINITIONS

A. Person-Day: One person for 8 hours within regular CONTRACTOR working hours.

1.02 SUBMITTALS

A. Informational Submittals:

1. Training Schedule: Submit not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.
2. Lesson Plan: Submit proposed lesson plan not less than 21 days prior to scheduled training and revise as necessary for acceptance.

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

A. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified elsewhere.

B. Representative subject to acceptance by OWNER and ENGINEER. No substitute representatives will be allowed unless prior written approval by such has been given.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

A. Furnish manufacturers' services when required by an individual Specification section, to meet the requirements of this Section.

B. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, the time required to perform the specified services shall be considered incidental.

C. Schedule manufacturer’ services to avoid conflict with other onsite testing or other manufacturers’ onsite services.

D. Determine, before scheduling services, that all conditions necessary to allow successful testing have been met.

E. Only those days of service approved by ENGINEER will be credited to fulfill the specified minimum services.

F. When specified in individual Specification sections, manufacturer's onsite services shall include:

1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of CONTRACTOR's assembly, erection, installation or application procedures.
2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
3. Providing, on a daily basis, copies of all manufacturers' representatives field notes and data to ENGINEER.
4. Revisiting the site as required to correct problems and until installation and operation are acceptable to ENGINEER.
5. Resolution of assembly or installation problems attributable to, or associated with, respective manufacturer's products and systems.
6. Assistance during functional and performance testing, and facility startup and evaluation.
7. Training of OWNER'S personnel in the operation and maintenance of respective product as required.
8. Additional requirements may be specified elsewhere.

3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

A. When specified in individual Specification section, submit prior to shipment of product or material.

B. ENGINEER may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.

C. Signed by product manufacturer certifying that product or material specified conforms to or exceeds specified. Attach supporting reference data, affidavits, and certifications as appropriate.

D. May reflect recent or previous test results on material or product, if acceptable to ENGINEER.

3.03 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this Section, shall be completed and signed by the equipment manufacturer's representative.

B. Such form shall certify that the signing party is a duly authorized representative of the manufacturer, is empowered by the manufacturer to inspect, approve, and operate their equipment and is authorized to make

recommendations required to assure that the equipment is complete and operational.

3.04 TRAINING

A. General:

1. Furnish manufacturers' representatives for detailed classroom and hands-on training to OWNER'S personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with OWNER, and familiar with operation and maintenance manual information specified in Section 01430, Operation and Maintenance Data.
3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule:

1. List specified equipment and systems that require training services and show:
   a. Respective manufacturer.
   b. Estimated dates for installation completion.
   c. Estimated training dates.
2. Allow for multiple sessions when several shifts are involved.
3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by OWNER, and to allow full participation by manufacturers' representatives. Adjust schedule for interruptions in operability of equipment.
4. Coordinate with Section 01311, Construction Schedules and Section 01810, Equipment Testing and Facility Startup.

C. Lesson Plan: When specified, prepare for each required course, containing the following minimum information:

1. Title and objectives.
2. Recommended types of attendees (e.g., managers, ENGINEERs, operators, maintenance).
3. Course description and outline of course content.
4. Format (e.g., lecture, self-study, demonstration, hands-on).
5. Instruction materials and equipment requirements.
6. Resumes of instructors providing the training.

D. Prestartup Training:

1. Coordinate training sessions with OWNER'S operating personnel and manufacturers' representatives**,** and with submission of operation and maintenance manuals in accordance with Section 01430, Operation and Maintenance Data.
2. Complete at least 14 days prior to beginning of facility startup.

E. Post-startup Training: If required in Specifications, furnish and coordinate training of OWNER'S operating personnel by respective manufacturer's representatives.

3.05 SUPPLEMENTS

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

1. Forms: Manufacturer's Certificate of Proper Installation.

END OF SECTION

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

Owner _____ EQPT SERIAL NO:_____

EQPT TAG NO:_____ EQPT/SYSTEM:_____

PROJECT NO:_____ SPEC. SECTION:_____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer's recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments:_____

_____

_____

_____

_____

_____

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

Date:_____, 20___

Manufacturer:_____

By Manufacturer's Authorized Representative: _____

(Authorized Signature)

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Project No. 12133

SECTION 01780
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Submit prior to application for final payment.
   a. Record Documents.
   b. Special Bonds, Special Guarantees, and Service Agreements.
   c. Consent of Surety to Final Payment.
   d. Releases or Waivers of Liens and Claims.
   e. Releases from Agreements.
   f. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01025, Measurement and Payment.
   g. Spare Parts, Special Tools and Extra Materials: As required by individual Specification sections.

B. Subcontractor Identification Form:

1. Submit form with final pay request.
2. Submit a separate form for each subcontractor used.
3. For Capital Improvement Projects, submit form along with final pay request to the CITY.
4. Form is attached as a Supplement to this Section.

1.02 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
   a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
   b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.

Prior to submitting each request for progress payment, request CITY's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by CITY to recommend whole or any part of CONTRACTOR's Application for Payment, either partial or final.

1.03 RELEASES FROM AGREEMENTS

A. Furnish OWNER written releases from property OWNERs or public agencies where side agreements or special easements have been made, or where CONTRACTOR's operations have not been kept within the OWNER'S construction right-of-way.

B. In the Event CONTRACTOR is Unable to Secure Written Releases:

1. Inform CITY of the reasons.
2. OWNER or its representatives will examine the site, and OWNER will direct CONTRACTOR to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
3. Should CONTRACTOR refuse to perform this Work, OWNER reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require CONTRACTOR to furnish a satisfactory Bond in a sum to cover legal claims for damages.
4. When OWNER is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) CONTRACTOR's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate claims that CONTRACTOR has failed to fulfill terms of side agreement or special easement, or (ii) CONTRACTOR is unable to contact or has had undue hardship in contacting grantor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from ENGINEER at no cost to CONTRACTOR, one complete set of Contract Documents. Drawings will be full size.
2. Delete ENGINEER title block and seal from all documents.
3. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.
4. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded. CONTRACTOR is responsible for providing "red-lined" markups of all changes including revised locations of buried features.
5. CONTRACTOR shall provide original signed and sealed "as-built" drawings and electronic copies of the new pump station and sanitary sewer upon

completion of construction. He shall employ a professional land surveyor licensed in the state of Florida. All work shall be in accordance with City of Fort Lauderdale surveying standards and per NAVD 88.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by PCM or ENGINEER.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
   a. Color Coding:
      1) Green when showing information deleted from Drawings.
      2) Red when showing information added to Drawings.
      3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by “cloud” drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
   a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
   b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
   c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
   d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
   e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and ENGINEER’S written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
   a. Clearly identify the item by accurate note such as “cast iron drain,” “galv. water,” and the like.
   b. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).
   c. Make identification so descriptive that it may be related reliably to Specifications.

3.02 FINAL CLEANING

A. At completion of the Work or of a part thereof and immediately prior to CONTRACTOR's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to CONTRACTOR's notice of completion, clean entire site or parts thereof, as applicable.

1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to OWNER and PCM.

2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
4. Clean all windows.
5. Clean and wax wood, vinyl, or painted floors.
6. Broom clean exterior paved driveways and parking areas.
7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
8. Rake clean all other surfaces.
9. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.
10. Leave water courses, gutters, and ditches open and clean.

B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

C. Meet all requirements of Section 02575, Surface Restoration.

3.03 SUPPLEMENTS

A. The supplements listed below, following “END OF SECTION,” are part of this Specification.

1. Subcontractor Identification Form

END OF SECTION

Project No. 12133

SUBCONTRACTOR IDENTIFICATION FORM

This form shall be completed by all City of Fort Lauderdale Prime Contractors who subcontracted out any portion of his/her City contract. The form shall be forwarded to the City of Fort Lauderdale's Public Services Department with the prime contractor's final pay request. A separate form is to be completed and submitted for each subcontractor. Please telephone (954) 761-5057 or 761-5083, if you have any questions regarding this form.

1) CITY OF FORT LAUDERDALE PROJECT NO. _____

2) PROJECT DESCRIPTION _____

3) SUBCONTRACTOR _____

_____
Business Name

_____
Address

_____
Telephone & Fax Nos.

_____
Email Address/Company Wesbsite (if applicable)

4) SUBCONTRACTOR'S PRINCIPAL OFFICER _____

5) CLASSIFICATION OF WORK SUBCONTRACTED OUT _____

6) COST OF WORK SUBCONTRACTED OUT _____

7) Please check the item(s) which properly identify the ownership status of the subcontractor's firm:

☐ Subcontractor firm is not a MBE or WBE

☐ Subcontractor firm is a MBE, as at least 51 percent is owned and operated by one or more socially and economically-disadvantaged individuals:

☐ American Indian ☐ Asian ☐ Black ☐ Hispanic ☐ White

☐ Subcontractor firm is a WBE, as at least 51 percent is owned and operated by one or more women.

☐ American Indian ☐ Asian ☐ Black ☐ Hispanic ☐ White

8) **PRIME Contractor** _____

_____
NAME & TITLE OF PRIME CONTRACTOR'S REPRESENTATIVE COMPLETING THIS FORM
(*Please Print*)

_____
(Telephone No.) *(Fax No.)* *(Email Address)*

SIGNATURE _____ **DATE** _____
Prime Contractor's Representative

Project No. 12133

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Project No. 12133

SECTION 01810
EQUIPMENT TESTING AND FACILITY STARTUP

PART 1 - GENERAL

1.01 DEFINITIONS

A. Facility: Entire Project, or an agreed-upon acceptable portion.

B. Field Quality Control: Term, as used in individual specification sections, which refers to specified on-site functional and performance testing of equipment.

C. Functional Test: Test or tests in presence of ENGINEER to demonstrate that installed equipment meets manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.

D. Performance Test: A test performed in presence of ENGINEER and after any required functional test, to demonstrate and confirm that individual equipment meets the performance requirements specified in individual specification sections.

E. Source Quality Control: Term, as used in individual specification sections, which refers to specified testing performed on specified equipment at manufacturer’s facility prior to shipment.

F. Unit process: As used in this section, a unit process is a portion of the facility that performs a specific process function.

1.02 SUBMITTALS

A. Informational Submittals:

1. Completed Manufacturer's Certificate of Proper Installation as required by individual specification sections. Submit prior to beginning Facility Startup procedures.
2. Testing:
   a. Functional and performance test schedules, test plan, procedures, and log format. Submit at least 14 days prior to start of related testing.
   b. Facility Startup and Performance Evaluation Plan: Submit at least 21 days prior to commencement of startup.
3. Certification of calibration for testing equipment, when so specified.
4. Documentation of HVAC systems balancing results, when so specified.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONTRACTOR’S TESTING AND STARTUP REPRESENTATIVE

A. Designate and furnish one or more CONTRACTOR's personnel to coordinate and expedite testing and facility startup.

B. Such person or persons shall be present during equipment testing and facility startup meetings, and shall be available at all times during the testing, facility

startup, and performance evaluation period.

3.02 EQUIPMENT TESTING

A. Preparation:

1. General:
   a. Complete installation of each unit and related processes before testing, including all related manufacturer's representative services.
   b. Furnish qualified manufacturer's representatives, when required by individual specification sections, to assist in testing.
   c. Obtain from equipment manufacturer's representative the Manufacturer's Certificate of Proper Installation Form, in accordance with Section 01640, MANUFACTURERS' SERVICES, when required by individual specification sections.
   d. Schedule equipment testing and facility startup meetings to discuss test schedule, plan of test, materials, chemicals and liquids required, facilities operations interface, and OWNER involvement.
   e. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required to conduct testing.
2. Equipment Test Report Form: Provide written test report form for each item of equipment to be tested, to include the minimum information:
   a. OWNER/Project Name.
   b. Equipment or item tested.
   c. Date and time of test.
   d. Type of test performed (Functional or Performance).
   e. Test conditions.
   f. Test results.
   g. Signature space for CONTRACTOR and ENGINEER representatives.
3. Cleaning and Checking: Prior to beginning functional testing:
   a. Calibrate testing equipment in accordance with manufacturer's instructions.
   b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
   c. Lubricate equipment in accordance with manufacturer's instructions.
   d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.
   e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
   f. Check power supply to electric-powered equipment for correct voltage.
   g. Adjust clearances and torque.
   h. Test piping for leaks.
   i. Balance HVAC systems, measuring airflow (cfm) static pressure, and component pressure losses.
4. Ready-to-test determination will be by ENGINEER based at least on the following:
   a. Notification by CONTRACTOR of equipment readiness for testing.
   b. Acceptable testing plan.
   c. Acceptable Operation and Maintenance Manuals.
   d. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.

e. Adequate completion of Work adjacent to, or interfacing with, equipment to be tested.
f. Availability and acceptability of manufacturer's representative, when specified, to assist in testing of respective equipment.
g. Satisfactory fulfillment of other specified manufacturers' responsibilities.
h. Equipment and electrical tagging complete.
i. Delivery of all spare parts and special tools.

B. Functional Testing:

1. Conduct as specified in individual specification sections.
2. Notify PCM, ENGINEER, and manufacturer's representative in writing at least 10 days prior to scheduled date of testing.
3. When, in ENGINEER's opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual specification sections. Such acceptance will be evidenced by ENGINEER's signature on Equipment Test Report.

C. Performance Testing:

1. Conduct as specified in individual specification sections.
2. Notify PCM and ENGINEER at least 14 days prior to scheduled date of test.
3. Performance testing shall not commence until equipment has been approved by ENGINEER as having satisfied functional test requirements specified.
4. Follow approved testing plan and detailed procedures specified.
5. Source and type of fluid, gas, or solid for testing shall be as specified.
6. Unless otherwise indicated, furnish all labor, materials, and supplies for conducting the test and taking all samples and performance measurements.
7. Prepare performance test report summarizing test method and results.
8. When, in ENGINEER's opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by ENGINEER's signature on Equipment Test Report.

3.03 FACILITY STARTUP AND PERFORMANCE EVALUATION

A. General:

1. Support OWNER's operations personnel throughout Facility Startup and Performance Evaluation Period.
2. Equipment shall be accepted by ENGINEER as having met requirements of specified functional testing prior to facility startup.
3. Sequence each unit process to the point that the complete facility is operational for evaluation of unit process and facility performance.
4. Demonstrate proper operation of required interfaces within and between individual unit processes.
5. Include equipment furnished by OWNER, if applicable.
6. Provide Subcontractor and equipment manufacturers' staff adequate to prevent delays.
7. Schedule ongoing Work so as not to interfere with or delay the completion of facility startup.

8. After the facility is operating, complete performance testing of those items of equipment not previously tested.

B. Facility Startup and Performance Evaluation Plan:

1. Develop a plan in conjunction with OWNER's operations personnel detailing step-by-step instructions for startup of each unit process and the complete facility.
2. Include a method of evaluation and overall performance report for each unit process.
3. Plan shall consist of bound copies of Startup and Performance Evaluation Forms. Use one form for each unit process; use example form attached, or one designed by CONTRACTOR.
4. Startup and Performance Evaluation Form will minimally include the following:
   a. Description of unit process being started.
   b. All equipment and devices included in the unit process.
   c. Unit process startup procedures (i.e., valves to be open/closed, order of equipment startup, etc.).
   d. Requirements for water, power, and chemicals needed for startup.
   e. CONTRACTOR Certification that each unit process is capable of performing its intended function(s), including fully automatic operation.
   f. Space for evaluation comments.

C. OWNER Responsibilities:

1. Assist CONTRACTOR in developing a Facility Startup and Performance Evaluation Plan detailing step-by-step instructions for startup of each unit process and the complete facility.
2. Provide water, power, chemicals, and other items as required for testing and facility startup, unless otherwise indicated.
3. Operate process units and devices, with support of CONTRACTOR.
4. Provide labor and materials as required for sampling and laboratory analyses.

D. Facility Startup Period:

1. Startup sequencing of unit processes shall be as chosen by CONTRACTOR and approved by the OWNER.
2. Make adjustments, repairs, and corrections necessary to complete facility startup.
3. Startup of entire facility or any portion thereof shall be considered complete when, in opinion of ENGINEER, facility or designated portion has operated in manner intended for 5 continuous days without significant interruption. This period is in addition to training, functional, or performance test periods specified elsewhere.
4. Significant Interruption: May include any of the following events:
   a. Failure of CONTRACTOR to provide and maintain qualified onsite startup personnel as scheduled.
   b. Failure to meet specified performance for more than 2 consecutive hours.

c. Failure of any critical equipment or unit process that is not satisfactorily corrected within 5 hours after failure.
d. Failure of any noncritical equipment or unit process that is not satisfactorily corrected within 8 hours after failure.
e. As determined by ENGINEER.

5. A significant interruption will require startup then in progress to be stopped and restarted after corrections are made.

E. Facility Performance Evaluation:

1. During the Facility Startup Period, conduct a performance evaluation for purpose of evaluating full capabilities of facility.
2. Certify, on the Facility Performance Evaluation Form, that each unit process is capable of performing its intended function(s), including fully automatic and computerized operation.

3.04 SUPPLEMENT

A. Supplement listed below, following "END OF SECTION," is a part of this Specification:

1. Startup and Performance Evaluation Form.

END OF SECTION

CITY OF FORT LAUDERDALE WATER AND WASTEWATER CAPITAL IMPROVEMENTS PROGRAM

STARTUP AND PERFORMANCE EVALUATION FORM

OWNER:_____ **PROJECT:**_____

Unit Process Description: (Include description and equipment number of all equipment and devices):

_____

_____

_____

_____

Startup Procedure (Describe procedure for sequential startup and evaluation, including valves to opened/closed, order of equipment startup, etc.):

_____

_____

_____

_____

_____

Startup Requirements (Water, power, chemicals, etc.):_____

_____

_____

Evaluation Comments:_____

_____

_____

CONTRACTOR Certification that Unit Process is capable of performing its intended function(s), including fully automatic operation:

Firm Name:_____

Startup Representative:_____ **Date**:_____, **20**___
(Authorized Signature)

PROJECT 12133

SECTION 02240
DEWATERING

PART 1 - GENERAL (NOT USED)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The CONTRACTOR shall be responsible for design, installation, permitting and operation of a dewatering system to dewater specified excavations.

1. The dewatering system shall be designed in accordance with the Best Management Practices (BMP's) adopted by FDEP.
2. Inspection and control of dewatering system operations will be in accordance with the FDEP guidelines established in the Florida Erosion and Sediment Control Inspector's Manual (current edition).

B. e base when manage and control excavation water recharge in order to facilitate and not impede construction activities at all times, including weekends, holidays, and during periods of work stoppages, and furnish and install, and operate, a contingency backup dewatering system to maintain control of excavation water levels to facilitate construction (i.e.; no construction delays).

C. The CONTRACTOR shall submit a dewatering plan to the CONSULTANT for review. The CONTRACTOR is advised that the SFWMD, FDOT, Broward County Environmental Protection & Growth Management Department. (BCEPGMD), etc. may require that a dewatering plan, prepared by a State of Florida licensed Professional Engineer or Registered Professional Geologist, be submitted and approved prior to issuance of a dewatering permit. The CONTRACTOR will retain a State of Florida Licensed Professional Engineer or Registered Professional Geologist to provide an initial report of potential dewatering issues in the Site vicinity. The CONTRACTOR shall retain a State of Florida Licensed Professional Engineer or Registered Geologist to provide any additional services required by regulatory agencies regarding dewatering and contaminated sites.

D. The CONTRACTOR is advised that the Broward County Environmental Protection Department may have identified contaminated sites within ¼ mile radius of the project site. The CONTRACTOR may be required to provide testing and monitoring of the dewatering operations, and to institute dewatering methods and controls, as required by BCEPD, SFWMD, FDOT, etc. The CONTRACTOR will be responsible for all costs associated with means and methods of dewatering which will be set forth by dewatering permits.

3.02 SUBMITTALS

A. Submittals shall be made in accordance with the requirements specified in Section 01300, Submittals, and the requirements of this Section.

B. Provide name, address, and phone numbers of all subcontractors.

C. The CONTRACTOR shall submit a Dewatering Best Management Practices (BMP)

Plan prior to the start of excavation expected to include dewatering operations. The Plan shall provide detailed descriptions of dewatering procedures to be utilized to meet the requirements of this Section. Methodologies to control dewatering discharge contamination include, but are not limited to:

1. Holding tanks of adequate size and volume.
2. Wellpointing systems.
3. Sump pumping systems.
4. Chemical precipitation of particulates.
5. Filter systems and siltation controls.
6. Outfall booms.

D. The CONTRACTOR shall provide a Site Health and Safety Plan and Activity Hazard Analysis (AHA) for contaminated soil as specified in the Contract Documents, and/or groundwater as specified in this Section, to include the following:

1. A written description of the proposed method for temporary stockpiling, transportation, and disposal of all wastes.
2. Copy of permits of disposal facilities.
3. Certification of disposal of all wastes.
4. Directions to the nearest hospital and phone number.
5. Emergency contact phone numbers.
6. Laboratory analyses and sampling plan required for transportation and disposal of all wastes in accordance with applicable federal, state, and local requirements.

E. Upon Completion of Remediation Activities, the Following shall be Provided:

1. Copy of manifests for all wastes leaving the site.
2. Copy of the laboratory analyses results from all sampling activities.
3. Copy of closure reports that may be required.

3.03 SURFACE WATER CONTROL

A. Remove surface runoff controls when no longer needed.

B. Seal off or berm catch basins in the area of construction to prevent discharge of untreated dewatering effluent or runoff from unstabilized construction areas into storm drains.

C. All drain inlets or catch basins used for dewatering discharge shall be provided with silt and sediment removal barriers as approved by the Engineer.

1. All barriers shall be cleaned regularly to avoid sediment discharge into the storm drain system.
2. Construction activities will be stopped at no cost to the OWNER until sediment controls are properly maintained, installed, and in compliance with the dewatering permit.
3. All barriers shall be removed upon issuance of a hurricane warning.

3.04 DEWATERING SYSTEMS

A. Design, furnish, and install, operate, and maintain a dewatering system of sufficient size and capacity to permit excavation and subsequent construction activities in water-free conditions, and to lower and maintain the excavation area

groundwater level a minimum of 2 feet below the lowest point of excavation. The dewatering system shall be designed and operated such that the system continuously maintains excavations water levels so as to maintain the excavation water level in order to allow for the initiation and completion of excavation backfill compaction and restoration activities.

B. Dewatering systems shall include, but is not limited to, furnishing and installing wells or well points, and or other equipment and appurtenances as may be necessary, including system components or equipment, installed outside the outermost perimeter of the excavation limits, and sufficiently below lowest point of excavation, to maintain the specified or required groundwater elevation.

C. Open trench pumping maybe permitted upon the approval of the Engineer.

D. Design and Operate Dewatering Systems:

1. To prevent loss of ground as water is removed.
2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.
3. Avoid surface water pollution or discharge of sediment to storm drain systems or waterways.

E. Provide supplemental ditches and sumps only as necessary to collect water from local seeps. Do not use ditches and sumps as primary means of dewatering. The CONTRACTOR shall not direct any flow of water over pavement surfaces. Discharge of water shall be conducted as approved by the local, state, and federal agencies and the Engineer.

F. Provide controls to prevent surface water from entering excavation pits, trenches, or stockpiled materials.

3.05 PIPELINES CONSTRUCTED UNDER WATER

A. In the event that it is found that the water in a trench cannot be lowered by ordinary means, i.e., well points and pumps, an alternate construction method may be proposed by the CONTRACTOR. Complete details, specifications, manufacturer's descriptive literature, installation lists and any other pertinent data regarding the proposed alternate method shall be submitted as an alternate by the CONTRACTOR to the ENGINEER within 5 calendar days of the time that the CONTRACTOR anticipates using such alternate method.

B. If the ENGINEER approves the alternate method in writing, it may be used, so long as the Work is performed in a manner which, in the opinion of the Engineer, conforms to the method and procedure as set forth in the information supplied by the CONTRACTOR in his original application for use of an alternate method. The ENGINEER may revoke approval of the alternate method if at any time, in his opinion, the Work is not conforming to any applicable portion of these Specifications.

C. No pipeline shall be laid under water without approval of the Engineer.

D. If the dewatering system is eliminated or the effort reduced, and the pipe is laid underwater, additional pipe zone material will be required as backfill to the water table elevation, or to the level it was reduced to.

3.06 DISPOSAL OF WATER

A. All water generated, pumped, or removed from excavations as a result of excavation dewatering activities shall be collected, containerized, and managed prior to discharge and or treatment at an approved discharge point or facility, in accordance with Broward County Code of Regulation, Sections 27-27, 27-193(a), 27-193(b)(3)a and 27-196. CONTRACTOR shall secure, obtain, and pay for all necessary local, state, and federal permits, licenses, fees, and or approvals to discharge water or perform onsite or offsite treatment and disposal. Treat water collected by dewatering operations as required by regulatory agencies, prior to discharge.

B. Discharge water as permitted, and in regulatory compliance with CONTRACTOR obtained discharge permits/licenses.

1. All discharge activities shall be performed so as to prevent silt and sediment discharge and eliminate any soil erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.
2. Maximum allowable turbidity of discharges to surface waters or storm drains will be 10 NTU's.
3. Sump discharges cannot be discharged directly to storm drains or surface waters without treatment.

C. Affected storm sewer outfalls shall be protected with floating silt booms as approved by the Broward County Environmental Protection & Growth Management Department (BCEPGMD) and the ENGINEER. All accumulated debris resulting from the dewatering discharge collecting in the boom shall be removed on a daily basis.

D. Visible silt plumes emanating from the area around the outfalls will be considered a failure of the silt and sediment removal measures and may result in a Notice of Violation issued by BCEPGMD. The CONTRACTOR will be responsible for all fines associated with the violation of the dewatering permit conditions issued to the CONTRACTOR.

E. Failure to control dewatering discharges as described above and as detailed in the Florida Erosion and Sediment Control Inspector's Manual, may result in an order to cease dewatering operations until the discharge problems are corrected. No claims will be accepted for costs or delays associated with unacceptable dewatering discharge practices.

3.07 WELL POINT REMOVAL

A. Well point holes shall be filled with sand which shall be washed into the hole.

B. Well point holes located within asphalt pavement surfaces or concrete pavements, shall be filled with sand to the subgrade. The remaining hole shall be filled with nonshrink grout.

3.08 CONTAMINATED GROUNDWATER AND DISPOSAL REQUIREMENTS

A. If CONTRACTOR suspects, witnesses, or identifies groundwater contamination at any time during the performance of the Work, CONTRACTOR shall notify the ENGINEER immediately. CONTRACTOR shall be responsible for sample collection and laboratory analysis.

B. If analytical testing (by CONTRACTOR) documents and indicates elevated concentrations above FDEP action levels (Chapter 62-777, Florida Administrative Code) dewatering operations will be suspended until appropriate treatment and or construction measures can be implemented. CONTRACTOR shall not resume operations until notified to do so in writing by Broward County. There shall be no delay or mobilization claim. In addition, the local agency will be immediately notified via telephone and in writing by the Engineer. Dewatering activities in the area will not proceed until review of the matter with the local agency is resolved and written authorization is issued.

C. Treatment of the groundwater will include three options depending on the magnitude of the contamination in the trench or as determined by the CONTRACTOR in conjunction with Broward County: Granular Activated Carbon (GAC) Treatment Vessels**,** Mobile Air Stripping Units, or Vacuum Truck Removal and Disposal or other method as approved by the County. The CONTRACTOR will provide a submittal list of all qualified groundwater remediation subcontractors for GAC vessel treatment/portable air stripping unit and vacuum truck disposal including phone numbers, contact names, and addresses prior to start of construction. The selected groundwater treatment/recycling facility for hauling contaminated groundwater shall also be identified.

D. If contaminated groundwater in the dewatering trench is encountered, the remediation operations will begin once local agency approval is obtained.

E. Effluent water from the treatment system will be analyzed by the CONTRACTOR to confirm that concentrations are below regulatory limits.

F. A Dewatering Plan describing the dewatering approach, groundwater monitoring, and remediation alternative shall be provided by the CONTRACTOR.

END OF SECTION

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PROJECT 12133

SECTION 02260
EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL (NOT USED)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The CONTRACTOR shall be responsible to design, provide, and maintain shoring, sheeting, and bracing as necessary to support the sides of excavations and to prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

B. Consider all available geotechnical information available when designing the excavation support system.

3.02 REMOVAL OF EXCAVATION SUPPORT

A. Remove excavation support in a manner that will maintain support as excavation is backfilled.

B. Do not begin to remove excavation support until support can be removed without damage to existing facilities, completed Work, or adjacent property.

C. Remove excavation support in a manner that does not leave voids in the backfill.

3.03 TRENCHES

A. For trench excavation exceeding 5 feet in depth, provide adequate safety system meeting requirements of the Occupational Safety and Health Administration's (OSHA), Trench Safety Standards, 29 C.F.R., S.1926.650, Subpart P, and all subsequent revisions or updates adopted by the Department of Labor and Employment Security.

- END OF SECTION -

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SECTION 02315
FILL AND BACKFILL

PART 1 - GENERAL

1.01 DEFINITIONS

A. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.

B. Completed Course: A course or layer that is ready for next layer or next phase of Work.

C. Lift: Loose (uncompacted) layer of material.

D. Geosynthetics: Geotextiles, geogrids, or geomembranes.

E. Well-Graded:

1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

F. Influence Area: Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:

1. 1-foot outside outermost edge at base of foundations or slabs.
2. 1-foot outside outermost edge at surface of roadways or shoulder.
3. 0.5-foot outside exterior at spring line of pipes or culverts.

G. Borrow Material: Material from required excavations or from designated borrow areas on or near site.

H. Selected Backfill Material: Materials available onsite that ENGINEER determines to be suitable for specific use.

I. Imported Material: Materials obtained from sources offsite, suitable for specified use.

J. Structural Fill: Fill materials as required under structures, pavements, and other facilities.

K. Embankment Material: Fill materials required to raise existing grade in areas other than under structures.

PART 2 - PRODUCTS

2.01 EARTHFILL

A. Excavated material from required excavations and designated borrow sites, free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.

B. Material containing more than 10 percent gravel, stones, or shale particles is unacceptable.

C. Provide imported material of equivalent quality, if required to accomplish Work.

2.02 GRANULAR FILL

A. Use graded aggregate base material of uniform quality throughout, substantially free from vegetable matter, shale, lumps and clay balls, and having a Limerock Bearing Ratio value of not less than 100.

B. Aggregate is composed of limestone, marble, or dolomite.

C. Use material retained on the No. 10 sieve composed of aggregate meeting the following requirements:

1. Soundness Loss, Sodium, Sulfate: AASHTO T 104, 15 percent.
2. Percent Wear: AASHTO T 96 (Grading A) 45 percent.

Sieve Size	Percent by Weight Passing
2 inch	100
1-1/2 inch	95 to 100
¾ inch	65 to 90
3/8 inch	45 to 75
No. 4	35 to 60
No. 10	25 to 45
No. 50	5 to 25
No. 200	0 to 10

2.03 WATER FOR MOISTURE CONDITIONING

A. Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

2.04 FOUNDATION STABILIZATION ROCK

A. General: Materials may be either limerock, shell rock, cemented coquina, or shell base sources approved by the Department.

B. Specific Requirements for Limerock: For limerock, carbonates of calcium and magnesium shall be at least 70 percent. Materials having a plasticity index of more than ten or a liquid limit greater than 40 shall not be used as a stabilizer. The gradation of limerock shall be FDOT No. 57 stone or such that 97 percent of these

materials will pass a 3-1/2 inch sieve.

C. Crushed Shell: Crushed shell for this use shall be mollusk shell (i.e., oysters, mussels, clams, cemented coquina). Steamed shell will not be permitted.

1. This shell shall Meet the Following Requirements:
   a. Material having a plasticity index of more than ten or a liquid limit greater than 40 shall not be used as a stabilizer.
   b. At least 97 percent by weight of the total material shall pass a 3-1/2 inch sieve and at least 50 percent by weight of the total material shall be retained on the No. 4 sieve.
   c. Not more than 20 percent by weight of the total material shall pass the No. 200 sieve. The determination of the percentage passing the No. 200 sieve shall be by washing only.
   d. In the event that the shell meets the above requirements without crushing, crushing will not be required.

PART 3 - EXECUTION

3.01 GENERAL

A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.

B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.

C. During filling and backfilling, keep level of fill and backfill around each structure and buried tank even.

D. If Pipe, Conduit, Duct Bank, or Cable is to be Laid Within Fill or Backfill:

1. Fill or backfill to an elevation 2 feet above top of item to be laid.
2. Excavate trench for installation of item.
3. Install bedding, if applicable, as specified in Section 02320, Trench Backfill.
4. Install item.
5. Backfill pipe zone and remaining trench, as specified in Section 02320, Trench Backfill, before resuming filling or backfilling specified in this Section.

E. Tolerances:

1. Final Lines and Grades: Within a tolerance of 0.1 foot, unless dimensions or grades are shown or specified otherwise.
2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.

F. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

3.02 BACKFILL UNDER AND AROUND STRUCTURES

A. Under Facilities: Within influence area beneath structures, slabs, pavements, curbs, piping, conduits, duct banks, and other facilities, backfill with granular fill, unless otherwise shown. Place granular fill in lifts of 6-inch maximum thickness and compact each lift to a density of at least 100 percent of the maximum density as determined by AASHTO T99, Method C.

3.03 FILL

A. Outside Influence Areas Beneath Structures, Pavements, Curbs, Slabs, Piping, and Other Facilities: Unless otherwise shown, place earthfill as follows:

1. Allow for proper thickness of topsoil where required.
2. Maximum 8-inch thick lifts.
3. Place and compact fill across full width of embankment.
4. Compact to a density of at least 80 percent of the maximum density as determined by AASHTO T99, Method C.
5. For the outer layer of all fill where plant growth will be established, DO NOT COMPACT. Leave this layer in a loose condition to a minimum depth of 6 inches.
6. Dress completed embankment with allowance for topsoil, crest surfacing, and slope protection, where applicable.

3.04 SITE TESTING

A. Gradation:

1. One sample from each 1,500 tons of finished product or more often as determined by Engineer, if variation in gradation is occurring, or if material appears to depart from Specifications.
2. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.
3. Remove material placed in Work that does not meet Specification requirements.

B. In-Place Density Tests: In accordance with AASHTO T99, Method C. During placement of materials, test as follows:

1. Earthfill: One test per 400 feet of pipe run.
2. Granular Fill: One test per 400 feet of pipe run.
3. Foundation Stabilization Rock: One test per lift.

3.05 REPLACING OVER-EXCAVATED MATERIAL

A. Replace excavation carried below grade lines shown or established by ENGINEER as follows:

1. Beneath Footings: Granular fill.
2. Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.
3. Beneath Slabs-On-Grade: Granular fill.
4. Trenches:
   a. Unauthorized Over-excavation: Either foundation stabilization rock, or granular pipe base material, as specified in Section 02320, 34 inch

Backfill.

b. Authorized Over-excavation: Foundation stabilization rock.

5. Permanent Cut Slopes (Where Overlying Area is Not to Receive Fill or Backfill):

a. Flat to Moderate Steep Slopes (3 to 1, Horizontal Run: Vertical Rise or Flatter): Earthfill.

b. Steep Slopes (Steeper than 3 to 1):

1) Correct over-excavation by transitioning between over-cut areas and designed slope adjoining areas, provided such cutting does not extend offsite or outside easements and right-of-ways, or adversely impacts existing facilities, adjacent property, or completed Work.

2) Backfilling over-excavated areas is prohibited unless, in Engineer's opinion, backfill will remain stable, and over-excavated material is replaced as compacted earthfill.

END OF SECTION

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PROJECT 12133

SECTION 02316
EXCAVATION

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Provide adequate survey control to avoid unauthorized over-excavation.

1.02 WEATHER LIMITATIONS

A. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.03 SEQUENCING AND SCHEDULING

A. CONTRACTOR shall call the utility companies 72 hours before excavation, see Section 01040, Coordination for each utility company phone number and contact person.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.

B. It shall be the CONTRACTOR's responsibility to notify business establishments and residents not less than 72 hours prior to construction. CONTRACTOR shall, wherever necessary, provide temporary sidewalks and driveway entrances at his own expense, including safe bridges over trenches and fencing around excavations for pedestrian protection.

C. Provide adequate survey control to avoid unauthorized over-excavation. Do not over-excavate without written authorization of Engineer. If the CONTRACTOR excavates beyond the limits shown or specified, the CONTRACTOR shall replace such excavation at his own expense. Replace over-excavated material as specified in Section 02315, Fill and Backfill.

D. Where muck, rock, clay, or other material within the limits of excavation is unsuitable in its original position, excavate such material to the cross-sections shown or specified. Backfill with suitable material and shape to the required cross-section.

E. Remove or protect obstructions as shown on the Drawings.

3.02 UNCLASSIFIED EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.03 TRENCH WIDTH

A. Minimum Width of Trenches:

1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
   a. Less than 4-Inch Outside Diameter or Width: 18 inches.
   b. Greater than 4-Inch Outside Diameter or Width: 18 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
3. Increase trench widths by thicknesses of sheeting, if used.
4. The maximum trench width shall not exceed the minimum stated width of the trench unless approved by the Engineer. Restoration for excavation beyond the minimum required width shall be at the CONTRACTOR's sole expense.

3.04 EMBANKMENT AND CUT SLOPES

A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown, with proper allowance for topsoil or slope protection, where shown.

B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.

C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and right-of-ways, or adversely impacts existing facilities, adjacent property, or completed Work.

3.05 STOCKPILING EXCAVATED MATERIAL

A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.

B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.

C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads, streets, public thoroughfares, or access to fire hydrants.

D. Do not stockpile excavated material adjacent to trenches and other excavations unless excavation sideslopes and excavation support systems are designed, constructed, and maintained for stockpile loads.

E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.06 DISPOSAL OF SPOIL

A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.

B. Dispose of debris resulting from removal of underground facilities.

C. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk.

END OF SECTION

PROJECT 12133

SECTION 02319
SUBGRADE PREPARATION

PART 1 - GENERAL

1.01 DEFINITIONS

A. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.

B. Subgrade: Layer of existing soil after completion of clearing, grubbing, scalping of topsoil prior to placement of fill, roadway structure or base for floor slab.

C. Proof-Rolling: Testing of subgrade by compactive effort to identify areas that will not support the future loading without excessive settlement.

1.02 QUALITY ASSURANCE

A. Notify ENGINEER when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.

B. Bring subgrade to proper grade and cross-section and uniformly compact surface.

C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.

D. Maintain prepared ground surface in finished condition until next course is placed.

3.02 COMPACTION

A. Under Earthfill: Compact upper 6 inches to minimum of 80 percent of the maximum density as determined by AASHTO T99, Method C.

B. Under Pavement, Floor Slabs On Grade, or Granular Fill Under Structures: Compact the upper 6 inches or as shown on the Drawings, to minimum of 100 percent of the maximum dry density as determined by AASHTO T180.

3.03 MOISTURE CONDITIONING

A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.

B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods to hasten drying process.

3.04 TESTING

A. Proof-roll subgrade with equipment specified in Article Compaction to detect soft or loose subgrade or unsuitable material, as determined by Engineer.

3.05 CORRECTION

A. Soft or Loose Subgrade:

1. Adjust moisture content and recompact, or

2. Over excavate as specified in Section 02316, Excavation, and replace with suitable material from the excavation, as specified in Section 02315, Fill and Backfill.

B. Unsuitable Material: Over excavate as specified in Section 02316, EXCAVATION, and replace with suitable material from the excavation, as specified in Section 02315, Fill and Backfill.

END OF SECTION

PROJECT 12133

SECTION 02320
TRENCH BACKFILL

PART 1 - GENERAL

1.01 DEFINITIONS

A. Base Rock: Granular material upon which manhole bases and other structures are placed.

B. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.

C. Imported Material: Material obtained by the CONTRACTOR from source(s) offsite.

D. Lift: Loose (uncompacted) layer of material.

E. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.

F. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.

G. Selected Backfill Material: Material available onsite that ENGINEER determines to be suitable for a specific use.

H. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Well-Graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.

PART 2 - PRODUCTS

2.01 GEOTEXTILE

A. None.

2.02 MARKING TAPE

A. Plastic:

1. Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.
2. Thickness: Minimum 4 mils.
3. Minimum Width: 2 inches.
4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
5. Manufacturers and Products:
   a. Reef Indusries; Terra Tape.
   b. Allen; Markline.

B. Metallic:

1. Solid aluminum foil, visible on unprinted side, encased in a protective high visibility, inert polyethylene plastic jacket.
2. Foil Thickness: Minimum 5.5 mils.
3. Width: 2 inches.
4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
5. Joining Clips: Tin or nickel-coated furnished by tape manufacturer.
6. Manufacturers and Products:
   a. Reef Industries; Terra ”D”.
   b. Allen; Detectatape.

C. Color: In accordance with APWA Uniform Color Code for Temporary Marking of Underground Facilities.

Color[a]	**Facility**
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communicating alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewers and drain lines
Blue	Water, irrigation, and slurry lines
[a]As specified in ANSI Z53.1, Safety Color Code.	

2.03 TRENCH STABILIZATION MATERIAL

A. Foundation stabilization rock as specified in Section 02315, Fill and Backfill.

2.04 BEDDING MATERIAL AND PIPE ZONE MATERIAL

A. Granular fill as specified in Section 02315, Fill and Backfill.

2.05 EARTH BACKFILL

A. Earth fill as specified in Section 02315, Fill and Backfill.

PART 3 - EXECUTION

3.01 TRENCH PREPARATION

A. Water Control:

1. As specified in Section 02240, dewatering.
2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.
3. Provide continuous water control until trench backfill is complete.

B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

C. Where the trench has been dewatered, backfilling must be done before the pumps are shut off so that the pipe will not float. Any pipe which has been displaced because of floatation will be removed and installed correctly at the CONTRACTOR's expense.

3.02 TRENCH BOTTOM

A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.

B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify ENGINEER. ENGINEER will determine depth of over-excavation, if any, required.

3.03 TRENCH STABILIZATION MATERIAL INSTALLATION

A. Rebuild trench bottom with trench stabilization material as directed by the ENGINEER.

B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.

C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

3.04 BEDDING

A. Furnish granular fill or imported bedding material as directed by the ENGINEER.

B. Place over the full width of the prepared trench bottom in two equal lifts when the required depth exceeds 8 inches.

C. Hand grade and compact each lift to provide a firm, unyielding surface.

D. Minimum thickness from the following depths below the bottom to the springline of the pipe are as follows, except increase depths listed by 6 inches in areas of rock excavation:

1. Pipe, 15 Inches and Smaller: 4 inches.
2. Pipe, 18 Inches to 36 Inches: 6 inches.
3. Pipe, 42 Inches and Larger: 8 inches.
4. Conduit: 3 inches.
5. Direct-Buried Cable: 3 inches.
6. Duct Banks: 3 inches.

E. Check grade and correct irregularities in bedding material. Loosen top 1 to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.

F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.

G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

3.05 BACKFILL PIPE ZONE

A. Furnish granular fill or imported bedding material as directed by the ENGINEER.

B. Upper Limit of Pipe Zone Shall Not Be Less Than Following:

1. Pipes:
   a. Up to 12-Inch Diameter: 6 inches above top of pipe.
   b. Greater than 12-Inch Diameter: 12 inches above top of pipe, unless shown otherwise.
2. Conduit: 3 inches, unless shown otherwise.
3. Direct-Buried Cable: 3 inches, unless shown otherwise.
4. Duct Bank: 3 inches, unless shown otherwise.

C. Restrain pipe, conduit, cables, and duct banks as necessary to prevent their movement during backfill operations.

D. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench. Compact to 90 percent density as determined by AASHTO T99.

1. Pipes 10 Inches and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter but not less than 3 inches. .
2. Pipes Over 10-Inch Diameter: Maximum 6-inch lifts.

E. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by “walking in” and slicing material under haunches with a shovel to ensure that voids are completely filled before placing each succeeding lift. Compact material in pipe zone to at least 98 percent maximum density as determined by AASHTO T180.

F. After the full depth of the pipe zone material has been placed as specified, compact the material by a minimum of three passes with a vibratory plate compactor only over the area between the sides of the pipe and the trench walls. CONTRACTOR shall exercise proper care to ensure that no pipe joints will be broken, damaged, or disturbed through the use of any compacting equipment.

G. Do not use power-driven impact compactors to compact pipe zone material.

H. Where approved by the ENGINEER, hydraulic compaction of the pipe zone material and granular trench backfill may be used providing density testing requirements are met. A submittal describing the method of hydraulic compaction will be required.

3.06 MARKING TAPE INSTALLATION

A. Continuously install marking tape along centerline of all buried piping, on top of last lift of pipe zone material. Coordinate with piping installation drawings.

1. Metallic Marking Tape: Install with nonmetallic piping and waterlines.
2. Plastic Marking Tape: Install with metallic piping.

3.07 BACKFILL ABOVE PIPE ZONE

A. General:

1. Process excavated material to meet specified gradation requirements.
2. Adjust moisture content as necessary to obtain specified compaction.
3. Do not allow backfill to free fall into the trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over the top of pipe.
4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
5. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.
6. Backfill around structures with same class backfill as specified for adjacent trench unless otherwise shown or specified.
7. Hydraulic compaction may be allowed based upon approval by the ENGINEER of the CONTRACTOR's detailed compaction and testing procedures.

B. Backfill for Areas in Landscaped Areas:

1. Place in lifts not exceeding 12-inch thickness.
2. Mechanically compact each lift to a minimum of 80 percent of the maximum density prior to placing succeeding lifts.

C. Backfill for Areas Under Facilities and Pavements: Backfill trench above the pipe zone with granular backfill in lifts not exceeding 12 inches. Compact each lift to a minimum of 98 percent of the maximum density compaction as determined by AASHTO Method T180, 100% for Broward County rights of way, prior to placing succeeding lifts.

3.08 ALTERNATE METHOD OF CONSTRUCTION

A. When high water tables, porous soils or other limitations to dewatering are encountered, the CONTRACTOR may request the approval of the ENGINEER for an alternate method of construction.

B. Use of alternative methods shall not relieve the CONTRACTOR of the work, result in increased costs to the OWNER or reductions in the quality of the work as defined by testing and acceptance requirements.

C. Removal of water requirements will be waived and the pipe and appurtenances will be permitted to be installed underwater.

D. Excavation shall be performed in accordance with Section 02316, Excavation, to the specified limits. The excavation shall be cleared of silt and other fines.

E. Pipe bedding shall be placed from the bottom of the excavation to 6 inches above the top of the pipe. The bedding shall be granular fill as described in Section 02315 Fill and Backfill.

F. Select backfill material shall be used to backfill the trench from the top of the bedding to a level 1 foot above the standing water level in the trench. Select material shall be FDOT # 57 stone or granular fill as described in Section 02315, Fill and Backfill. This lift shall be compacted in accordance with the provisions of this Section after which the remainder of the backfill can proceed as normal.

G. If the above described method is used, all backfill material used below the water table shall not be released into the trench until the bucket or container is less than 1 foot above the water level. Pipe bedding and pipe zone material as defined above shall not be dumped or pushed into the trench.

3.09 MAINTENANCE OF TRENCH BACKFILL

A. After each section of trench is backfilled, maintain the surface of the backfilled trench even with the adjacent ground surface until final surface restoration is completed.

B. Other Areas: Add excavated material where applicable and keep the surface of the backfilled trench level with the adjacent ground surface.

C. Water shall be applied to the unstabilized trench backfill to control dust as directed by the ENGINEER.

D. Placement of lime rock base course and prime coat shall occur no longer than 5 days following trench backfill or as soon thereafter as record information is available to verify that pipe inverts and slopes are acceptable.

3.10 SETTLEMENT OF BACKFILL

A. Settlement of trench backfill, or of fill or facilities constructed over trench backfill within the warranty period for the project will be considered a result of defective compaction of trench backfill.

END OF SECTION

PROJECT 12133

SECTION 02340
SOIL EROSION STABILIZATION

PART 1 - GENERAL

1.01 DEFINITIONS

A. Soil Erosion Stabilization:

1. Provide erosion control measures on the Project and in areas where work is accomplished in conjunction with the Project, so as to prevent pollution of water, detrimental effects to public or private property adjacent to the Project.

2. Ground surfaces exposed during the wet season.

3. Areas which will not be subjected to heavy wear by ongoing construction traffic.

4. Temporary and long-term stabilization of new disturbed ditches, swales, storm water ponds, or disturbed ground with intermittent construction traffic.

B. Buffer Zone: Undisturbed area or, strip of natural vegetation, or an established suitable planting adjacent to disturbed area that reduces erosion and runoff.

C. Coordinate the installation of temporary erosion control features with the construction of the permanent erosion control features to the extent necessary to ensure economical, effective, and continuous control of erosion and water pollution.

D. Permanent Stabilization:

1. Permanently stabilize exposed soil surfaces at finished grades
2. Permanent stabilization methods include, but are not limited to, sodding (permanent), mulching, and landscaping.
3. Immediately perform permanent stabilization at each completed excavation and embankment areas except for areas that are scheduled to be redisturbed.
4. Incorporate all permanent erosion control features into the Project at the earliest practical time.

1.02 DELIVERY, STORAGE, AND PROTECTION

A. General: Prevent or reduce the discharge of pollutants to storm water from all material delivery or storage by minimizing the storage of hazardous materials onsite, storing materials in a designated area, installing secondary containment, conducting regular inspection, and training employees or subcontractors.

B. Sod: Provide as indicated on the plans.

C. Mulch: Mark package of mulch to show air-dry weight.

1.03 SEQUENCING AND SCHEDULING

A. CONTRACTOR shall accept responsibility for existing soil and erosion control on the site, including maintenance, installed before starting earth disturbance activities.

B. Projects permitted by the South Florida Water Management District require written

approval of the erosion/sedimentation control plan. Engineer's acceptance of Construction Period Erosion/Sedimentation Control Plan required prior to starting earth disturbing activities.

C. Complete soil preparation, sodding, fertilizing, mulching, and matting on disturbed areas that will require stabilization either because the area has reached final grade (permanent landscaping) or because the area remains unworked for over 14 days (temporary sodding) during the wet season.

D. Notify ENGINEER at Least 3 Working Days in Advance of:

1. Materials delivery.
2. Start of planting activity.

E. Sodding: Perform under favorable weather conditions during seasons that are normal, for such Work as determined by accepted local practice.

1.04 MAINTENANCE

A. Operations:

1. Sodded Areas: Perform during maintenance period to include:
   a. Watering: Keep surface moist.
   b. Washouts: Repair by filling with topsoil, and replace sodded areas.
   c. Mulch: Replace wherever and whenever washed or blown away.
   d. Resod unsatisfactory areas or portions thereof immediately if a satisfactory stand has not been produced.
2. Inspect, repair, and replace as necessary all erosion control measures during the time period from start of construction to completion of construction.
3. Inspect a minimum of at least once every 7 days or after each storm event and at least daily during prolonged rainfall. At no time shall more than 1 foot of sediment be allowed to accumulate in any erosion control device. The cleaning operation shall not dispose of sediment offsite.

B. Sediment Removal:

1. Remove sediment from erosion control devices and work into the grading plan at least once a week as required to maintain proper operation of devices. The cleaning operation shall not dispose of sediment offsite.
2. Sediment shall be removed and the controls upgraded or repaired as needed as soon as practicable, but not later than 2 days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment needed for repair operations.
3. In the event of continuous rainfall over a 24 hour period, or other circumstances that preclude equipment operation in the area, hand carry and install additional sediment controls as approved by the Engineer.
4. Replace rock filters with new rock at least once a month or when the sediment reduces by one half the filtering capacity of the facility.

PART 2 - PRODUCTS

2.01 FERTILIZER

A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose.

B. Fertilizer shall have the Following Minimum Percentage of Plant Food by Weight:

1. Nitrogen: 16 percent.
2. Phosphoric Acid: 4 percent.
3. Potash: 8 percent.

C. At least 50 percent of phosphoric acid shall be from normal superphosphate or an equivalent source which will provide a minimum of two units of sulfur.

2.02 SOD

A. As indicated on the plans.

2.03 MULCH

A. The mulch material shall be dry straw or hay, consisting of oat, rye, or wheat straw, or of pangola, peanut, coastal bermuda, or bahia grass, hay or compost; and shall be free from noxious weeds and plants.

B. 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. Furnish to the Engineer, prior to incorporation onto the project, a certification from the Florida Department of Agriculture and Consumer Services, Division of Plant Industry, stating that the Mulch materials are free of noxious weeds. Any such noxious plant or plant part found to be delivered as mulch will be removed by the CONTRACTOR at his expense and in accordance with the law.

C. Only undeteriorated mulch which can readily be cut into the soil shall be used. The “air-dry” weight (as defined by the Technical Association of the Pulp and Paper Industry, for wood cellulose) shall be marked on each package by the producer.

2.04 SOIL TACKIFIER

A. Derived from natural organic plant sources containing no growth or germination-inhibiting materials.

B. Capable of hydrating in water, and readily blend with other slurry materials.

C. Wood Cellulose Fiber: Add as tracer, at rate of 150 pounds per acre.

D. Manufacturers and Products:

1. Chevron Asphalt Co.; CSS-1.
2. Terra; Tack AR.
3. J-Tack; Reclamare.

2.05 EROSION CONTROL MATTING

A. Excelsior mat or straw blanket; staples as recommended by matting manufacturer.

B. Manufacturers and Products:

1. Akzo Industries, Ashville, NC.

2. North American Green, Evansville, IN.

2.06 REINFORCED PLASTIC COVERING

A. Co-extruded, copolymer laminate reinforced with a nonwoven grid of high strength nylon cord submersed in a permanently flexible adhesive media allowing for equal tear resistance in all directions.

B. Black in color and ultraviolet stabilized.

C. Physical Requirement (Minimum Average Roll Values):

1. Tear Strength: 130 pounds.
2. Elongation: 620 percent.
3. Minimum Thickness: 6 mil.

D. Manufacturers:

1. Reef Industries, Inc., Houston, TX.
2. Griffolyn Co., Houston, TX.

2.07 SILT FENCE

A. Support Posts: As recommended by manufacturer of geotextile.

B. Fasteners: Heavy-duty wire staples at least 1-inch long, tie wires, or hog rings, as recommended by manufacturer of geotextile.

C. Filter Fabric: Polyester, polypropylene, or nylon filaments, woven into a uniform pattern, distinct and measurable openings.

1. Filaments: Resistant to damage from exposure to ultraviolet rays and heat.
2. Material Edges: Finish so that, filaments retain their relative positions under stress.

D. In accordance with requirements of Table No. 1:

Table No. 1 - Filter Fabric

Physical Property	Required Value	Test Method
Weight, lbs/sq yd, min.	4	ASTM D3776
Equivalent Opening Size, max.	50-70	U.S. Standard Sieve
Grab Tensile Strength, lb, min. ARV	400	ASTM D4632
Elongation, % max.	25	ASTM D1682
Mullen Burst Strength, psi, min. ARV	200	ASTM D3786
Ultraviolet Radiation Resistance, % Strength Retention	80	ASTM D4355
Flow Rate, gpm/sf, min. ARV	30 to 50	ASTM D4491

E. Manufacturers:

1. Polyfelt, Evergreen, AL.
2. Dupont Co., Wilmington, DE.

3. Mirafi, Inc., Charlotte, NC.

2.08 STRAW BALES

A. Machine baled clean salt hay or straw of oats, wheat, barley, or rye, free from seed of noxious weeds, using standard baling wire or string.

2.09 POSTS FOR STRAW BALES

A. Two-inch by 2-inch untreated wood, rebar, or commercially manufactured metal posts.

2.10 STABILIZED CONSTRUCTION ENTRANCES

A. Clean pit run or 2 inches minus gravel.

B. Subgrade geotextiles as specified on the plans.

2.11 DUST CONTROLLER

A. Nontoxic materials that do not have an adverse effect on soil structure or establishment and growth of vegetation.

1. Calcium chloride meeting the meeting the requirements of AASHTO M144.
2. Water; reasonably clean, and shall be free from suspended water.

PART 3 - EXECUTION

3.01 GENERAL

A. Erosion control measures are required during all construction and site disturbance activities, and shall remain until permanent site ground covers are in-place.

B. Limitation of Exposure of Erodible Earth: The ENGINEER may limit the surface areas of unprotected erodible earth exposed by the construction operation, and may direct the CONTRACTOR to provide erosion or pollution control measures to prevent contamination of any river, stream, lake, tidal waters, reservoir, canal, or other water impoundments, or to prevent detrimental effects on property outside the project right-of-way or damage to Project. Limit the area in which excavation and filling operations are being performed so that it does not exceed the capacity to keep the finish grading, grassing, sodding, and other such permanent erosion control measures current in accordance with the accepted schedule.

C. Do not allow the surface area of erodible earth that clearing and grubbing operations or excavation and filling operations expose to exceed 750,000 ft^2 without specific prior approval by the Engineer. This limitation applies separately to clearing and grubbing operations and excavation and filling operation.

D. The ENGINEER may increase or decrease the amount of surface area the CONTRACTOR may expose at any one time.

E. The implementation of the erosion control plan and the construction maintenance, replacement and upgrading the erosion control devices are the responsibility of the CONTRACTOR until all construction is completed and landscaping established and approved. During the construction period, the erosion control devices shall be

upgraded for unexpected storm events and to ensure that sediment and sediment laden water do not leave the site.

F. Maintain existing buffer zones adjacent to Project Limits. Keep all construction equipment, debris, and soils out of the natural buffer zone.

3.02 STABILIZED CONSTRUCTION ENTRANCES

A. Provide a graveled construction access at each access point between the site and any public or private road or other paved surfaces.

B. Place subgrade geotextile on the ground prior to aggregate placement.

C. Place aggregate over the subgrade geotextile to a minimum thickness of 8 inches.

D. Minimum dimensions for stabilized construction entrances are 50 feet in length by 20 feet in width.

3.03 SOIL PREPARATION

A. Before start of sodding, and after surface has been shaped and graded, and lightly compacted to uniform grade, scarify soil surface to minimum depth of 1 inch.

3.04 SODDING

A. As specified on the plans.

3.05 MULCHING

A. Apply uniformly on disturbed areas that will remain undisturbed for 7 days or more, as requested by Engineer, and on all sodded areas.

B. Application: Sufficiently loose to permit penetration of sunlight and air circulation, and sufficiently dense to shade ground, reduce evaporation rate, and prevent or materially reduce erosion of underlying soil.

1. As recommended by manufacturer.

3.06 SOIL TACKIFIER

A. Spray on after mulch is in place.

B. The soil tackifier shall be applied at the rate per acre specified by manufacturer for applicable grades.

3.07 REINFORCED PLASTIC COVERING

A. Place on areas where sodding and erosion control matting have not controlled erosion, and over all temporary stockpiles.

B. Install in single thickness, strips parallel to direction of drainage. Anchor plastic in 6-inch by 6-inch trench backfilled with compacted native material.

C. Maintain tightly in place by using sand bags on ropes with a maximum 10-foot grid spacing in all directions.

D. Tape or weight down full length, overlap seams at least 12 inches.

E. Remove at final acceptance unless notified otherwise by Engineer.

3.08 SILT FENCE

A. Install prior to starting earth disturbing activities upslope of fence.

B. Install silt fence along contour where shown on the Drawings. Do not deviate from grade more than 4 inches.

C. One-piece filter fabric or continuously sewn to make one-piece filter fabric for full height of the fence, including portion buried in the toe trench.

D. When joints are necessary, splice filter fabric together only at a support post, with a minimum 6-inch overlap, and securely fasten both ends to support post.

E. Filter fabric shall not extend more than 30 inches above the ground surface. Securely fasten to upslope side of each support post using ties. Filter fabric shall not be stapled to existing trees.

F. Take precaution not to puncture filter fabric during installation. Repair or replace damaged area.

G. Remove silt fence after upslope area has been permanently stabilized. Immediately dress sediment deposits remaining after the sediment fence has been removed to conform to existing grade. Prepare and sod graded area.

3.09 TEMPORARY SOIL STOCKPILES

A. Cover with reinforced plastic covering, as directed in Article Reinforced Plastic Covering.

B. Protect perimeter of stockpile from erosion with ditches.

3.10 DUST CONTROL

A. Apply appropriate dust control measures on a continuous basis until permanent stabilization measures are in place.

B. Apply on construction routes and other disturbed areas subject to surface dust movement and where off-site damage may occur if dust is not controlled.

C. Avoid creating erosion when using water as a dust controller.

3.11 STRAW BALES

A. Embed minimum of 4 inches in flat-bottomed trench.

B. Place with ends tightly abutting or overlapped. Corner abutment is not acceptable.

C. Install so that bale bindings are oriented around the sides and not over the top and bottom of the bale.

D. Use two posts for each bale. Drive posts through the bale until top of post is flush with top of bale and post is 1-1/2 feet to 2 feet in the ground.

E. Wedge loose straws in any gaps between bales.

3.12 EROSION CONTROL MATTING

A. Place on sodded slopes 3H to 1V, and steeper.

B. Apply sod and fertilizer prior to matting.

C. At top of slope, entrench material in 6-inch by 6-inch trench. Secure matting at 1 foot intervals down the slope. At the bottom of the slope, extend the mat 2 feet beyond the toe of slope, turn material under 4 inches, and staple at 1 foot intervals.

D. Mats shall be stapled in-place as they are installed down the slope face. The mats shall have direct contact with the soil surface.

E. Overlap:

1. Lengthwise: 1 foot minimum.
2. Crosswise: 6 inches minimum.

3.13 CLEANUP

A. Sediment trapped in erosion control devices shall be removed from the site or regraded into the slopes on the site. Do not flush sediment-laden water into drainage system.

B. After site restoration is complete and when approved by the Engineer, all temporary erosion control measures shall be completely removed and disposed offsite to locations that are approved by federal, state, and local authorities.

C. Silt fence, straw bales, reinforced plastic covering, and any other erosion control devices shall be disposed offsite to locations that are approved by federal, state, and local authorities.

END OF SECTION

PROJECT 12133

SECTION 02500
CONVEYANCE PIPING - GENERAL

PART 1 - GENERAL

1.01 DELIVERY, STORAGE, AND HANDLING

A. In accordance with manufacturer's recommendations and as specified in the individual Specification(s) following this Section.

B. Marking at Plant: Mark each pipe and fitting at plant. Include date of manufacture, manufacturer's identification, specification standard, diameter of pipe, pipe class, and other information required for type of pipe.

C. Pipe, specials, and fittings received at Project site in damaged condition will not be accepted.

D. Gasket Storage: Store rubber gaskets in cool, well ventilated place and do not expose to direct rays of sun. Do not allow contact with oils, fuels, petroleum, or solvents.

E. Handling:

1. Heavy canvas, or nylon slings of suitable strength shall be used for lifting and supporting materials. Do not use chains or cables.
2. Lifting pipe during unloading or lifting into trench shall be done using two slings placed at quarter point of pipe section. Pipe may be lifted using one sling near center of pipe, provided pipe is guided to prevent uncontrolled swinging and no damage will result to pipe or harm to workmen. Slings shall bear uniformly against pipe.
3. Pipe and fittings shall not be stored on rocks or gravel, or other hard material that might damage pipe. This includes storage area and along pipe trench.

PART 2 - PRODUCTS

2.01 PIPE

A. As specified in the individual Specification(s) following this Section and as shown on the Drawings.

B. Color Coding for Water Mains:

1. All pipe used for water main applications shall be color-coded blue in accordance with FAC 62-555.320(21)(b)(3).
2. Continuous blue stripes, parallel to the axis of the pipe, shall be applied using tape or paint applied to the dry pipe exterior surface.
3. Pipe striped during manufacture shall have stripes applied at 90-degree intervals around the pipe that remain intact following installation of the pipe.

4. Pipe striped during installation shall be in a continuous line along the top of the pipe. Pipes 24 inches and greater shall have two additional stripes on each side.
5. Aboveground water main piping shall be color-coded or marked similar to underground piping.

2.02 JOINTS

A. As specified in the individual Specification(s) following this Section.

2.03 COUPLINGS

A. General:

1. Coupling linings for use in potable water systems shall be in conformance with NSF 61B. Linings for wastewater piping shall be in accordance with the provisions of Section 02502, Ductile Iron Pipe and Fittings.
2. Couplings shall be rated for appropriate operating pressure and hydrostatic test pressure.
3. Exposed, bolted, sleeve-type couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.
4. Buried, bolted, sleeve-type couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.

B. For Pipe with Plain Ends:

1. Bolted, sleeve-type couplings, in accordance with AWWA C219.
2. Fabricated steel, mechanical slip-type expansion joints, in accordance with AWWA C221.

C. Unless thrust restraint is provided by other means, bolted, sleeve-type couplings shall be harnessed. Harness details shall be in accordance with requirements of appropriate reference standard or as shown on Drawings.

D. For Pipe with Grooved Ends:

1. Grooved couplings, in accordance with AWWA C606. System shall provide for flexible or rigid joints as shown on Drawings.
2. Exposed couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.
3. Buried couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.

E. For Pipe with Flanged Ends:

1. Flanged coupling adapters, in accordance with AWWA C219.
2. Dismantling joints for connecting flanged pipe shall be AWWA C219 compliant. Studs and nuts provided to seal gasket shall be separate and independent from tie-bar restraint system.

F. Bolting Materials: As recommended by coupling manufacturer for specified conditions.

2.04 SLEEVES

A. Sleeves shall be long or short pattern as appropriate to the application conforming to AWWA C110.

B. Sleeves shall be mechanical joint with restraint if required, provided by external mechanical joint restraints.

C. Sleeves shall have a minimum pressure rating of 250 psi.

D. Linings and coatings ductile iron sleeves shall be in accordance with the provisions of Section 02502, Ductile Iron Pipe and Fittings.

2.05 TAPPING SLEEVES – DUCTILE IRON

A. Ductile iron tapping sleeves are preferred for force main and water main taps.

B. Tapping sleeves shall meet ASTM A536 Grade 65-45-12.

C. Side flange seals shall be O-ring type with round, oval, or rectangular cross section.

D. CONTRACTOR shall inspect and/or verify diameter of the pipe to be tapped and order the correct sleeve.

E. Sleeves shall be coated in accordance with the provisions of this Specification.

F. 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.

G. Tapping sleeve shall be American Flow Control Series 1004 or 2800, Mueller H-615, US Pipe T-9 or Clow F-5205.

H. Tapping machine and cutter shall provide the full-size of the tapped connection.

I. The coupon shall be removed from the pipe shall be given to the PCM.

2.06 TAPPING SLEEVES - STEEL

A. Steel tapping sleeves are acceptable for use where ductile iron sleeves are not practical and as approved by the Engineer.

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. 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.

E. Minimum wall thickness of the sleeve shall be 0.375 inch.

F. Tapping sleeve shall be pressure rated to 150 psi, minimum.

G. Tapping sleeve shall be Dresser Style 630, JCM Series 412; or equal.

H. Tapping machine and cutter shall provide the full-size of the tapped connection.

I. The coupon removed from the pipe shall be given to the PCM.

2.07 SERVICE SADDLES

A. Service saddles shall be ductile iron with double stainless steel straps conforming to AWWA C-111/A.21.11-00.

2.08 SLAB, FLOOR, WALL, AND ROOF PENETRATIONS

A. Modular Mechanical Seal:

1. Type: Interconnected synthetic rubber links shaped and sized to continuously fill annular space between pipe and wall sleeve opening.
2. Assemble interconnected rubber links with Type 316 stainless steel bolts, nuts, and pressure plates.
3. Size modular mechanical seals according to manufacturer's instructions for the size of pipes shown to provide a watertight seal between pipe and wall sleeve opening.
4. Manufacturers and Products:
   a. Thunderline/LinkSeal, Div. Of PSI, Houston, TX; Link Seal.
   b. Calpico, Inc., South San Francisco, California; Sealing Linx.
   c. Advance Products and Systems, Lafayette, Louisiana; Innerlynx.

B. Wall Sleeves:

1. Diameter, ends, and length shall be as shown on Drawings.
2. Shall include integral seep ring to minimize seepage between metal sleeve and concrete.

C. Wall Couplings:

1. Diameter, ends, and length shall be as shown on Drawings.
2. Wall couplings shall provide flexible mechanical joint.
3. Body and end rings shall be coated with fusion bonded epoxy.
4. Body shall include integral seep ring.
5. Shall comply with AWWA C219.

D. If core drilling is required for penetrations of existing concrete walls or slabs, locations of drilling shall be determined by radiograph to avoid damage to reinforcing steel and conduits.

2.09 FLANGES, FLANGE GASKETS, AND BOLTING MATERIALS

A. As specified in individual Specifications following this Section.

B. Flanges, bolting materials, and flange gaskets for steel flanges shall conform to AWWA C207.

C. Flanges, bolting materials, and flange gaskets for ductile iron flanges shall conform to AWWA C110 and C115.

2.10 INSULATING FLANGES AND COUPLINGS

A. Dielectric Flange Manufacturers:

1. Pipeline Seal and Insulator, Inc.; Houston, Texas.
2. Central Plastics Co.; Shawnee, Oklahoma.
3. Calpico, Inc.; South San Francisco, California.

B. Insulating Flanges:

1. Bolt holes sized as required.
2. Manufacturers and Products:
   a. Dresser Industries; Style 39.
   b. Baker Coupling Company, Inc.; Series 216.

2.11 PIPE LOCATING TAPE

A. As specified in Section 02320, Trench Backfill.

2.12 PIPE BEDDING AND PIPE ZONE MATERIAL

A. Granular material as specified in Section 02320, Trench Backfill.

2.13 TRENCH STABILIZATION MATERIAL

A. As specified in Section 02320, Trench Backfill.

PART 3 - EXECUTION

3.01 GENERAL

A. Notify ENGINEER at least 2 weeks prior to field fabrication of pipe or fittings.

B. Furnish feeler gauges of proper size, type, and shape for use during installation for each type of pipe furnished.

C. Distributing Materials: Place materials along trench only as will be used each day, unless otherwise approved by Engineer. Placement of materials shall not be hazardous to traffic or to general public, obstruct access to adjacent property, or obstruct others working in area.

3.02 EXAMINATION

A. Verify size, material, joint types, elevation, and horizontal location of existing pipeline to be connected to new pipeline or new equipment.

B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.

C. Damaged Coatings and Linings: Repair using coating and lining materials in accordance with manufacturer's instructions.

3.03 PREPARATION

A. Prepare trench as specified in Section 02316, Excavation.

B. Unless otherwise permitted by Engineer, maximum length of open trench shall not exceed 400 feet.

C. Trench Grade:

1. Grade bottom of trench by hand to specified line and grade, with proper allowance for pipe thickness and pipe base, when specified. Trench bottom shall form a continuous and uniform bearing and support for pipe between bell holes.

2. Before laying each section of pipe, check grade and correct irregularities found. Grade may be disturbed for removal of lifting tackle.

D. Pipe Bedding: Place and compact pipe bedding material as follows:

1. Install to full width of trench, from the following depths below bottom to springline of pipe:
   a. For Pipe 12-Inch Diameter: 4 to 6 inches.
   b. For Pipe Larger than 12-Inch Diameter: 6 to 8 inches.
2. Compact to at least 98 percent of its maximum density as determined by AASHTO T180.
3. Ensure that no unfilled or uncompacted areas occur beneath pipe.

E. Bell (Joint) Holes: At each joint, dig bell holes of ample dimensions in bottom of trench, and at sides where necessary, to permit joint to be made properly and to permit easy visual inspection of entire joint.

3.04 INSTALLATION

A. General:

1. Provide and use proper implements, tools, and facilities for safe and proper prosecution of Work.
2. Lower pipe, fittings, and appurtenances into trench, piece by piece, by means of a crane, slings, or other suitable tools and equipment, in such a manner as to prevent damage to pipe materials, protective coatings and linings.
3. Do not drop or dump pipe materials into trench.
4. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.
5. Install individual pipe lengths in according to approved lay diagram. Misplaced pipe shall be removed and replaced.
6. Inspect pipe and fittings before installation, clean ends thoroughly, remove foreign matter and dirt from inside.
7. Flanged Joints:
   a. Install perpendicular to pipe centerline.
   b. Bolt Holes: Straddle vertical centerline, aligned with connecting equipment flanges or as shown on Drawings.

c. Use torque-limiting wrenches to provide uniform bearing and proper bolt tightness.
d. Flange Type: Use flat-faced flange when joining with flat-faced ductile or cast iron flange.

8. Couplings:
   a. Install in accordance with manufacturer's written instructions.
   b. Before coupling, clean pipe holdback area of oil, scale, rust, and dirt.
   c. Do not remove pipe coating. If damaged, repair before joint is made.
   d. Clean and lubricate gaskets before installation.
   e. Tighten coupling bolts progressively, drawing up bolts on opposite sides gradually until bolts have uniform tightness.

B. Cleaning Pipe and Fittings:

1. Remove lumps, blisters, and excess coating from bell and spigot ends of each pipe. Wire brush outside of spigot and inside of bell and wipe clean, dry, and free from oil and grease before pipe is laid.
2. Wipe ends of mechanical joint pipe and fittings and of rubber gasket joint pipe and fittings clean of dirt, grease, and foreign matter.

C. Laying Pipe:

1. Direction of Laying: Lay pipe with bell end facing in direction of laying. For lines on an appreciable slope, face bells upgrade at discretion of Engineer.
2. Mechanical Joint, Push-On Joint, and Restrained Joint Pipe: After first length of pipe is installed in trench, secure pipe in-place with approved backfill material tamped under and along sides to prevent movement. Keep ends clear of backfill. After each section is jointed, place backfill as specified to prevent movement.
3. Take precautions necessary to prevent floating of pipe prior to completion of backfill operation.
4. When using movable trench shield, take necessary precautions to prevent pipe joints from pulling apart when moving shield ahead.
5. Do not allow foreign material to enter pipe while it is being placed in trench.
6. Close and block open end of last laid section of pipe to prevent entry of foreign material or creep of gasketed joints when laying operations are not in progress, at close of day's work, or whenever workers are absent from job.
7. Pipe shall be installed in a straight alignment and deflections made as required after the joint has been completed.

D. Joining Push-On Joint Pipe and Mechanical Joint Fittings:

1. Join pipe with push-on joints and mechanical joint fittings in strict accordance with manufacturer's recommendations.
2. Provide special tools and devices, such as, special jacks, chokers, and similar items required for installation.
3. Lubricate all pipe gaskets and pipe ends using lubricant furnished by pipe manufacturer. No substitutes will be permitted.
4. Clean ends of fittings of dirt, mud, and foreign matter by washing with water and scrubbing with a wire brush, after which, slip gland and gasket on plain end of pipe. Lubricate end of pipe to facilitate sliding gasket in place, then guide fitting onto spigot of pipe previously laid.

E. Cutting Pipe:

1. General: Cut pipe for inserting valves, fittings, or closure pieces in a neat and workmanlike manner without damaging pipe or lining and so as to leave a smooth end, at right angles to axis of pipe.
2. Pipe: Cut pipe with milling type cutter or saw. Do not flame cut.
3. Dressing Cut Ends: Dress cut end of mechanical joint pipe to remove sharp edges or projections, which may damage rubber gasket. Dress cut ends of push-on joint pipe by beveling, as recommended by manufacturer.

F. Buried Pressure Pipe:

1. Concrete Encased or Embedded Pipe: Do not encase joints in concrete unless specifically shown on Drawings.
2. Placement:
   a. Keep trench dry until pipe laying and joining is completed. If the excavation cannot be effectively dewatered the CONTRACTOR shall propose alternate pipe installation methodology for approval by the ENGINEER prior to proceeding. All requirements of Section 02320, Trench Backfill, will remain in effect.
   b. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.
   c. Measure for grade at pipe invert, not at top of pipe.
   d. Excavate trench bottom and sides of ample dimensions to permit proper joining, welding, visual inspection, and testing of entire joint.
   e. Prevent foreign material from entering pipe during placement.
   f. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.
   g. In general, lay pipe upgrade with bell ends pointing in direction of laying.
   h. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:
      1) Shorter pipe lengths.
      2) Special mitered joints.
      3) Standard or special fabricated bends.
   i. Check gasket position with feeler gauge to assure proper seating.
   j. After joint has been made, check pipe alignment and grade.
   k. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.
   l. Prevent uplift and floating of pipe prior to backfilling.
3. Tolerances:
   a. Deflection From Horizontal Line: Maximum 2 inches.
   b. Deflection From Vertical Line: Maximum 1 inch.
   c. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.
   d. Horizontal position of pipe centerline on alignment around curves maximum variation of 1 foot from position shown.
4. Cover Over Top of Pipe: Minimum 3 feet, unless otherwise shown.
5. Disposal of Excess Excavated Material: As specified in Section 02316, Excavation.

G. Line and Grade:

1. No high points will be allowed between air valves on pressure piping.
2. Maintain pipe grade between invert elevations to provide minimum clearance at air valve locations from existing ground surface to top of pipe.
3. Install air valves as shown on the Drawings and as verified in the field and field verify intervening low points. When field conditions warrant, exceptions may be made upon approval of Engineer.
4. Deviations exceeding 1/2 inch from specified line or 1/4 inch from specified grade will not be allowed without express approval of Engineer.
5. Pipeline sections that are not installed to elevations shown or installed as approved by ENGINEER shall be reinstalled to proper elevation.

3.05 THRUST RESTRAINT

A. Location: At pipeline tees, plugs, valves, caps, bends, and locations where unbalanced forces exist, and as shown on the Drawings.

B. All pressure pipe will be restrained at all valves and fittings. Provide additional restraint as shown on the Drawings.

C. Use of thrust blocks is not permitted.

3.06 CORROSION PROTECTION

A. Buried Pipe: As specified in the individual Specifications following this Section.

B. Notify ENGINEER at least 3 days prior to start of surface preparation, coating application, and corrosion protection work.

3.07 PLACEMENT OF PIPE LOCATING TAPE

A. Place pipe locating tape in accordance with Section 02320, Trench Backfill.

3.08 PIPE BEDDING AND PIPE ZONE MATERIAL

A. Place pipe bedding and pipe zone material in accordance with Section 02320, Trench Backfill.

3.09 FIELD QUALITY CONTROL – INSPECTION AND TESTING

A. General:

1. Notify ENGINEER in writing at least 15 days in advance of testing. Perform testing in presence of Engineer.
2. Using water as test medium, all newly installed pipelines shall successfully pass hydrostatic leakage test prior to acceptance.
3. Conduct field hydrostatic test on buried piping after trench has been completely backfilled. Testing may, as approved by Engineer, be done prior to placement of asphaltic concrete or roadway structural section.
4. CONTRACTOR may, if field conditions permit and as approved by Engineer, partially backfill trench and leave joints open for inspection and conduct initial service leak test. Final field hydrostatic test shall not, however, be conducted until backfilling has been completed as specified above.

5. Supply of Temporary Water: In accordance with Section 01500, Construction Facilities and Temporary Controls.
6. Install restraint as necessary to prevent movement of pipe and protect adjacent piping or equipment. Make necessary taps in piping prior to testing.
7. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
8. New Piping Connected to Existing Piping: Isolate new piping with grooved-end pipe caps, blind flanges, or other means as acceptable to Engineer.
9. Service connections for water mains are to be installed to the angle stop prior to disinfection and testing of the installed main.
10. Fire hydrant leads are to be installed to the shut-off valve prior to disinfection and testing of the installed main.

B. Tapping Sleeve and Valve:

1. Install mechanically restrained test plug with relief port.
2. Test tapping sleeve and valve prior to performing tap.
   a. Test at 150 psi for 15 minutes.
   b. Successful test will be no visible leakage.
3. Test sleeve and valve together with valve open.

C. Hydrostatic Testing Procedure:

1. Furnish testing equipment, as approved by Engineer, which provides observable and accurate measurements of leakage under specified conditions.
2. Maximum Filling Velocity: 0.25 foot per second calculated based on full area of pipe.
3. Expel air from piping system during filling.
4. Test Pressure: 150 psi as measured at low point of pipeline.
5. Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.
6. Maintain hydrostatic test pressure continuously for 2 hours minimum, adding makeup water only as necessary to restore test pressure.
7. Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for duration of test.

D. Maximum Allowable Leakage:

$$Q = \frac{LD(P)^{1/2}}{148{,}000}$$

where:

Q = Quality of makeup water, in gallons per hour.
L = Length of pipe section tested, in feet.
D = Nominal diameter of pipe, in inches.
P = Average test pressure during hydrostatic test, in pounds per square inch.

3.10 CLEANING AND DISINFECTION

A. Pipelines shall be kept clean during installation. Following assembly and testing, and prior to disinfection and final acceptance, flush pipelines with water at 2.5 fps minimum flushing velocity until foreign matter is removed.

B. Water shall be obtained from a potable, CITY source and shall be metered. The CITY shall be notified at least 2 working days prior to the intended use such that the meter can be installed. The CONTRACTOR shall pay the CITY for all water used. Water cost shall be incidental to the related pipeline installation work items.

C. Flushing shall be accomplished by partially opening and closing valves several times under expected line pressures with velocities adequate to remove foreign materials from the pipe, valves, and hydrants.

D. If impractical to flush large diameter pipe at 2.5 fps, clean pipe by use of pipe pig as approved by Engineer. Multiple passes of pipe pig may be required to adequately clean line.

E. Remove accumulated debris through blowoffs 2 inches and larger or by removing spools and valves from piping. If hydrants are used, they must be adequately flushed and cleaned prior to being put into service.

F. Disinfection of Water Mains: In accordance with ANSI/AWWA C651-14.

3.11 ABANDONMENT OF WATER MAINS

A. Water mains, 8 inches and less, being replaced shall be abandoned in-place.

B. When new mains have been tested, approved, and services relocated, cut, cap, and restrain any connections to remaining pressurized mains.

3.12 REPAIR OF DAMAGED PIPING

A. All existing piping damaged by the CONTRACTOR as a result of construction activities shall be repaired by the CONTRACTOR.

1. The Utilities Department shall be notified of all water main and force main damage and for all control valve operation.
2. Damage to unmarked mains shall be considered additional work or will be repaired by the OWNER.
3. Damage to marked mains shall be repaired at no additional cost to the OWNER.

B. Cleaning and disinfection of water main repairs shall be in accordance with the provisions of ANSI/AWWA C-651-14.

C. If the OWNER is required to make repairs for damaged mains that are the responsibility of the CONTRACTOR, the cost of the work will be charged to the CONTRACTOR.

END OF SECTION

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PROJECT 12133

SECTION 02502

DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Quality Control Submittals:

1. Manufacturer's Certificate of Compliance, in accordance with Section 01640, Manufacturers' Services, stating that inspections and specified tests have been made and that results thereby comply with requirements of Article Source Quality Control.
2. Field Hydrostatic Testing Plan: Submit at least 15 days prior to testing and at minimum, include the following:
   a. Testing dates.
   b. Piping systems and section(s) to be tested.
   c. Method of isolation.
   d. Method of conveying water from source to system being tested.
   e. Calculation of maximum allowable leakage for piping section(s) to be tested.
3. Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
4. Test documentation form and results.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Pipe:

1. General:
   a. Centrifugally cast, grade 60-42-10 iron, minimum 350 psi working pressure for pipes 12 inches and less, minimum 250 psi working pressure for pipes 14 inches and greater.
   b. Meet requirements of AWWA C151, C110, C153, and C111.
   c. Lined and coated as specified.
2. Pressure rating of pipe to be specified according to the particular requirements of the Project.
3. Pipe wall thickness of threaded pipe for a flanged pipe end shall be minimum special thickness Class 53 from 4-inch to 54-inch and/or minimum pressure Class 350 for 60-inch to 64-inch diameter pipe in accordance with AWWA C115.
4. Grooved end pipe, for all pipe diameters, shall be minimum Special Class 53.
5. Pipe shall be new and recently manufactured. Refurbished pipe shall not be provided.

B. Joints:

1. Push-On Joint: Rated at minimum working pressure equal to pipe material design.
2. Restrained Joint:
   a. Manufactured proprietary joint that mechanically restrains pipe to adjoining pipe.
   b. Manufacturers and Products:
      1) U.S. Pipe; TR Flex, Restrained Tyton, and Field-Lok.
      2) American Cast Iron Pipe;Flex-Ring, Lok-Ring, and Fast-Grip.
      3) One bolt fittings as manufactured by One Bolt, Inc., for restrained fittings 12 inches in diameter and less.
   c. Use of restraining gaskets for planned joint restraint is restricted to pipes 12 inches in diameter or less.
3. Mechanical Wedge Action Type Joint: Use only in areas where adjoining to fixed points where laying length is determined in field. Prior to purchase and installation, type and application of this joint shall be approved by ENGINEER. Use of mechanical joint restraint or field-restraining type gaskets in excess of 12 inches shall not be allowed, unless an unexpected field condition requires cutting the pipe and installation of a field applied restraint. Use of set screws to provide restraint of any kind is not permitted.
   a. Manufacturers and Products:
      1) Meg-a-lug, as manufactured by EBBA Iron.
      2) Stargrip, as manufactured by Star Pipe Products.
      3) Grip-ring, as manufactured by Romac.
4. Flanged Joint: Threaded 250 psi working pressure ductile iron flanges conforming to AWWA C115 for Class 125 flanges.
5. Grooved Joint:
   a. Rigid and/or Flexible type radius cut grooved, conforming to AWWA C606, depending on the particular application.
   b. As manufactured by Victaulic Company of America.

C. Fittings:

1. Ductile Iron, Push-On, Flanged or Restrained Joint: In accordance with AWWA C110 or C153; 250 psi minimum working pressure for 4- to 24-inch fittings and 250 psi minimum working pressure for 24- to 64-inch fittings and AWWA C111.
2. Mechanical Joint Fittings: In accordance with AWWA C111.
3. Grooved End Fittings:
   a. Radius cut grooved, rigid and/or flexible type conforming to AWWA C110 and/or AWWA C153 as above.
   b. Manufacturers:
      1) Victaulic Company of America.
      2) Gustin-Bacon.
4. Fittings shall be new and recently manufactured. Refurbished fittings will not be accepted.

D. Welded Outlet: Only weld to pipe in manufacturer's shop – may be used in lieu of a tee where economical and where subject to manufacturer's limitations.

E. Lining:

1. Pipe and fittings for clean water applications shall be cement lined and asphaltic seal coated in accordance with AWWA C104.
2. Pipe and fittings for wastewater applications shall be lined with 40-mils Protecto 401 ceramic epoxy, or equivalent.

F. Coating:

1. Buried Pipe: Asphaltic coating, 1 mil thick, in accordance with AWWA C151, C115, C110, and C153.
2. Exposed Pipe: Coal-tar epoxy, 2 coats, 16 mils thick, primed in accordance with the manufacturers recommendations and surface prepared to SP 5-91 (SSPC standards).

G. Polyethylene Encasement:

1. All buried ductile iron pipe and fittings shall be encased, unless otherwise indicated.
2. Virgin polyethylene raw material conforming to requirements of ASTM D4976.
3. Elongation: 800 percent, minimum in machine and transverse direction (ASTM D882).
4. Tensile Strength: 3,600 psi, minimum.
5. Dielectric Strength: 800V/mil-thickness, minimum.
6. Propagation Tear Resistance: 2,550 gf, minimum in machine and transverse direction (ASTM 1922).
7. Tube form, conforming to AWWA C105.
8. Film shall have minimum in thickness of 0.008 in (8 mil).

H. Bolting:

1. Bolts for flanged connections shall be carbon steel, ASTM A307, Grade A hex bolts and ASTM A563, Grade A hex head nuts.
2. Bolts for grooved end connections shall be manufacturer's standard.

I. Gaskets:

1. Gaskets for flat faced 150 and 250 psi working pressure flanges shall be 1/8-inch thick, red rubber (SBR), hardness 80 (Shore A), rated to 200 degrees F, conforming to ANSI B16.21, AWWA C207, and ASTM D1330, Grades 1 and 2.
2. Gaskets for grooved end joints shall be Halogenated butyl, conforming to ASTM D2000 and AWWA C606.
3. Tor-seal or equal gaskets shall be used for exposed, flanged joints.

J. Pressure Test Gauges:

1. Heavy duty industrial quality gauges.
2. Oil-filled.

2.02 SOURCE QUALITY CONTROL

A. Factory Tests: In accordance with AWWA C104, C105, C110, C111, C115, C150, C151, C153, or C606, as required by the particular Project application.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Inspect pipe and fittings to ensure no cracked, broken, or otherwise defective materials are being used.

3.02 INSTALLATION

A. In accordance with AWWA C605, ASTM D2321, and AWWA Manual 23, Section 02500, Conveyance Piping – General, and Section 02320, Trench Backfill.

B. Field Welding:

1. Use of field welded outlets will not be allowed. Welding for outlets shall be performed only in pipe manufacturer's shop.
2. Field installed outlets may be installed with saddle approved by Engineer. Opening in pipe shall be machined cut and not with cutting torch.
3. Field welding of bars for restrained joint systems will not be allowed. All welding shall be performed in pipe manufacturer's shop.

C. Polyethylene Encasement:

1. Encase pipe, fittings, and valves where specified in accordance with AWWA C105, Method A.
2. Cut polyethylene tube approximately 2 feet longer than pipe length.
3. Slip tube around pipe, centering to provide 1-foot overlap on each adjacent section.
4. Pull encasement to take out slack and wrap snug around pipe.
5. Secure overlap in place and fold at quarter points of pipe length.
6. Wrap and tape encasement snug around fittings and valves.

3.03 TESTING AND INSPECTION

A. In accordance with the provisions of Section 02500, Conveyance Piping-General.

END OF SECTION

PROJECT 12133

SECTION 02509

POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FITTINGS

PART 1 - GENERAL

1.1 DELIVERY, STORAGE, AND HANDLING

A. Solvent Cement: Store in accordance with ASTM D2855.

B. In general PVC pipe will be used for small diameter (4-8 inch) water distribution piping.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe:

1. All PVC pressure pipe shall be C-900, minimum SDR-18 with a minimum pressure rating of 150 psi, conforming to requirements of AWWA C900 and AWWA C905.
2. Dimension Ratio (DR) shall be in accordance with the particular application and as shown on Drawings.
3. Pipe to be used for potable water conveyance shall be manufactured from National Sanitation Foundation (NSF) approved compounds.
4. Pipe to be used for force mains shall be the color green, and pipes to be used for water mains shall be the color blue or have continuous blue stripes parallel to the pipe axis located at 90-degree intervals around the pipe.
5. All PVC pipe shall have a No. 6, single strand, copper wire placed on top of the pipe. The wire shall be electrically continuous over the length of the pipe and fastened every 10 feet with a No.12 copper wire.

B. Joints:

1. Rubber gasketed.
2. Conform to AWWA C900, AWWA C905, and ASTM D3139.

C. Fittings: PVC or DI, as recommended by pipe manufacturer. DI fittings shall conform with the requirements of Section 2502, Ductile Iron Pipe and Fittings.

D. Service Saddles:

1. Double strap type with minimum strap width of 2 inches.
2. Straps shall be Type 304 stainless steel. Saddles shall be ductile iron, epoxy-coated, 10 mils minimum thickness.

E. Restrained Joints: Pipe restraint, where indicated on Drawings, shall be provided by system using wedges or gripping teeth or by integral pipe system restraint. System shall be specifically recommended for use on PVC pipe. Systems with set screws shall not be used.

1. Restraint is required at all valves and fittings and for additional pipe length as shown on the Drawings.
2. Manufacturer and Products:

a. EBBA Meg-a-lug.
b. Star Pipe Products Stargrip.
c. Romac Grip-Ring.
d. Certainteed style restrained joints where available for size of pipe.
e. Solvent welded joints as appropriate and as shown on the Drawings.
f. Or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. In accordance with AWWA C605, ASTM D2321, and AWWA Manual 23, the Uni-Bell Plastic Pipe Association PVC Pipe Manual, Section 02500, Conveyance Piping – General, and Section 02320, Trench Backfill.

B. Solvent cement used for joints as recommended by pipe manufacturer.

C. Joints:

1. Rubber Gasketed: In accordance with manufacturer's written instructions.
2. Solvent Cemented: In accordance with ASTM D2855.
3. Restrained Joint Systems: In accordance with manufacturer's written instructions.

D. Pipe Bending for Horizontal or Vertical Curves:

1. Radius of curves shall not exceed 75 percent of manufacturer's recommended values.
2. Use blocks or braces at pipe joints to ensure axial deflection in gasketed or mechanical joints does not exceed allowable deflection.

E. Maximum Joint Deflection: 75 percent of manufacturer's recommended values.

3.2 INSPECTION AND HYDROSTATIC TESTING

A. In accordance with the provisions of Section 02500, Conveyance Piping - General.

END OF SECTION

SECTION 02533

MANHOLES

PART 1 - GENERAL (NOT USED)

PART 2 - PRODUCTS

2.01 PRECAST MANHOLES

A. Riser Sections:

1. Minimum 48 inches in diameter.
2. Fabricate in accordance with ASTM C478.
3. Minimum Wall Thickness: 8 inches or 1/6 times inside diameter, whichever is greater.
4. Top and bottom shall be parallel.
5. Joints: Tongue-and-groove with confined gaskets meeting ASTM C443.
   a. Preformed plastic gaskets shall be Ram-Nek, Henry Co. Houston, TX, or equal.
   b. Preformed rubber gaskets shall be Rub'R Nek, Henry Co., Houston, TX; or equal.

B. Cone Sections:

1. Provide concentric cones.
2. Same wall thickness and reinforcement as riser section.
3. Top and bottom shall be parallel.

C. Base Sections and Base Slab:

1. Base Sections: Base slab integral with sidewalls.
2. Fabricate in accordance with ASTM C478.

D. Manhole Extensions:

1. Concrete grade rings
   a. Maximum 6 inches high.
   b. Mortared joints.
   c. Fabricate in accordance with ASTM C478.
2. HDPE Grade Rings:
   a. Material to comply with ASTM D1248.
   b. Silicone sealant used for joints.
   c. Suitable for H-20 loading.

E. Source Quality Control:

1. All test specimens shall be mat tested and meet the permeability test requirements of ASTM C14.
2. Conduct tests at point of manufacture prior to delivery of any section.

3. Sections to be tested will be selected at random from stockpiled material to be supplied for the Project.

2.02 CAST-IN-PLACE BASE SECTION AND SLABS

A. Reinforcing Steel: Billet steel bars for concrete reinforcement shall conform to the requirements of ASTM A615, Grade 60.

B. Concrete: Concrete shall be ready-mixed, conforming to ASTM C94/C94M, Alternate 2. Compressive field strength shall not be less than 4,000 psi at 28 days. Maximum size of aggregate shall be 1-1/2 inch, slump shall be between 2 and 4 inches, field strength shall be assumed as equal to 85 percent of strength of laboratory-cured cylinders.

C. Use for “dog-house” manholes or as required by special circumstances.

2.03 DROP MANHOLES

A. Interior or exterior drop as shown on the Drawings. Interior drops for shallow drops and/or single drops only and only for existing manholes. All new drop manholes in excess of 24 inches shall be external drop.

B. Drop manhole construction shall comply with the general requirements of all manholes.

C. External drop manholes shall have the drop pad cast monolithically with the bottom slab and walls. If base and walls cannot be of monolithic construction, the bottom slab and drop pad shall be of monolithic construction.

2.04 MANHOLE FRAMES AND COVER

A. Castings:

1. Tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and defects.
2. Cast Iron: ASTM A48 Class 30B.
3. Plane or grind bearing surfaces to ensure flat, true surfaces.
4. Frames and covers in roadway and traffic areas (7-inch frame) shall have a minimum total weight of 405 pounds. All other frames and covers (4-inch frame) shall have a minimum total weight of 355 pounds.

B. Cover: True and seat within ring at all points with the CITY logo as shown on the Drawings.

C. Covers shall have two concealed watertight pick holes. Covers shall not have boltholes or any other penetrations.

D. Manufacturer: U.S. Foundry Company No. 420-GL for the 7-inch depth frame or U.S. Foundry Company No. 465-GL for the 4-inch depth frame, or approved equal.

2.05 ARV MANHOLE COVER

A. Castings:

1. Tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and defects.
2. Cast Iron: ASTM A48 Class 30B.
3. Plane or grind bearing surfaces to ensure flat, true surfaces.
4. Frames and covers in roadway and traffic areas (7-inch frame) shall have a minimum total weight of 405 pounds. All other frames and covers (4-inch frame) shall have a minimum total weight of 355 pounds.

B. Cover: True and seat within ring at all points with the CITY logo as shown on the Drawings.

C. Covers shall have two concealed watertight pick holes. Covers shall not have boltholes or any other penetrations.

D. Manufacturer: U.S. Foundry Company No. 690-AG-M; or equal, double lid manhole cover or approved equal. Inner lid shall be centered in the outer lid.

2.06 MANHOLE FRAME TO STRUCTURE SEALS

A. Banded Gasket Type (internal or external)

1. Materials
   a. Extrude or mold gasket from a high-grade rubber compound.
   b. Comply with materials test requirements of ASTM C923.
   c. Minimum Thickness: 3/16-inch.
   d. Minimum Unstretched Length: Sufficient to extend from the manhole frame, across a maximum of 12 inches of extension rings, to the manhole one section.
   e. Fabricate bands for compressing sleeve against manhole from Type 304 stainless steel:
      1) Channeled Sheet: Minimum 16-gauge, ASTM A167
      2) Round: 5/16-inch diameter, ASTM A240.
2. Screws, Bolts, or Nuts: Stainless steel conforming to ASTM F593 and ASTM 594, Type 304.
3. The internal gasket or its appurtenances shall not extend into the manhole opening to restrict entry into or exit from the manhole.
4. The gasket shall be made only of materials that have been proven to be resistant to the following exposures and conditions:
   a. Sanitary sewage.
   b. Corrosion or rotting under wet or dry conditions.
   c. Gaseous environment in sanitary sewers and at road surfaces including common levels of ozone, carbon monoxide, and other trace gases at the sites of installation.
   d. Biological environment in soils and sanitary sewers.
   e. Chemical attack by road salts, road oil, and common street spillages or solvents used in street construction or maintenance.
   f. Temperature ranges, variations, and gradients in the area of construction.
   g. Variations in moisture conditions and humidity.
   h. Fatigue failure caused by a minimum of 30 freeze-thaw cycles per year.

i. Vibrations due to traffic loadings.
j. Fatigue failure due to repeated variations of tensile, compressive and shear stresses, and repeated elongation and compression.
k. Any combination of the above.

5. Materials used shall be compatible with each other and with the manhole materials.
6. Design Gasket to Meet the Following Requirements:
   a. Continuously prevent leakage of water from outside the manhole into the manhole at the joints between the manhole frame and the cone section.
   b. At the same time, seal shall remain flexible, allowing repeated vertical movements of the frame from 0 to 2 inches, or repeated horizontal movements of the frame with respect to the top of the extension or cone of from 0 to 1/2 inch due to pavement movements or other causes, or both types of movement occurring simultaneously at rates not exceeding 1/10 inch per minute.
7. Manufacturers:
   a. Cretex chimney seal (internal and external).
   b. NPC FlexRib Chimney Seal.
   c. Infi-Shield by SSI
   d. Or equal.

B. Applied Internal Seal

1. The seal shall cover the area from the frame to the corbel including all extensions and risers and shall overlap any applied internal coating.
2. The seal shall consist of no less than 120 mils of elastomeric compound conforming to ASTM D-412 and having the following characteristics:
   a. Elongation 900% minimum
   b. Applied elongation 325% minimum
   c. Durometer Hardness 75 minimum
   d. Tensile Strength = 3200 psi minimum
   e. Adhesion = 350 pli minimum
   f. The product shall be solvent and VOC free
3. Applicators must be certified by the seal manufacturer
4. Manufacturers
   a. ElastaSeal
   b. Madewell 806
   c. Flex-Seal by SSI
   d. Or equal

C. If an external chimney seal is not installed prior to backfill and paving, the CONTRACTOR shall be required to install internal seals at no additional cost.

2.07 MORTAR

A. Not required for standard installations.

B. Standard premixed in accordance with ASTM C387, or proportion 1 part Portland cement to 2 parts clean, well-graded sand that will pass a 1/8-inch screen.

C. Admixtures: May be included but do not exceed the following percentages of weight of cement:

1. Hydrated Lime: 10 percent.

2. Diatomaceous Earth or Other Inert Material: 5 percent.

D. Mix Consistency:

1. Tongue-and-Groove Type Joint: Such that mortar will readily adhere to pipe.

2.08 EXTERIOR COATING AND JOINT SEALS

A. All manholes shall be provided with external, coal tar epoxy, or approved equal. Minimum 16 mils dry film thickness, first coat shall be red and second coat shall be black.

1. Coopers Creek #775 Epoxy Tar Coating
2. Rustoleum C9578 Coal Tar Epoxy
3. EpoxySystems #216 Coal Tar Epoxy Coating
4. Simtar 200 Coal Tar Epoxy
5. or equal

B. All manholes section joints shall be covered with an external, water-tight, plastic or rubberized seal conforming to the structure shape.

1. As manufactured by Canusa Wrapid Seal, Houston TX.
2. EZ-Wrap as manufactured by Press-Seal Gasket Corp., Ft. Wayne, IN.
   Cretex Wrap asmanufactured by Cretex Specialty Products, Waukesha, WI.
3. Gator-Wrap by SSI
4. Or equal.

2.09 IMPORTED PIPE BASE

A. Furnish as specified in Section 02320, Trench Backfill.

2.10 FLEXIBLE PIPE JOINTS

A. Manufacturers:

1. “Kor-N-Seal” flexible rubber boot with stainless steel accessories as manufactured by NPC, Inc., Milford, New Hampshire.
2. “Z-LOK XP” or “A-LOK” flexible connectors as manufactured by A-LOK Products, Inc., Tullytown, PA.
3. Lockjoint Flexible Manhole Sleeve as manufactured by Chardon Rubber Company, Chardon, OH.

2.11 MANHOLE LINING AND REHABILITATION

A. Mainstay DS-5 Epoxy Coating, as specified and manufactured by Madewell Products Corp., Roswell, GA.

B. SewperCoat Calcium Aluminate Mortar as specified and manufactured by Kerneos Aluminate Technologies, Chesapeake, VA.

C. Strong-Seal HPM Calcium Aluminate Mortar as specified and manufactured by The Strong Co., Pine Bluff, AK.

D. I.E.T Systems Polymorphic Resin Systems 1 and 3 as specified and manufactured by Integrated Environmental Technologies of Santa Barbara, CA.

2.12 REPAIR MATERIALS

A. Nonshrink Grout: Grout shall be nonmetallic. The grout shall be nongas-liberating type, cement-base, premixed product requiring only the addition of water for the required consistency. All components shall be inorganic. The following listed grouts meet these requirements and are acceptable for use:

1. Horngrout, TAMMS Industries, Mentor, OH.
2. UPCON Super Flow, The UPCO Company, Cleveland, OH.
3. Set Grout, The Master Builders Co., Cleveland, OH.
4. Crystex, L&M Construction Chemicals, Inc., Omaha, NE.

B. Patching Mortar: Shall be as approved by waterproofing/structural repair materials manufacturer as listed in Paragraph Waterproofing/Structural Repair Material.

C. Waterproofing/Structural Repair Material: Materials shall be compatible with the selected lining system as confirmed by the manufacturer. The following listed waterproofing/structural repair materials are acceptable for use:

1. EMACO 588-CA, Master Builders, Inc., Cleveland, OH.
2. QUADEX QM-1s RESTORE, QUADEX Sewer Rehabilitation Products of Maumelle, AR.
3. Mainstay ML-72, Parson Environmental Products, Inc., Reading, PA.
4. SewperCoat Calcium Aluminate Mortar as specified and manufactured by LaFarge Aluminates, Chesapeake, VA.
5. Strong-Seal HPM Calcium Aluminate Mortar as specified and manufactured by The Strong Co., Pine Bluff, AK

D. Concrete: Conform to the requirements of Section 03301, Reinforced Concrete.

E. Mortar: Mortar shall be sand/portland cement mix conforming to ASTM C270.

F. Pipe Plugs: Pipe plugs shall be rubber gasketed test plugs, sized as necessary.

G. Backfill: Conform to the requirements of Section 02320, Trench Backfill.

PART 3 - EXECUTION

3.01 GENERAL

A. Remove and keep all water clear from the excavation during construction and testing operations.

B. Place imported pipe base material on undisturbed earth; thoroughly compact with a mechanical vibrating or power tamper.

C. No traffic or live loads shall be allowed to be placed on all precast manholes for at least 1 day after installation.

3.02 EXCAVATION AND BACKFILL

A. Excavation: As specified in Section 02316, Excavation.

B. Backfill: As specified in Section 02320, Trench Backfill.

C. Manholes coated with coal tar epoxy coating shall dry a minimum of 6 hours before backfilling.

3.03 INSTALLATION OF PRECAST MANHOLES

A. Concrete Base:

1. Cast-In-Place:
   a. Vibrate to densify concrete and screed so first precast manhole section to be placed has a level, uniform bearing for full circumference.
   b. Deposit sufficient mortar on base to assure watertight seal between base and manhole wall, or place first precast section of manhole in concrete base before concrete has set. Properly locate and plumb first section.
2. Precast:
   a. Place on 6-inch minimum compacted imported base material.
   b. Properly locate, ensure firm bearing throughout, and plumb first section.

B. Sections:

1. Thoroughly clean ends of sections to be joined.
2. Thoroughly wet joint with water prior to placing mortar.

C. Mortar Joints:

1. As required by specific circumstances only. Preferred joint is gasket and external seal as specified.
2. Place mortar on groove of lower section prior to section installation.
3. Fill joint completely with mortar of proper consistency.
4. Trowel interior and exterior surfaces smooth on standard tongue-and-groove joints.
5. Prevent mortar from drying out and cure by applying an approved curing compound or comparable approved method.
6. Do not use mortar mixed for longer than 30 minutes.
7. Chip out and replace cracked or defective mortar.
8. Wrap and seal all manholes joints in accordance with manufacturer's instructions.
9. Completed Manholes: Rigid and watertight.

D. Interior and Exterior Coating:

1. All sanitary sewer manholes shall receive 2 coats (minimum 7 mils per coat) of coal tar epoxy to the base slab, interior and exterior walls.
2. Manholes shall be painted at least 24 hours prior to installation. Repair all slabs to coating once manhole is constructed.
3. When proper coating and thickness is applied, a definite sheen is present. If the coating does not have a sheen, additional coating will be applied until the sheet is obtained.

E. Extensions:

1. Provide on manholes in streets or other locations where a subsequent change in existing grade may be likely.

2. Install to height not exceeding 12 inches.
3. Grade rings to be precast concrete or HDPE.
4. Lay concrete grade rings in mortar with sides plumb and tops level.
5. Seal joints with external joint wrap as specified for sections, and make watertight.

3.04 MANHOLE INVERT

A. Construct with smooth transitions to ensure an unobstructed flow through manhole. Remove sharp edges or rough sections that tend to obstruct flow.

B. Where full section of pipe is laid through manhole, break out top section as shown and cover exposed edge of pipe completely with mortar. Trowel mortar surfaces smooth.

C. The channel height shall match the crown of the connecting pipes.

3.05 MANHOLE FRAMES AND COVERS

A. Set frames in bed of mortar with mortar carried over flange as shown.

B. Set tops of covers flush with surface of adjoining pavement or 3 inches higher than the surrounding unsurfaced ground surface, unless otherwise shown or directed.

C. At all locations, unless otherwise provided on the Drawings, install exterior manhole frame to structure seals in accordance with manufacturer's instructions.

3.06 ADJUSTING EXISTING MANHOLES

A. Cut down or extend existing manholes within the limits of the proposed work, to meet the finished grade of the proposed pavement, or if outside of the proposed pavement area, to the finished grade designated on the Drawings for such structures.

B. Use materials and construction methods which meet the requirements specified to cut down or extend the existing structures.

C. The CONTRACTOR may extend manholes needing to be raised using adjustable extension rings of the type which do not require the removal of the existing manhole frame. Use an extension device that provides positive locking action and permits adjustment in height as well as diameter and meets the approval of the Engineer.

3.07 MANHOLE PIPING

A. Drop Assembly:

1. Extend pipe from the drop to a minimum of 3 feet beyond the manhole excavation into the trench, and connect to sewer pipe with an adapter.
2. Support lower drop elbow with concrete monolithically-placed with manhole base.

B. Flexible Joints:

1. Provide in all pipe not more than 1-1/2 feet from manhole walls.
2. Where last joint of pipe is between 1-1/2 and 6 feet from manhole wall, provide a flexible joint in the manhole wall.

C. Stubouts for Future Connections:

1. Provide same type and class of pipe as specified for use in service connection, lateral, main, or trunk sewer construction. Where there are two different classes of pipe at manhole, use higher strength pipe.
2. Grout pipe in precast walls or manhole base to provide watertight seal or use flexible joints as specified herein.
3. Maximum Length: 1-1/2 feet outside manhole wall.
4. Construct invert channels as shown. Unless otherwise approved by Engineer, match inside top elevation of service connection pipe to inside top elevation of outlet pipe.
5. Test Plugs:
   a. Install rubber-gasketed plugs in end of stubouts with gasket joints similar to sewer pipe being used.
   b. Plugs shall withstand internal or external pressures without leakage.
   c. Adequately brace plugs against all hydrostatic or air test pressures.

D. Permanent Plugs:

1. Clean interior contact surfaces of pipes to be cut off or abandoned as shown, and construct plug as follows:
   a. Pipe 18 Inches or Less in Diameter: Concrete plug in end, minimum 8 inches in length.
   b. Pipe 21 Inches and Larger:
      1) Construct plugs of common brick, concrete block, or concrete.
      2) Plaster exposed face of block or brick plugs with mortar.
   c. Plugs shall be watertight and capable of withstanding internal and external pressures without leakage.

3.08 MANHOLES OVER EXISTING PIPING

A. Maintain flow through existing pipelines at all times.

B. Plastic Pipe:

1. Use solvent recommended by pipe manufacturer to slightly soften the pipe wall.
2. Apply a dense coating of clean mortar sand over all areas that will be in contact with concrete.
3. Allow mortar to dry completely prior to placing concrete.

C. Concrete Pipe: Apply a bonding agent on all surfaces to be in contact with concrete.

D. Construct base under existing piping.

E. Construct manhole as specified.

F. Break out existing pipe within new manhole, cover edges with mortar, and trowel smooth.

G. Protect new concrete and mortar work for 7 days after placing concrete.

3.09 CONNECTIONS TO EXISTING MANHOLES

A. Core drill hole in existing manhole bases or grouting as necessary.

B. Clean all surfaces and apply a bonding agent.

C. Install appropriate pipe to manhole adapter.

D. Regrout to provide smooth flow into and through manholes.

E. Provide diversion facilities and perform work necessary to maintain flow during connection.

3.10 MANHOLE REHABILITATION

A. Specific manhole repairs required are shown on the Drawings.

B. Cleaning: All structures scheduled for rehabilitation shall be cleaned and scarified with a minimum 2,000 psi water jet at a minimum water temperature of 140 degrees F, or a 3,000 psi water jet at a minimum water temperature of

60 degrees F. The water jet shall hit the wall surface at as near a perpendicular angle as possible. Cleaning the walls from the surface without appropriate angled nozzles will not be accepted. All surface buildup and contamination and all loose mortar shall be removed during the cleaning process. If required, detergent and/or muriatic acid shall be used to remove grease, oil, and other matter that would prevent a good adhesive. Specific manufacturer's recommendations may require additional cleaning measures. Before cleaning, the CONTRACTOR shall install wire mesh screening over the inlet and outlet pipes to prevent materials from entering the sewer system. Remove all debris from the bottom of the structure and bear all costs for proper disposal.

C. Structurally Repair Entire Structure: Clean walls in accordance with Paragraph on Cleaning. Plug any leaks in accordance with the manufacturer's recommendation. If heavy leaks flow after Item C is complete, install bleedlines, as necessary at the bottom of the manhole to reduce the hydrostatic pressure. After pressure is reduced, plug remaining leaks with approved patching mortar as discussed in subparagraph Patching Mortar. Next, plug bleedlines with approved patching mortar and continue waterproofing process. Fill all cracks, holes, and joints that have voids with approved material as listed in Subparagraph Waterproofing/Structural Repair Material in accordance with the manufacturer's recommendations. Apply waterproofing/structural repair material per manufacturer's recommendations. Apply minimum 1" thick Sewpercoat (PG or 2000 MS) or approved equal to entire rehabilitated structure.

D. Plug Abandoned Line: Plug abandoned sewer pipes if not shown with concrete plug prior to placement of lining.

3.11 FIELD QUALITY CONTROL

A. All installed manholes are to be inspected and approved prior to backfilling or CONTRACTOR may be required to excavate the manhole at no additional cost.

B. Hydrostatic Testing:

1. When, in Engineer's opinion, the groundwater table is too low to permit visual detection of infiltration leaks, hydrostatically test all project manholes.
2. Procedure: Plug inlets and outlets and fill manhole with water to height determined by Engineer.
3. A manhole may be filled 24 hours prior to time of testing, if desired, to permit normal absorption into the pipe walls to take place.
4. Leakage in each manhole shall not exceed 0.1 gallon per hour per foot of head above the invert.
5. Repair manholes that do not meet the leakage test, or do not meet specified requirements from visual inspection.

END OF SECTION

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PROJECT 12133

SECTION 02575
SURFACE RESTORATION

PART 1 - GENERAL

1.01 STANDARD SPECIFICATIONS

A. When referenced in this Section, shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition.

1.02 INTENT

A. Specific surface restoration requirements are detailed in this and other sections.

B. For pipeline projects, the intent of these Specifications and the criteria of Section 01025, Measurement and Payment, is that the roadway, adjacent right-of-way, and properties affected by construction activity shall be returned to their pre-existing condition, unless otherwise indicated by these Contract Documents.

1. For pipelines constructed in the right-of-way between the sidewalk and edge of pavement, the ground surface will be graded into a swale as shown on the Drawings and provided with sod.
    a. Argentine Bahia sod will be used for areas without irrigation systems, except where St. Augustine turf existed previously.
    b. St. Augustine “Floritam” sod will be used for areas with irrigation systems and in locations with similar, existing turf.
2. Driveways and sidewalks will be placed in kind, using similar materials of construction.
3. Trees, shrubs, and personal property (e.g. mail boxes) located in the swale area shall be relocated or replaced in kind, in accordance with the provisions of these Specifications.

C. For work areas disturbed by the CONTRACTOR for convenience, the area affected shall be restored in kind.

1. The costs of this restoration shall be incidental to the cost of the Work.
2. Payment for restoration outside the limits of work shall be repaired at the CONTRACTOR’s expense.

1.03 WORK INCLUDED

A. This Section covers the Work necessary to replace all pavement, curbs, sidewalks, rock surfacing, and other street features damaged either directly or indirectly by the operations incidental to the construction described in other sections of these Specifications.

B. Where the materials, construction procedures, degree of compaction of materials, and the method of control and testing, as required in these Specifications differ from the Standard Specifications requirements, the more stringent requirements shall apply.

C. The intent of the Drawings is to provide a full lane, permanent trench repair for all work crossing or running parallel with roadways. Temporary restoration to provide a passable surface is also required.

D. Overlay of asphalt pavement may be required as shown on the Drawings.

E. Provide finished gradation and grassing in accordance with Contract Documents.

1.04 OPTIMUM MOISTURE CONTENT

A. "Optimum moisture content" shall be determined by the ASTM standard specified to determine the maximum dry density for relative compaction.

1.05 TEMPORARY TRENCH REPAIR OR STABILIZATION

A. Following pipe installation and prior to permanent trench repair or asphalt replacement, temporary trench repair will be defined as one of the following:

1. Installation of flowable fill as described in this Section and Section 02772, Asphalt Concrete Pavement.
2. Installation of the compacted base course and an asphalt prime coat as described in this Section and Section 02772, Asphalt Concrete Pavement.

B. Temporary trench repair shall be maintained in accordance with the requirements of this Section and Section 02772, Asphalt Concrete Pavement, until the final trench repair or asphalt surface is installed to provide a dust- free, drivable, and safe roadway surface.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials for replacement of existing base course and asphalt surfacing shall conform to the Standard Specifications except as modified herein.

B. The CONTRACTOR will be responsible for furnishing satisfactory materials that meet the Specifications and shall provide such tests during the course of the Work as are necessary to assure that the quality of the material used meets the Specifications.

2.02 LIME ROCK BASE COURSE

A. Aggregate quality and gradation shall meet the requirements of the Standard Specifications.

2.03 BITUMINOUS PRIME AND TACK COAT

A. Prime Coat: Material shall be cutback asphalt, Grade RC-70 or RC-250 meeting the requirements of the Standard Specifications, or approved equal.

B. Tack Coat: Material shall be emulsified asphalt, Grade RS-2, SS-1, or SS-1H meeting the requirements of the Standard Specifications.

C. Tack coats used for temporary trench stabilization shall be sanded to prevent damage to vehicles.

2.04 ASPHALT CONCRETE

A. The asphalt concrete for trench leveling, restoration and overlay shall be Type SP and S-III, meeting the requirements of the Standard Specifications and Section 02772, Asphalt Concrete Pavement.

B. Aggregate: The aggregate shall meet the requirements of the Standard Specifications.

C. Submit test results from commercial testing laboratories to the ENGINEER to show that the materials meet the quality and gradation requirements.

2.05 FLOWABLE FILL

A. Provide flowable fill with a mix design meeting the requirements of the (FDOT) Standard Specifications for excavatable, flowable fill. Flowable fill may be allowed as a substitute for compacted base upon approval of the Engineer, at no additional cost.

2.06 CONCRETE

A. Concrete shall be 3,000 psi minimum concrete meeting the requirements of the Standard Specifications.

B. Concrete Forms: All forms for curbs and sidewalks shall be either 2-inch dimensioned lumber, plywood, or metal forms. Forms on the face of the curb shall have no horizontal form joints within 7 inches of the top of the curb.

C. Curing Compound: Meeting the requirements of the Standard Specifications.

D. Reinforcing Steel: Conform to ASTM A615, Grade 60.

2.07 TRAFFIC MARKINGS

A. All traffic striping markings (i.e., lane, edge of pavement, directional, informational, etc.) damaged by the CONTRACTOR during construction shall be replaced with new painted items in meeting the requirements of the Standard Specifications.

B. Raised reflective pavement markers (rpm's) damaged by the CONTRACTOR during construction shall be replaced with new rpm's meeting the requirements of the Standard Specifications.

C. The CONTRACTOR shall place and maintain temporary striping markings throughout the course of the work until the permanent striping marking is placed on the final roadway surface.

D. The CONTRACTOR shall provide painted traffic stripping at all intersections including stop bars and crosswalks as required whether they are currently stripped or not. It shall be the CONTRACTOR's responsibility to take a complete inventory and provide the appropriate permanent stripping after the completion of the Work.

2.08 SWALE STABILZATION

A. Materials used for stabilization of swale areas shall consist of suitable excess existing base material removed from trenching operations, if approved by the Engineer, crushed limerock, rock screenings, or other suitable material as approved

by the Engineer.

1. Materials having a plasticity index of more than 10, or a liquid limit greater than 40 shall not be used.
2. Maximum dimension shall not exceed 1.5 inches.

PART 3 - EXECUTION

3.01 CONSTRUCTION PROCEDURE

A. The ENGINEER reserves the right to vary the type of resurfacing as best serves the interest of the OWNER. Trench backfill shall be as specified in Section 02320, Trench Backfill.

B. Replace all bituminous and concrete roadway pavement damaged or removed under this Contract with asphalt concrete regardless of original type. Pavement thickness shall be in accordance with the Drawings.

C. In addition to the requirements set forth herein, the work shall conform to the applicable workmanship requirements of the state and county highway or municipal specifications.

D. Water to control dust shall be used as directed by the ENGINEER until the trench repair has been stabilized. If control of dust is inadequate by these means, the ENGINEER may direct the immediate application of a prime or tack coat in accordance with the provisions of this Section, at no additional cost to the OWNER. The ENGINEER reserves the right to delay additional excavation activities until dust control measures are adequate.

E. Base course and prime coat shall be installed to provide temporary trench stabilization within 5 working days of trench backfill or as soon thereafter as the as-built conditions and pipe slopes have been verified.

F. Final, permanent trench repair, and paving shall be installed within 3 weeks of pipe verification and temporary trench stabilization, unless flowable fill is used for temporary trench repair, in accordance with the provisions of this Section.

3.02 REMOVAL OF PAVEMENT, SIDEWALK, CURBS, AND GUTTERS

A. Removal of all pavement, sidewalks, curbs, and gutters shall conform to Section 02220, Demolition, and payment for removal shall be included in that Section. Payment for removal is incidental to the cost of pipe installation except where required for water and sewer service installation.

3.03 CUTTING EXISTING PAVEMENT

A. Where new pavement abuts existing pavement, the old pavement shall be trimmed by saw cutting to a straight line. Any pavement which has been damaged or which is broken and unsound shall be removed to provide a smooth, sound edge for joining new pavement.

3.04 STREET MAINTENANCE

A. Maintain all trenches as specified in this section and under Section 02320, Trench Backfill.

3.05 CONSTRUCTION OF BASE COURSE

A. Base course shall be constructed in accordance with Section 200 of the Standard Specifications.

B. Compact base materials to a minimum of 98 percent of the maximum density as determined by AASHTO T180. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer. Where the base is constructed in more than one course, the density shall be obtained in each lift.

C. Alternately, and with the approval of the Engineer, the CONTRACTOR shall provide a minimum 10 inches of excavatable, flowable fill. The flowable fill shall be placed up to 1 ½ inches from the top of the existing pavement or to the fill line without vibration or compaction. Flowable fill shall not be placed during periods of inclement weather and rainfall. Provide a means to confine the material within the designated space. Flowable fill installed in accordance with this provision shall comply with temporary pavement restoration provisions.

3.06 MILLING OR GRINDING OF EXISTING ASPHALT PAVEMENT

A. Milling of existing asphalt pavement shall meet the requirements of Section 327 of the Standard Specifications.

B. Milling shall be used to lower the grade of adjacent existing asphalt prior to trench repair to completely remove existing asphalt.

C. Milled and ground asphalt can be mixed for use with the limerock base course material.

D. To avoid the trench restoration areas appearing as “patches”, trench repair may be accompanied by additional milling and resurfacing to full lane widths, as directed by the Engineer.

3.07 BITUMINOUS PRIME AND TACK COAT

A. The bituminous prime coat shall be applied to the lime rock base immediately following the placement of the compacted base course. The prime coat shall be maintained with additional coats as determined by the ENGINEER as temporary restoration until the final asphalt surface is installed. Additional prime coats will be provided at no cost to the OWNER.

B. The lime rock base shall be hard planed with a blade grader immediately prior to the application of the prime coat.

C. The rate of application of the bituminous prime coat shall meet the requirements of the Standard Specifications.

D. The bituminous tack coat shall be applied to existing asphalt surfaces prior to the placement of new asphalt, between layers of asphalt concrete surface courses, surfaces of concrete footings that will come in contact with the asphalt concrete pavement, and vertical faces of all longitudinal and transverse joints that have become compacted or cooled.

E. The rate of application for the bituminous tack coat shall meet the requirements

of the Standard Specifications.

3.08 ASPHALT CONCRETE PAVEMENT REPLACEMENT

A. Preparation for Paving:

1. A prime coat shall be applied over the full length of the roadway, and asphalt concrete pavement shall not be placed until the prime coat has cured as per the manufacturer's recommendations.
2. Should any holes, breaks, or irregularities develop in the roadway surface after the prime coat has been applied, they shall be patched with asphalt concrete immediately in advance of placing the asphalt concrete.
3. After the maintenance, patching, or repair work has been completed and immediately prior to placing the asphalt concrete pavement, the surface of the prime coat shall be swept clean of all dirt, dust, or other foreign matter.

B. The proposed pavement reconstruction schedule consists of immediately paving over trenches as soon as possible after it has been determined that subbase and base have achieved required compactions. The base course will be brought up to the elevations indicated on the Drawings and asphalt placed to bring grade up to match existing pavement elevations as shown on the Drawings.

C. For deep excavations where the pavement repair constitutes a full lane or roadway, workmanship shall conform to the standards and details of new road way construction.

1. Existing pavement more than 2 feet wide beyond the trench area shall be left in place and a full overlay applied to the limits of the existing road width.
2. Existing base beyond the trench area shall be left in place.
3. Full lane or width roadways shall have a consistent cross-section and straight edge of pavement delineation's.

3.09 CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT OVERLAY – IF REQUIRED

A. The Contractor shall place a layer of tack coat at a rate of 0.05 to 0.12 gallon per square yard over all areas to receive asphalt concrete.

B. Lay asphalt concrete over all areas designated to be resurfaced. The asphalt concrete pavement overlay shall be placed in two ¾-inch lifts to a compacted depth of 1-1/2 inches or as shown on the Drawings. The method of proportioning, mixing, transporting, laying, processing, rolling the material, and the standards of workmanship shall meet the applicable requirements of the Standard Specifications. At no time shall the coarse aggregate segregated from the mix either from hand spreading or raking of joints be scattered across the paved mat. Such material shall be collected and disposed of.

C. The ENGINEER will examine the prepared roadway before the paving is begun and bring any deficiencies to the CONTRACTOR's attention to be corrected before the paving is started. Roll each lift of the asphalt concrete until roller marks are eliminated and compacted to 100 percent of the laboratory compacted mixture. The grade, line, and cross section of the finished surface shall conform to the Drawings. Asphalt or asphalt stains which are noticeable upon surfaces of concrete or materials which will be exposed to view shall be promptly and completely removed.

3.10 ASPHALT CONCRETE PAVEMENT

A. Workmanship in producing, hauling, placing, compacting, and finishing asphalt concrete shall meet the applicable portions of the Standard Specifications.

3.11 CONNECTIONS WITH EXISTING FACILITIES

A. Where the bituminous pavement is to be connected with an existing roadway surface or other facility, the CONTRACTOR will be required to modify the existing roadway profile in such a manner as to produce a smooth riding connection to the existing facility. The CONTRACTOR shall meet existing neat lines where required.

B. Where it is necessary to remove existing asphalt surfaces or oil mat surfaces to provide proper meet lines and riding surfaces, the CONTRACTOR shall sawcut the existing surface so that there will be sufficient depth to provide a minimum of 1 inch of asphalt concrete, and the waste material shall be disposed of to the satisfaction of the Engineer. Prior to placing the asphalt concrete, these areas shall be tacked. Meet lines shall be straight and the edges vertical. The edges of meet line cuts shall be painted with liquid asphalt or emulsified asphalt prior to placing asphalt concrete. After placing the asphalt concrete, the meet line shall be sealed by painting with a liquid asphalt or emulsified asphalt and immediately covered with clean, dry sand.

3.12 CONSTRUCTION OF COURSES

A. The asphalt concrete pavement shall be constructed in one or more courses as shown on the Drawings.

1. Rolling shall continue until all roller marks are eliminated and compacted to 100 percent of the laboratory compacted mixture has been obtained.

3.13 SURFACE TOLERANCE

A. Tests for conformity with the specified grade shall be made by the CONTRACTOR immediately after initial compression. Any variation shall be immediately corrected by the removal or addition of materials and by continuous rolling.

B. The completed surface of the pavement shall be of uniform texture, smooth, uniform as to grade, and free from defects of all kinds. The completed surface shall not vary more than 1/8 inch from the lower edge of a 12-foot straightedge placed on the surface along the centerline or across the trench.

C. After completion of the final rolling, the smoothness and grade of the surface shall again be tested by the CONTRACTOR.

D. When deviations in excess of the above tolerances are found, the pavement surface shall be corrected as stated in the Standard Specifications.

E. All areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the satisfaction of the Engineer.

F. All costs involved in making the corrections of defects described above shall be borne by the CONTRACTOR and no compensation will be made for this Work.

3.14 SAMPLES

A. If directed by the Engineer, the CONTRACTOR shall without additional charge, provide the ENGINEER with test results of samples of asphalt concrete cut from the completed pavement or the individual courses thereof for each occurrence. Provide a minimum of three test cores located as directed by the Engineer. He shall also provide the ENGINEER with test results of samples of the uncompressed asphalt concrete mixtures and all materials incorporated in the Work.

3.15 WEATHER CONDITIONS

A. Asphalt shall not be applied to wet material. Asphalt shall not be applied during rainfall or any imminent storms that might adversely affect the construction. The ENGINEER will determine when surfaces and materials are dry enough to proceed with construction. Asphalt concrete shall not be placed during heavy rainfall or when the surface upon which it is to be placed is wet.

3.16 PROTECTION OF STRUCTURES AND ADJUSTMENT OF APPURTENANCES

A. Provide whatever protective coverings may be necessary to protect the exposed portions of bridges, culverts, curbs, gutters, posts, guard fences, road signs, and any other structures from splashing oil and asphalt from the paving operations. Remove any oil, asphalt, dirt, or any other undesirable matter that may come upon these structures by reason of the paving operations.

B. Where water valve boxes, manholes, catch basins, or other underground utility appurtenances are within the area to be surfaced, the CONTRACTOR shall adjust the tops of these facilities to conform with the proposed surface elevations. The CONTRACTOR shall notify the proper authority and either raise or lower the appurtenances or make arrangements with that authority for having the facilities altered at the CONTRACTOR's expense before proceeding with the resurfacing. The CONTRACTOR will be responsible for making certain that appurtenances are brought to proper grade to conform with finished surface elevations and any delays experienced from such obstructions will be considered as incidental to the paving operation. No additional payment will be made. Protect all covers during asphalt application. All adjustments shall be made in accordance with the requirements of the respective utility.

C. To extend manhole use grade rings as specified, do not use leveling rings. Remove the frame and cover, rebuild the manhole top to raise it so that the new height meets the overlay elevations and then replace the frame and cover in accordance with Section 02533, Manholes, and the Drawings.

3.17 EXCESS MATERIALS

A. Dispose of all excess materials. Make arrangements for the disposal and bear all costs or retain any profit incidental to such disposal.

3.18 CONTRACTOR'S RESPONSIBILITY

A. Settlement of replaced pavement over trenches within the warranty period shall be considered the result of improper or inadequate compaction of the subbase or base materials. The CONTRACTOR shall promptly repair all pavement deficiencies noted during the warranty period at the Contractor's sole expense.

3.19 SIDEWALKS AND CURBS

A. Replace concrete sidewalks and curbs to the same section width, depth, line, and grade as that removed or damaged or as shown on the Drawings. The minimum thickness of sidewalks shall be 4 inches and 6 inches in driveways. Cut ends of existing curb to a vertical plane. Prior to replacing the sections, properly backfill and compact the trench to prevent subsequent settlement.

B. Replace concrete sidewalks at scored joints and make replacement in a manner that will avoid a patched appearance. Provide a minimum 2-inch thick compacted leveling course of clean sand or gravel of quality hereinbefore specified. Finish concrete surface similar to the adjacent sidewalks.

3.20 DRIVEWAYS AND WALKS

A. Replace asphalt driveways and walks in accordance with Paragraph Asphalt Concrete Pavement Replacement.

B. Replace concrete and paver driveways in kind, using similar materials of construction. Concrete driveways shall consist of a reinforced, 6-inch section installed in accordance with Section 02771, Concrete Curbs and Sidewalks.

3.21 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.

3.22 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 the Standard Specifications.

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.

3.23 PAVEMENT REPAIR

A. All damage to pavement as a result of work under this Contract shall be repaired in a manner satisfactory to the ENGINEER and at no additional cost to the OWNER. The repair shall include preparation of the subgrade, placing and compaction of the lime rock base and placement of the final asphalt surface as described in this Section.

B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage with the edge of pavement left saw cut to a true edge with no irregularities. For county roads and CITY streets recently constructed or overlaid, the repair may be required to be full-lane width as shown on the Drawings.

3.24 SWALE RESTORATION

A. New or existing swale areas (areas between pavement edge and sidewalks, or right-of-way line if there is no existing or proposed sidewalk) shall be graded and reshaped to the cross section shown on the Drawings. Where storm inlets are present, the swale shall have a consistent longitudinal slope towards the inlet.

B. Swale areas with previously existing improved surfaces, including but not limited to asphalt, concrete, pavers, crushed or decorative rock, shall be restored in kind. Asphalt paved areas shall be constructed with a minimum 6- inch stabilized subbase and minimum 6-inch compacted limerock base, primed and topped with minimum 1-inch asphalt.

C. Swale areas with previously unimproved or turfed surfaces will be restored with soil stabilization where existing natural soil will not support vehicle loads normally imposed by movement and parking of heavy vehicles without rutting and shifting of soil. Subject to the approval of the Engineer, this work may be performed in connection with preparation of subgrade or construction of the limerock base course.

D. Swale areas with previously unimproved or turfed surfaces will be topped with sod. St. Augustine “Floritam” and two inches of topsoil shall be used in irrigated areas and where St. Augustine sod was previously established. Bahia sod shall be placed in all other areas not previously improved or sodded.

3.25 SWALE STABILIZATION

A. Where swale stabilization is required as indicated above, stabilization shall be achieved by the addition and mixing in of suitable stabilizing materials. It shall be incorporated into the existing swale soils by plowing, disking, harrowing, blading or mixing with rotary tillers or other appropriate equipment approved by the Engineer, until the mixed materials are of uniform bearing value throughout the width and at least 6-inch depth from the top of the swale after the swale is graded and shaped to the section indicated on the plans.

B. The swale areas shall be mixed and compacted to achieve a minimum average dry density of 90 percent throughout the 6-inch thickness, as determined by AASHTO T180. In the determination of such average, the minimum acceptable density shall be 85 percent and the maximum density which shall be used in calculations shall be 100 percent (if the tested density is reported above 100 percent).

C. Density tests for swale stabilization shall be made at intervals not less than one set of three per CITY block on each side of the roadway, or at increased intervals as directed by the ENGINEER when required to measure small or isolated sections (except where such testing may be considered unnecessary by the Engineer). Each set of three shall be averaged as indicated above for determination of meeting the minimum requirements.

3.26 BRICK OR PAVER RESTORATION

A. Restore pavers and apron area as shown in the Drawings.

B. If brick and paver materials are damaged, new materials shall match or all materials within the crossing must be replaced at no additional cost. New materials shall be approved by the OWNER.

END OF SECTION

PROJECT 12133

SECTION 02632

STORM DRAIN AND SANITARY SEWER PIPING

PART 1 - GENERAL

1.01 DELIVERY, STORAGE, AND HANDLING

A. The storage of pipe at the Project site shall be done in accordance with pipe manufacturer's recommendations and with the approval of the ENGINEER.

B. Marking at Plant: Mark each pipe and fitting at plant. Include date of manufacture, manufacturer's identification, specification standard, diameter of pipe, pipe class, and other information required for type of pipe

C. Pipe, specials, and fittings received at Project site in damaged condition will not be accepted.

D. Pipe and fittings shall not be stored on rocks or gravel, or other hard material that might damage pipe. This includes storage area and along pipe trench.

E. Gasket Storage: Store rubber gaskets in cool, well-ventilated place and do not expose to direct rays of sun. Do not allow contact with oils, fuels, petroleum, or solvents.

F. Handling:

1. Pipe shall be protected during handling against impact, shock, and falling.
2. Heavy canvas, or nylon slings of suitable strength shall be used for lifting and supporting materials. Do not use chains or cables.
3. Lifting pipe during unloading or lifting into trench shall be done using two slings placed at quarter point of pipe section. Pipe may be lifted using one sling near center of pipe, provided pipe is guided to prevent uncontrolled swinging and no damage will result to pipe or harm to workmen. Slings shall bear uniformly against pipe.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

A. As specified on the Data Sheets located at the end of this Section as a supplement. C-900 PVC pipe as specified in Section 02500, CONVEYANCE PIPING – GENERAL, may be substituted for the PVC pipe specified in this Section.

B. Damaged storm drain piping shall be replaced with the same size piping using materials as specified in this Section.

2.02 JOINTS

A. As specified on the Data Sheets located at the end of this Section as a supplement.

2.03 SERVICE AND DRAIN CONNECTIONS

A. Pipe and fittings for individual service connection shall be of one type of material throughout. No interchanging of pipe and fittings allowed. Long-radius bends shall be used for changes in directions, unless approved otherwise by ENGINEER.

B. All sewer service connections shall be PVC.

C. Residential Service: 6 inch.

D. Commercial Service, Including Motel and Apartments: 6 inch, unless shown otherwise.

E. Cleanouts and Covers:

1. PVC for non-traffic areas as shown on the Drawings.
2. No cleanouts are to be installed in the sidewalk, unless approved by the ENGINEER.
3. Cast iron valve box and cover required for installation in driveways, sidewalks, swales or traffic areas, USF 7615 (FC); or equal.

2.04 CLOSED CIRCUIT TELEVISION (CCTV) EQUIPMENT

A. The CCTV camera with rotating lens or pan and tilt shall be color and one specifically designed and constructed for such inspections. Lighting and camera quality shall be suitable to allow a clear, in-focus picture of a minimum of 6 inches to the entire inside periphery of the sewer pipe. The camera shall have a minimum resolution capability of 350 lines per inch. The camera shall record in VHS T 120 format. Do not use long play as quality is not acceptable.

B. Color television monitors shall be provided. Monitors shall have a resolution capability of no less than 350 lines per inch. Continuously displayed on the monitors as part of the video presentation shall be the date of the survey, number designation of the manhole section being surveyed, and a continuous forward or reverse readout of the camera distance from the manhole of reference. Picture quality and definition shall be to the satisfaction of the OWNER's representative and if unsatisfactory, equipment shall be replaced at the CONTRACTOR's expense.

C. A Polaroid type camera shall be available for making still photos for reproduction.

D. CCTV inspection of sewers to be horizontally is required prior to excavation to verify lateral locations.

2.05 PIPE BEDDING AND PIPE ZONE MATERIAL

A. Granular material as specified in Section 02320, TRENCH BACKFILL.

PART 3 - EXECUTION

3.01 GENERAL

A. Notify ENGINEER at least 2 weeks prior to field fabrication of pipe or fittings.

B. Furnish feeler gauges of proper size, type, and shape for use during installation for each type of pipe furnished.

C. Distributing Materials: Place materials along trench only as will be used each day, unless otherwise approved by ENGINEER. Placement of materials shall not be hazardous to traffic or to general public, obstruct access to adjacent property, or obstruct others working in area.

3.02 PREDIGGING AND RELOCATIONS OF WATER MAIN

A. The CONTRACTOR is responsible to relocate and protect water mains that are within the construction limits of sewers, manholes, laterals, and appurtenances. Water mains shown on the drawings were located based on record drawings and general installation procedures. In certain instances it may be necessary to relocate the water main horizontally or vertically because the actual location is too close to a structure or conflicts with the new sewer main.

B. At some locations the pre-digging of a water main is called out on the Drawings. However, some water mains may have to be relocated as a result of information gathered during the CONTRACTOR's excavation for the new sewers.

C. In both instances, the CONTRACTOR is to expose the water main and provide the invert elevation and physical dimensions of the water main and adjacent structures to the ENGINEER. After review of the information, the ENGINEER will direct the CONTRACTOR how to proceed with the relocation.

D. When the CONTRACTOR is directed to relocate the water main it shall be accomplished by installing four 45-degree bends, two solid sleeves, and approximately 30 feet of PVC or DI pipe, depending on the existing material.

1. The complete installation shall have all restrained joints including the connections to the existing pipe.
2. The installation shall be cleaned and disinfected in accordance with the provisions of Section 02519, DISINFECTION OF WATER SYSTEMS.

E. The CONTRACTOR may request a pre-dig and payment will be made only if the ENGINEER agrees that the situation justifies the need.

F. In the instance where the CONTRACTOR does not pre-dig, but the ENGINEER decides that the water main should be relocated, payment will be made only for the relocation.

G. In the instance where the CONTRACTOR does pre-dig, but the actual information reveals to the ENGINEER that the water main should not be relocated, payment will be made only for the pre-digging.

H. Only water mains 2 inches and larger shall be considered for payment. Water mains and services smaller than 2 inches in diameter shall be considered incidental to the installation of the new sewers and be relocated at the sole cost of the CONTRACTOR.

3.03 EXAMINATION

A. Verify size, material, joint types, elevation and horizontal location of existing pipeline to be connected to new pipeline or new equipment.

B. Damaged Coatings and Linings: Repair using coating and lining materials in accordance with manufacturer's instructions.

C. Repairs to Reinforced Concrete Pipe section will be allowed, only if approved in writing by ENGINEER. Damaged pipe which, in opinion of ENGINEER, cannot be repaired, will be rejected and removed from the Project site.

3.04 EXCAVATION

A. Excavate pipe trenches as specified in Section 02316, EXCAVATION.

B. The amount of trench length permitted to be open at one time shall not extend more than 400 feet of the pipe laying operations, unless approved by the ENGINEER.

C. Place and compact bedding material as specified in Section 02320, TRENCH BACKFILL.

3.05 PIPE PREPARATION AND HANDLING

A. Pipe Distribution: Do not distribute more than 1 week's supply of materials in advance of laying, unless otherwise approved by ENGINEER.

B. Inspect all pipe and fittings prior to lowering into trench to ensure no cracks, broken, or otherwise defective materials are being used.

C. Clean ends of pipe thoroughly. Remove foreign material and dirt from inside of pipe and keep clean during and after laying.

D. Use proper implements, tools, and facilities for the safe and proper protection of the work.

E. Lower pipe into the trench in such a manner as to avoid any physical damage to the pipe. Remove all damaged pipe from the jobsite. Do not drop or dump pipe into trenches under any circumstances.

3.06 INSTALLATION OF PIPE, FITTINGS, AND APPURTENANCES

A. General:

1. Keep trench dry until pipe laying and joining are completed. Take precautions to prevent "uplift" or floating of pipe prior to completion of backfill operation. If the excavation cannot be effectively dewatered the CONTRACTOR shall propose alternate pipe installation methodology for approval by the ENGINEER prior to proceeding. All requirements of Section 02320, TRENCH BACKFILL, will remain in effect.
2. Pipe laying shall proceed upgrade with spigot ends pointing in direction of flow.

3. When field cutting or machining pipe is necessary, use only tools and methods recommended by pipe manufacturer and approved by ENGINEER.
4. Excavate bell holes at each joint to permit correct assembly and inspection of entire joint.
5. Pipe shall be laid accurately to line and grade. Establish line and grade for pipe by use of lasers. Check for alignment and grade after joint has been made.
6. Measure for grade at pipe invert, not at top of pipe.
7. Pipe invert may deviate from line or grade up to 1/2 inch for line and 1/4 inch for grade, provided that finished pipe line will present a uniform bore, and such variation does not result in a level or reverse sloping invert, or less than minimum slope shown. As-built information will be collected on a daily basis as provided in Section 01040, COORDINATION. Pipe runs with less than the required slope will be required to be removed and replaced at the CONTRACTOR'S expense.
8. Pipe bedding shall form a continuous and uniform bearing and support for the pipe barrel between joints. Pipe shall not rest directly on the bell or pipe joint.
9. Prevent entry of foreign material into gasketed joints. The presence of debris in the main will require correction.
10. Use gasket lubricant as recommended by gasket manufacturer. Assemble joint in accordance with recommendations of manufacturer.
11. No pipe shall be laid until the two preceding lengths have been thoroughly embedded in-place, so as to prevent moment or disturbance of the pipe.
12. Apply sufficient pressure in making joint to assure that joint is "home" as defined in standard installation instructions provided by pipe manufacturer. Inside joint space shall not exceed 50 percent of pipe manufacturer's recommended maximum allowance.
13. Whenever the pipe laying is discontinued, as at night, the unfinished end is to be securely protected from displacement by laying of the banks or from other injury, and a suitable stopper is to be inserted into the pipe end to prevent clogging of the pipe.
14. Plug or close off pipes which are stubbed off for manhole, concrete structure, or for connection by others, with temporary watertight plugs.
15. Connections between one pipe material and another shall be by means of flexible compression collar, installed in accordance with the manufacture's recommendations, or concrete closure collar.

B. Connection to Structure or Manhole:

1. Locate standard pipe joint within 1.5 feet outside face of structure for pipe 18 inches and smaller and within one pipe diameter for pipe 21 inches and larger.
2. Connect PVC pipe to manhole or structure with pipe to manhole connector in accordance with manufacturer's recommendations.

C. Crossing Waterlines: Where sanitary sewer crosses less than 18 inches below waterline, use ductile iron or PVC pressure pipe for crossing or encase in concrete envelope for a minimum distance of 9 feet on each side of waterline.

D. Concrete Closure Collars: Only use concrete closure collars where shown or authorized by ENGINEER.

E. Service Connections:

1. Minimum Slope: 1/8-inch per foot.
2. Minimum Trench Depth: 3 feet at property line or on property within permanent sewer easement. ENGINEER will determine required depth at end of line in each case.
3. Progress of Construction: Unless otherwise approved by ENGINEER, install service connections not more than 5 days after backfilling of sewer trench in block or equivalent 400-foot section of sewer.
4. Service Connection Tees or Wyes: Furnish tee or wye outlets with gasketed type joint or approved adapter to join service connection pipe. Concrete encase tees or wyes deeper than 12 feet. Do not encase joints at ends of tee or wye fittings.
5. Disconnecting and Reconnecting Existing Service Connections:
   a. Locate the existing service connections prior to constructing the tee in the new sewer line.
   b. First length of pipe out from tee on lateral or main shall not be greater than 3 feet in length.
   c. Maximum deflection permissible with any one fitting shall not exceed 45 degrees and shall be accomplished with long-radius curves or bends. Short-radius elbows or curves will not be permitted, except by permission of ENGINEER.
   d. Disconnect existing service connections from existing sewers to be abandoned and reconnect them to the new sewers.
   e. Make service connection to sewer system at manhole when directed by ENGINEER. Where service connection pipe is connected to manhole or concrete structure, make connection so standard pipe joint is located not more than 1.5 feet from structure.

3.07 BACKFILLING AND COMPACTION

A. Backfill and compact all pipe trenches as specified in Section 02320, TRENCH BACKFILL.

B. Repair excavations in roadways as specified in Section 02772, ASPHALT CONCRETE PAVEMENT, or Section 02575, SURFACE RESTORATION.

3.08 WORK STOPPAGE

A. If the Work is stopped on the whole or any part of the trench, and the same is left open for an unreasonable length of time in advance of the construction for any reason except delay in removing obstructions over which the CONTRACTOR has no control, the CONTRACTOR shall, when directed, refill such trench or part thereof and temporarily repave over the same with 8-inch rock base and asphalt cold patch at his own cost and expense, and he shall not again open such trench or part thereof until he is ready to proceed with construction.

3.09 SEWER CLEANING AND CCTV INSPECTION

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

necessary, use mechanical rodding or bucketing equipment.

B. The following general procedure shall be followed to pressure clean and televise the sewer pipes. The work shall be accomplished completely in one manhole section at a time. A manhole section is defined as the length of pipe connecting two manholes. Internally inspect pipelines by CCTV after the completion of pipeline cleaning and testing. Conduct inspection in presence of ENGINEER.

1. High-pressure clean a manhole section.
2. Inspect the manhole section internally with TV within 3 days of cleaning, and make a log of conditions encountered.
3. Simultaneous with TV inspection make a video tape recording of each manhole section.
4. Take Polaroid or digital photos of the monitor image as required by the ENGINEER.
5. Plug off manhole at ends of line so no flow enters new sewer pipe except that from service connections.
6. Pull camera at uniform rate, stopping to properly document defects. Maximum pull of camera shall not exceed 30 feet per minute.

C. Provide detailed information on the videotape at each starting manhole and similar information on the sewer logs. At a minimum, provide company name, project name, date of video, street name, manhole number, manhole-to- manhole run, manhole diameter, direction of flow, size of pipe, type of pipe, crew leader name, OWNER's inspector's name, lateral location (footage from manhole), and direction (north, south, east, or west).

D. Show sufficient detail to determine cracks in pipe, offset joints, leaking joints, sags and other flaws in pipeline installation. Record location of deficiencies by distance from center of reference manhole.

E. Upon completion, playback tape in presence of ENGINEER. Any tape not meeting quality standard will be rejected and taping process repeated.

F. Correct deficiencies in pipe found as a result of video replay. Replace any sewer pipe which has any deficiencies specified. Grouting of leaky joints or damaged pipe on new sewer pipe will not be accepted. Re-inspect the replaced pipe for deficiencies and replace pipe until no deficiencies exist.

G. Dispose of cleaning water in a manner that will not damage or interfere with adjacent property and in a manner acceptable with ENGINEER and regulatory agencies.

3.10 HYDROSTATIC TEST

A. General:

1. Notify ENGINEER in writing 5 days in advance of testing. Perform testing in presence of ENGINEER.
2. Test sections of constructed sewer between stations only after service connections, manholes, and backfilling have been completed. Testing may be done prior to placement of asphaltic concrete or roadway structural section.
3. Isolate new pipelines that are connected to existing pipelines. Install pipe

plugs as required to allow section of new pipe to be pressure tested.

4. Plug wyes, tees, stubs, and service connections with gasketed caps or plugs securely fastened or blocked to withstand internal test pressure. Such plugs or caps shall be removable, and their removal shall provide socket suitable for making flexible jointed lateral connection or extension.
5. Furnish testing equipment and perform tests as approved by ENGINEER. Testing equipment shall provide observable and accurate measurement of leakage under specified conditions.
6. Provide and bear costs of necessary water required for testing project piping.

B. Testing Equipment Accuracy: Plus or minus 1/2-gallon of water leakage under specified conditions.

C. Maximum Allowable Leakage: 0.16 gallons per hour per inch diameter per 100 feet. Include service connection footage in test section, subjected to minimum head specified.

D. Exfiltration Test:

1. Hydrostatic Head:
   a. At least 6 feet above maximum estimated groundwater level in section being tested.
   b. No less than 6 feet above inside top of highest section of pipe in test section, including service connections.
2. Length of Pipe Tested: Limit length such that pressure on invert of lower end of section does not exceed 30 feet of water column.

E. Infiltration Test:

1. Groundwater Level: At least 5 feet above inside top of highest section of pipe in test section, including service connections.
2. Visible infiltration will require correction.

F. Piping with groundwater infiltration rate greater than allowable leakage rate for exfiltration will be considered *defective* even if pipe previously passed a pressure test.

G. Defective Piping Sections: Replace, and retest as specified.

3.11 LOW PRESSURE AIR TESTING

A. In accordance with ASTM F-1417.

B. General:

1. Notify ENGINEER in writing 5 days in advance of testing. Perform testing in presence of ENGINEER.
2. Test sections of constructed sewer between stations only after service connections, manholes, and backfilling have been completed. Testing may be done prior to placement of asphaltic concrete or roadway structural section.
3. Isolate new pipelines that are connected to existing pipelines. Install pipe plugs as required to allow section of new pipe to be pressure tested.

4. Plug wyes, tees, stubs, and service connections with pneumatic plugs. The plug design shall be such that they will hold against the test pressure without external blocking or bracing. Such plugs shall be removable, and their removal shall provide socket suitable for making flexible jointed lateral connection or extension. One of the plugs shall have 3 air hose connections; one for inflating the plug, one for reading the air pressure and one for introducing air into the sealed line.
5. Furnish testing equipment and perform tests as approved by ENGINEER. Testing equipment shall provide observable and accurate measurement of leakage under specified conditions. Calibrate gauges with standardized test gauge at start of each testing day. Install compressor, air piping manifolds, gauges, and valves at ground surface.
6. Provide pressure release device, such as rupture disc or pressure relief valve, to relieve pressure at 8 psig or less.
7. If the groundwater is higher than the top of the pipe, the test pressure shall be increased by 0.43 psi/foot up to five (5) feet above the top of the pipe. For groundwater in excess of 5 feet above the top of the pipe, infiltration testing shall be conducted.

C. No person shall enter manhole or structure, or occupy area above opening of manhole or structure where pipe is under pressure.

D. Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure resulting from any groundwater above the pipe. At least two minutes shall elapse to allow the pressure to stabilize.

E. The time required for the internal pressure to decrease from 3.5 to 2.5 psig greater than the average back pressure shall not be less than the time shown for a given pipe diameter:

Pipe Diameter (in.)	Minimum Elapsed Time (min.)
8	7.5
10	9.25
12	11.25
15	14
18	17

F. Defective Piping Sections: Replace, and retest as specified.

3.12 PVC PIPE DEFLECTION TESTING

A. General:

1. Test installed gravity PVC pipeline by pulling a mandrel through the main without the use of a mechanical pulling device.
2. Perform the test at least 10 days after trench backfill and compaction have been completed.

B. Mandrel:

1. Full circle, solid or rigid legged (9 min) steel cylinder with pulling rings at each end.
2. Sized to allow an ultimate deflection of less than 5 percent minimum size,

96.67 percent if inside pipe diameter.

C. Correcting Deficiencies:

1. Excavate to spring line and replace and re-compact pipe zone material.
2. Internal pipe re-rounding or vibration will not be permitted.
3. If pipe does not past mandrel test following (1), replace pipe section.

3.13 INTERNAL INSPECTION (LAMPING)

A. Notifications:

1. Notify ENGINEER:
a. If depth of flow in pipeline exceeds 50 percent of pipe diameter.
b. If conditions for lamping activities are found to be unsafe or impractical.

B. Inspection Equipment:

1. Allows inspection from surface.
2. Equip with:
a. Belt-mounted, rechargeable battery and control.
b. Telescoping Pole: 18 feet long, maximum.
c. Flood lamps.

C. ENGINEER will be present during initial inspections to establish quality guidelines. All lamping shall be conducted in the presence of an OWNER's Representative.

D. Prevent unnecessary disruption of traffic and access to residences or businesses.

E. Provide one person, in addition to physical inspection crew, to work from surface only.

F. Record defects that are visible from manhole.

3.14 SUPPLEMENTS

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

1. Data Sheets.

Number	Title
-03	Polyvinyl Chloride (PVC)
-05	Reinforced Concrete

END OF SECTION

SECTION 02632-03 POLYVINYL CHLORIDE (PVC)	
Item	**Description**
Pipe: 15-inch diameter and under	ASTM D3034: Standard dimension ratio less than 26, except that the cell classification shall be 12454-B or 12454-C as defined in ASTM D1784.
Pipe: 18 through 24-inch diameter	ASTM F679: Standard dimension ratio less than 18, except that the cell classification shall be 12454-C as defined in ASTM D1784.
Ribbed Profile Pipe: 18- through 36-inch diameter	ASTM F794: Minimum stiffness of 46 psi when tested in accordance with ASTM D2412, except that the cell classification shall be 12454-C as defined in ASTM D1784.
Joints	ASTM D3212 rubber gasketed.
Gaskets	ASTM F477. Lubricants: As approved by manufacturer.
Fittings	PVC, gasketed. Provide plug when service piping is not required.
Plugs	Removable. Removal shall provide a socket suitable for making a flexible jointed lateral connection or extension.
Source Quality Control Testing	In accordance with specified ASTM.

END OF SECTION

SECTION 02632-05 REINFORCED CONCRETE	
Item	**Description**
Pipe	ASTM C76, Wall B, class as shown. Mark each joint with pipe class. Rotating packer or platform not allowed.
Cement	ASTM C150, Type II. ASTM C150, Type I, with fly ash; maximum 12 percent Tricalcium Aluminate. ASTM C595 Rev A, Type IP, with fly ash; Cement: ASTM C150. Minimum 564 pounds per cubic yard without fly ash. Minimum 479 pounds per cubic yard with fly ash.
Ratio: Water to Cementitious Materials	Not over 0.49.
Fly Ash	ASTM C618, Class C or Class F, Tables 1 and 2 modified as follows: Loss on Ignition: Maximum 3 percent Water Requirement: Maximum 100 percent of control Ratio Percent CaO/Fe_2O_3: Maximum 1.5 or test cement fly ash mix in accordance with ASTM C1012. Mix: Equal to or better than ASTM C150, Type II cement. 85 pounds per cubic yard minimum, 160 pounds per cubic yard maximum. Test: ASTM C311 and ASTM C618.
Joints	ASTM C443 Rev A. Captive gasket in groove.
Rubber Gaskets	ASTM C443.
Tee Fittings	Reinforced concrete, rubber gasketed. Provide plug when service piping is not required.
Plugs	Removable. Removal shall provide a socket suitable for making a flexible jointed lateral connection or extension.
Circumferential Reinforcement	Not closer than 1-inch to inside surface of pipe. Area of outer circular reinforcing cage not less than 75 percent of inner cage.
Elliptical Reinforcement	Not allowed.

SECTION 02632-05 REINFORCED CONCRETE	
Item	**Description**
Source Quality Control Testing	Load Bearing 0.01-inch Crack, Compressive Strength and Absorption: ASTM C76. Load Bearing Ultimate: ASTM C76. Permeability: ASTM C497. Voids: Longitudinally sawcut one pipe from each 100 lengths of pipe manufactured in half with saw that will not damage the concrete or reinforcing steel. Inspect for voids adjacent to circumferential bars. Voids will be considered continuous if a 1/16-inch diameter pin can be inserted 1/4-inch deep. If voids exist adjacent to more than 10 percent of the circumferential bars, two additional pipe shall be tested. If either of the two pipe fail, the entire 100 lengths will be rejected.

END OF SECTION

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PROJECT 12133

SECTION 02710
LIMEROCK BASE

PART 1 - GENERAL

1.01 DEFINITIONS

A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross section.

B. Completed Lift: Compacted with uniform surface reasonably true to cross-section.

PART 2 - PRODUCTS

2.01 LIMEROCK BASE ROCK

A. The material used in limerock base shall be material classified as Miami Oolite Formation.

B. The minimum of carbonates of calcium and magnesium in the limerock shall be 70 percent. The maximum percentage of water-sensitive clay material shall be 3.

C. Limerock material shall be uniform in color and not contain cherty or other extremely hard pieces, or lumps, balls, or pockets of sand or clay size material in sufficient quantities as to be detrimental to the proper bonding, finishing, or strength of the limerock base.

D. The limerock base shall be uniformly graded from coarse to fine with 97 percent passing a 3-1/2-inch sieve, 80 percent passing a 2-inch sieve. The fine material shall consist entirely of dust of fracture. All crushing or breaking up, which might be necessary in order to meet such size requirements, shall be done before the material is placed on the road.

E. Physical Qualities:

1. Liquid Limit, AASHTO T89: Maximum 35 percent.
2. Nonplastic.
3. Limerock material shall have an average limerock bearing ratio (LBR) value of not less than 100.

2.02 SOURCE QUALITY CONTROL

A. CONTRACTOR: Perform tests necessary to locate acceptable source of materials meeting specified requirements.

B. Final approval of aggregate material will be based on materials' test results on installed materials.

C. Should separation of coarse from fine materials occur during processing or stockpiling, immediately change methods of handling materials to correct uniformity in grading.

PART 3 - EXECUTION

3.01 SUBGRADE PREPARATION

A. As specified in Section 02319, Subgrade Preparation.

B. Obtain Engineer's acceptance of subgrade before placement of limerock base rock.

C. Do not place base materials on soft, muddy subgrade.

3.02 EQUIPMENT

A. Use mechanical rock spreaders, equipped with a device that strikes off the rock uniformly to laying thickness, capable of producing even distribution. For areas where the use of a mechanical spreader is not practicable, the CONTRACTOR may spread the rock using bulldozers or blade graders.

3.03 HAULING AND SPREADING

A. Hauling Materials:

1. The limerock shall be transported to the point where it is to be used and dumped on the end of the preceding spread.
2. Do not haul over surfacing in process of construction.
3. Loads: Of uniform capacity.
4. Maintain consistent gradation of material delivered; loads of widely varying gradations will be cause for rejection.

B. Spreading Materials:

1. Distribute material to provide required density, depth, grade and dimensions with allowance for subsequent lifts.
2. Produce even distribution of material upon roadway without segregation.
3. Should segregation of coarse from fine materials occur during placing, immediately change methods of handling materials to correct uniformity in grading.

3.04 CONSTRUCTION OF COURSES

A. General: Complete each lift in advance of laying succeeding lift to provide required results and adequate inspection.

B. Limerock Base:

1. Maximum Completed Lift Thickness: 6 inches or equal thickness.
2. Completed Course Total Thickness: As shown.
3. Spread lift on preceding course to required cross-section.
4. Lightly blade and roll surface until thoroughly compacted.
5. Blade or broom surface to maintain true line, grade, and cross-section.

C. Gravel Surfacing:

1. Maximum Completed Lift Thickness: 6 inches or equal thickness.
2. Completed Course Total Thickness: As shown.
3. Spread on preceding course in accordance with cross-section shown.
4. Blade lightly and roll surface until material is thoroughly compacted.

3.05 ROLLING AND COMPACTION

A. Commence compaction of each layer of base after spreading operations and continue until density of 98 percent of maximum density has been achieved as determined by AASHTO T 180.

B. Roll each course of surfacing until material shall not creep under roller before succeeding course of surfacing material is applied.

C. Commence rolling at outer edges of surfacing and continue toward center; do not roll center of road first.

D. When the material does not have the proper moisture content to ensure the required density, wet or dry, as required. When adding water, uniformly mix it in by disking to the full depth of the course that is being compacted. During wetting or drying operations, manipulate as a unit, the entire width and depth of the course that is being compacted.

E. Place and compact each lift to required density before succeeding lift is placed.

F. Bind up preceding course before placing leveling course. Remove floating or loose stone from surface.

G. Blade or otherwise work surfacing as necessary to maintain grade and cross-section at all times, and to keep surface smooth and thoroughly compacted.

H. Surface Defects: Remedy surface defects by loosening and rerolling. Reroll entire area, including surrounding surface, until thoroughly compacted.

1. Finished Surface: True to grade and crown before proceeding with surfacing.

3.06 SURFACE TOLERANCES

A. Finished Surface of Base Course and Leveling Course: Within plus or minus 0.10-foot of grade shown at any individual point.

B. Compacted Surface of Leveling Course: Within 0.04-foot from lower edge of 10-foot straightedge placed on finished surface, parallel to centerline.

3.07 DRIVEWAY RESURFACING

A. Replace gravel surfacing on driveways which were gravel surfaced prior to construction.

B. Provide compacted gravel surfacing to depth equal to original, but not less than 4 inches.

C. Leave each driveway in as good or better condition as it was before start of construction.

3.08 FIELD QUALITY CONTROL

A. In-Place Density Tests:

1. Construct base course so areas shall be ready for testing.
2. Allow reasonable length of time for ENGINEER to perform tests and obtain results during normal working hours.

3.09 CLEANING

A. Remove excess material; clean stockpile areas of aggregate.

END OF SECTION

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PROJECT 12133

SECTION 02726
WET WELL AND VAULT CONSTRUCTION

PART 1 - GENERAL

1.01 SUBMITTALS

A. Shop Drawings:

1. Precast Wet Wells and Vaults: Details of construction.
2. Precast Base Sections: Details of construction.

B. Quality Control Submittals:

1. Concrete: Proposed curing method for cast-in-place concrete structures.
2. Precast Sections: Manufacturer's results of tests performed on representative sections to be furnished.
3. Manufacturer’s Certification for Liner System.

PART 2 - PRODUCTS

2.01 BASE ROCK

A. FDOT No. 57 stone.

2.02 CONCRETE

A. Ready-mixed, meeting ASTM C94, Alternate 2, and the following:

1. Minimum Compressive Strength: 4,000 psi at 28 days.
2. Maximum Aggregate Size: 1-1/2 inches.
3. Slump: 2 to 4 inches.
4. Cement: ASTM C150, Type II.
5. Minimum Cement Content: 564 pounds per cubic yard.
6. Water Cement Ratio: Maximum of 0.49.

2.03 MORTAR

A. Standard premixed meeting ASTM C387, or proportion 1 part Portland cement to 2 parts clean, well-graded sand which will pass a 1/8-inch screen.

B. Admixtures: May be included but do not exceed the following percentages of weight of cement:

1. Hydrated Lime: 10 percent.
2. Diatomaceous Earth or Other Inert Material: 5 percent.

C. Consistency:

1. Tongue-and-Groove Type Joint: Such that mortar will readily adhere to pipe.
2. Confined Groove (Keylock) Joint: Such that excess mortar will be forced out of groove and support is not provided for section being placed.

2.04 BONDING AGENT

A. As manufactured by:

1. Sika Corp., Sikastix 370.
2. Sika Corp., Sikador Hi-Mod.
3. Horn Co., Epoxtite Binder 2385.

2.05 FORMS

A. Exposed Surfaces: Plywood or steel panels.

B. Other Surfaces: Matched boards, plywood, or other approved material.

C. Trench walls, large rock, or earth are not acceptable form material.

2.6 REINFORCING STEEL

A. Conform to ASTM A615, Grade 40, deformed bars.

2.7 CAST-IN-PLACE STRUCTURES

A. Acceptable, subject to submittal and ENGINEER's approval.

2.8 PRECAST RISER SECTIONS

A. Minimum 6 feet diameter for wet wells, or as shown on the Drawings. Valve vaults to be rectangular and dimensioned as shown on the Drawings. For other structures, conforming to ASTM C478 and the following:

1. Minimum wall thickness as shown on Drawings.
2. Top and bottom of sections shall be parallel.
3. Confined O-ring with rubber gaskets meeting ASTM C443.
4. External Coating: Koppers Bitumastic No. 300-M coal tar epoxy, or approved equal. Minimum 16 mils dry film thickness, first coat shall be red and second coat shall be black.

B. Source Tests:

1. Prior to delivery of any size precast manhole section to jobsite, conduct yard tests at point of manufacture.
2. Precast sections to be tested will be selected at random from stockpiled material to be supplied for the job.
3. All test specimens shall be mat tested and meet the permeability test requirements of ASTM C14.

2.9 PRECAST BASE SECTIONS AND BASES

A. Preferred by ENGINEER, unless wet well is to be installed by tremie method. Separate slab and base sections with water proofing provision, only if approved.

B. Valve Vault Base Sections: Base slab integral with sidewalls. Valve vaults shall be single section, unless approved by the ENGINEER. Valve vaults shall be less than 5 feet deep whenever possible to avoid classification as a confined space.

C. Base Slab: Minimum 6 inches thick with No. 4 reinforcing bars, 8-inch centers, both directions in center of slab or as shown on the Drawings. Tie reinforcing steel to wall steel.

D. Pipe penetrations for wet well section to be cored or cast in-place based on piping and pump layout. Penetrations for valve vault to be core-drilled based on final field adjustments of piping layout valve configuration.

E. Provide cast in-place, Type 316 stainless steel anchored "J" bolts for pump bases as shown on the Drawings. Coordinate with pump supplier. Drilled anchors not permitted.

2.10 PREFORMED PLASTIC GASKETS

A. Preferred in lieu of mortar type joints. Mortar joints to be used only in special circumstances and upon approval of the ENGINEER.

B. Conform to requirements of Federal Specification SS-S-00210.

C. Manufacturers:

1. Hamilton Kent Manufacturing Co., Box 178, Kent, OH 44240, Kent-Seal No. 2.
2. K. T. Snyder Co., Inc., Central National Bank Bldg., Houston, TX 77002, Ram-Nek.

2.11 CONCRETE PROTECTIVE LINER FOR NEW WET WELLS

A. As manufactured by Sure-Grip polypropylene liner, as manufactured by U.S. Precast, Cape Coral, FL.

2.12 CONCRETE PROTECTIVE LINER FOR EXISTING WET WELLS

A. Mainstay ML-72 Microsilica Cement Mortar with Mainstay DS-5 Epoxy Coating, as manufactured by Madewell Products Corp., Roswell, GA., or SewperCoat Calcium Aluminate Mortar as manufactured by LaFarge Aluminates, Chesapeake, VA,

2.13 REPAIR MATERIALS

A. Nonshrink Grout: Grout shall be nonmetallic. The grout shall be nongas-liberating type, cement-base, premixed product requiring only the addition of water for the required consistency. All components shall be inorganic. The following listed grouts meet these requirements and are acceptable for use:

1. Horngrout, TAMMS Industries, Mentor, OH.
2. UPCON Super Flow, The UPCO Company, Cleveland, OH.
3. Set Grout, The Master Builders Co., Cleveland, OH.
4. Crystex, L&M Construction Chemicals, Inc., Omaha, NE.

B. Patching Mortar: Shall be as approved by waterproofing/structural repair materials manufacturer as listed in Paragraph Waterproofing/Structural Repair Material.

C. Waterproofing/Structural Repair Material: The following listed waterproofing/structural repair materials are acceptable for use:

1. EMACO 588-CA, Master Builders, Inc., Cleveland, OH.

2. QUADEX QM-1s RESTORE, QUADEX Sewer Rehabilitation Products of Maumelle, AR.
3. Mainstay ML-72, Parson Environmental Products, Inc., Reading, PA.

D. Concrete: Conform to the requirements of Section 03301, REINFORCED CONCRETE.

E. Mortar: Mortar shall be sand/portland cement mix conforming to ASTM C270.

F. Pipe Plugs: Pipe plugs shall be rubber gasketed test plugs, sized as necessary.

G. Backfill: Conform to the requirements of Section 02320, TRENCH BACKFILL.

2.14 ACCESS COVERS AND FRAMES

A. Access covers for the wet well shall allow for unrestricted vertical removal of the pumps in accordance with the pump manufacturers recommendations and requirements.

B. Valve vault access covers shall allow for unrestricted vertical removal of valves and check valves.

C. Access covers shall be as specified in Section 05500, METAL FABRICATIONS AND CASTINGS, and/or Section 11305, SUBMERSIBLE PUMPS.

PART 3 - EXECUTION

3.01 EXCAVATION AND BACKFILL

A. As specified in Section 02316, EXCAVATION.

B. Backfill: Use highest class of trench backfill immediately adjacent, as shown.

C. As specified in Section 02380, CAISSONS (WET WELLS). The wet wells are designed for installation as caissons. At the CONTRACTOR's option and at no additional cost, the wet wells may be installed using sheet piles and open excavation with dewatering as required. The CONTRACTOR shall submit analternative design, including method and calculations for anti-flotation as a substitute for the tremie plug, prepared by a registered professional engineer.

3.02 BASE ROCK

A. Remove water from the excavation.

B. Place minimum of 6 inches of rock base (FDOT No. 57 stone) and thoroughly compact with a mechanical vibrating or power tamper.

3.03 CONCRETE BASE

A. Construct concrete base and tremie plug as shown.

B. Vibrate to densify concrete and screed so first precast section to be placed has a level, uniform bearing for full circumference.

C. Deposit sufficient mortar on base to assure watertight seal between base and

manhole wall, or place first precast section of manhole in concrete base before concrete has set. Properly locate and plumb first section.

D. If material in bottom of trench is unsuitable for supporting manhole, excavate below the base as directed by ENGINEER, and backfill to required grade with rock, as specified in Section 02315, FILL AND BACKFILL, Article FOUNDATION STABILIZATION.

3.04 PLACING PRECAST SECTIONS

A. Section Installation – Mortared Joints:

1. Thoroughly clean ends of sections to be joined.
2. Thoroughly wet joint with water prior to placing mortar.
3. Place mortar on groove of lower section.
4. Set next section in-place.
5. Fill joint completely with mortar of proper consistency.
6. Trowel interior and exterior surfaces smooth on standard tongue-and-groove joints.
7. Prevent mortar from drying out and cure by applying an approved curing compound or comparable approved method.
8. Do not use mortar mixed for longer than 30 minutes.
9. Chip out and replace cracked or defective mortar.
10. Completed Wet Wells and Vaults: Rigid and watertight.

B. Section Installation - Preformed Plastic Gaskets: If used in lieu of mortar joints, install in accordance with manufacturer's instructions and the following:

1. Carefully inspect precast sections to be joined.
2. Do not use sections with chips or cracks in the tongue.
3. Use only pipe primer furnished by gasket manufacturer.
4. Install gasket material in accordance with manufacturer's instructions.
5. Completed Wet Wells and Vaults: Rigid and watertight.

C. Rubber Gasketed Joints: Install in accordance with manufacturer's instructions.

3.05 PERMANENT PLUGS

A. Clean interior contact surfaces of pipes to be cut off or abandoned as shown, and construct plug as follows:

1. Pipe 18 Inches or Less in Diameter: Concrete plug in end, minimum 8 inches in length.
2. Pipe 21 Inches and Larger:
   a. Construct plugs of common brick, concrete block, or concrete.
   b. Plaster exposed face of block or brick plugs with mortar.
3. Plugs shall be watertight and capable of withstanding internal and external pressures without leakage.

3.06 CONCRETE STRUCTURES

A. Excavation and Formwork:

1. Remove and keep all water clear from the excavation.
2. Place 6-inch minimum layer of base rock to undisturbed earth.

3. Thoroughly compact base rock with a mechanical vibrating or power tamper.
4. Form all vertical surfaces with materials as specified.

B. Reinforcing Steel:

1. Bar Splices: 24 diameters, but in no case less than 12 inches.
2. Wire tie splices and intersections.

C. Placing Concrete:

1. Remove all water from forms prior to placing concrete.
2. Place concrete so there is no segregation of aggregate and vibrate all concrete placed.
3. Do not place concrete when ambient temperature is below 40 degrees F without special protection.
4. Cure concrete for 7 days in an approved manner.

D. Finish:

1. After form removal, patch rock pockets, form tie holes, and irregularities with a stiff mixture of portland cement and sand mixed in same proportion as original mix.
2. Steel trowel slabs and tops of walls.
3. Finish exposed walls to produce a uniform, flat surface.

E. Backfill:

1. Remove all form materials and debris from excavations before placing any backfill.
2. Backfill around structures only after concrete has attained 2/3 of specified compressive strength.
3. Obtain ENGINEER's approval of concrete work prior to backfilling.

3.07 LINING SYSTEMS

A. The installation of polypropylene concrete protective liner (CPL) into precast wet wells shall be accomplished only by a factory certified precast concrete manufacturer with a minimum of 5 years of precast manufacturing experience and a minimum of 5 years' experience in the installation of corrosion resistant liners in concrete structures. Upon request, the liner installer shall provide written certification that the installation is in accordance with the liner manufacturer's specifications.

B. Placement of the liner on forms shall conform to the liner manufacturer's written instructions.

C. Lining shall cover all vertical walls and bottom of top slab.

D. If exposed concrete is visible at the section joints, an internal seal of liner material shall be welded over both sides of the joint in accordance with the manufacturer's recommendations. The preferred installation is liner returns over the joint edge and under the joint seal as shown on the Drawings.

3.08 FIELD QUALITY CONTROL

A. Hydrostatic Testing:

1. When, in ENGINEER's opinion, the groundwater table is too low to permit visual detection of leaks, hydrostatically test all wet wells.
2. Procedure: Plug inlets and outlets and fill structure with water to height determined by ENGINEER.
3. A wet well may be filled 24 hours prior to time of testing, if desired, to permit normal absorption into the walls to take place.
4. Leakage in each wet well shall not exceed 1.0 gallon per hour per foot of head above the bottom for an 8-foot diameter wet well. Leakage allowances shall be proportional for different wet well diameters.
5. Repair wet wells that do not meet the leakage test, or do not meet specified requirements from visual inspection.

END OF SECTION

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SECTION 02761
PAVEMENT MARKING

PART 1 - GENERAL

1.01 STANDARD SPECIFICATIONS

A. When referenced in this section, shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition.

1.02 DELIVER, STORAGE, AND PROTECTION

A. Packaging and Labeling: All coatings and traffic marking materials shall be shipped in strong containers plainly marked with the weight in pounds per gallon, the volume of coatings and traffic marking materials content in gallons, the color, user information, date of manufacture, LOT, batch and DOT code number. Each batch manufactured shall have a unique number. A true statement of the percentage composition of the pigment, the proportion of pigment to vehicle, and the name and address of the manufacturer, also shall be shown. The label shall warn the user of any special handling or precautions of the material, as recommended by the manufacturer. Any package not so marked will not be accepted for use under these Specifications.

B. Storage: Any coatings and traffic marking materials which, although inspected and approved at the point of manufacture, hardens or livers in the containers so that it cannot be readily broken up with a paddle to a smooth, uniform painting consistency, will be rejected. All materials shall have a container storage life of one year from date of manufacture. Any coatings and traffic marking materials not acceptable for proper application will be rejected, even though it conforms to these Specifications in all other respects.

C. Mixing: All paints except aluminum shall be delivered to the project completely mixed, and ready to be used without additional oil or thinner. Gasoline shall not be used for thinner under any circumstances.

PART 2 - PRODUCTS

2.01 PAINT

A. Color: White, yellow, or blue traffic paint meeting the requirements of the Standard Specifications.

B. Homogeneous, easily stirred to smooth consistency, with no hard settlement or other objectionable characteristics during a storage period of 6 months.

2.02 THERMOPLASTIC STRIPING

A. White or yellow thermoplastic striping material meeting the requirements of the Standard Specifications.

2.03 RAISED REFLECTIVE MARKERS

A. Metallic or nonmetallic, or prismatic reflector type, of permanent colors retaining color and brightness under action of traffic.

B. Rounded surfaces presenting a smooth contour to traffic. The minimum area of each reflective face shall be 2-1/2 inches squared.

C. Marker and adhesive epoxy in accordance with ASTM D4280

D. Markers shall meet the requirements of the Standard Specifications.

2.04 GLASS SPHERES

A. Glass spheres shall be of a composition designed to be highly resistant to traffic wear and to the effects of weathering.

B. In accordance with AASHTO M247, Type I with moisture resistant coating or a formulation specified by the traffic striping material manufacturer and Section 971-14 of the Standard Specifications.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. Cleaning:

1. Thoroughly clean surfaces to be marked before application of pavement marking material.
2. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water or a combination of these methods.
3. Completely remove rubber deposits, surface laitance, existing paint markings, and other coatings adhering to pavement with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion.
4. Scrub areas of old pavement affected with oil or grease with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application.
5. Surfaces shall be completely free of dry dirt and ice, and dry of water at the time of application of any of the materials specified herein.
6. Oil-Soaked Areas: After cleaning, seal with cut shellac to prevent bleeding through the new paint.
7. Reclean surfaces when Work has been stopped due to rain.
8. Existing Pavement Markings:
   a. Remove existing pavement markings that may interfere or conflict with newly applied marking patterns, or that may result in a misleading or confusing traffic pattern.
   b. Do not apply thermoplastic markings over existing preformed or thermoplastic markings.
   c. Perform grinding, scraping, sandblasting or other operations so finished pavement surface is not damaged.

B. Pretreatment for Early Painting: Where early painting is required on rigid pavements, pretreat with an aqueous solution containing 3 percent phosphoric acid and 2 percent zinc chloride.

C. New Concrete Pavement:

1. Allow a minimum cure time of 30 days before cleaning and marking.
2. Clean by either sandblasting or water blasting to the following results:

a. No visible evidence of curing compound on peaks of textured concrete surface.
b. No heavy puddled deposits of curing compound in valleys of textured concrete surface.
c. Remaining curing compound is intact, with loose and flaking material completely removed.
d. Peaks of textured pavement surface are rounded in profile and free of sharp edges and irregularities.

3. Allow a minimum drying time of 24 hours after water blasting before applying thermoplastic markings.

3.02 ALIGNMENT FOR MARKINGS

A. The CONTRACTOR shall be responsible for all measurements, reference points and marks, string lining, and any other steps required in establishing pavement marking locations and alignment. On tangents and on curves up to 1 degree, the alignment of the marking shall not deviate from the string line by more than 1 inch. On curves exceeding 1 degree, the maximum permissible deviation shall be 2 inches. All alignment width and location shall conform to the details shown on the Drawings.

3.03 PAINT APPLICATION

A. General:

1. Thoroughly mix pigment and vehicle together prior to application, and keep thoroughly agitated during application.
2. Do not add thinner.
3. Apply only when air and pavement temperatures are above 40 degrees F and less than 95 degrees F. Maintain paint temperature within these same limits.
4. Apply only when surface is dry.
5. Do not apply when conditions are windy to the point of causing overspray or fuzzy line edges.
6. New Asphalt Pavement: Allow a minimum pavement cure time as recommended by the manufacturer before applying paint.
7. Provide guide lines and templates to control paint application.
8. Take special precautions in marking numbers, letters, and symbols.
9. Sharply outline edges of markings and apply without running or spattering.

B. Rate of Application:

1. Reflective Markings:
   a. Paint: Apply evenly, 105 plus or minus 5 square feet per gallon.
   b. Glass Beads: Apply uniformly, 6 plus or minus 0.5 pounds of glass spheres per gallon of paint.
2. Nonreflective Markings: Apply paint evenly to pavement surface at a rate of 105 plus or minus 5 square feet per gallon.
3. On new pavement or new asphalt surface treatments, apply two coats of paint at a uniform rate of 210 square feet per gallon.

C. Drying:

1. Provide maximum drying time to prevent undue softening of bitumen and pickup, displacement, or discoloration by traffic.
2. If drying is abnormally slow, discontinue painting operations until cause is

determined and corrected.

3.04 THERMOPLASTIC MARKING APPLICATION

A. Following specified surface preparation, prime and apply marking and glass beads to provide a reflectorized strip as shown on Drawings.

B. The material shall be applied to the pavement by the extrusion method only, wherein one side of extrusion shaping die is the pavement and the other sides are formed by suitable equipment for heating and controlling the flow of the material.

C. Application Temperatures:

1. Pavement Surface: Minimum 40 degrees F and rising.
2. Thermoplastic: Minimum 375 degrees F, maximum 425 degrees F.

D. Primer:

1. On portland cement concrete and existing asphalt pavements, apply epoxy resin primer/sealer according to the thermoplastic manufacturer's recommendations.
2. All primer/sealer to dry prior to applying thermoplastic.

E. Thermoplastic Marking:

1. Extrude in a molten state, free of dirt or tint. at a thickness of 0.10 to 0.15 inch for lane lines and 0.07 to 0.10 inch for edge or other lines in accordance with FDOT 711-4.3.
2. Apply centerline, skipline, edgeline, and other longitudinal type markings with a mobile applicator.
3. Apply special markings, crosswalks, stop bars, legends, arrows, and similar patterns with a portable, extrusion-type applicator.

F. Glass Bead Application:

1. Immediately after marker application, mechanically apply such that the beads are held by and imbedded in the surface of the molten material.
2. Application Rate: One pound per 20 square feet of compound.

G. Cool completed marking to ambient temperature prior to allowing vehicular traffic.

3.05 INSTALLATION OF RAISED REFLECTIVE MARKERS

A. Apply markers to the bonding surface using bituminous adhesives only.

B. Apply the adhesive to the binding surface (not the marker) so that 100 percent of the bonding area of the marker will be covered.

C. Align markers carefully, projecting no more than 3/4-inch above level of pavement. Reflective face of the marker shall be perpendicular to a line parallel to the roadway centerline. Do not install markers over longitudinal or transverse joints of the bonding surface.

D. Spacing: As shown on the Drawings.

E. Immediately remove excess adhesive from the bonding surface and exposed surface of the marker.

F. Use only a mineral spirits meeting Federal Specifications TT-T-291 to remove adhesive from exposed faces of markers.

3.06 GLASS BEAD APPLICATION

A. Apply immediately following application of paint.

B. Use evenly distributed, drop-on application method.

C. Rate: 10 pounds per gallon of paint.

3.07 PROTECTION

A. The CONTRACTOR shall erect adequate warning signs and/or provide sufficient number of flagmen, and take all necessary precautions for the protection of the materials and safety of the public.

B. Protect surfaces from disfiguration by paint spatters, splashes, spills, or drips.

3.08 CLEANUP

A. Remove paint spatters, splashes, spills, or drips from Work and staging areas and areas outside of the immediate Work area where spills occur.

END OF SECTION

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SECTION 02771
CONCRETE CURBS AND SIDEWALKS

PART 1 - GENERAL (NOT USED)

PART 2 - PRODUCTS

2.01 EXPANSION JOINT FILLER

A. 1/2-inch thick, preformed asphalt-impregnated, expansion joint material meeting AASHTO M153 Type I, II, or III, or AASHTO M213, or cellulose fiber types meeting the requirements of AASHTO M213, except the asphalt content is acceptable provided they contain minimum of 0.2 percent copper pentachlorophenate as a preservative and 1 percent water proofing wax.

2.02 CONCRETE

A. Ready-mixed meeting ASTM C94, Option A, with compressive strength of 3,000 psi at 28 days.

B. Maximum Aggregate Size: 1-1/2 inch.

C. Slump: 2 to 4 inches.

2.03 CURING COMPOUND

A. Liquid membrane-forming, clear or translucent, suitable for spray application and meeting ASTM C309, Type 1.

PART 3 - EXECUTION

3.01 FORMWORK

A. Lumber Materials:

1. 2-inch dressed dimension lumber, or metal of equal strength, straight, free from defects that would impair appearance or structural quality of completed curb and sidewalk.
2. 1-inch dressed lumber or plywood may be used where short-radius forms are required.

B. Metals: Steel in new undamaged condition.

C. Setting Forms:

1. Construct forms to shape, lines, grades, and dimensions.
2. Stake securely in place.

D. Bracing:

1. Brace forms to prevent change of shape or movement resulting from placement.

2. Construct short-radius curved forms to exact radius.

E. Tolerances:

1. Do not vary tops of forms from gradeline more than 1/8 inch when checked with 10-foot straightedge.
2. Do not vary alignment of straight sections more than 1/8 inch in 10 feet.

3.02 PLACING CONCRETE

A. Excavate to the required depth, place and compact limerock base rock as specified in Section 02710, Limerock Base. Compact directly under the area and 1 foot beyond each side of the sidewalk and curb.

B. Prior to placing concrete, remove water from excavation and debris and foreign material from forms.

C. Place concrete as soon as possible, and within 1-1/2 hours after adding cement to mix without segregation or loss of ingredients, and without splashing.

D. Place, process, finish, and cure concrete in accordance with applicable requirements of ACI 304, and this section. Wherever requirements differ, the more stringent shall govern.

E. To compact, vibrate until concrete becomes uniformly plastic.

F. All edges shall be smooth and rounded.

3.03 CURB CONSTRUCTION

A. Construct ramps at pedestrian crossings.

B. Expansion Joints: Place at maximum 20-foot intervals and at the beginning and end of curved portions of curb, and at connections to existing curbs. Install expansion joint filler at each joint.

C. Curb Facing: Do not allow horizontal joints within 7 inches from top of curb.

D. Contraction Joints:

1. Maximum 10-foot intervals in curb.
2. Provide open joint type by inserting thin, oiled steel sheet vertically in fresh concrete to force coarse aggregate away from joint.
3. Insert steel sheet to full depth of curb.
4. Remove steel sheet with sawing motion after initial set has occurred in concrete and prior to removing front curb form.
5. Finish top of curb with steel trowel and finish edges with steel edging tool.

E. Front Face:

1. Remove front form and finish exposed surfaces when concrete has set sufficiently to support its own weight.
2. Finish formed face by rubbing with burlap sack or similar device to produce uniformly textured surface, free of form marks, honeycomb and other defects.

3. Remove and replace *defective* concrete.
4. Apply curing compound to exposed surfaces of curb upon completion of finishing.
5. Continue curing for minimum of 5 days.

F. Backfill curb with earth upon completion of curing period, but not before 7 days has elapsed since placing concrete.

1. Backfill shall be free from rocks 2 inches and larger and other foreign material.
2. Compact backfill firmly.

3.04 SIDEWALK CONSTRUCTION

A. Thickness:

1. 4 inches in walk areas.
2. 6 inches in driveway and commercial areas.

B. Connection to Existing Sidewalk:

1. Remove old concrete back to an existing contraction joint.
2. Clean the surface.
3. Apply a neat cement paste immediately prior to placing new sidewalk.

C. Expansion Joints: Place at maximum 20-foot intervals, at adjacent curb expansion joint, where sidewalk ends at curb, and around posts, poles, or other objects penetrating sidewalk. Install expansion joint filler at each joint.

D. Contraction Joints:

1. Provide transversely to walks at locations opposite contraction joints in curb.
2. Dimensions: 3/16-inch by 1-inch weakened plane joints.

3. Construct straight and at right angles to surface of walk.

E. Finish:

1. Broom surface with fine-hair broom at right angles to length of walk and tool at edges, joints, and markings.
2. Ensure that the surface variations are not more than ¼ inch under a 10-foot straightedge, or more than 1/8 inch on a 5-foot transverse section.
3. Mark walks transversely at 5-foot intervals, or in pattern shown on Drawings, with jointing tool; finish edges with rounded steel edging tool.
4. Apply curing compound to exposed surfaces upon completion of finishing.
5. Protect sidewalk from damage and allow to cure for at least 7 days.

END OF SECTION

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PROJECT 12133

SECTION 02772

ASPHALT CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 STANDARD SPECIFICATIONS

A. When referenced in this Section shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition.

1.02 QUALITY ASSURANCE

A. Qualifications:

1. Independent Testing Laboratory: In accordance with ASTM E329.
2. Asphalt concrete mix formula shall be prepared by an approved certified independent laboratory under the supervision of a certified asphalt technician.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Temperature: Do not apply asphalt materials or place asphalt mixes when ground temperature is lower than 10 degrees C (50 degrees F), or air temperature is lower than 4 degrees C (40 degrees F). Measure ground and air temperature in shaded areas away from heat sources or wet surfaces.

B. Moisture: Do not apply asphalt materials or place asphalt mixes when application surface is wet.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Prime Coat: Cut-back asphalt, Grades RC-70 or RC-250 meeting the requirements of the Standard Specifications.

B. Tack Coat: Emulsified asphalt, Grade RS-2, SS-1, or SS-1H meeting the requirements of the Standard Specifications. The bituminous material shall be heated to a suitable consistency as directed by the Engineer.

C. Sand (Blotter Material): Clean, dry, with 100 percent passing a 4.75 mm (No. 4) sieve, and a maximum of 10 percent passing a 75 mm (No. 200) sieve.

2.02 ASPHALT CONCRETE MIX

A. General:

1. Mix formula shall not be modified except with the written approval of Engineer.
2. Source Changes:
   a. Should material source(s) change, establish a new asphalt concrete mix formula before the new material(s) is used.
   b. Perform check tests of properties of the plant-mix bituminous

materials on the first day of production and as requested by ENGINEER to confirm that properties are in compliance with design criteria.

c. Make adjustments in gradation or asphalt content as necessary to meet design criteria.

B. Asphalt Concrete: Type S-III or SP-9.5 (coarse) meeting the requirements in the Standard Specifications.

C. Composition: Hot-plant mix of aggregate, mineral filler, and paving grade asphalt cement. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that the resulting mixture meets the grading requirements of the mix formula.

D. Aggregate:

1. The aggregate shall meet the requirements of the Standard Specifications.
   a. Mineral Filler shall meet the requirements of the Standard Specifications

E. Asphalt Cement: Paving Grade AC-30 meeting the requirements of Section 916 of the Standard Specifications.

PART 3 - EXECUTION

3.01 GENERAL

A. Traffic Control: Minimize inconvenience to traffic, but keep vehicles off freshly treated or paved surfaces to avoid pickup and tracking of asphalt.

B. Driveways: Repave driveways from which pavement was removed. Leave driveways in as good or better condition than before start of construction.

3.02 LINE AND GRADE

A. Provide and maintain intermediate control of line and grade, independent of the underlying base to meet finish surface grades and minimum thickness.

B. Shoulders: Construct to line, grade, and cross-section shown.

3.03 PREPARATION

A. Prepare subgrade as specified in Section 02319, Subgrade Preparation.

B. Existing Roadway:

1. Modify profile by grinding, milling, or overlay methods as approved, to provide meet lines and surfaces and to produce a smooth riding connection to existing facility.
2. Resurface entire roadway following adjustment of base and asphalt grades.
3. Paint edges of meet line with tack coat prior to placing new pavement.

C. Thoroughly coat edges of contact surfaces (curbs, manhole frames) with emulsified asphalt or asphalt cement prior to laying new pavement. Prevent staining

of adjacent surfaces.

3.04 PAVEMENT APPLICATION

A. General: Place asphalt concrete mixture on an approved, prepared base in conformance with this Section.

B. Prime Coat:

1. Heat cut-back asphalt between 100 degrees F and 150 degrees F prior to application.
2. Apply uniformly to clean, dry surfaces. Avoiding overlapping of applications.
3. Do not apply when moisture content of upper 3 inches of base exceeds optimum moisture content of base, or if free moisture is present.
4. Application Rate: Minimum 0.1 gallons per square yard of surface area.
5. Remove or redistribute excess material.
6. Allow a minimum of 5 full days for curing of primed surface before placing asphalt concrete.

C. Tack Coat:

1. Apply uniformly to clean, dry surfaces. Avoiding overlapping of applications.
2. Do not apply more tack coat than necessary for the day's paving operation.
3. Touch up missed or lightly coated surfaces and remove excess material.
4. Application Rate:
   a. Minimum 0.05 gallons to maximum 0.12 gallons of asphalt (residual if diluted emulsified asphalt) per square yard of surface area.
   b. Apply at rate, within range specified, sufficient to assure good bonding, but not so heavy that surplus asphalt flushes into asphalt concrete being placed.

D. Pavement Mix:

1. Prior to Paving:
   a. Sweep primed surface free of dirt, dust, or other foreign matter.
   b. Patch holes in primed surface with asphalt concrete pavement mix.
   c. Blot excess prime material with sand.
2. Place asphalt concrete pavement mix in lifts as shown.
3. Compacted Lift Thickness:
   a. Minimum: Twice the maximum aggregate size, but in no case less than 3/4 inch. Minimum thickness for Type S-III and SP-9.5 is 1.5 inches.
   b. Maximum: 4 inches.
4. Total Compacted Thickness: As shown.
5. Apply such that meet lines are straight and edges are vertical.
6. Collect and dispose of segregated aggregate from raking process. Do not scatter material over finished surface.
7. Joints:
   a. Offset edge of each layer a minimum of 6 inches so joints are not directly over those in underlying layer.
   b. Offset longitudinal joints in roadway pavements, so longitudinal joints in wearing layer coincide with pavement centerlines and lane divider lines.
   c. Form transverse joints by cutting back on previous day's run to expose full vertical depth of layer.

8. Succeeding Lifts: Apply tack coat to pavement surface between each lift.
9. After placement of pavement, seal meet line by painting a minimum of 6 inches on each side of the joint with cut-back or emulsified asphalt. Cover immediately with sand.

E. Compaction:

1. Roll until roller marks are eliminated and compacted to 100 percent of the laboratory compacted mixture.
2. Joint Compaction:
   a. Place top or wearing layer as continuously as possible.
   b. Pass roller over unprotected end of freshly laid mixture only when placing of mix is discontinued long enough to permit mixture to become chilled.
   c. Cut back previously compacted mixture when Work is resumed to produce a slightly beveled edge for full thickness of layer.
   d. Cut away waste material and lay new mix against fresh cut.

F. Tolerances:

1. General: Conduct measurements for conformity with crown and grade immediately after initial compression. Correct variations immediately by removal or addition of materials and by continuous rolling.
2. Completed Surface or Wearing Layer Smoothness:
   a. Uniform texture, smooth, and uniform to crown and grade.
   b. Maximum Deviation: 1/8 inch from lower edge of a 12-foot straightedge, measured continuously parallel and at right angle to centerline.
   c. If surface of completed pavement deviates by more than twice the specified tolerances, remove and replace wearing surface.
3. Transverse Slope Maximum Deviation: ¼ inch in 12 feet from the rate of slope shown.
4. Finished Grade:
   a. Perform a field differential level survey on a maximum 50-foot grid and along all grade breaks.
   b. Maximum Deviation: 0.02 foot from the grade shown.

G. Seal Coat:

1. General: Apply seal coat of paving grade or emulsified asphalt to finished surface at longitudinal and transverse joints, joints at abutting pavements, areas where the asphalt concrete was placed by hand, patched surfaces, and other areas as directed by the Engineer.
2. Preparation:
   a. Maintain surfaces that are to be sealed free of holes, dry, and clean of dust and loose material.
   b. Seal in dry weather and when the temperature is above 35 degrees F.
3. Application:
   a. Fill cracks over 1/16 inch in width with an asphalt-sand slurry or approved crack sealer prior to sealing.
   b. When sealing patched surfaces and joints with existing pavements, extend minimum 6 inches beyond edges of patches.

3.05 PAVEMENT OVERLAY

A. Preparation:

1. Remove fatty asphalt, grease drippings, dust, and other deleterious matter.
2. Surface Depressions: Fill with asphalt concrete mix, and thoroughly compact.
3. Damaged Areas: Remove broken or deteriorated asphalt concrete and patch as specified in Article Patching.
4. Portland Cement Concrete Joints: Remove joint filler to minimum 1/2 inch below surface.

B. Application:

1. Tack Coat: As specified in this Section.
2. Place and compact asphalt concrete as specified in Article Pavement Application.
3. Place first layer to include widening of pavement and leveling of irregularities in the surface of the existing pavement.
4. When leveling irregular surfaces and raising low areas, the actual compacted thickness of any one lift shall not exceed 2 inches.
5. The actual compacted thickness of intermittent areas of 120 square yards or less may exceed 2 inches, but not 4 inches.
6. Final wearing layer shall be of uniform thickness, and meet grade and cross-section as shown.

3.06 PATCHING

A. Preparation:

1. Remove damaged, broken, or unsound asphalt concrete adjacent to patches. Trim to straight lines exposing smooth, sound, vertical edges.
2. Prepare patch subgrade as specified in Section 02319, Subgrade Preparation.

B. Application:

1. Patch Thickness: 3 inches or thickness of adjacent asphalt concrete, whichever is greater.
2. Place asphalt concrete mix across full width of patch in layers of equal thickness.
3. Spread and grade asphalt concrete with hand tools or mechanical spreader, depending on size of area to be patched.

C. Compaction:

1. Roll patches with power rollers capable of providing compression of 200 to 300 pounds per linear inch. Use hand tampers where rolling is impractical.
2. Begin rolling top course at edges of patches, lapping adjacent asphalt surface at least 1/2 the roller width. Progress toward center of patch overlapping each preceding track by at least 1/2 the width of roller.
3. Make sufficient passes over entire area to remove roller marks and to produce desired finished surface.

D. Tolerances:

1. Finished surface shall be flush with and match grade, slope, and crown of adjacent surface.
2. Tolerance: Surface smoothness shall not deviate more than plus 1/4 inch or minus 0 when a straightedge is laid across patched area between edges of new pavement and surface of old surfacing.

3.07 FIELD QUALITY CONTROL

A. General: Provide services of an approved certified independent testing laboratory to conduct tests.

B. Field Density Tests:

1. Perform tests from cores or sawed samples.
2. Measure with properly operating and calibrated nuclear density gauge.
3. Maximum Density: In accordance with ASTM D2041, using a sample of mix taken prior to compaction from the same location as the density test sample.

C. Testing Frequency:

1. Quality Control Tests:
   a. Asphalt Content, Aggregate Gradation: Once per every 500 tons of mix or once every 4 hours, whichever is greater.
   b. Mix Design Properties, Measured Maximum (Rice's) Specific Gravity: Once every 1,000 tons or once every 8 hours, whichever is greater.
2. Density Tests: Once every 500 tons of mix or once every 4 hours, whichever is greater.

END OF SECTION

PROJECT 12133

SECTION 02900

LANDSCAPE WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All applicable provisions of the “INFORMATION TO BIDDERS”, “STANDARD FORM OF AGREEMENT”, and Division 1 - General Requirements shall govern the work under this Section.

1.02 WORK INCLUDED

A. The work included in this section consists of furnishing all labor, supplies equipment and materials necessary to complete the installation of all landscaping as shown on the Plans as base bid including the installation of sod and seeding as shown, as well as all other related responsibilities as described in these Specifications and accompanying plans.

B. Installation: All plant materials included shall be of the specific size and quality indicated on the plans and in these specifications and shall be installed in strict accordance with sound nursery practices and shall include maintenance and watering for all work outlined on the plans and specifications until final acceptance.

C. Quantities and Locations: The LANDSCAPE ARCHITECT reserves the right to adjust the number and locations of the designated types and species to be used at any of the locations shown in order to provide for any modifications which might become necessary.

1.03 RELATED WORK

A. Section 02221 - Demolition

B. Section 02810 - Site Grading

1.04 QUALITY ASSURANCE

A. Responsibility for Assuring Quality Work: The CONTRACTOR’s Superintendent shall be well versed in Florida plant material, planting operations, blue print reading, and coordination with other performing contracts or services in the job area.

All employees shall be competent and highly skilled in their particular job in order to properly perform the work assigned to them. The CONTRACTOR shall be responsible for maintaining the quality of the material on the job throughout the duration of the CONTRACT.

B. Correct Grade of Plants: In the event that it becomes apparent that any nursery supplying plants for this work has knowingly and consistently represented the grade of plants as being higher than their actual grades as determined under these provisions, all plants already delivered from such sources shall be removed from the job at the CONTRACTOR’s expense, and no further plants will be accepted from such nursery until

written evidence is submitted and confirmed that all material for delivery has been inspected and approved by inspectors of the State Plant Board as being of the grade as represented.

C. Authority for Nomenclature, Species, Etc.: All plant material shall conform to the names given in Hortus Third, 1976 edition. Names of varieties not included therein conform generally with names accepted in the nursery trade.

D. Grade Standards: All plant materials shall be nursery grown except where specified as collected material, and shall comply with all required inspections, grading standards and plant regulations as set forth by the Florida Department of Agriculture's "Grades and Standards for Nursery Plants" revised 1973, or with any superseding specifications that may be called for on the Plans or in the Specifications. ALL PLANTS NOT LISTED IN THE GRADES AND STANDARDS FOR NURSERY PLANTS, shall conform to a Florida No. 1 as to: (1) Health and Vitality, (2) Condition of Foliage, (3) Root System, (4) Freedom from Pest or Mechanical Damage, (5) Heavily Branched and Densely Foliated according to the accepted normal shape of the species, or sport, (6) Form and branching habit.

E. Balled and Burlapped (B&B) and Wire Balled and Burlapped (WB&B) Plants: These plants shall be properly protected until they are planted. The plant shall be handled only by the earth ball and not be the plant itself.

Any (B&B) or (WB&B) plant which shows evidence of having handled by a method other than the method outlined above, and resulting in a cracked or broken ball or of the roots being loosened within the ball shall be rejected.

For plants grown in soil of loose texture, which does not readily adhere to the root system, (especially in the case of large plant material), WB&B plants may be specified. For WB&B plants, before plant is removed from the hole, sound hog wire shall be placed around the burlapped ball and looped and tensioned until the burlapped ball is substantially packaged by the tightened wire netting, such as to prevent disturbing of the loose soil around the roots during handling. Any wire, synthetic material or chemically treated material will be removed from the rootball at planting time, all ties shall be removed from the rootball and around the trunk at planting.

F. Container Grown Plants (CG): Any Container Grown (CG) plants, which have become "pot bound" or for which the top system is out of proportion (larger) to the size of the container, will not be acceptable.

With metal containers, unless the root-ball system slips easily and unbroken from the can, a nursery can-cutter shall be used to slit the can in such a way that the can may be opened fully.

CG plants shall not be removed from the can until immediately before planting, and with all due care to prevent damage to the root system.

G. Submit to the LANDSCAPE ARCHITECT the names and locations of nurseries proposed as sources of acceptable plant material. The LANDSCAPE ARCHITECT reserves the right to visit the nursery to inspect and/or select the specified material.

1.05 DELIVERY, STORAGE AND HANDLING

A. Inspection and Transporting: Movement of nursery stock shall comply with all Federal, State, and local laws and regulations. Therefore, required inspection certificates shall accompany each shipment, and shall be filed with the LANDSCAPE ARCHITECT.

Wrap root balls with burlap. Wire wraps burlap if root ball is not sufficiently compacted. Palms will not require burlap wrapping if the following requirements are met:

1. Dug from marl or heavy soil that adheres to roots and retains shape without shattering.

2. Moistened material used to cover ball and roots not exposed to wind and sun.

3. Transport material on vehicles large enough to allow plants not to be crowded. Plants shall be covered to prevent wind damage during transit and shall be kept moist, fresh and protected at all times. Such protection shall encompass the entire period, which the plants are in transit, being handled, or are in temporary storage.

B. All plant material shall not remain on the work site longer than two (2) days prior to being installed.

1.06 SUBSTITUTIONS

A. Substitutions of plant types or change in the size of plant material will only be permitted upon submission of documented proof that the particular plant type and size specified is not obtainable.

B. Where B&B or WB&B plants are specified, CG plants of the same species, etc., will not be accepted. Where a B&B or WB&B is not specified on a particular plant material, B&B, WB&B or CG plants may be used provided they meet all specifications.

1.07 GUARANTEE

A. All plant material shall be guaranteed for a minimum of one (1) calendar year from the time of final acceptance.

1.08 REPLACEMENT

A. The guaranteeing of plant material shall be construed to mean the complete and immediate replacement of plant material if it is:

1. Not in a healthy growing condition.
2. There is a question to its survival ability at the end of the guarantee period.
3. It is dead.

1.09 SIZE, QUALITY AND GRADE OF REPLACEMENT

A. Replacement plant material shall be of the same species, quality and grade as that of the plant to be replaced. The size of the replacement shall not necessarily be the same size as the original specified plant at its initial planting but shall closely match specimens of the

same species. Replacements shall be guaranteed for a period equal to the originally specified guarantee. This guarantee period shall begin at time of plant replacement.

1.10 GUARANTEE NULL AND VOID

A. The guarantee shall be null and void for plant material which is damaged or dies as a result of "Act of God" limited to hail, freeze, lightening, winds which exceed hurricane force, and lethal yellowing, providing the plant was in a healthy growing condition prior to these "Acts of God".

PART 2 - MATERIALS

2.01 PLANT MATERIAL

A. All material shall be as specified on the construction plans.

PART 3 - EXECUTION

3.01 INSPECTION

A. Utilities: The location and existence of utilities (overhead and underground) shall be thoroughly investigated and verified by the CONTRACTOR before the work begins in the area of said utilities. The CONTRACTOR shall exercise care in digging and work so as not to damage existing utilities in said areas, such as underground pipes, cables, wires, etc. Should such overhead or underground obstructions be encountered which interfere with planting, the LANDSCAPE ARCHITECT shall be consulted immediately in order for a decision to be made on the relocations of plant material to clear such obstruction. The CONTRACTOR shall be responsible for the immediate repair of any damage to utilities caused by CONTRACTOR's work.

3.02 PREPARATION

A. Preparation shall be as specified on the construction plans and details sheets.

3.03 INSTALLATION

A. Preparation shall be as specified on the construction plans and details sheets.

3.04 CLEANING AND PROTECTION

A. Disposal of Trash: All debris and other objectionable material created through planting operations and landscape construction shall be removed completely on a daily basis from the job or as directed by the LANDSCAPE ARCHITECT. Excess soil shall be disposed of as directed by the ENGINEER.

B. Responsibility for Protection and Restoration of Property: The CONTRACTOR shall be responsible for all damage to property whether it is accidental or necessary for the completion of the contract.

C. Protection Against Mechanical Damage: The CONTRACTOR's responsibility for protection against mechanical damage shall include providing protection from vehicles and providing warning signs and barricades as might be necessary and CONTRACTOR

shall repair, restore and replace any planting areas which become damaged as a result of any negligence of the CONTRACTOR or CONTRACTOR's employees in complying with these requirements. Coordination shall be with the CITY and the LANDSCAPE ARCHITECT.

D. Responsibility Prior to Final Acceptance:

1. Maintenance shall begin immediately after each plant is planted and continue until final acceptance by the CITY.
2. Plants shall be hand watered, soaking thoroughly each day for the first two weeks (14 calendar days) and every other day for the following two-week period. Soaking then shall continue on a twice-weekly basis for another period of eight (8) weeks for a total of 90 days or three (3) months, whichever is longer. All watering is required without regard to an irrigation system.
3. Plant maintenance shall include watering, pruning, weeding, cultivating, mulching, tightening and repairing of guys, stakes, braces, etc., replacement of sick or dead plants, resetting plants to proper grades or upright position and maintenance of the watering saucer, and all other care needed for proper growth of the plants. Plant material rejected during the course of the construction shall be removed within five (5) working days and replaced before the inspection for completion will be scheduled.
4. During the maintenance period and up to the issuance of Certificate of Final Acceptance, the CONTRACTOR shall do all seasonal spraying and/or dusting of all planting. The materials and methods shall be in accordance with the highest standard nursery practices and as recommended by the Horticultural Engineer and approved by the LANDSCAPE ARCHITECT, prior to implementation.
5. Planting areas and plants shall be protected against trespassing and damage. If any plants become damaged or injured they shall be treated or replaced, as directed and in compliance with this specification. No work shall be done within or over planting areas or adjacent to plants without proper safeguards and protection.

3.05 MEASUREMENT AND PAYMENT

A. Measurement and payment will be based on the actual quantities installed at the unit prices bid in the bid schedule.

END OF SECTION

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PROJECT 12133

SECTION 02919

TOPSOIL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All applicable provisions of the Bidding and Contract Requirements, and Division 1 - General Requirements shall govern the work under this Section.

1.02 WORK INCLUDED

A. Provide all labor, materials, necessary equipment and services to complete the work, as indicated on the drawings, as specified herein or both.

B. Including but not necessarily limited to the following:

1. Topsoil Stripping.
2. Topsoil Mixing and Spreading.

C. There shall be no classification of excavation for measurement of payment regardless of materials encountered.

1.03 RELATED WORK

A. Section 02230 - Site Clearing.

B. Section 02310 - Site Grading.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Topsoil shall be obtained from any previously established stockpile on site, to the extent that suitable material is available.

B. Additional topsoil, if required, shall be obtained by mixing existing on-site sandy fill with imported muck or compost if existing on-site fill is determined to be insufficient.

C. Topsoil, whether obtained from stockpile, or mixed as described in "B" above, shall be sandy loam, and shall have the following characteristics:

1. 95% of topsoil shall pass a ¼ inch sieve.
2. Topsoil shall be free of stones 1" in longest dimensions, earth clods, plant parts, and debris.
3. Organic matter content shall be 9% to 11% of total dry weight.
4. pH and nutrient content shall be adjusted as necessary to conform with recommendations made by testing laboratory. (See 2.01 (D))

D. CONTRACTOR is responsible for the testing of the samples for both the existing top soil that is stripped and stock piled as well as any new topsoil that may be needed. Test shall indicate compliance with the specifications and recommendations as to the type and quantity of soil additives required to bring the nutrient content and pH to satisfactory levels for planting specified plant material. Tests shall be required at a rate of one per 500 cubic yards of material placed, for the first 5,000 cubic yards of material, and may be reduced at the LANDSCAPE ARCHITECT discretion thereafter. Sampling shall be done in the presence of the LANDSCAPE ARCHITECT. The CONTRACTOR shall be responsible for the cost of testing.

PART 3 - EXECUTION

3.01 JOB CONDITIONS

A. Protection: Use all means necessary to protect existing objects and vegetation. In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the LANDSCAPE ARCHITECT.

3.02 FILLING AND GRADING

A. Topsoil shall be spread in a uniform 2" layer after compaction, over all sodded areas, and finished to grades shown on the plans, making allowance, where necessary, for sod.

- END OF SECTION -

PROJECT 12133

SECTION 02945

STEEL TRELLIS SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Trellis panels and accessories

B. Related Sections include the following:

1. Section 02900 "Landscape Work"
2. Section 03300 "Cast-in-Place Concrete"

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
2. ASTM A82 - Mechanical, Physical and Performance Properties of Carbon Steel Wire.
3. ASTM A641 - Zinc-Coated (Galvanized) Carbon Steel Wire.
4. ASTM A879 - Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring in Designation of the Coating Mass on Each Surface.
5. ASTM B117 - Operating Salt Spray (Fog) Apparatus.
6. RAL - German Institute for Quality Assurance and Indication.

1.04 SUBMITTALS

A. Submittals shall be in accordance with Section 01300.

B. Product Data: Submit manufacturer's product data, standard details, and installation instructions.

C. Shop Drawings: Submit showing sizes critical dimensions, panel layout constraints using a 2 x 2 inch modular grid, and details and locations of accessories.

D. Color Submittals: Submit coupons 2 x 2 inches minimum showing color and texture to be provided. See plans for color choice.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from damage. Store panels flat. Provide edge protection when strapping is used. Do not apply loads to panel edges.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. GREENscreen®, Los Angeles, CA; phone 800-450-3494, fax 310-837-0523, www.greenscreen.com.

2.02 PANELS

A. Panels shall be rigid, three-dimensional welded wire grid fabricated of 14-gage ASTM A641 galvanized steel wire.

B. Face Grid: Wires shall be welded at each intersection to form a 2 x 2 inch face grid on the front and back of panels.

C. Trusses: Face grids shall be separated by bent wire trusses spaced at 2-inch centers and welded to front and back face grids at each truss apex.

D. Thickness: 3 inches. As shown on Drawings.

E. Length and Width: Provide in 2-inch nominal increments.

F. Tolerance: 1/8 inch in width and ¼ inch in length.

2.03 ACCESSORIES

A. Trim:

1. Fabricate from 20-gage ASTM A879 galvanized steel.
2. Types:
   a. Channel Trim: Thickness of panel x ½ inch legs.
   b. Angle Trim: ½ inch x ½ inch legs.
3. Locations:
   a. Top of Treillage where Exposed to Pedestrians: Channel type.
   b. Side of Treillage: Channel type.

B. Clips and Straps: Provide manufacturer's standard types of clips and straps suitable for mounting conditions. Fabricate from ASTM A879 galvanized steel. Adjustable clips shall have ¼ inch diameter 18-8 stainless steel bolt, washer, and nut.

2.04 FABRICATION

A. Cut to size.

B. Weld trim to panels and grind smooth exterior surfaces of welds.

2.05 FINISHES

A. Metal components (except fasteners) shall be factory finished after fabrication.

B. Finish System: pretreat with general purpose, alkaline, water based cleaner / degreaser applied at 240 degrees F. prime with zinc-rich epoxy powder coat.

C. Salt spray Resistance: Finish shall remain rust free when tested 1680 hours in accordance with ASTM B117.

D. Touch-Up Paint: Provide high quality, exterior-grade spray paint suitable for conditions of use.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Inspect substrates and conditions affecting work of Section. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Structure Posts: Install posts as shown on approved shop drawings

3.03 INSTALLATION

A. Install panels plumb and square, centered within area designated for panels and aligned to maintain modular grid.

B. Avoid cutting panels in field. Where field cutting essential, apply touch-up paint to cut edges.

C. Install securely with fasteners located as shown on Drawings.

D. Repair bent or damaged panels. If panels cannot be repaired to satisfaction of Landscape Architect, remove from jobsite and replace with new panels.

END OF SECTION

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PROJECT 12133

SECTION 02957
SEWER MANHOLE REHABILITATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Section includes requirements for repair and rehabilitation of sanitary sewer manholes.

1.02 QUALITY ASSURANCE

A. Follow national standards and as specified herein.

B. CONTRACTOR's personnel involved in installation of materials: Certified by manufacturer that they have successfully completed training in handling, applying and finishing materials used.

C. CONTRACTOR: Inspecting pre-rehabilitation work, rehabilitation operations, and post-rehabilitation work.

D. For a product to be considered commercially proven, a minimum of 1,000 vertical linear feet of manhole rehabilitation must have been completed over a period of at least 3 years with the material proposed, by the CONTRACTOR or by other CONTRACTORs.

1. Submit description of each project including material used, vertical linear feet of manhole rehabilitated and OWNER's contact information.

1.03 SUBMITTALS

A. Submit:

1. Grout, Cementitious Reconstruction, Patching Materials, Chimney Seals, Manhole Liners.

a. Material type and manufacturer to be used, including catalog data showing manufacturer's clarifications and updates, ASTM references, material composition, specifications, physical properties and chemical resistance, manufacturer's recommended mix, additives and set time.
b. Manufacturer's detailed description of recommended procedures for handling and storing material to include use of strip recorder to monitor temperature at storage location.
c. Manufacturer's detailed description of processes to execute the use of material including equipment required.
d. Detailed description of field testing processes and procedures.
e. Certification: Backup equipment is available and deliverable to project sites within 24 hours.
f. Shipping manifest:

1) Date shipped.
2) Origination and delivery locations
3) Shipping method and carrier

4) Shipping order number
5) Purchase order number
6) Shipped item
7) Stock number
8) Lot number
9) Manufacturer
10) Any shipping, storage, or safety requirements, including MSDS documents
11) Received by, and date
12) Signature of receiver

2. Shop drawings and manufacturer's installation requirements for internal rubber sleeve chimney seals.
3. Bypass pumping plan.
   a. Intake manhole
   b. Service over pumping
   c. Receiving manhole
   d. Expected flows
   e. Pump size
   f. Pipe layout
   g. Backup equipment
   h. Procedures to monitor upstream mains for backup impacts
   i. Procedures for setup and breakdown of pumping operations
4. Emergency plan detailing procedures to be followed in event of pump failures, sewer overflows, service backups, and sewage spillage.
   a. Maintain copy on site for duration of project.

B. Submit:

1. Certified statement from manufacturer that CONTRACTOR is approved installer of the material or system with certificates of training for each crew member involved in each process from manufacturer.
   a. Documentation for products and installers must be approved by Contract Manager before installation of material.
2. For each manhole rehabilitated, complete and accurate record of work completed.
   a. Show identifying number and location, quantities of rehabilitation material used, estimate of infiltration/inflow eliminated, and results of post-rehabilitation inspection.
3. Field test reports.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect, store, and handle during transportation and delivery, while stored on-site, and during installation following approved submittals.

1. Maintain temperature less than 120 degrees Fahrenheit while in storage.

B. Material Found to be Defective or Damaged Due to Manufacture or Shipment.

a. Repair following manufacturer's recommendations if Contract Manager deems repairable.

b. Material not deemed repairable: Rejected, removed from Project site, and replace at Contract Manager's direction.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Acrylic or Acrylate Base Grout.

1. Two-part grout mixed at point of injection.
2. Minimum 25 percent acrylic or acrylate base material by volume.
   a. Use higher concentration of base material at Contract Manager's direction to increase strength or offset dilution during injection period.
3. Controllable reaction time: 10 seconds to 1 hour.
4. Viscosity: 1.5 centipoise water.
   a. May increase viscosity to no more than 2.5 centipoise water, at Contract Manager's direction.
   b. Remain constant throughout injection period.
5. Tolerates dilution and reacts in moving water.
6. Final reaction:
   a. Continuous irreversible, impermeable, non-porous still gel in pure form.
   b. Stabilized soil in ground that will not become brittle or rigid.
7. Gel does not bleed water under stress.
8. Dehydrated gel returns to 90 percent of its original volume and form after prolonged period of low ground water.
9. Do not use catalyst containing dimethyl amino propionitrile (DMAPM).
10. Use root inhibitor (50% active dichlobenil) when roots are present in manholes.
11. Use Latex additive for increased tensile strength.
12. Tinted to allow detection of grout in drill holes or at leakage locations.
13. Approved Manufacturers.
    a. Grout:
       1) Avanti International, AV 118 Duriflex
       2) De Neef, Inc., AC400
       3) Or Equal
    b. Root Inhibitor:
       1) Avanti, Norosac AC 50W
       2) Or Equal
    c. Latex Additive:
       1) Avanti, AV-257 Icoset
       2) Or Equal

B. Urethane Base Grout.

1. Ratio: One part urethane prepolymer to 1 to 10 parts water by volume (10 to 50 percent prepolymer).
2. Liquid prepolymer:
   a. Solids content: 77 to 83 percent.
   b. Specific Gravity: 1.04

c. Flash Point: 20 degrees Centigrade
d. Viscosity: 200 to 1,200 centipoise at 70 degrees Fahrenheit

3. Water for reacting prepolymer: pH of 5 to 9
4. Use gel control agent to control cure time as required
5. Final Reaction:
   a. Chemically stable, non-biodegradable, flexible gel, impermeable to water at pressures up to 15 psi.
6. Use root inhibitor (50 percent active dichlobenil) when roots are present in manholes.
7. Use Latex additive for increased tensile strength.
8. Tinted to allow detection of grout in drill holes or at leakage locations.
9. Approved Manufacturers:
   a. Grout:
      1) 3M Corporation, Scotch-Seal 5610
      2) De Neef, Inc., Hydroactive Multigel NF
      3) Avanti International, AV 350
      4) Or Equal.
   b. Root Inhibitor:
      1) Avanti, Norosac AC 50W
      2) Or Equal
   c. Latex Additive:
      1) Avanti, AV-257 Icoset
      2) Or Equal

C. Cementitious Reconstruction for Manhole Restoration.

1. Quick setting, high strength, corrosion resistant cementitious material
2. Suitable for rotary spray application to inside of manhole
3. Use additives to increase corrosion resistance or bond strength at manufacturer's direction and with Contract Manager's approval.
4. Initial set time per manufacturer's recommendation and per project conditions.
5. Density when applied: 135 lb/cf +/- 5 lb/cf
6. Compressive strength 9ASTM C109) at 1 day:
   a. Per manufacturer's recommendation
   b. Minimum acceptable for "or equal" products: 2,800 psi
7. Compressive strength (ASTM C109) at 28 days:
   a. Per manufacturer's recommendation
   b. Minimum acceptable or "equal" products: 5,800 psi
8. Bond Strength (ASTM C882) at 28 days:
   a. Per manufacturer's recommendation
   b. Minimum acceptable "or equal" products: 1,640 psi
9. Flexural Strength 9ASTM C78) at 28 days:
   a. Per manufacturer's recommendation
   b. Minimum acceptable "or equal" products: 1,500 psi
10. Shrinkage (ASTM C596) at 28 days: 0 percent
11. Approved Manufacturers:

a. IPA Systems, Inc., Octocrete
b. The Strong Company, INc., Strong-Seal
c. AP/M Permaform, Permacast MS-10,000 or CR-9,000
d. Sauereisen, F-120 Underlayment
e. QuadEx Aluminaliner
f. Or Equal

D. Hydraulic Water Plugs.
1. Rapid setting hydraulic water plug to plug active leaks prior to other rehabilitation work
2. Initial Set Time at 70 degrees Fahrenheit: 60 to 90 seconds
3. Final Set Time at 70 degrees Fahrenheit: One hour
4. Compressive Strength 9ASTM C109) at 28 days:
   a. Per manufacturer's recommendation
   b. Minimum acceptable "or equal" products: 4,000 psi
5. Length Change (ASTM C157): 0 percent
6. Approved Manufacturers:
   a. Saureisen, Instaplug F-180
   b. IPA Systems, Inc., Octoplug Plus
   c. The Strong Company, Inc., Strong-Seal Strong-Plug
   d. AP/M Permaform, Permacast-Plug
   e. Or Equal

E. Oil-free Oakum Water Plugs.

1. Rapid setting oil-free oakum and hydrophilic grout to plug active water leaks prior to other rehabilitation work
2. Oil-free oakum meeting Federal Specification HH-P-117
3. Two-part urethane resin
4. Initial set time: 5 to 10 minutes.
   a. Use accelerator to decrease initial set time
5. Approved Manufacturers:
   a. Avanti International, Oil-free Oakum (AV-219) and Multigrout (AV-202)
   b. DeNeef, Inc., Oil-free Oakum and Hydro Active Sealfoam or Hydro Active Flex LV grout
   c. Or Equal

F. Manhole Chimney Seals.

1. Elastomeric hand applied lining or flexible internal rubber sleeve and appurtenances.
2. Elastomeric liner.
   a. Two part urethane-based elastomer
   b. Initial set time at 70 degrees Fahrenheit: One hour
   c. Minimum thickness: 125 mils.
   d. Tensile strength (ASTM D638): 54 lb/sq. in

3. Internal Rubber Sleeve.
   a. Extruded or molded from high grade rubber compound following ASTM C923
   b. Minimum Tensile Strength (ASTM D412): 1,500 psi
   c. Maximum Compression set: 18 percent
   d. Hardness (durometer): 48 +/- 5
   e. Minimum thickness: 3/16 inch
   f. Sealing fins for watertight seal against manhole chimney
   g. Top and Bottom Expansion Bands: 16 gauge Type 304 stainless steel, minimum width of 1-3/4 inches
4. Approved Manufacturers:
   a. Internal Rubber Sleeve.
      1) Cretex Specialty Products, Manhole Chimney Sleeve
      2) NPC, FlexRib Manhole Frame-Chimney Seal
      3) Or Equal
   b. Elastomeric Liner.
      1) Sauereisen, Manhole Chimney Seal F-88
      2) Or Equal

G. Manhole Liners.

1. Cured in Place Liners.
   a. Multiple structural layers of fiberglass with non-porous membrane layer between fiberglass, or Polyvinyl Chloride/Polyester (PVCP) liner with a fiberglass layer, bonded to manhole under pressure and heat.
   b. Liner fabricated to match manhole dimensions for custom fit.
   c. Epoxy resin.
      1) Polyamide Bisphenol “A” Epichlorodhydrin for use with fiberglass lines
      2) Modified epoxy resin for use with PVCP liner
   d. Approved Manufacturers:
      1) Terre-Hill, Multi-Plexx Liner System
      2) Poly-Triplex Technologies, Poly Triplex Liner System
      3) Or Equal
2. Spray on Epoxy Liners.
   a. Two or 3 part epoxy to protect concrete and steel from chemical attack.
   b. Minimum thickness
      1) Spray on epoxy: 60 mils.
      2) Rotary spray on epoxy: 125 mils.
   c. Tensile Strength (ASTM C307): Minimum 2,500 psi
   d. Flexural Strength (ASTM C580): Minimum 4,600 psi
   e. Working time at 70 degrees Fahrenheit: 30 minutes
   f. Initial set time at 70 degrees Fahrenheit: 17 hours
   g. Approved Manufacturers:
      1) Sauereisen, Sewer Gard No. 210, No. 210S or No. 210RS
      2) Raven, Raven 400S

3) Terre Hill, Hydropoxxy
4) AP/M Permaform, Cor+Gard
5) SprayRoq, Inc., Spray Wall
6) Or Equal

3. Concrete Protective Liners.
   a. High density Polyethylene (HDPE) concrete protective liner.
      1) Integrally extruded with anchoring studs, minimum 39 studs per square foot
      2) Minimum thickness of liner sheet with anchoring studs: 2 mm
      3) Minimum thickness of flat liner sheet at joint overlaps: 3 mm
      4) Joints sealed using thermal welding
      5) Density (ASTM D792): 0.945 gm/cm^3
      6) Elongation at Break (ASTM D638): Greater than 400 percent
      7) Minimum abrasion resistance (ASTM D4833): 160 pounds
      8) Steel profiles for mounting liner.
         a) Maintain minimum 2.5 inch annular space when filling with flowable concrete
         b) Maintain minimum 1 inch annular space when filling with grout
         c) Anchor bolts: minimum penetration of concrete on manhole wall: 1.5 inches
         d) Countersink screws to mount liner to profiles
      9) Cement in annular space.
         a) Minimum Compressive Strength: 4,000 psi at 28 days
         b) Minimum aggregate size: 8 mm
         c) Maximum aggregate size: 32 mm
      10) Grout in annular space
         a) Minimum Compressive Strength: 6,000 psi at 28 days
         b) Low viscosity, high flowability to fill annular space without voids
         c) Bonds to manhole wall
      11) Approved Manufacturers:
         a) AGRU, Sure Grip Concrete Protective Liner
         b) Or Equal
   b. Polyvinyl Chloride (PVC) Sheet Liner.
      1) Resin: Minimum 99 percent PVC by weight
      2) Do not use copolymer resins or recycled materials
      3) Minimum thickness: 1.65 mm, with integrally extruded anchoring extensions on maximum 2 inch center and minimum ¼ inch deep.
      4) Joints sealed using thermal welding
      5) Tensile Strength (ASTM C307): Minimum 2,200 psi
      6) Elongation at Break (ASTM D638): 200 percent minimum
      7) Mastic primer and 2-part mastic to seal liner to manhole walls
      8) Approved Manufacturers:

a) Ameron, Arrow-Lock
b) Or Equal

4. Cast in Place Concrete Liner.
   a. Formed in place seamless concrete manhole within the existing manhole, extending from bench to frame.
      1) Structurally independent of existing manhole structure
   b. Concrete.
      1) Type I/II Portland cement concrete
      2) Maximum Aggregate Size: 5/8 inch
      3) Fiber reinforcement and plasticizers to produce minimum compressive strength of 4,000 psi at 28 days
   c. Formwork:
      1) Segmented forms in cylindrical and conical sections
      2) Allow adequate annular space for concrete
      3) Result in minimum finished manhole opening of 20 inches
      4) Sealed at bench and pipe openings to form water stop
      5) Removable from within new cast concrete manhole wall
   d. When specified, provide PVC or polyethylene liner on new interior manhole wall surface.
      1) Minimum thickness: 0.065 inch
      2) Ribbed or studded for embedment into concrete
         a) Minimum pull out strength: 100 pounds per linear inch.
      3) Fit securely to exterior of concrete forms
      4) Heat fuse or extrusion weld seams
   e. Approved Manufacturers:
      1) AP/M Permaform, Permaform Liner
      2) Or equal

H. Precast Concrete Manholes: See Section 03400 and Section 02530.

I. Manhole Frames and Covers: See Section 02530.

PART 3 - EXECUTION

3.01 PUBLIC NOTIFICATION

A. Maintain service usage throughout duration of project.

1. Maximum amount of time of no service: 8 hours for any property served by sewer.
   a. Any service out longer than 8 hours will be bypassed to a sanitary sewer.
2. Public Notification Program.
   a. Deliver written notices to each home or business 48 hours before commencement of work being conducted on section, including local telephone number of CONTRACTOR contact for inquiries or complaints.
   b. Provide OWNER or occupant a summary of work to be completed, and time and duration of service interruption to building.

c. Contact any home or business that cannot be reconnected within time stated in written notice.
d. Fax or email copies of all delivered notices to Contract Manager.

3.02 MANHOLE PREPARATION

A. Sewer Bypass Pumping

B. Clean interior surfaces of manhole of debris, dirt, oil, grease, remains of old coating materials, and any other extraneous materials following approved submittals for rehabilitation products used.

C. Pressure wash manhole walls to remove loose mortar, concrete, debris following approved submittals for rehabilitation products used.

D. Repair irregularities in manhole following approved submittals for rehabilitation products used.

E. Repair leakage in manhole following approved submittals for rehabilitation products used.

F. Trim and grout incoming laterals and pipes following approved submittals for rehabilitation products used.

G. Remove debris from manhole and sewer.

1. Handle cleaning water in closed discharge hoses to prevent water and residue from causing damage.
2. Do not discharge debris through sanitary sewer system
3. Filter solids-laden water through an approved desilting device
4. Dispose of residue from cleaning and other construction operations in a manner satisfactory to Contract Manager and authority having jurisdiction over area where work site is located.

3.03 GROUTING

A. Provide 48 hour notice to Contract Manager prior to start of work for equipment inspection.

1. Allow measurements to be taken
2. Demonstrate acceptable grout volumetric measuring technique

B. Adjust chemical mixing ratios required for specific application.

1. Minimum gel time 30 seconds or at Contract Manager's direction

C. Do not block pipes entering/exiting manhole with grout

1. Use mirror or camera to confirm pipes are not blocked

D. Do not damage manhole structure during operations.

1. Repair damage at Contract Manager's direction.

E. Protect area of manhole below repair work.

1. Do not allow solid material to enter sewage flow
2. Remove protective devices as soon as practicable

F. Manhole Sealing.

1. Following ASTM F2414 and specified herein
   a. Do not use curtain grout sealing around brick manholes
   b. Drill only the amount of holes necessary to stop leakage
   c. Seal manhole base when specified.
      1) Drill holes and inject grout through manhole base.

G. Cementitious Reconstruction.

1. Mix and handle following approved submittals.
2. Apply coating materials using rotary spray equipment or spray gun following approved submittals.
3. Apply beginning at the top of the manhole and work down to bench
   a. Seal around pipe connections and steps
4. Do not allow solid material to enter sewage flow
5. Apply thickness following approved submittals
   a. Minimum total thickness: ½ inch
6. Trowel and brush finish following approved submittals
7. Cure following approved submittals.
   a. Use curing compound when recommended by manufacturer
   b. Do not allow flow in manhole or traffic over manhole, until manufacturer's minimum cure times have been achieved.

H. Hydraulic Water Plugs

1. Provide mechanical key by undercutting or square cutting the opening and removing loose materials following approved submittals
2. Mix, handle, place and cure following approved submittals
3. Furnish surface following approved submittals and as required for other rehabilitation work.

I. Oil-free Oakum Water Plugs.

1. Saturate oakum with resin following approved submittals
   a. Use additives as required
2. Place and cure following approved submittals

J. Manhole Chimney Seals.

1. Provide smooth circular surface for internal rubber sleeve following manufacturer's requirements

a. Install following Standard Details
b. Realign manhole frame and cover if required

2. Mix, handle, apply and cure elastomeric lining following approved submittals.

K. Manhole Liners.

1. Cured in Place Liners.
   a. Custom fabricate liner to individual manhole dimensions
      1) When finished, liner forms a monolithic structure from the manhole frame to the bench.
   b. Line bench area with material placed in the bottom of the manhole and extending a minimum of 6 inches up to the manhole wall
   c. Remove manhole steps
   d. Saturate liner with resin, place into manhole, pressurize with air or water and cure with hot water, steam or hot air following approved submittals.
   e. Finish liner following approved submittals.
2. Epoxy Liners.
   a. Mix and apply following approved submittals
   b. Sagging of epoxy coating not permitted
   c. Seal around pipe connections and steps
   d. Cure following approved submittals
3. Concrete Protective Liners.
   a. Remove manhole steps
   b. Liner attached to wall using supports.
      1) Insert liner sheet into manhole and support following approved submittals
         a) Apply bonding agent compatible with grout or concrete to manhole wall before placing liner
         b) Provide adequate annular space between liner sheet and manhole wall to allow placement of concrete or grout
         c) Secure liner supports to manhole walls
         d) Secure liner to supports
         e) Form liner seams following approved submittals
         f) Place concrete or grout with no wrinkling of liner
            i. Vibrate to prevent voids
         g) After curing, remove internal forms or supports
         h) Finish seams following approved submittals
   c. Liner Attached to Wall Using Mastic.
      1) Apply mastic primer to manhole wall and cure following approved submittals
      2) Apply mastic to primed manhole wall
      3) Apply liner to mastic
         a) Embed anchoring extensions in mastic
         b) Wrinkling of liner not permitted
      4) Finish liner seams following approved submittals

4. Formed in Place Concrete Liner.
   a. Remove manhole steps
   b. Place pipe extensions in manhole at main line and pipes entering manhole
   c. Erect internal forms
      1) Place PVC or PE liner with forms when specified
      2) Seal forms at bench to prevent concrete leakage
   d. Place concrete to prevent segregation of aggregate and cement
   e. Consolidate concrete to fill pockets, seams and cracks in existing manhole wall
   f. Remove formwork when concrete is cured
   g. Finish liner seams following approved submittals
   h. Seal concrete liner at frame and at pipe penetrations following approved submittals.

3.04 RESET/REPLACE FRAME AND COVER

A. Follow Section 02530 and Standard Details.

3.05 REPLACE MANHOLE

A. Follow Section 02530 and Standard Details

3.06 FIELD TESTING

A. Visual inspection to determine integrity of rehabilitation materials and water-tightness.

1. Provide flow-through plugs for duration of 6 hours
2. No infiltration or inflow permitted
3. Repair damage and leakage

B. Test manhole lining for continuity following ASTM D4787 and approved submittals.

1. Repair holes and discontinuities following manufacturer's recommendations.

C. Test grout and concrete for compressive strength following ASTM C109.

3.07 WARRANTY INSPECTIONS

A. Conduct visual inspection to determine integrity of rehabilitation materials and water- tightness within 3 months of expiration of guarantee period.

1. Preferably conducted in spring season

B. Accompany Contract Manager on inspections.

C. Inspect 25 percent of manholes rehabilitated at locations selected by Contract Manager.

1. No infiltration or inflow permitted
2. If any manhole fails warranty inspection, inspect all manholes in contract with

Contract Manager.

PART 4 - MEASUREMENT AND PAYMENT

4.01 REPLACE FRAME AND COVER

A. Measurement: By each manhole frame and cover replaced.

B. Payment: At unit price listed in Bid Schedule.

1. Payment includes removal of existing frame and cover, replacing frame and cover, and disposal of old frame and cover following Section 02530 and Standard Details.

4.02 ADJUSTMENT MATERIALS

A. Measurement: By vertical linear foot of adjustment materials provided.

B. Payment: At price per linear foot listed in Bid Schedule.

1. Payment includes providing adjustment materials following Standard Details, including at least one grade ring, from bottom of frame and cover to top of manhole cone following Section 02530.

END OF SECTION

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Project No. 12133

SECTION 03301
REINFORCED CONCRETE

PART 1 - GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Concrete Institute (ACI):
   a. 301, Specifications for Structural Concrete for Buildings.
   b. 305R, Hot Weather Concreting.
   c. 306R, Cold Weather Concreting.
   d. 318/318R, Building Code Requirements for Reinforced Concrete.
   e. 347, Formwork for Concrete.
2. ASTM International (ASTM):
   a. A497, Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
   b. A615, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   c. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   d. C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   e. C94, Standard Specification for Ready-Mixed Concrete.
   f. C150, Standard Specification for Portland Cement.
   g. C260, Standard Specification for Air-Entraining Admixtures for Concrete.
   h. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
   i. C494, Standard Specification for Chemical Admixtures for Concrete.
   j. C618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
   k. D994, Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
3. Concrete Reinforcing Steel Institute (CRSI):
   a. Manual of Standard Practice.
   b. Recommended Practice for Placing Reinforcing Bars.

1.02 SUBMITTALS

A. Action Submittals:

1. Reinforcing steel in accordance with CRSI Manual of Standard Practice.
2. Curing compound data.
3. Complete data on the concrete mix, including aggregate gradations and admixtures, in accordance with ASTM C94.

B. Informational Submittals:

1. Manufacturer's application instructions for curing compound.
2. Ready-mix delivery tickets for each truck in accordance with ASTM C94.

1.03 QUALITY ASSURANCE

A. Formwork: Unless otherwise specified, follow the recommendations of ACI 347.

B. Concrete and Reinforcement: Unless otherwise specified, meet the requirements of ACI 301 and ACI 318/318R.

C. Hot Weather Concreting: Conform to ACI 305R.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Do not use curing compound where solvents in the curing compounds are prohibited by state or federal air quality laws. Use only water curing methods.

PART 2 - PRODUCTS

2.1 CONCRETE

A. Ready-mixed meeting ASTM C94, Option A.

B. Portland Cement: ASTM C150, Type I or II.

C. Admixtures:

1. Air-Entraining: ASTM C260.
2. Water-Reducing: ASTM C494, Type A or Type D.
3. Superplasticizers: ASTM C494, Type F or Type G.
4. Fly Ash: ASTM C618, Class C or Class F.
5. Color Pigments: Inert mineral or metaloxide pigments, either natural or synthetic; resistant to lime and other alkalies.

D. Mix Design:

1. Minimum Allowable 28-day Compressive Field Strength**:** 3,000 psi when cured and tested in accordance with ASTM C31 and ASTM C39.
2. Water-Cement Ratio: 0.48, maximum.
3. Cement Content: 540 pounds per cubic yard, minimum.
4. Coarse Aggregate Size: 3/4 inch(es) and smaller.
5. Slump Range: 3 inches to 5 inches.
6. Air Entrainment: Between 3 and 6 percent by volume. Use 4 percent minimum for concrete placed under requirements of cold weather concreting.
7. Water Reducers: Use in concrete without plasticizers.
8. Superplasticizers: Use for structures.

E. Mixing: Minimum 70 and maximum 270 revolutions of mixing drum. Nonagitating equipment is not allowed.

2.2 REINFORCING STEEL

A. Deformed Bars: ASTM A615, Grade 60.

B. Welded Wire Fabric: ASTM A497.

2.3 ANCILLARY MATERIALS

A. Expansion Joint Filler: ASTM D994, 1/2-inch thick, or as shown.

B. Nonshrink Grout:

1. Color: To match concrete.
2. Manufacturers and Products:
   a. Master Builder Co., Cleveland, OH; Master Flow 928.
   b. Euclid Chemical Co., Cleveland, OH; Hi-flow Grout.

C. Clear Floor Hardener (Surface-Applied): Colorless, aqueous solution of zinc and magnesium fluosilicate with a minimum 2 pounds of crystals per gallon.
1. Manufacturers:
   a. Master Builders, Co., Cleveland, OH.
   b. Tamms Industries, Inc., Kirkland, IL.
   c. Sonneborn, Minneapolis, MN.

PART 3 - EXECUTION

3.1 FORMWORK

A. Form Materials:

1. Use hard plastic finished plywood for exposed areas, and new shiplap or plywood for unexposed areas.
2. Earth cuts may be used for forming footings.

B. Form Ties:

1. Fixed conical or spherical type inserts that remain in contact with forming material and allow for dry packing of form tie holes.
2. Ties shall withstand pressures and limit deflection of forms to acceptable limits.
3. Wire ties are not acceptable.

C. Construction:

1. In accordance with ACI 347.
2. Make joints tight to prevent escape of mortar and to avoid formation of fins.
3. Brace as required to prevent distortion during concrete placement.
4. On exposed surfaces locate form ties in uniform pattern or as shown.
5. Construct so ties remain embedded in the wall with no metal within 1 inch of concrete surface when forms, inserts, and tie ends are removed.

D. Form Removal:

1. Remove after concrete has attained 28-day strength, or approval is obtained in writing from ENGINEER.
2. Remove forms with care to prevent scarring and damaging the surface.
3. Prior to form removal, provide thermal protection for concrete being placed under the requirements of cold weather concreting.

3.2 PLACING REINFORCING STEEL

A. Unless otherwise specified, place reinforcing steel in accordance with CRSI Recommended Practice for Placing Reinforcing Bars.

B. Splices and Laps:

1. Top Bars: Horizontal bars placed such that 12 inches of fresh concrete is cast below in single placement.
2. Horizontal wall bars are considered top bars.
3. Lap top bars 42 diameters or minimum 24 inches.
4. Lap all other bars 30 diameters or minimum 18 inches.
5. Tie splices with 18-gauge annealed wire as specified in CRSI Standard.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

B. Prior to placing concrete, remove water from excavation and debris and foreign material from forms. Check reinforcing steel for proper placement and correct discrepancies.

C. Before depositing new concrete on old concrete, clean surface using sandblast or bushhammer or other mechanical means to obtain a 1/4-inch rough profile, and pour a cement-sand grout to minimum depth of 1/2 inch over surface. Proportion 1 part cement to 2.5 parts sand by weight.

D. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 2 feet deep. Place within 1-1/2 hours after adding cement to mix.

E. Eight feet maximum vertical drop to final placement, when not guided with chutes or other devices to prevent segregation due to impact with reinforcing.

3.4 COMPACTION

A. Vibrate concrete as follows:

1. Apply approved vibrator at points spaced not farther apart than vibrator's effective radius.
2. Apply close enough to forms to vibrate surface effectively but not damage form surfaces.
3. Vibrate until concrete becomes uniformly plastic.
4. Vibrator must penetrate fresh placed concrete and into previous layer of fresh concrete below.

3.5 CONSTRUCTION JOINTS

A. Locate as shown or as approved.

B. Maximum Spacing between Construction Joints: 40 feet.

3.6 FINISHING

A. Floor Slabs and Tops of Walls:

1. Screed surfaces to true level planes.
2. After initial water has been absorbed, float with wood float and trowel with steel trowel to smooth finish free from trowel marks.
3. Do not absorb wet spots with neat cement.

B. Unexposed Slab Surfaces: Screed to true surface, bull float with wood float, and wood trowel to seal surface.

C. Tolerances: Floors shall not vary from level or true plane more than 1/4 inch in 10 feet when measured with a straightedge.

D. Exterior Slabs and Sidewalks:

1. Bull float with wood float, wood trowel, and lightly trowel with steel trowel.
2. Finish with broom to obtain nonskid surface.
3. Finish exposed edges with steel edging tool.
4. Mark walks transversely at 5-foot intervals, or in pattern shown on Drawings, with jointing tool.

3.7 FINISHING AND PATCHING FORMED SURFACES

A. Cut out honeycombed and defective areas.

B. Cut edges perpendicular to surface at least 1 inch deep. Do not feather edges. Soak area with water for 24 hours.

C. Patch with shotcrete or low pressure mortar as specified in Section 03720, Vertical and Overhead Concrete Surface Repair Systems.

D. Finish surfaces to match adjacent concrete.

E. Keep patches damp for minimum 7 days or spray with curing compound to minimize shrinking.

F. Fill form tie holes with nonshrink grout.

3.8 PROTECTION AND CURING

A. Protect fresh concrete from direct rays of sunlight, drying winds, and wash by rain.

B. Keep concrete slabs continuously wet for a 7-day period. Intermittent wetting is not acceptable.

C. Use curing compound only where approved by ENGINEER. Cure formed surfaces with curing compound applied in accordance with manufacturer's directions as soon as forms are removed and finishing is completed.

D. Remove and replace concrete damaged by freezing.

3.9 FLOOR HARDENER

A. Use where noted or scheduled.

B. Follow manufacturer's application instructions.

3.10 FIELD TESTS

A. Evaluation of Concrete Field Strength: In accordance with ACI 318/318R.

END OF SECTION

PROJECT 12133

SECTION 05500
METAL FABRICATIONS AND CASTINGS

PART 1 - GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. Aluminum Association, Inc. (AA): Standards, Specifications, and Data.
2. American National Standards Institute (ANSI):
   a. A14.3, Ladders, Fixed, Safety Requirements.
   b. B1.1, Unified Inch Screw Threads (UN and UNR Thread Form).
3. American Society for Testing and Materials (ASTM):
   a. A36, Standard Specification for Structural Steel.
   b. A48, Standard Specification for Gray Iron Castings.
   c. A53, Standard Specification for Pipe, Steel, Black and Hot- Dipped, Zinc-Coated Welded and Seamless.
   d. A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   e. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware (R 1987).
   f. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   g. A193, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
   h. A194, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
   i. A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
   j. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
   k. A325, Standard Specification for High-Strength Bolts for Structural Steel Joints.
   l. A385, Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip) (R 1991).
   m. A395, Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
   n. A489, Standard Specification for Carbon Steel Eyebolts.
   o. A500, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   p. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
   q. A525, Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
   r. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
   s. B308, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Shapes.

t. B429, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
u. C881, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
v. D648 E2, Standard Test Method for Deflection Temperature of Plastics under Flexural Load (R 1988).
w. D695, Standard Test Method for Compressive Properties of Rigid Plastics.
x. D746, Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact (R 1987).
y. D1056, Standard Specification for Flexible Cellular Materials- Sponge or Expanded Rubber.
z. D1505, Standard Test Method for Density of Plastics by the Density-Gradient Technique (R 1990).
aa. D1525, Standard Test Method for Vicat Softening Temperature of Plastics.
bb. F436, Standard Specification for Hardened Steel Washers.
cc. F468, Standard Specification for Nonferrous Nuts for General Use.
dd. F844, Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.

4. American Welding Society (AWS):
   a. AWS D1.1, Structural Welding Code-Steel.
   b. AWS D1.2, Structural Welding Code-Aluminum.
5. Federal Specifications (FS):
   a. QQ-F-461C(1), Floor Plate, Steel, Rolled 5/4/77.
   b. RR-S-001301.

1.02 DEFINITIONS

A. Submerged: A location at or below a point 1 foot 6 inches above maximum water surface elevation in water-holding basins and channels.

1.03 SUBMITTALS

A. Shop Drawings:

1. Metal fabrications, including welding and fastener information.
2. Specific instructions for all phases of installation including hole size, preparation, placement, procedures, and instructions for safe handling of anchoring systems.

B. Quality Control Submittals:

1. Vinyl Ester and Epoxy Anchors:
   a. Manufacturer's Certificate of Compliance.
   b. Manufacturer's past project experience data.
   c. Test reports for each batch of vinyl ester or epoxy delivered to site.
   d. Manufacturer's Certificate of Qualification for installers.

e. Current test data indicating that cured adhesive anchors meet or exceed design loads.

2. Ladders: Results of load tests.
3. Welders: Evidence of certification.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Welders: Certified in accordance with AWS D1.1, Chapter 5.
2. Vinyl Ester and Epoxy Anchor Manufacturers: Experience on at least three similar projects within the last 3 years.
3. Vinyl Ester and Epoxy Anchor Installers: Trained and certified by manufacturer.

B. Regulatory Requirements:

1. Anchoring Systems:
   a. Current evaluation and acceptance reports by ICBO or other similar code organization.
   b. Acceptable for use in potable water structures by EPA and local health agencies or NSF.

C. Welding Procedures: Follow the requirements of AWS D1.1 and AWS D1.2.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Shipment:

1. Insofar as practical, factory assemble items specified herein.
2. Package and clearly tag parts and assemblies that are of necessity shipped unassembled, in a manner that will protect materials from damage, and facilitate identification and field assembly.

B. Storage of Epoxy Adhesive:

1. Store epoxy cartridges on pallets or shelving in a covered storage area.
2. Control temperature above 60 degrees F and dispose of cartridges if shelf life has expired.

C. Storage of Vinyl Ester Products:

1. Store components on pallets or shelving in a covered storage area with locking door.
2. Control temperature within 41 to 77 degrees F and dispose of product if shelf life has expired.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Unless Otherwise Indicated, Meet the Following Requirements:

Item	ASTM Specification
Steel Shapes and Plates	A36
Steel Pipe	A501 or A53, Type E or S, Grade B
Structural Steel Tubing	A500, Grade B
Stainless Steel:	
Bars and Shapes	A276, AISI Type 316
Steel Plate, Sheet, and Strip	A167, AISI Type 316
Bolts and Threaded Rods	A193, AISI Type 316, B8MN, B8M2, or B8M3
Nuts	A194, AISI Type 316, B8MN, B8M2, or B8M3
Steel Bolts and Nuts:	
Carbon Steel	A307 or A3690
High-Strength	A325, Type 3
Galvanized Steel Bolts and Nuts	A307 or A36, with A153 Zinc Coating, and ANSI B1.1
Eyebolts	A489
Threaded Rods	A36
Flat Washers (Unhardened)	F844; use A153-82 for Zinc Coating
Flat Washers (Hardened)	F436
Aluminum, Structural Shapes, and Plates	B209 and B308, Alloy 6061-T6
Aluminum Bolts and Nuts	F468, Alloy 2024-T4
Cast Iron	A48, Class 35

B. Checkered Plates:

1. Steel: Federal Specification QQ-F-461, Class I, minimum 1/4 inch; galvanize after fabrication.
2. Aluminum: ASTM B209, Alloy 6061-T6, tread plate, thickness minimum 1/4 inch.

C. Anchor Bolts: As shown in Fastener Schedule at the end of this Section and as specified in various equipment sections.

D. Anchor Bolt Sleeves:

1. High Density Polyethylene Plastic:
   a. Single unit construction with deformed sidewalls such that the concrete and grout lock in place.

b. The top of the sleeve shall be self-threading to provide adjustment of the threaded anchor bolt projection.
c. Material requirements:
1) Plastic: High density polyethylene.
2) Density: ASTM D1505.
3) Vicat Softening Point: ASTM D1525.
4) Brittleness Temperature: ASTM D746.
d. Manufacturer: Sinco West, Simi Valley, CA.
2. Fabricated Steel Sleeve: A36 steel.

E. Antiseizing Lubricant: Lubricant shall contain substantial amounts of molybdenum disulfide, graphite, mica, talc, or copper. Use Loc Tite Co., Permatex.

2.02 ANCHORING SYSTEMS FOR CURED CONCRETE

A. Wedge Anchors:

1. AISI Type 316 stainless steel throughout.
2. Manufacturers and Products:
a. ITW Ramset/Red Head, Wood Dale, IL; Trubolt Wedge Anchor.
b. Hilti, Inc., Tulsa, OK; Kwik-Bolt II Stud Anchor.
c. Wej-It Corp., Broomfield, CO; Wej-It Anchor Bolt.
d. Molly Division of Emhart Corp., Temple, PA; Parabolt Concrete Anchor.

B. Expansion Anchors:

1. Self-drilling anchors, snap-off type or flush type.
2. Furnish anchors for use with galvanized bolts.
3. Nondrilling Anchors: Flush type for use with bolt, or stud type with projecting threaded stud.
4. Manufacturers and Product:
a. ITW Ramset/Red Head, Wood Dale, IL; Multi-Set Anchor.
b. Hilti, Inc., Tulsa, OK; Hilti HDI Drop-In Anchor.

C. Epoxy Anchors:

1. Anchor Rod: Stainless steel threaded rod free of grease, oil, or other deleterious material with a 45 degree chisel point.
2. Epoxy Adhesive:
a. ASTM C881, Type 1, Grade 3, Class A, B, or C.
b. Two-component, 100 percent solids, nonsag, paste, insensitive to moisture, designed to be used in adverse freeze/thaw environments and gray in color.
c. Cure Temperature, Pot Life, and Workability: Compatible for intended use and environmental conditions.
3. Mixed Epoxy Adhesive: Nonsag paste consistency, with ability to remain in a 1 inch diameter overhead drilled hole without runout, having the following properties:

a. Slant Shear Strength, ASTM C881, No Failure in Bond Line, Dry/Moist Conditions: 5,000 psi.
b. Compressive Strength, ASTM D695: 14,000 psi, minimum.
c. Tensile Strength, ASTM D695: 4,500 psi.
d. Heat Deflection Temperature, ASTM D648 E2: 135 degrees F, minimum.

4. Epoxy Adhesive Packaging:
   a. Disposable, self-contained cartridge system capable of dispensing both epoxy components in the proper mixing ratio, and fit into a manually or pneumatically operated caulking gun.
   b. Cartridge Markings: Include manufacturer's name, batch number, mix ratio by volume, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.
5. Manufacturers and Products:
   a. Adhesives Technology Corp.; Anchor-It Fastening Systems, HS 200 Epoxy Resin.
   b. ITW Ramset/Red Head; Epcon Ceramic 6 Epoxy Anchor System.
   c. Covert Operations; CIA Epoxy Anchors with viscosity to suit application.
   d. Rawlplug Co., Inc.; Rawl/Sika Foil Fast Epoxy Injection Gel System.

D. Adhesive Anchors:

1. Two-component vinyl ester adhesive, insensitive to moisture, designed to be installed in adverse freeze/thaw environments.
2. Cure Temperature, Pot Life, and Workability: Compatible for intended use and anticipated environmental conditions.
3. Container Markings: Include manufacturer's name, product name, batch number, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.
4. Anchor Rods: Stainless steel threaded rods, sized by adhesive manufacturer for design loads required and adhesive system used.
5. Manufacturer and Product: Hilti, Inc.; HIT Doweling Anchor System (HIT C-100).

2.03 ACCESS COVERS

A. Doors:

1. Exterior type waterproof aluminum single- or double-leaf.
2. Component Fabrication:
   a. Access Door Leaf(s): H-20 rated with 1/4 inch diamond pattern plate and reinforcing on underside to withstand a live load equal to AASHTO H20 requirements with a maximum deflection of 1/150th of the span.
   b. Channel Frame: 1/4 inch with full anchor flange around perimeter.
   c. Equip door(s) with heavy stainless steel hinges with stainless steel pins.
   d. Hinges:

1) Through-bolt to cover with tamper-proof stainless steel bolts or “lock bolts” to resist vandalism.
2) Through-bolted to frame with stainless steel bolts and fiber locknuts.

e. Equip doors with fully enclosed and lubricated compression springs with lower enclosing telescopic tube locked into supporting “boot” firmly attached to frame to retard downward motion of door leaves or corrosion-resistant stainless steel gas springs designed to limit to 17 pounds the lifting force required to open.

f. Equip doors with hold-open arm with positive locking device with conveniently positioned release handle for easy and controlled closing.

g. Equip doors with recessed staple/hasp for padlock.

h. Furnish stainless steel snap lock mounted on bottom of leaf with removable topside handle and socket recessed in cover and provided with threaded plug for flush surface with handle removed.

i. Locate 1-1/2 inch drainage coupling in front right corner of channel frame.

j. Hardware: Type 316 stainless steel.

3. Aluminum Finish: Mill finish with bituminous coating applied to surfaces in contact with concrete.

4. Reinforced for H-20 wheel loading.

5. Manufacturers:

a. Bilco Co., New Haven, CT.

b. Thompson Fabricating Co., Birmingham, AL.

c. Halliday Products, Orlando, FL.

B. Heavy-Duty Cast Iron Slab Type Manhole Frame and Lid:

1. To be used where vault or well access is located in areas subject to vehicular travel.

2. Frame and cover shall have an H-20 wheel load rating.

3. Slab type manhole frame and lid with flush, waterproof lift handles, and solid bronze Type R butt hinges.

4. Covers shall lock in the fully opened position.

5. ASTM A48, Class 35 cast iron.

6. Manufacturers:

a. Neenah Foundry Co., Series R663.

b. US Foundry Co.

7. Frames and lids shall be rectangular and sized as shown on the Drawings.

PART 3 - EXECUTION

3.01 FABRICATION

A. General:

1. Finish exposed surfaces smooth, sharp, and to well-defined lines.

2. Furnish necessary rabbets, lugs, and brackets so work can be assembled in neat, substantial manner.
3. Conceal fastenings where practical; where exposed, flush countersink.
4. Drill metalwork and countersink holes as required for attaching hardware or other materials.
5. Round sharp edges to small uniform radius. Grind burrs, jagged edges, and surface defects smooth.
6. Material Thinner than 1/8 Inch: Either galvanize before fabrication in accordance with ASTM A525, Coating Designation G210, or after fabrication in accordance with ASTM A123, except the weight of zinc coating shall average minimum 1.2 ounces per square foot of actual surface area with no individual specimen having a weight of less than 1 ounce per square foot.

B. Aluminum:

1. Fabricate in accordance with the Aluminum Association Standards and manufacturers' recommendations as approved.
2. Grind smooth sheared edges exposed in finished work.

3.02 WELDING

A. Steel:

1. Meet requirements of AWS D1.1 for techniques of welding employed, appearance, quality of welds made, and the methods of correcting *defective* work.
2. Meet visual acceptance standards of AWS D1.1, paragraph 8.15.1.
3. Complete welding before applying finish.

B. Aluminum: Meet requirements of AWS D1.2.

3.03 INSTALLATION OF METAL FABRICATIONS

A. General:

1. Install metal fabrications plumb or level, accurately fitted, free from distortion or defects.
2. Install rigid, substantial, and neat in appearance.
3. Erect steel in accordance with applicable portions of AISC Code of Standard Practice, except as modified.
4. Install manufactured products in accordance with manufacturer's recommendations.
5. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
6. Field weld components indicated.
7. Perform field welding in accordance with AWS D1.1.
8. Obtain ENGINEER approval prior to site cutting or making adjustments not scheduled.

9. After erection, apply prime or galvanize coating to welds, abrasions, and surfaces not in contact with concrete.

B. Erection Tolerances:

1. Maximum Offset from True Alignment: 1/4 inch.

C. Aluminum:

1. Erection: In accordance with the Aluminum Association specifications.
2. Do not remove mill markings from concealed surfaces.
3. Remove inked or painted identification marks on exposed surfaces not otherwise coated after installed material has been inspected and approved.

D. Pipe Sleeves:

1. Provide where pipes pass through concrete or masonry.
2. Holes drilled with a rotary drill may be provided in lieu of sleeves in existing walls.
3. Provide a center flange for water stoppage on sleeves in exterior or water-bearing walls.
4. Provide a rubber caulking sealant or a modular mechanical unit to form a watertight seal in the annular space between pipes and sleeves.

3.04 ANCHOR BOLTS

A. Accurately locate and hold anchor bolts in place with templates at the time concrete is placed.
B. Use sleeves for location adjustment and provide two nuts and one washer per bolt of same material as bolt. Minimum bolt size: 1/2 inch diameter by 12 inches long, unless otherwise shown.

3.05 ANCHORING SYSTEMS FOR CONCRETE

A. Begin installation only after concrete or masonry receiving anchors have attained design strength.

B. Do not install an anchor closer than six times its diameter to either an edge of concrete or masonry, or to another anchor, unless specifically shown otherwise.

C. Install in accordance with manufacturer's specific quality control submittal instructions. Hole diameters are critical to installation, use only drills recommended by anchor manufacturer. Follow manufacturer's safe handling instructions.

D. Epoxy or Adhesive Anchors: Do not install when temperature of concrete is below 40 degrees F or above 100 degrees F, unless stated otherwise in manufacturer's written instructions.

E. Follow specific manufacturer safe handling practices when handling and installing concrete anchors.

3.06 ACCESS COVERS

A. Accurately position prior to placing concrete, such that covers are flush with floor surface.

B. Protect from damage resulting from concrete placement. Thoroughly clean exposed surfaces of concrete spillage to obtain a clean, uniform appearance.

C. Sidewalk Door:

1. Install in accordance with manufacturer's instructions.
2. Doors shall operate to satisfaction of ENGINEER.

3.07 ELECTROLYTIC PROTECTION

A. Aluminum:

1. Solvent clean and prime the surfaces in accordance with manufacturer's instructions.
2. Where in contact with dissimilar metals, or embedded in masonry or concrete, protect surfaces with 1 coat, 10 MDFT of bituminous paint.
3. Allow paint to dry before installation of the material.
4. Protect painted surfaces during installation.
5. Should coating become marred, prepare and touch up in accordance with paint manufacturer's written instructions.

3.08 MANUFACTURERS' SERVICES

A. Epoxy and Vinyl Ester Anchors: Conduct site training of installation personnel for safe and proper installation, handling, and storage of epoxy or vinyl ester adhesive system. Notify ENGINEER of time and place for sessions.

3.09 FASTENER SCHEDULE

A. Provide Fasteners as Follows:

Service Use and Location	Product	Remarks
Anchor Bolts Cast Into Concrete for Equipment Bases:		
Dry Areas	Stainless steel “J” bolts, unless otherwise specified with equipment	
Submerged or Wet Areas	Stainless steel “J” bolts with fusion bond coating unless otherwise specified with equipment	1 or 2 coasts, 7 MDFT of Fusion Bonded Coating 100 percent Solids Epoxy or Polyurethane.

Service Use and Location	Product	Remarks
Anchor Bolts Cast Into Concrete for Metal Fabrications and Structural Components:		
Dry or Protected Areas	Stainless steel bolts	
Exterior, Wet, Washdown, and Chemical Handling Areas	Stainless steel bolts with fusion bond coating	3 coats, 250 SFPGPC of Polyamide Epoxy, High Solids.
Anchors for Metal Components to Concrete; e.g., Electrical Panels and Equipment:		
Dry Areas	Galvanized or stainless steel wedge or expansion anchors	
Wet and Damp Areas	Epoxy or adhesive stainless steel anchors	
Submerged or Buried in Earth	Epoxy or adhesive stainless steel anchors	
Connections for Steel Fabrications and Wood Components:		
Exterior and Interior	Stainless steel bolts	
Connections of Aluminum Components:		
Exterior and Interior	Stainless steel bolts	
All Others:		
Exterior and Interior	Stainless steel fasteners	

B. Antiseizing Lubricant: Use on all stainless steel threads.

C. Do not use epoxy anchors to support fire-resistive construction or where ambient temperature will exceed 120 degrees F.

END OF SECTION

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SECTION 11305
SUBMERSIBLE PUMPS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This Section includes the Work necessary to furnish and install, complete, the submersible pumps specified herein.

B. Furnish a complete installation, including pumps, accessories, and field panel with controls as part of the pump system package. Instrumentation and controls shall be in conformance with Division 16, ELECTRICAL requirements and Section 16810, LIFT STATION CONTROL PANELS.

1.02 REFERENCES

A. The following is a list of Standards that may be referenced in this Section:

1. American Society for Testing and Materials (ASTM):
   a. A48, Standard Specification for Gray Iron Castings.
   b. A576, Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.
2. Hydraulic Institute Standards (HIS).
3. National Electric Code (NEC).
4. National Electrical Manufacturers Association (NEMA).
5. National Fire Protection Association (NFPA): 70, National Electric Code.
6. Underwriters Laboratories (UL).

1.03 DEFINITIONS

A. Terminology pertaining to pumping unit performance and construction shall conform to ratings and nomenclature of Hydraulic Institute Standards.

B. Total Head: Total head in feet of liquid pumped shall be the discharge head minus the suction head (or plus the suction lift), both measured at the pump flanges and corrected to the pump shaft centerline, plus the differences in velocity head at the same points.

C. Hydraulic Efficiency: Hydraulic efficiency shall be the ratio of the useful output power of the pump to the input power of the pump.

1.04 SUBMITTALS

A. Shop Drawings:

1. Make, model, weight, and horsepower of each equipment assembly.
2. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
3. Performance data curves showing head, capacity, horsepower demand, and pump efficiency over entire operating range of pump, from shutoff to maximum capacity. Indicate separately head, capacity, horsepower

demand, overall efficiency, and minimum submergence required at guarantee point.

4. Power and control wiring diagrams, including terminals and numbers. Include a functional description of internal and external instrumentation and controls to be supplied and a list of parameters monitored, controlled or alarmed.
5. Description and rating of motor thermal and moisture sensing and protection systems.
6. Detailed Mechanical Drawings showing equipment fabrications and interface with other work. Include dimensions and weights.
7. Complete motor nameplate data, as defined by NEMA, from motor manufacturer.
8. Factory finish system.
9. Bearing life calculations.

B. Quality Control Submittals:

1. Factory Performance Test Reports.
2. Manufacturer's Certification of Compliance that factory finish system meets requirements specified herein.
3. Special shipping, storage and protection, and handling instructions.
4. Manufacturer's printed installation instructions.
5. Manufacturer's Certificate of Proper Installation
6. Suggested spare parts list to maintain equipment in service for period of 1 to 5 years. Include list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
7. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
8. Operation and Maintenance Manual.

1.05 EXTRA MATERIALS

A. Furnish for Each Pump:

1. One set mechanical seals for each pump.
2. One additional impeller for each pump.

PART 2 - PRODUCTS

2.01 GENERAL

A. Pump and Electrical Driver: Meet requirements for class, group, and division location in accordance with NFPA 70. The pump station installation shall meet all the requirements for a Class I, Division 2, gases and vapors (Group D) location as described in the NEC and NFPA 824. Motors shall be listed and labeled for use in the location specified by UL, CSA, or FM.

B. Pump cables shall be sized according to NEC standards. The cable and entry into the pump shall be approved for use in NEC Class 1, Division 1, Groups C and D hazardous locations.

C. Al cables shall be continuous, without splices from the motor to the control panel.

2.02 SUPPLEMENTS

A. Specific requirements are attached to this Section as supplements.

B. Pumps shall be as specified in the supplements to this Section as supplied by Flygt, Davis/EMU, Homa, or Ebara.

2.03 COMPONENTS

A. Pump equipment shall consist of pump(s) complete with motor(s), internal sensors, control system, guide rail and anchoring brackets, base elbow, power cable(s), and pump lifting chain.

1. Pump metal parts that come into contact with guide rail or cable system shall be made of nonsparking materials.
2. Pump shall be a center discharge style.
3. Wet or dry pit models depending on the application(s) shown on the Drawings. Pumps shall be provided with motor cooling provisions suitable for intended application.
4. Control panel and level switches as specified in Section 16810, LIFT STATION CONTROL PANELS.

B. Lifting Arrangement: Type 316 stainless steel chain, and one “grip-eye” with Type 316 stainless steel cable for each station. Attach chain permanently to pump and access platform with stainless steel wire rope. “Grip-eye” will be capable of being threaded over and engaging links of stainless steel chain so pump and motor may be lifted with “grip-eye” and independent hoist.

C. Motor:

1. Motor nameplate horsepower shall not be exceeded at any head capacity point on pump curve.
2. Pump motor and sensor cables shall be suitable for submersible pump application and cable sizing shall conform to NEC specifications for pump motors. Cable shall be of sufficient length to reach terminal junction without strain or splicing.
3. The motor shall be designed, manufactured, and tested in accordance with NEMA MG1 and shall be selected to provide the operation specified for this equipment.
   a. At 100 Percent Load:

Horsepower	Guaranteed Minimum Efficiency	Guaranteed Minimum Power
Under 5	72	82
5 thru 10	80	82
10.1 thru 50	85	82
50.1 thru 100	87	82
Over 100	89	82

4. Insulation System: Manufacturer's standard Class B or Class F.
5. Motor capable of running dry continuously.
6. Enclosure:
   a. Hermetically sealed, watertight, for continuous submergence up to 65-foot depth.
   b. Listed to meet UL 674, or equal, FM certification, and NFPA 70 requirements for Class 1, Division 2, Group D hazardous atmosphere.
   c. Seals: Tandem mechanical.
7. Bearing and Lubrication:
   a. Permanently sealed and lubricated, replaceable antifriction guide and thrust bearings.
   b. Minimum 15,000 hours L-10 bearing life.
8. Inrush kVA/horsepower no greater than NEMA MG 1 and NFPA 70, Code F.
9. Winding Thermal Protection:
   a. Thermal sensor and switch assembly, one each phase, embedded in stator windings and wired in series.
   b. Switches normally closed, open upon excessive winding temperature, and automatically reclose when temperature has cooled to safe operating level.
   c. Switch contacts rated at 5 amps, 120 volts ac.
10. Motor Seal Failure Moisture Detection:
   a. Probes or sensors to detect moisture beyond seals.
   b. Probe or sensor monitoring module for mounting in motor controller, suitable for operation from 120-volt ac supply.
   c. Monitoring module with control power transformer, probe test switch and test light, and two independent 120-volt ac contacts, one opening and one closing when the flux of moisture is detected.
11. Winding thermal protection, moisture detection, and bearing overtemperature specified above may be monitored by a single device providing two independent 120-volt ac contacts, one closing and one opening on malfunction.
12. Connecting Cables:
   a. One cable containing power, control, and grounding conductors.
   b. Each cable suitable for hard service, submersible duty with watertight seal where cable enters motor.
   c. Length: 50 feet minimum, or longer as required to prevent splices.
   d. UL 1 listed and sized in accordance with NFPA 70.
13. Motor Service Factor = 1.15.

2.04 CONTROL PANEL

A. Provide package control system, instrumentation, control system and accessories as specified in Section 16810, LIFT STATION CONTROL PANELS. This Section contains information, submittal requirements and mandatory requirements for the package control system to be furnished with the equipment specified in this Section.

2.05 ACCESSORIES

A. Level Control:

1. Provide Level Switch for:
   a. LOW Level: Pumps OFF/ALARM.
   b. Level Switch C: Pumps OFF
   c. Level Switch B: Lead pump ON.
   d. Level Switch A: Lag pump ON.
   e. HIGH Level: Alarm/All Pumps ON.
2. In accordance with Section 16810, LIFT STATION CONTROL PANELS.

B. Equipment Identification Plate: 16-gauge stainless steel with 1/4-inch die-stamped equipment tag number securely mounted in readily visible location.

C. Guide Rails: Sliding guide bracket shall be integral part of pump unit. Pump unit shall be guided by no less than 2 CP guide rails and pressed tightly against discharge connection elbow with metal-to-metal contact or through use of profile-type gasket, provided that gasket is attached to pump's flange and can be easily accessed for inspection when pump is lifted out of wet well.

1. Upper guide bracket shall be Type 316 stainless steel.
2. Guide rail assemblies shall be complete with all supports and anchor brackets necessary to provide a properly functioning installation based on the sump geometry and dimensions provided on the Drawings.
3. Guide rail assemblies and all support brackets shall be Type 304 stainless steel
4. Intermediate guide rail supports shall be used for rails over 20 feet long.
5. Install with tapered or rubber grommeted fittings to reduce vibration.

D. Provide Type 316 stainless steel cable rack for cables and floats.

E. Provide Type 316 stainless steel lifting bail for each pump.

F. Lifting Lugs: Equipment weighing over 100 pounds.

G. Anchor Bolts: All anchor bolts required for equipment and accessories shall be provided as specified in Section 05500, METAL FABRICATIONS AND CASTINGS.

1. Pump base anchor bolts shall be "J" type bolts, minimum 3/4-inch with 2 inches minimum projection. Pump base bolts shall be cast-in-place.
2. CONTRACTOR will be responsible for improperly installed anchor systems within the warranty period for the Project, including but not limited to concrete failure, poor workmanship, and fastener failure.

H. Access Covers and Doors: In accordance with the provisions of Section 05500, METAL FABRICATIONS AND CASTINGS.

I. Pressure Gauge:

1. General:

a. Function: Pressure indication.
b. Bourdon tube actuated for ranges 10 psig and above.

2. Performance:
   a. Range: 0 to 100 feet or as noted. Compound scale when noted.
   b. Accuracy: Plus or minus 0.5 percent of span.
3. Features:
   a. Mounting: Lower stem, unless otherwise noted.
   b. Dial: 4-1/2-inch diameter, unless otherwise noted.
   c. Case Material: Phenolic plastic, unless otherwise noted.
   d. Element Material: Phosphor-bronze, unless otherwise noted.
   e. Dampening: Pulsation dampener when noted, piston type with multiple choice of piston placement to vary the desired amount of dampening.
   f. Case Type: Solid front design with solid wall between window and element. Rear of case, gasketed pressure relief.
   g. Pointer: Micrometer pointer with self-locking adjustment.
   h. Movement: Stainless steel, rotary geared.
   i. Liquid Filled Face: If noted.
4. Process Connection:
   a. Line Size: 1/2 inch.
   b. Connection Type: Threaded.
5. Manufacturers:
   a. Ashcroft Duragauge, Model No. 1279/1379.
   b. Robert Shaw Acragage.
   c. Marsh Mastergauge.
   d. WIKA Type 21X.34.

J. Pressure Seal, Diaphragm:

1. General:
   a. Function: Isolate sensing element from process fluid.
   b. Type: Fluid filled, corrosion-resistant.
2. Service:
   a. Pressure: Same as associated sensor.
   b. Temperature: As noted.
3. Features:
   a. Materials:
      1) Lower Housing: Type 316 stainless steel, unless otherwise noted.
      2) Diaphragm Material: Type 316 stainless steel, unless otherwise noted.
   b. Bleed screw in upper housing.
   c. Fill Fluid: As noted. Factory filled and assembled when possible.
4. Process Connections:
   a. Instrument: 1/2-inch female NPT, unless otherwise noted.
   b. Process: 1/2-inch female NPT, unless otherwise noted.
   c. Connection Material: As noted.
5. Manufacturers:
   a. Ametek, Mansfield and Green Division, Type SG.
   b. Ashcroft, Type 101.

2.06 FACTORY FINISHING

A. Pump equipment and accessories shall be factory prepared, primed, and painted with a coal-tar epoxy system, applied in two 16 MDFT coats. Coating shall be amine or phenolic epoxy type; 70 percent volume solids minimum, suitable for immersion service.

B. Manufacturer's standard baked enamel finish.

2.07 SOURCE QUALITY CONTROL

A. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.

B. The rotating parts of each pump and driving unit shall be dynamically balanced before final assembly. The driving unit alone shall operate without vibration in excess of the limits stated in the latest revision of NEMA MG 1.

C. Factory Tests and Adjustments: Test all equipment and control panels actually furnished.

D. Factory Test Report: Include test data sheets, curve test results, performance test logs.

E. Functional Test: Perform manufacturer's standard.

F. Performance Test:

1. Conduct on each pump.
2. Perform under actual or approved simulated operating conditions.
3. Test for a continuous 3-hour period without malfunction.
4. Test Log: Record the following:
   a. Total head.
   b. Capacity.
   c. Horsepower requirements.
   d. Driving motor voltage and amperage measured for each phase.
   e. Throttle discharge valve to obtain pump data points on curve at 2/3, 1/3, and shutoff conditions.

G. Test cables and conductors in accordance with Section 16120, ELECTRICAL CONDUCTORS.

2.08 CONTROL PANEL

A. The pump motor control panel and all related components shall be the responsibility of the pump Supplier. Provide a complete control panel and components as shown on the Electrical Drawings and as specified in Division 16, ELECTRICAL. The panel shall be manufactured with all the specified components, no exceptions. This Section shall have complete responsibility for the supply, manufacturing, coordination with electrical and RTU contractors, and all test and startup as specified elsewhere in these Contract Documents.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's printed instructions.

B. Connect suction and discharge piping without imposing strain to pump flanges.

C. No portion of pump shall bear directly on floor of sump.

3.02 FIELD QUALITY CONTROL

A. Functional Test: Conduct on each pump.

1. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
2. Flow output.
3. Test for continuous 3-hour period.
4. Test Report Requirements: In accordance with Hydraulic Institute Standards for centrifugal pump tests HIS 1.6.

3.03 MANUFACTURER'S SERVICES

A. Manufacturer's Representative: Present at site or classroom designated by OWNER, for minimum person-days listed below, travel time excluded:

1. ½ person-day for installation assistance and post startup training per pump station.
2. ½ person-day for performance testing and completion of Manufacturer's Certificate of Proper Installation.

3.04 SUPPLEMENTS

A. The supplements listed below, following “END OF SECTION,” are part of this Specification.

1. Data Sheets: Pump and motor.

3.05 PUMPS CONTROL SCHEME

A. The operations scheme for the pump station is: only one pump will be used to pump all the flow and the second pump be used if #1 cannot keep up with the flow, after which both pumps will be running together and share the load and drop-off as the flow falls below an operator entered well level set-point. A maximum of two pumps will run at the same time. The third pump is only used as a standby back-up.

END OF SECTION

PROJECT 12133

SUBMERSIBLE PUMP DATA SHEET, 11305-_____

Tag Numbers: N/A

Pump Name: **Pump Station A-13**

Manufacturer and Model Number: (1) Flygt NP 3301 MT 3 ~ 636

SERVICE CONDITIONS

Liquid Pumped (Material and Percent): domestic wastewater

Pumping Temperature (Fahrenheit): Normal: 75 Max 80 Min 70

Abrasive (Y/N) Y Possible Scale Buildup (Y/N): N

PERFORMANCE REQUIREMENTS

Minimum Shutoff Head (ft): _____

Capacity (US gpm): Rated: 2087 Secondary: _____.

Total Dynamic Head (Ft): Rated: 79 Secondary: _____.-

Min. Rated Pump Hydraulic Efficiency at Rated Capacity (%): 70

Max. Pump Speed at Rated Capacity (rpm): 1185 Constant (Y/N): N
Adjustable (Y/N): Y

DESIGN AND MATERIALS

Pump Type: Heavy-Duty Non-Clog (Y/N) Y Other: _____
Volute Material: Grey Cast Iron ASTM A48

Pump Casing Material: Cast Iron ASTM A48

Motor Housing Material: Cast Iron ASTM A48 (Class 35B)

Wear Rings/Plate Case (Y/N) Y Material: Nitrile Rubber

Wear Ring Impeller (Y/N): N Material: _____

PROJECT 12133

SUBMERSIBLE PUMP DATA SHEET, 11305-_____

Tag Numbers: N/A

Pump Name: **Pump Station A-13**

Elastomers: Nitrile Rubber

Fasteners: Stainless Steel 304

Impeller: Type: Non-Clog (Y/N):Y_____Other: _____
Material: Cast Iron ASTM A48

Shaft Material: Carbon Steel, ASTM A576 with stainless steel sleeve or all stainless steel.

Base Elbow: Grey Cast Iron ASTM A48

Double Mechanical Seal (Y/N): Y_____ Bearing Life (Hrs): 50,000_____

DRIVE MOTOR (See Section 16405, ELECTRIC MOTORS)

Horsepower: 70 Voltage: 480_____Phase: 3 Synchronous Speed (rpm):

1200 Enclosure: EXP Y

CLASSIFICATION: Class 1, Group D, Division 2

For Adjustable Speed Drive Range: 65% min to 100% max, See Section 16485, ADJUSTABLE FREQUENCY DRIVE SYSTEMS.

Other Features: _____

Moisture Detection Switches (Y/N): Y_____

Thermal Protection Embedded in Windings (Y/N): Y,

REMARKS _____

_____

_____

_____

SECTION 15100
VALVES AND OPERATORS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Shop Drawings:

1. Product data sheets for make and model.
2. Complete catalog information, descriptive literature, Specifications, and identification of materials of construction.

PART 2 - PRODUCTS

2.01 GENERAL

A. Valve to include operator, actuator, handwheel, chain wheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and accessories as appropriate and as shown on the Drawings for a complete operation.

B. Valve to be suitable for intended service. Renewable parts not to be of a lower quality than specified.

C. Valve same size as adjoining pipe.

D. Valve ends to suit adjacent piping.

E. Size operator to operate valve for the full range of pressures and velocities.

F. Valve to open by turning counterclockwise.

G. Factory mount operator, actuator, and accessories.

2.02 MATERIALS

A. Brass and bronze valve components and accessories that have surfaces in contact with water to be alloys containing less than 16 percent zinc and 2 percent aluminum.

B. Approved Alloys Are of the Following ASTM Designations:

1. B61, B62, B98 (Alloy UNS No. C65100, C65500, or C66100), B139 (Alloy UNS No. C51000), B584 (Alloy UNS No. C90300 or C94700), B164, B194, and B127.
2. Stainless steel Alloy 18-8 may be substituted for bronze.

2.03 FACTORY FINISHING

A. Epoxy Lining and Coating: In accordance with manufacturer's instructions for on-site soil and groundwater conditions and Section 02502, Ductile Iron Pipe and Fittings.

B. Exposed Valves:

1. In accordance with manufacturer's instructions for onsite soil and groundwater conditions.
2. Safety isolation valves and lockout valves with handles, handwheels, or chain wheels "safety yellow."

2.04 VALVES

A. Gate Valves:

1. All valves, unless otherwise specified, shall be the product of one manufacturer.
2. Gate valves shall be resilient seat gate valves for 150 psi minimum working pressure, conforming to AWWA C515 or C509.
   a. The gate valves shall have a high strength, bronze, nonrising stem.
   b. Valves shall have neoprene, Buna-N or equal, but not natural rubber, O-ring stem seals and be of a design that allows replacement of the O-rings while the valve is in service under pressure.
   c. Operating nuts shall be AWWA 2-inch square with skirts and open by turning the nut counter clockwise.
   d. Valve body, bonnet, and gate shall be ductile iron conforming to ASTM A536. Shell thickness of body and bonnet components shall conform to Table 2, Section 4.4 of AWWA C509 or C515.
3. Valve body and bonnet shall be coated on all interior and exterior surfaces with a two-part epoxy conforming to the requirements of AWWA C550. Coating shall be suitable for potable water service.
4. Gates shall be covered with rubber over all interior and exterior ferrous surfaces. Rubber shall be securely bonded to the gate body including the part that houses the stem nut.
5. Direct-buried gate valves shall be polyethylene encased and shall have Type 304 stainless steel bonnet bolts.
6. Gate valves shall be as manufactured by American Flow Control Series 2500, Mueller Series 2360 and 2361; or Clow/Kennedy.
7. Tapping valves shall conform to these Specifications. Tapping sleeves shall be in accordance with the provisions of Section 02500, Conveyance Piping – General. Tapping valves shall be mounted in a horizontal position. Tapping valves shall be compatible with the tapping sleeve – no field grinding will be permitted.

B. Ball Valves:

1. Ball Valve 2 Inches and Smaller for General Water and Air Service: All- bronze, three-piece body type, screwed ends, full bore ports, Teflon seat, blowout-proof stem, hand lever operator, rated 150 psi SWP, 400-pound WOG minimum.
   a. Manufacturers and Products:
      1) Nibco, Inc.; T-595-Y.
      2) Grinnell Supply Sales Co.; Figure 3810.

C. Plug Valves:

1. All valves, unless otherwise specified, shall be the product of one manufacturer.
2. Eccentric Valve 3 Inches through 12 Inches:
   a. Nonlubricated type rated 175 psig CWP.
   b. Drip-tight shutoff with pressure from either direction. Valves will be

rejected if they are delivered to the site with no indication that they meet this requirement.

c. Cast iron body with flanged ends or grooved ends in accordance with AWWA C606 for rigid joints, mechanical joint ends for buried valve.

d. Plug shall be cast iron with round or rectangular port or no less than 80 percent of the connecting pipe area and coated with Buna-N or Hycar.

e. Seats shall be welded nickel.

f. Stem bearing shall be self-lubricating stainless steel, bronze or reinforced Teflon.

g. Stem seal shall consist of multiple V-rings, U-cups, or O-rings of nitrile rubber with grit seals on stem.

h. For buried service, provide external epoxy coating.

i. For wastewater service, valves shall be lined with a two-part epoxy in accordance with AWWA C550.

j. Valve 3 through 4 inches with wrench lever manual operator.

k. Valve 6 through 12 inches with totally enclosed, geared, manual operator with handwheel, 2-inch nut, or chain wheel.

1) Size operator for 1.5 times the maximum operating shutoff pressure differential for direct or reverse pressure, whichever is greater.

2) For buried service, provide completely sealed operator filled with heavy lubricant.

l. Manufacturer and Products: DeZurik; Series PEC, Clow, or Val-matic Camcentric.

3. Eccentric Valve 14 Inches through 20 Inches:

a. Nonlubricated type rated 150 psig CWP.

b. Driptight shutoff with pressure from either direction. Valves will be rejected if they are delivered to the site with no indication that they meet this requirement.

c. Cast iron body with flanged ends or grooved ends in accordance with AWWA C606 for rigid joints, mechanical joint ends for buried valve.

d. Plug shall be cast iron with round or rectangular port or no less than 80 percent of the connecting pipe area and coated with Buna-N or Hycar.

e. Seats shall be welded nickel.

f. Stem bearing shall be self-lubricating stainless steel, bronze, or reinforced Teflon.

g. Stem seal shall consist of multiple V-rings, U-cups, or O-rings of nitrile rubber with grit seals on stem.

h. For buried service, provide external epoxy coating.

i. For wastewater service, valves shall be lined with a two-part epoxy in accordance with AWWA C550.

j. Totally enclosed, geared, manual operator with handwheel, 2-inch nut, or chain wheel.

1) Size operator for 1.5 times the maximum operating shutoff pressure differential for direct or reverse pressure, whichever is greater.

2) For buried service, provide completely sealed operator filled with heavy lubricant.

k. Manufacturer and Products: DeZurik; Series PEC, Clow, or Val- matic

Camcentric.

4. Eccentric Valve 24 Inches through 48 Inches:
   a. Nonlubricated type rated 150 psig CWP.
   b. Driptight shutoff with pressure from either direction. Valves will be rejected if they are delivered to the site with no indication that they meet this requirement.
   c. Cast iron body with flanged ends or grooved ends in accordance with AWWA C606 for rigid joints, mechanical joint ends for buried valve.
   d. Plug shall be cast iron with round or rectangular port or no less than 80 percent of the connecting pipe area and coated with Buna-N or Hycar.
   e. Seats shall be welded nickel.
   f. Stem bearing shall be self-lubricating stainless steel, bronze or reinforced Teflon.
   g. Stem seal shall consist of multiple V-rings, U-cups, or O-rings of nitrile rubber with grit seals on stem.
   h. For buried service, provide external epoxy coating.
   i. For wastewater service, valves shall be lined with a two-part epoxy in accordance with AWWA C550.
   j. Totally enclosed, geared, manual operator with handwheel, 2-inch nut, or chain wheel.
      1) Size operator for 1.5 times the maximum operating shutoff pressure differential for direct or reverse pressure, whichever is greater.
      2) For buried service, provide completely sealed operator filled with heavy lubricant.
   k. Manufacturer and Products: DeZurik; Series PEC, Pratt Ballmatic, Clow, or Val-matic Camcentric.

D. Butterfly Valves:

1. General:
   a. All valves, unless otherwise specified, shall be the product of one manufacturer.
   b. Valves shall meet the requirements or AWWA C504 except as modified herein.
   c. Valves shall be Class 150B.
   d. Valves shall be flanged, short-body design for exposed service and mechanical joint design for buried service with joints as described in Section 02500, Conveyance Piping - General.
   e. Actual port diameter shall not be less than 1 inch smaller than the nominal pipe size.
   f. Valves shall be equipped with an adjustable, mechanical limiting device in the operator to prevent over travel of the disc in the open and closed position. Disc position stops in the valve body are not permitted.
   g. Valves shall be lined with a two-part epoxy in accordance with AWWA C550. Coating shall be suitable for potable water service.
2. Valve bodies shall be constructed of ASTM B126 Class B cast iron and shall have two integrally cast trunnions for shaft bearings.
3. Valve Seats:
   a. Shall be field adjustable around the full circumference of the body without interruption of flow for all valves 24 inches and larger.

b. For valves in buried service, seats shall be incorporated into the valve body. For above grade service, seats may be incorporated into the valve body or valve disc.
c. Seats shall be replaceable without dismantling the operator, disc or shaft and without removing the valve from the line.
d. Valve seats shall be Buna-N unless otherwise specified.
e. Seats bond shall be tested at 75 pounds in accordance with ASTM D429, Method B for valves 20 inches and smaller. For valves larger than 20 inches, seats shall be retained in the body by mechanical means without retaining rings, segments, screws or hardware of any kind protruding into the flow stream.

4. Bearings:
   a. Valve bearings shall be the sleeve type.
      1) 100 percent nylon or Teflon for valves 20 inches and smaller.
      2) Bearings shall be Teflon with fiberglass backing for valves 24 inches and larger.
   b. Bearings shall be self-lubricating and bearing load shall not exceed 1/5 of the compressive strength of the bearing or shaft material.
5. Valve Discs:
   a. Discs shall operate through a 90-degree angle from fully closed to fully open.
   b. Valve discs shall be cast iron alloy ASTM A436 Type 1, ASTM A48 or ASTM A126 for valves 20 inches and smaller and ASTM A48 cast iron or ASTM A536 ductile iron for valves 24 inches and larger.
   c. Valve discs shall have a Type 316 stainless steel seating edge and shall not have any hollow chambers.
6. Shafts and Seals:
   a. Valve shafts shall be Type 316 stainless steel meeting the minimum requirements of AWWA C504.
   b. Valve shafts shall be one piece for valves 20 inches and smaller and two piece for valves 24 inches and larger.
   c. Shaft seals shall be self-compensating, split V type and shall be adjustable and replaceable without removing the operator and/or the shaft, except for buried applications.
   d. Shaft seals shall be Buna-N unless otherwise specified.
7. Valves for buried service shall be totally enclosed, fully gasketed, grease packed and designed to operate indefinitely when submerged under a minimum 20 feet of water.
8. Manufacturers: Valmatic – American BFV, Mueller Lineseal III, Pratt - Groundhog, or Dezurik – BAW.

E. Check Valves:

1. Swing Check Valve 2-1/2 Inches through 12 Inches: Flanged end, cast iron body, bronze mounted swing type, solid bronze hinges, stainless steel hinge shaft, outside lever and spring, rated 125-pound SWP, 200-pound WOG. Check valves shall meet requirements of AWWA C508.
   a. Manufacturers and Products:
      1) GA Series 250 Swing Check
      2) Milliken Swing Check.
      3) American Flow Control Series 50SC or 600
   b. Valves shall be lined with a two-part epoxy in accordance with AWWA C550.

2. Resilient Seat Check Valve 2-1/2 Inches through 16 Inches: Flanged end, cast iron body and bonnet, rubber-encapsulated, DI or steel disc, rated 125-pound SWP, 200 pound WOG. Check valves shall meet requirements of AWWA C508.
   a. Manufacturers and Products:
      1) American Flow Control Series 2100.
      2) Milliken Flex Check.
      3) Val-Matic Swingflex.
   b. Valves shall be lined with a two-part epoxy in accordance with AWWA C550
3. Type V642 Reduced Pressure Backflow Preventer: Two check valves, independent relief between the valves; testing cock, in accordance with AWWA C511, rated 175-pound CWP, meets requirements of USC Cross Connection Control Laboratory.
   a. Manufacturers and Products:
      1) FEBCO; Model 825Y, 825YD.
      2) Hersey; Model FRP II, 6CM.

F. Self-Contained Automatic Valves:

1. Sewage Air and Vacuum Release Valve:
   a. Combination valve, suitable for sewer service, automatically provides air release during normal operation, exhausts air during the filling of a system and allows air to re-enter during draining or when vacuum occurs.
   b. Rated 150 psi working pressure and built with a special short body, and have cast iron, ductile iron, or semi-steel body, covers with stainless steel float and trim.
   c. Sewage air and vacuum valve to be fitted with blowoff valve, quick disconnect couplings, and a minimum 6 feet of hose to permit backflushing after installation without dismantling valve.
   d. Provide with service saddle on main and ball corporation stop (Ford FB500 style; or equal).
   e. Size as shown on the Drawings or 2 inches minimum.
   f. Manufacturers and Products:
      1) International Valve Marketing, Inc., (Vent-O-Mat - Series RGX).
      2) APCO Valve and Primer Corp – 440 Series; or equal.
      3) Val-Matic Series 301A-308.
2. Water Combination Air and Vacuum Release Valve:
   a. Single body, combination valve suitable for water service, automatically provides air release during normal operation, exhausts air during the filling of a system and allows air to re-enter during draining or when vacuum occurs.
   b. Rated 150 psi working pressure and built with a special short body, and have cast iron, ductile iron, or semi-steel body, covers with stainless steel float and trim.
   c. Provide with service saddle on main and ball corporation stop (Ford FB500 style; or equal).
   d. Size as shown on the Drawings, or 2 inches minimum.
   e. Manufacturers and Products:
      1) International Valve Marketing, Inc., (Vent-O-Mat - Series RBX).
      2) APCO Valve and Primer Corp. - 140C Series; or equal.
      3) Val-Matic Series 200.

2.05 OPERATORS

A. Manual Operator:

1. General:
   a. Operator force not to exceed 40 pounds under any operating condition, including initial breakaway. Gear reduction operator when force exceeds 40 pounds.
   b. Operator self-locking type or equipped with self-locking device.
   c. Position indicator on quarter-turn valves.
   d. Worm and gear operators one-piece design worm-gears of gear bronze material. Worm hardened alloy steel with thread ground and polished. Traveling nut type operators threader steel reach rods with internally threaded bronze or ductile iron nut.
2. Exposed Operator:
   a. Galvanized and painted handwheels.
   b. Lever operators allowed on quarter-turn valves 8 inches and smaller.
   c. Cranks on gear type operators.
   d. Valve handles to take a padlock, and wheels a chain and padlock.
3. Buried Operator:
   a. Buried service operators on valves larger than 2-1/2 inches shall have a 2-inch AWWA operating nut. Buried operators on valves 2 inches and smaller shall have cross handle for operation by forked key. Enclose moving parts of valve and operator in housing to prevent contact with the soil.
   b. Design buried service operators for quarter-turn valves to withstand 450 foot-pounds of input torque at the FULLY OPEN or FULLY CLOSED positions, grease packed and gasketed to withstand a submersion in water to 10 psi.
   c. Buried valves shall have extension stems, bonnets, and valve boxes.

2.06 ACCESSORIES

A. Cast Iron Valve Box: Designed for traffic loads, sliding type, with minimum of 6-inch ID shaft.

1. Box: Cast iron with minimum depth of 9 inches.
2. Lid: Cast iron.
   a. Minimum depth 3 inches.
   b. Marked SEWER or WATER, as appropriate.
   c. Turn to retain with locking bolt.
3. Extensions: cast iron.
   a. O-ring seal between sections.
   b. Self-centering alignment ring.
4. American Flow Control Trench Adaptor or equal.

B. Provide service saddles and fittings in accordance with ANSI/AWWA Standards.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Flange Ends:

1. Flanged valve boltholes shall straddle vertical centerline of pipe.
2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.

B. Screwed Ends:

1. Clean threads by wire brushing or swabbing.
2. Apply joint compound.

C. Valve Orientation:

1. Install operating stem vertical when valve is installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above finished floor, unless otherwise shown.
2. Install operating stem horizontal in horizontal runs of pipe having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above finish floor, unless otherwise shown.
3. Orient butterfly valve shaft so that unbalanced flows or eddies are equally divided to each half of the disc, i.e., shaft is in the plane of rotation of the eddy.
4. If no plug valve seat position is shown, locate as follows:
   a. Horizontal Flow: The flow shall produce an “unseating” pressure, and the plug shall open into the top half of valve.
   b. Vertical Flow: Install seat in the highest portion of the valve.

D. Install a line size ball valve and union upstream of each solenoid valve, in-line flow switch, or other in-line electrical device, excluding magnetic flowmeters, for isolation during maintenance.

E. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.

F. Extension Stem for Operator: Where the depth of the valve is such that its centerline is more than 3 feet below grade, furnish an operating extension stem with 2-inch operating nut to bring the operating nut to a point 6 inches below the surface of the ground and/or box cover.

G. Torque Tube: Where operator for quarter-turn valve is located on floor stand, furnish extension stem torque tube of a type properly sized for maximum torque capacity of the valve.

3.02 TESTS AND INSPECTION

A. Valve may be either tested while testing pipelines, or as a separate step.

B. Test that valves open and close smoothly with operating pressure on one side and atmospheric pressure on the other, in both directions for two-way valve and applications.

C. Inspect air and vacuum valves as pipe is being filled to verify venting and seating is fully functional.

D. Count and record number of turns to open and close valve; account for any

discrepancies with manufacturer's data.

E. Set, verify, and record set pressures for all relief and regulating valves.

F. Test hydrostatic relief valve seating; record leakage. Adjust and retest to maximum leakage of 0.1 gpm per foot of seat periphery.

END OF SECTION

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SECTION 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 -- GENERAL

1.01 RELATED SECTIONS

A. Requirements specified within this section apply to all sections in Division 16, ELECTRICAL. Work specified herein shall be performed as if specified in the individual sections.

1.02 DESIGN REQUIREMENTS

A. All electronic boards as part of electrical equipment shall meet the atmospheric conditions of the space the equipment is installed in. All electronic boards which are not installed in a conditioned environment shall be fungus-resistant.

B. All electrical equipment shall be rated for the conditions the equipment is installed in.

1.03 STANDARDS, CODES, PERMITS, AND REGULATIONS

A. Perform all work; furnish and install all materials and equipment in full accordance with the latest applicable rules, regulations, requirements, and specifications of the following:

1. Local Laws and Ordinances.
2. State and Federal Laws.
3. National Electrical Code (NEC).
4. State Fire Marshal.
5. Underwriters' Laboratories (UL).
6. National Electrical Safety Code (NESC).
7. American National Standards Institute (ANSI).
8. National Electrical Manufacturer's Association (NEMA).
9. National Electrical Contractor’s Association (NECA) Standard of Installation.
10. Institute of Electrical and Electronics Engineers (IEEE).
11. Insulated Cable Engineers Association (ICEA).
12. Occupational Safety and Health Act (OSHA).
13. National Electrical Testing Association (NETA).
14. American Society for Testing and Materials (ASTM).
15. Florida Building Code, including Local County amendments.

B. Conflicts, if any, which may exist between the above items, will be resolved at the discretion of the ENGINEER.

C. Wherever the requirements of the Specifications or Drawings exceed those of the above items, the requirements of the Specifications or Drawings govern. Code compliance is mandatory. Construe nothing in the Contract Documents as permitting work not in compliance with these codes.

D. Obtain all permits and pay all fees required by any governmental agency having jurisdiction over the work. Arrange all inspections required by these agencies. On completion of the work, furnish satisfactory evidence to the ENGINEER that the work is acceptable to the regulatory authorities having jurisdiction.

1.04 ELECTRICAL COORDINATION

A. Work Provided Under this Contract:

1. Provide and install complete electrical power system shown on drawings and as per specifications for lift station A-06, located on the corner of Ashbury Road and Edgewater Drive. Coordinate with local utility company (FPL – phone number is listed on electrical drawing E-01) for installation of new service to each lift station complete in place. Coordinate with other disciplines for demolition of the existing lift station A-06.
2. Provide and install all electrical equipment indicated on the drawings and as described in the specifications including new utility meter, main/MTS, lift station control panel, control transformers, SPD (Surge Protection Device), etc. complete in place.
3. Provide and install all new underground conduit and wiring indicated on the drawings complete in place.
4. Provide and install new grounding system complete in place.
5. Provide and install all electrical required to support instrumentation and control system as shown on the drawings complete in place.
6. Provide all miscellaneous electrical including switches, terminations, fittings, wiring, conduit, junction box, terminal junction box, etc., not specified but obviously necessary for a complete working system in place.
7. Provide an Electrical Systems Analysis and Arc Flash Study per Specification 16015.

B. Temporary Power:

1. Provide temporary power for all office trailers and for all construction areas. Coordinate with local power and telephone utility for temporary construction power and telephone service during construction.

1.05 SUBMITTALS

A. The following information shall be provided for all electrical equipment:

1. A copy of each specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check-marks (√) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the CONTRACTOR, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined shall signify compliance on the part of the CONTRACTOR with the specifications. The submittal shall be accompanied by a detailed, written justification for each deviation.

2. Electrical equipment submittals shall be made by specification section. Submit one package per specification section and do not group multiple specification sections under one submittal package.

3. Provide complete conduit and equipment layouts: a scaled plan layout of the electrical room(s) showing spatial relationships of all equipment as well as the overall size of the room. Minimum scale shall be ¼"=1'-0".

4. Provide a conduit plan for major power, instrumentation and control conduits, both interior and exterior, showing routing, size and stub up locations for buried or in slab conduits.

B. As part of the electrical submittal, the CONTRACTOR shall provide a minimum of ¼"=1'-0" scaled layout of the electrical equipment in the electrical room or major electrical equipment in a mechanical room showing sizes of all equipment and their spatial relationship. Non-electrical equipment shall be approved before finalizing the electrical layout in mechanical rooms.

1.06 ENVIRONMENTAL CONDITIONS

A. All chemical rooms and areas shall be designated as corrosive.

B. All indoor chemical and process equipment areas shall be considered wet locations.

C. Electrical equipment in rooms designated as Classified by NFPA 70 (national electrical code) as Division 1 or Division 2 shall meet all requirements set forth for that classification as described in NEC article 500.

1.07 INSPECTION OF THE SITE AND EXISTING CONDITIONS

A. The Electrical Drawings were developed from past record drawings and information supplied by the OWNER. Verify all scaled dimensions prior to submitting bids.

B. Before submitting a bid, visit the site and determine conditions at the site and at all existing structures in order to become familiar with all existing conditions and electrical system which will, in any way or manner, affect the work required under this Contract. No subsequent increase in Contract cost will be allowed for additional work required because of the CONTRACTOR's failure to fulfill this requirement.

C. Carry out any work involving the shutdown of the existing services to any piece of equipment now functioning in existing areas at such time as to provide the least amount of inconvenience to the OWNER. Do such work when directed by the ENGINEER.

D. After award of Contract, locate all existing underground utilities at each area of construction activity. Protect all existing underground utilities during construction. Pay for all required repairs without increase in Contract cost, should damage to underground utilities occur during construction.

1.08 RESPONSIBILITY

A. The CONTRACTOR shall be responsible for:

1. Complete systems in accordance with the intent of these Contract Documents.

2. Coordinating the details of facility equipment and construction for all Specification Divisions which affect the work covered under Division 16, ELECTRICAL.
3. Furnishing and installing all incidental items not actually shown or specified, but which are required by good practice to provide complete functional systems.

1.09 INTENT OF DRAWINGS

A. Electrical plan Drawings show only general location of equipment, devices, and raceway, unless specifically dimensioned. The CONTRACTOR shall be responsible for the proper routing of raceway, subject to the approval of the ENGINEER.

B. Electrical equipment sizes and characteristics have been based on Square D and Eaton.

If the CONTRACTOR chooses to and is allowed to substitute, the CONTRACTOR shall be responsible for fitting all the equipment in the available space as shown on the Drawings or re-designing the space, at no additional cost to the OWNER, and shall reimburse the ENGINEER for time and materials spent in reviewing revised design.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Provide materials and equipment listed by UL wherever standards have been established by that agency. If a UL listing is not available, equipment shall have a label and listing from a nationally recognized testing laboratory (NRTL) acceptable to the authority having jurisdiction (AHJ) over the project location.

B. Equipment Finish:

1. Provide manufacturers' standard finish and color, except where specific color is indicated.

2. If manufacturer has no standard color, provide equipment with ANSI No. 61, light gray color.

PART 3 - EXECUTION

3.01 GENERAL

A. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

B. Install work in accordance with NECA Standard of Installation, unless otherwise specified.

3.02 LOAD BALANCE

A. Drawings and Specifications indicate circuiting to electrical loads and distribution equipment.

B. Balance electrical load between phases as nearly as possible on switchboards, panel boards, motor control centers, and other equipment where balancing is required.

C. When loads must be reconnected to different circuits to balance phase loads, maintain accurate record of changes made, and provide circuit directory that lists final circuit arrangement.

3.03 CHECKOUT AND STARTUP

A. Voltage Field Test:

1. Check voltage at point of termination of power company supply system to project when installation is essentially complete and is in operation.
2. Check voltage amplitude and balance between phases for loaded and unloaded conditions.
3. Record supply voltage (all three phases simultaneously on the same graph) for 24 hours during normal working day.
   a. Submit Voltage Field Test Report within 5 days of test.
4. Unbalance Corrections: Make written request to power company to correct condition if balance (as defined by NEMA) exceeds 1 percent, or if voltage varies throughout the day and from loaded to unloaded condition more than plus or minus 4 percent of nominal.
   a. Obtain a written certification from a responsible power company official that the voltage variations and unbalance are within their normal standards if corrections are not made.

B. Equipment Line Current Tests:

1. Check line current in each phase for each piece of equipment.
2. Make line current check after power company has made final adjustments to supply voltage magnitude or balance.
3. If any phase current for any piece of equipment is above rated nameplate current, prepare Equipment Line Phase Current Report that identifies cause of problem and corrective action taken.

C. Startup:

1. Demonstrate satisfactory operation of all 240-volt electrical equipment. Participate with other trades in all startup activities.

2. Assist the I&C Contractor in verifying signal integrity of all control and instrumentation signals.

D. Conflicts, if any that may exist between the above items will be resolved at the discretion of the ENGINEER.

E. Wherever the requirements of the Specifications or Drawings exceed those of the above items, the requirements of the Specifications or Drawings govern. Code compliance is mandatory. Construe nothing in the Contract Documents as permitting work not in compliance with these codes.

F. Obtain all permits and pay all fees required by any governmental agency having jurisdiction over the work. Arrange all inspections required by these agencies. On completion of the work, furnish satisfactory evidence to the ENGINEER that the work is acceptable to the regulatory authorities having jurisdiction.

- END OF SECTION -

SECTION 16015

ELECTRICAL SYSTEMS ANALYSIS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The requirements of this specification shall apply to the existing modified and new electrical distribution system installed under this contract. The end result shall be a fully protected and properly coordinated system with proper arc flash safety labels and personal protective equipment recommendations.

B. CONTRACTOR shall furnish short-circuit and protective device coordination studies as described herein. The coordination study shall begin with the existing panel/switchboard feeder protective device and include all of the electrical protective devices down to, and including, the main breaker and feeder circuit in each 480V and 208 Volt panelboard.

C. The CONTRACTOR shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E - Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D.

1.02 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. IEEE 141 – Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems
   b. IEEE 241 – Recommended Practice for Electric Power Systems in Commercial Buildings
   c. IEEE 242: Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
   d. IEEE 399: Recommended Practice for Industrial and Commercial Power System Analysis.
   e. IEEE 1015 – Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems
   f. IEEE 1584-2002: Guide for Performing Arc Flash Hazard Calculations.
2. American National Standards Institute (ANSI):
   a. C57.12.00, Standard General Requirements for Liquid-immersed Distribution, Power, and Regulating Transformers.
   b. ANSI C37.13 – Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures
   c. ANSI C37.010 – Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis
   d. ANSI C 37.41 – Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches and Accessories
   e. ANSI C37.5 – Methods for Determining the RMS Value of a Sinusoidal Current Wave and Normal-Frequency Recovery Voltage, and for Simplified Calculation of Fault Currents

3. National Fire Protection Association:
   a. NFPA 70E: National Electrical Safety Code Chapter 1.
   b. NFPA 70: National Electrical Code.
4. Occupational Safety & Health Administration (OSHA):
   a. 29-CFR, Part 1910, sub part S.

1.03 SUBMITTALS

A. Shop drawings: the results of the short-circuit; protective device coordination and arc flash hazard analysis studies shall be summarized in a preliminary and final summary report. Submit five (5) three-ring binder bound copies of the complete preliminary and final study reports. The preliminary short circuit and device coordination study report shall be submitted within 30 days of notice to proceed and shall be a basis for approval of all other electrical equipment in the power distribution system. The CONTRACTOR is expected to review the results of the preliminary short circuit and device coordination study report against all other applicable shop drawings, including industrial control panels, prior to shop drawing submittal to coordinate appropriate fault duty ratings of all electrical equipment. The final short circuit and device coordination study report shall incorporate all comments from shop drawing submittals and include the arc-flash hazard analysis. The CONTRACTOR shall ensure proper arc-flash warning labels are applied to all appropriate electrical equipment installed under this contract when the final study has been approved.

1.04 QUALITY ASSURANCE

A. Short circuit, protective device coordination, and arc flash studies shall be prepared by the manufacturer furnishing the electrical power distribution equipment or a professional electrical engineer registered in the State of Florida, hired by the manufacturer, in accordance with IEEE 242 and IEEE 399.

B. Manufacturer shall have unit responsibility for the equipment and protective device coordination.

1.05 SEQUENCING AND SCHEDULING

A. An initial, complete short circuit and arc flash study must be submitted and reviewed before ENGINEER will approve Shop Drawings for breakers, distribution panels, transfer switches and circuit breaker panelboard equipment. Failure to do so will delay the approval of major equipment submittals.

B. The short circuit, protective device coordination and arc flash studies shall be updated prior to Project Substantial Completion. Utilize characteristics of as-installed equipment actual wire run lengths and materials.

PART 2 - PRODUCTS

2.01 GENERAL

A. CONTRACTOR shall furnish all field data as required for the power system studies. The ENGINEER performing the short-circuit, protective device coordination and arc flash hazard analysis studies shall furnish the CONTRACTOR with a listing of required data

immediately after award of the contract. The CONTRACTOR shall expedite collection of the data to eliminate unnecessary delays and assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.

B. Source combination may include present and future utility supplies, motors, and generators.

C. Load data utilized may include existing and proposed loads obtained from Contract Documents provided by OWNER or CONTRACTOR.

D. Equipment and component titles used in the studies shall be identical to the equipment and component titles shown on the Drawings.

E. Perform studies using digital computer with a software package such as SKM Power*Tools for Windows™ DAPPER™, CAPTOR™ and ARC FLASH™, or approved equal.

F. Perform complete fault calculations for all busses on utility and generator power sources. Perform load flow and voltage drop studies for major feeders and loads with long feeder runs. Analysis shall include expected fault currents at industrial control panels manufactured in accordance with UL 508A and NEC article 409.

G. Fault source combinations shall include large motors, large transformers, utility and generator.

H. Utilize proposed and existing load data for the study obtained from Contract Documents and field survey. Coordinate with local power utility for available fault currents from utility services.

I. Existing Equipment:

1. Include fault contribution of existing motors, services, generators and equipment, as appropriate, in the study.

2. Obtain required existing equipment data from the field and FPL.

J. Provide a comprehensive report document containing the short circuit, device coordination and arc flash studies. As a minimum the report structure shall contain the following:

1. Executive Summary.
2. Methodology.
3. One Line Diagram(s).
4. Short Circuit Analysis.
5. Short Circuit Analysis Results/Conclusions/Recommendations.
6. Device Coordination Analysis.
7. Recommended protective devices settings.
8. Arc Flash Analysis.
9. Arc Flash PPE recommendations.

2.02 SHORT CIRCUIT STUDY

A. General:

1. Use cable impedances based on copper conductors. Use actual conductor impedances if know. If unknown, use typical conductor impedances based on IEEE Standards 141, latest edition.
2. Use bus impedances based on copper bus bars.
3. Use cable and bus resistances calculated at 25 degrees C.
4. Use 600-volt cable reactances based on use of typical data of conductors to be used in this project.
5. Use transformer impedances 92.5 percent of "nominal" impedance based on tolerances specified in ANSI C57.12.00.

B. Provide:

1. Calculation methods and assumptions.
2. Selected base per unit quantities.
3. One-line diagrams annotated with results of short circuit analysis including:
   a. Three phase, line-to-line and single line to ground faults.
   b. Equipment Short Circuit Rating.
4. Source impedance data, including electric utility system and motor fault contribution characteristics.
5. DAPPER™ Short circuit report, demand load report, load flow report and input data reports.
6. Results, conclusions, and recommendations.

C. Calculate short circuit interrupting and momentary (when applicable) duties for an assumed symmetrical three-phase bolted fault, bolted line-to-ground fault, and bolted line-to-line fault at each:

1. Electric utility's supply termination point.
2. Main breakers, generator breakers and feeder breakers.
3. Low voltage switchgear, switchboard and/or distribution panelboard.
4. Switchboards.
5. Fire Pumps.
6. Standby generator.
7. Automatic Transfer Switch.
8. All branch circuit panelboards.
9. Industrial control panels manufactured in accordance with UL 508A and NEC article 409.
10. Other significant locations throughout the system.
11. Lift Station
12. Future load contributions as shown on one-line diagram.

D. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short circuit ratings Verify all equipment, main breakers, ATS, and protective devices are applied within their ratings.

2. Adequacy of switchgear, switchboards, motor control centers, unit substations and panelboard bus bar bracing to withstand short-circuit stresses
3. Adequacy of transformer windings to withstand short-circuit stresses
4. Cable and busway sizes for ability to withstand short-circuit heating besides normal load currents.
5. Notify OWNER in writing, of existing, circuit protective devices improperly rated for the calculated available fault current

E. Through the General Contractor, furnish expected fault currents for industrial control panels, constructed and installed under other divisions and specifications of this contract, to the panel builder for his coordination with meeting the requirements of UL 508A and NEC article 409.

2.03 PROTECTIVE DEVICE COORDINATION STUDY

A. Proposed protective device coordination time-current curves for distribution system, graphically displayed on log-log scale paper. Time Current Curve plots from SKM CAPTOR™ program are acceptable.

B. Each curve sheet to have title and one-line diagram with legend identifying the specific portion of system associated with time-current curves on that sheet.

C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which device is exposed.

D. Identify device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

E. Perform device coordination on time-current curves for low voltage distribution system(s).

F. Provide Individual protective device time-current characteristics on log-log paper or software generated graphs.

G. Plot Characteristics on Curve Sheets:

1. Electric utility's relays or protective device (if applicable).
2. Electric utility's fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands (if applicable).
3. Medium voltage equipment relays (if applicable).
4. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
5. Low voltage equipment circuit breaker trip devices, including manufacturer’s tolerance bands.
6. Transformer full-load current, magnetizing inrush current, and ANSI transformer withstand parameters.
7. Transformer damage curves.
8. Conductor damage curves.
9. ANSI transformer with stand parameters.
10. Significant symmetrical and asymmetrical fault currents.
11. Ground fault protective devices and settings (if applicable).

12. Pertinent motor starting characteristics and motor damage points.
13. Pertinent generator short circuit decrement curve and generator damage point.
14. Circuit breaker panelboard main breakers, where appropriate.
15. Motor circuit protectors for major motors

H. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

I. Primary Protective Device Settings for Delta-Wye Connected Transformer:

1. Secondary Line-to-Ground Fault Protection: Primary protective device operating band within the transformer's characteristics curve, including a point equal to 58 percent of ANSI C57.12.00 withstand point.

2. Secondary Line-To-Line Faults: 16 percent current margin between primary protective device and associated secondary device characteristic curves.

J. Separate medium voltage relay characteristics curves from curves for other devices by at least 0.4-second time margin.

2.04 ARC FLASH ANALYSIS

A. Perform incident energy calculations in accordance with IEEE 1584-2002 Guide for Performing Arc Flash Hazard Calculations for all equipment analyzed in the short circuit study. Tabular results and recommended labels from SKM ARC FLASH™ are acceptable.

B. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model.

C. The flash protection boundary and the incident energy shall be calculated at all significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, bussway and unit substations, variable frequency drives, industrial control panels) where work could be performed on energized parts.

D. The Arc-Flash Hazard Analysis shall include all medium voltage and low voltage locations. Arc-Flash Hazard Analysis on low voltage systems 50V and below is not required.

E. Safe working distances shall be specified for calculated fault locations based upon the calculated arc flash boundary considering an incident energy of 1.2 cal/cm2.

F. The Arc Flash Hazard analysis shall include calculations for maximum and minimum contributions of fault current magnitude. The minimum calculation shall assume that the utility contribution is at a minimum and shall assume a minimum motor load. Conversely, the maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.

G. Arc flash computation shall include both line and load side of main breaker calculations, where necessary.

H. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. Maximum clearing time will be capped at 2 seconds based on IEEE 1584-2002 section B.1.2.

I. Furnish recommendations for Personal Protective Equipment, in accordance with OSHA standards, and proper labels to be located on the electrical equipment in accordance with NEC Article 110.16.

J. Use manufacturer data for: enclosure type; gap between exposed conductors or buss way; grounding type; number of phases and connection; and working distance.

2.05 TABULATIONS

A. Input Data:

1. Utility three-phase and line-to-ground available contribution with associated X/R ratios.
2. Short circuit reactances of rotating machines and associated X/R ratios.
3. Cable type, construction, size, quantity per phase, length, impedance and conduit type.
4. Bus data, including impedance.
5. Transformer primary & secondary voltages, winding configurations, kVA rating, impedance, and X/R ratio.

B. Short Circuit Data:

1. Source fault impedance and generator contributions.
2. X to R ratios.
3. Asymmetry factors.
4. Motor contributions.
5. Short circuit kVA.
6. Symmetrical and asymmetrical fault currents.

C. Recommended Protective Device Settings:

1. Phase and ground relays:
   a. Relay name.
   b. Device number.
   c. Description.
   d. TCC catalog number.
   e. Short circuit ratings.
   f. Current transformer ratio.
   g. Current tap.
   h. Time dial setting (as applicable).
   i. Instantaneous pickup setting (as applicable).
   j. Ground fault setting (as applicable).
   k. Specialty, non-overcurrent device settings.
   l. Recommendations on improved relaying systems, if applicable
2. Circuit Breakers:
   a. Breaker name.
   b. Breaker Description.

c. Model number.
d. TCC catalog number.
e. Short circuit rating.
f. Frame/Sensor rating.
g. Adjustable pickups and time delays (long time, short time, ground).
h. Adjustable time-current characteristic.
i. Adjustable instantaneous pickup.
j. Recommendations on improved trip systems, if applicable

3. Motor Circuit Protectors (MCP):
   a. MCP name.
   b. MCP Description.
   c. Model number.
   d. TCC catalog number.
   e. Short circuit rating.
   f. Frame/Sensor rating.
   g. Instantaneous settings.
4. Fuses:
   a. Fuse name.
   b. Fuse Description.
   c. Model number.
   d. TCC catalog number.
   e. Short circuit rating.
   f. Fuse rating.

D. Incident energy and flash protection boundary calculations.
   1. Arcing fault magnitude
   2. Device clearing time
   3. Duration of arc
   4. Arc flash boundary
   5. Working distance
   6. Incident energy
   7. Hazard Risk Category
   8. Recommendations for arc flash energy reduction

2.06 STUDY ANALYSES

A. Written Summary:

   1. Scope of studies performed.
   2. Explanation of bus and branch numbering system.
   3. Prevailing conditions.
   4. Selected equipment deficiencies.
   5. Results of short circuit and coordination studies.
   6. Comments or suggestions.

B. Suggest changes and additions to equipment rating and/or characteristics.

C. Notify ENGINEER in writing of existing circuit protective devices improperly rated for new fault conditions.

PART 3 - EXECUTION

3.01 GENERAL

A. Adjust relay and protective device settings according to values established by coordination study.

B. Make minor modifications to equipment as required to accomplish conformance with the short circuit and protective device coordination studies.

C. Notify ENGINEER in writing of any required major equipment modifications.

- END OF SECTION -

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SECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1- GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American National Standards Institute (ANSI):
   a. C55,1, Standard for Shunt Power Capacitors.
   b. C62.11, Standard for Metal-Oxide Surge Arrestors for AC Circuits.
   c. Z55.1, Gray Finishes for Industrial Apparatus and Equipment.
2. American Society for Testing and Materials (ASTM):
   a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   b. A240, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
   c. A570, Standard Specification for Steel, Sheet, and Strip, Carbon, Hot-Rolled, Structural Quality.
3. Federal Specifications (FS):
   a. W-C-596, Connector, Receptacle, Electrical.
   b. W-S-896E, Switches, Toggle, Flush Mounted.
4. National Electrical Contractor's Association, Inc. (NECA): 5055, Standard of Installation.
5. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
   b. AB 1, Molded Case Circuit Breakers and Molded Case Switches.
   c. CP I, Shunt Capacitors.
   d. ICS 2, Industrial Control Devices, Controllers, and Assemblies.
   e. KS 1, Enclosed Switches.
   f. LA I, Surge Arrestors.
   g. PB 1, Panelboards.
   h. ST 20, Dry-Type Transformers for General Applications.
   i. WD I, General Requirements for Wiring Devices.
6. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
7. Underwriters Laboratories, Inc. (UL):
   a. 67, Standard for Panelboards.
   b. 98, Standard for Enclosed and Dead-Front Switches.
   c. 198C, Standard for Safety High-Intermpting-Capacity Fuses, Current-Limiting Types.
   d. 198E, Standard for Class Q Fuses.
   e. 486E, Standard for Equipment Wiring Terminals.
   f. 489, Standard for Molded Case Circuit Breakers and Circuit Breaker Enclosures.
   g. 508, Standard for Industrial Control Equipment.
   h. 810, Standard for Capacitors.
   i. 943, Standard for Ground-Fault Circuit Interrupters.
   j. 1059, Standard for Terminal Blocks.

k. 1561, Standard for Dry-Type General-Purpose and Power Transformers.

1.02 SUBMITTALS

A. Shop Drawings:

1. Device boxes for use in hazardous areas.
2. Junction and pull boxes used at, or below, grade.
3. Hardware.
4. Terminal junction boxes.
5. Panelboards and circuit breaker data.
6. Fuses.
7. Contactors.
8. Transformers.
9. All other miscellaneous material part of this project.
10. Wire pulling compound.

1.03 QUALITY ASSURANCE

A. UL Compliance: Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

B. Hazardous Areas: Materials and devices shall be specifically approved for hazardous areas of the class, division, and group shown and of a construction that will ensure safe performance when properly used and maintained.

1.04 SPARE PARTS

A. Furnish, tag, and box for shipment and storage the following spare parts:

1. Fuses, 0 to 600 Volts: Six of each type and each current rating installed.

PART 2 - PRODUCTS

2.01 OUTLET AND DEVICE BOXES

A. Cast Stainless Steel Box:

1. Box: Cast stainless steel.
2. Cover: Gasketed, weatherproof, cast stainless steel, with stainless steel screws.
3. Hubs: Threaded.
4. Lugs (Cast Mounting) Manufacturer:
   a. Calbrite, stainless steel.

2.02 JUNCTION AND PULL BOXES

A. Outlet Boxes Used as Junction or Pull Box: As specified under Article OUTLET AND DEVICE BOXES.

B. Large Stainless Steel Box: NEMA 250, Type 4X.

1. Box: 14-gauge, ASTM A240, Type 316 stainless steel.

2. Cover: Hinged with screws.
3. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
4. Manufacturers:
   a. Hoffman Engineering Co.
   b. No equal.

C. Large Nonmetallic Box, use only where shown on plan:

1. NEMA 250, Type 4X.
2. Box: High-impact, fiberglass-reinforced polyester or engineered thermoplastic, with stability to high heat.
3. Cover: Hinged with screws.
4. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
5. Conduit hubs and mounting lugs.
6. Manufacturers:
   a. Crouse-Hinds; Type NJB.
   b. No equal.

2.03 WIRING DEVICES

A. Switches:

1. NEMA WD I and FS W-S-896E.
2. Specification grade, totally-enclosed, ac type, with quiet tumbler switches and screw terminals.
3. Capable of controlling 100 percent tungsten filament and fluorescent lamp loads.
4. Rating: 20 amps, 120/277 volts.
5. Color:
   a. Office Areas: Ivory.
6. Switches with Pilot Light: 125-volt, neon light with red jewel, or lighted toggle when switch is ON.
7. Manufacturers:
   a. Hubbell.

B. Receptacle, Single and Duplex:

1. NEMA WD 1 and FS W-C-596.
2. Specification grade, two-pole, three-wire grounding type with screw type wire terminals suitable for No. 10 AWG.
3. High strength, thermoplastic base color.
4. Color:
   a. Office Areas: Ivory.
5. Contact Arrangement: Contact to be made on two sides of each inserted blade without detent.
6. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
7. Manufacturers:
   a. Hubbell.

C. Receptacle, Ground Fault Circuit Interrupter: Duplex, specification grade, tripping at 5 mA.

1. Color: Ivory.
2. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps, capable of interrupting 5,000 amps without damage.
3. Size: For 2-inch by 4-inch outlet boxes.
4. Standard Model: NEMA WD 1 with No. 12 AWG copper USE/RHH/RHW-XLPE insulated pigtails and provisions for testing.
5. Feed-Through Model: NEMA WD 1, with No. 12 AWG copper USE/RHH/RHW-XLPE insulated pigtails and provisions for testing.
6. Manufacturers:
   a. Hubbell.

2.04 DEVICE PLATES

A. General: Sectional type plates not permitted.

B. Plastic:

1. Material: Specification grade, 0.10-inch minimum thickness, noncombustible, thermosetting.
2. Color: To match associated wiring device.
3. Mounting Screw: Oval-head metal, color matched to plate.

C. Metal:

1. Material: Specification grade, one-piece, 0.040-inch nominal thickness 316 stainless steel.
2. Finish: ASTM A167, Type 316.
3. Mounting Screw: Oval-head, finish matched to plate.

D. Cast Metal:

1. Material: Malleable ferrous metal, with gaskets.
2. Screw: Oval-head stainless steel.

E. Engraved:

1. Character Height: 3/16 inch.
2. Filler: Black.

F. Weatherproof:

1. For Receptacles: Gasketed, stainless steel, with individual cap over each receptacle opening.
2. Mounting Screw: Stainless steel.
   a. Cap Spring: Stainless steel.
   b. Manufacturers:
      (1) Hubbell.
3. For Switches: Gasketed, cast metal incorporating external operator for internal switch.

a. Mounting Screw: Stainless steel.
b. Manufacturers:
(1) Crouse-Hinds; DS-181 or DS-185.

G. Raised Sheet Metal: 1/2-inch high zinc- or cadmium-plated steel designed for one-piece drawn type sheet steel boxes.

2.05 CIRCUIT BREAKER, INDIVIDUAL, 0 TO 600 VOLTS

A. NEMA AB I, UL 489 listed for use at location of installation.

B. Minimum Interrupt Rating: As shown or as required.

C. Thermal-magnetic, quick-make, quick-break, indicating type, showing ON/OFF and TRIPPED indicating positions of the operating handle.

D. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

E. Locking: Provisions for padlocking handle.

F. Multipole breakers to automatically open all poles when an overload occurs on one-pole.

G. Enclosure: NEMA 250, Type 12, Industrial Use, 4X - outdoors, wet locations and corrosive areas, unless otherwise shown.

H. Interlock: Enclosure and switch shall interlock to prevent opening cover with switch in the ON position.

I. Do not provide single-pole circuit breakers with handle ties where multipole circuit breakers are shown.

2.06 FUSE, 0 TO 600 VOLTS

A. Current-limiting, with 200,000 ampere rms interrupting rating.

B. Provide to fit mountings specified with switches and features to reject Class H fuses.

C. Motor and Transformer Circuits, 0- to 600-Volt:

1. Amperage: 0 to 600.
2. UL 198E, Class RK-1, dual element, with time delay.
3. Manufacturers:
a. Bussmann; Type LPS-RK.
b. Littlefuse; Type LLS-RK.

D. Motor and Transformer Circuits, 0- to 250-Volt:

1. Amperage: 0 to 600.
2. UL 198E, Class RK-1, dual element, with time delay.
3. Manufacturers:
a. Bussmann; Type LPN-RK.
b. Littlefuse; Type LLN-RK.

E. Feeder and Service Circuits, 0- to 600-Volt:

1. Amperage: 0 to 600.
2. UL 198E, Class RK-I, dual element, with time delay.
3. Manufacturers:
   a. Bussmann; Type LPS-RK.
   b. Littlefuse; Type LLS-RK.

F. Feeder and Service Circuits, O- to 250-Volt:

1. Amperage: 0 to 600.
2. UL 198E, Class RK-I, dual element, with time delay.
3. Manufacturers:
   a. Bussmann; Type LPN-RK.
   b. Littleluse; Type LLN-RK.

G. Feeder and Service Circuits, 0- to 600-Volt:

1. Amperage: 601 to 6,000.
2. UL 198C, Class L, double O-rings and silver links.
3. Manufacturers:
   a. Bussmann; Type KRP-C.
   b. Littlefuse; Type KLPC.

2.07 PUSHBUTTON, INDICATING LIGHT, AND SELECTOR SWITCHES

A. Contact Rating: NEMA ICS 2, Type A600.

B. Selector Switch Operating Lever: Standard.

C. Indicating Lights: LED type Push-to-test.

D. Pushbutton Color:

1. ON or START: Red.
2. OFF or STOP: Green.

E. Pushbuttons and selector switches lockable in the OFF position where indicated.

F. Legend Plate:

1. Material: Aluminum.
2. Engraving: 11 character/spaces on one line, 14 character/spaces on each of two lines, as required, indicating specific function.
3. Letter Height: 7/64 inch.

G. Manufacturers:

1. Heavy-Duty, Oiltight Type:
   a. Square D; Type T.

2. Heavy-Duty, Watertight, and Corrosion-Resistant Type:
   a. Square D; Type SK.

2.08 TERMINAL JUNCTION BOX

A. Cover: Hinged, unless otherwise shown.

B. Terminal Blocks: Provide separate connection point for each conductor entering or leaving box.

   1. Spare Terminal Points: 25 percent.

C. Interior Finish: Paint with white enamel or lacquer.

2.09 TERMINAL BLOCK (0 TO 600 VOLTS)

A. UL 486E and UL 1059.

B. Size components to allow insertion of necessary wire sizes.

C. Capable of termination of all control circuits entering or leaving equipment, panels, or boxes.

D. Screw clamp compression, dead front barrier type, with current bar providing direct contact with wire between the compression screw and yoke.

E. Yoke, current bar, and clamping screw of high strength and high conductivity metal.

F. Yoke shall guide all strands of wire into terminal.

G. Current bar shall ensure vibration-proof connection.

H. Terminals:

   1. Capable of wire connections without special preparation other than stripping.
   2. Capable of jumper installation with no loss of terminal or rail space.
   3. Individual, rail mounted.

I. Marking system allowing use of preprinted or field-marked tags.

J. Manufacturers:

   1. Weidmuller.
   2. Ideal.
   3. Electrovert.

2.10 MAGNETIC CONTROL RELAY

A. NEMA ICS 2, Class A600 (600 volts, 10 amps continuous, 7,200VA make, 720VA break), industrial control with field convertible contacts.

B. Time Delay Relay Attachment:

1. Pneumatic type, timer adjustable from 0.2 to 60 seconds (minimum).

C. Latching Attachment: Mechanical latch having unlatching coil and coil clearing contacts.

D. Manufacturers:

1. Square D.

2.11 MAGNETIC CONTACTOR

A. NEMA ICS 2, UL 508.

B. Electrically operated, electrically held.

C. Main Contacts:

1. Power driven in one direction with gravity dropout.
2. Silver alloy with wiping action and arc quenchers.
3. Continuous-duty, rated 30 amperes, 600-volt.
4. Three-pole.

D. Control: Two-wire.

E. One normally open and one normally closed auxiliary contacts rated 10 amperes at 480-volt.

F. Enclosure: NEMA 250, Type 12, unless otherwise shown.

G. Manufacturers:

1. Allen-Bradley; Bulletin 500 Line.

2.12 SUPPORT AND FRAMING CHANNELS

A. Material:

1. Dry indoors - galvanized.
2. All Other Areas: ASTM A167, Type 316 stainless steel or fiber-reinforced epoxy, as required.

B. Finish:

1. Dry indoors - galvanized.
2. All Other Areas: ASTM A167, Type 316 stainless steel or fiber-reinforced epoxy, as required.

C. Inserts: Continuous.

D. Beam Clamps: Gray cast iron.

E. Manufacturers:

1. Unistrut.

2.13 NAMEPLATES

A. Material: Laminated plastic.

B. Attachment Screws: Stainless steel.

C. Color: White, engraved to a black core.

D. Engraving:

1. Pushbuttons/Selector Switches: Name of drive controlled on one, two, or three lines, as required.
2. Panelboards: Panelboard designation, service voltage, and phases.

E. Letter Height:

1. Pushbuttons/Selector Switches: 1/8 inch.
2. Panelboards: 1/4 inch.

2.14 TRANSIENT VOLTAGE SURGE SUPPRESSION/ SURGE PROTECTION DEVICE

A. This section describes the material and installation requirements for transient voltage surge suppression devices (TVSS) or surge protection device (SPD) in switchboards, panelboards, and motor control centers for the protection of all AC electrical circuits.

B. SPD shall be listed and component recognized in accordance with UL 1449 and UL 1283.

C. SPD shall be installed and warranted by and shipped from the electrical distribution equipment manufacturer's factory.

D. SPD shall provide surge current diversion paths for all modes of protection; L-L, L-N, L-G, N-G in WYE systems, and L-L, L-G in DELTA systems.

E. SPD shall be modular in design. Each module shall be fused with a surge rated fuse.

F. A UL approved disconnect switch shall be provided as a means of disconnect in the switchboard device only.

G. SPD shall meet or exceed the following criteria:

1. Maximum surge current capability (single pulse rated) shall be:
   a. Service entrance switchboard 300kA
   b. Branch panelboards 150kA
   c. Control Panel 150kA
2. UL 1449 Listed and Recognized Component Suppression Voltage Ratings shall not exceed the following:

Voltage	L-N	L-G	N-G
208Y/120	400V	400V	400V
480Y/277	800V	800V	800V

H. SPD shall have a minimum EMI/RFI filtering of -44dB at 100kHz with an insertion ration of 50:1 using MIL STD. 220A methodology.

I. SPD shall be provided with 1 set of NO/NC dry contacts.

J. SPD shall have a warranty for a period of five years, incorporating unlimited replacements of suppressor parts if they are destroyed by transients during the warranty period. Warranty will be the responsibility of the electrical distribution equipment manufacturer.

K. Approve manufactures are:

1. Square D Company XTE Series

PART 3 - EXECUTION

3.01 GENERAL

A. Install equipment in accordance with NECA 5055.

3.02 OUTLET AND DEVICE BOXES

A. Install suitable for conditions encountered at each outlet or device in the wiring or raceway system, sized to meet NFPA 70 requirements.

B. Size:

1. Depth: Minimum 2 inches, unless otherwise required by structural conditions. Box extensions not permitted.
   a. Hollow Masonry Construction: Install with sufficient depth such that conduit knockouts or hubs are in masonry void space.
   b. Ceiling Outlet: Minimum 4-inch octagonal sheet stainless steel device box, unless otherwise required for installed fixture.
   c. Switch and Receptacle: Minimum 2-inch by 4-inch stainless steel device box.
2. Locations:
   a. Drawing locations are approximate.
   b. To avoid interference with mechanical equipment or structural features, relocate outlets as directed by ENGINEER.
   c. Light Switch: Install on lock side of doors.
   d. Light Fixture: Install in symmetrical pattern according to room layout unless otherwise shown.

C. Mounting Height:

1. General:
   a. Measured to centerline of box.

b. Where specified heights do not suit building construction or finish, mount as directed by ENGINEER.

2. Light Switch: 48 inches above floor.
3. Thermostat: 54 inches above floor.
4. Telephone Outlet: 6 inches above counter tops or 15 inches above floor.
5. Wall Mounted Telephone Outlet: 52 inches above floor.
6. Convenience Receptacle:
   a. General Interior Areas: 15 inches above floor.
   b. General Interior Areas (Counter Tops): Install device plate bottom or side flush with top of splashback, or 6 inches above countertops without splashback.
   c. Industrial Areas, Workshops: 48 inches above floor.
   d. Outdoor, All Areas: 24 inches above finished grade.
7. Special-Purpose Receptacle: 54 inches above floor or as shown.

D. Install plumb and level.

E. Flush Mounted:

1. Install with concealed conduit.
2. Install proper type extension rings or plaster covers to make edges of boxes flush with finished surface.
3. Holes in surrounding surface shall be no larger than required to receive box.

F. Support boxes independently of conduit by attachment to building structure or structural member.

G. Install bar hangers in frame construction, or fasten boxes directly with wood screws on wood, bolts and expansion shields on concrete or brick, toggle bolts on hollow masonry units, and machine screws threaded into steelwork.

H. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.

I. Provide plaster rings where necessary.

J. Boxes embedded in concrete or masonry need not be additionally supported.

K. Install 316 stainless steel mounting hardware in industrial areas.

L. Boxes Supporting Fixtures: Provide means of attachment with adequate strength to support fixture.

M. Open no more knockouts in sheet steel device boxes than are required; seal unused openings.

N. Box Type (Steel Raceway System):

1. Exterior Locations:
   a. Exposed Raceways: Cast metal.
   b. Concealed Raceways: Cast metal.
   c. Concrete Encased Raceways: Cast metal.

d. Class I, II, or III Hazardous Areas: Cast metal.

O. Box Type (Rigid Aluminum Raceway System): Cast aluminum.

P. Box Type (Nonmetallic Raceway System):

1. Corrosive Locations: Nonmetallic.
2. Exposed Raceways: Nonmetallic.
3. Concealed Raceways: Nonmetallic.
4. Concrete Encased Raceways: Nonmetallic.

Q. Box Type, Corrosive Locations (PVC-Coated Rigid Galvanized Steel Raceway System): PVC coated cast metal.

3.03 JUNCTION AND PULL BOXES

A. Install where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.

B. Install pull boxes where necessary in raceway system to facilitate conductor installation.

C. Install in conduit runs at least every 150 feet or after the equivalent of three right-angle bends.

D. Use outlet boxes as junction and pull boxes wherever possible and allowed by applicable codes.

E. Installed boxes shall be accessible.

F. Do not install on finished surfaces.

G. Install plumb and level.

H. Support boxes independently of conduit by attachment to building structure or structural member.

I. Install bar hangers in frame construction, or fasten boxes directly with wood screws on wood, bolts and expansion shields on concrete or brick, toggle bolts on hollow masonry units, and machine screws or welded threaded studs on steelwork.

J. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.

K. Boxes embedded in concrete or masonry need not be additionally supported.

L. At or Below Grade:

1. Install boxes for below grade conduits flush with finished grade in locations outside of paved areas, roadways, or walkways.
2. If adjacent structure is available, box may be mounted on structure surface just above finished grade in accessible but unobtrusive location.

3. Obtain ENGINEER's written acceptance prior to installation in paved areas, roadways, or walkways.
4. Use boxes and covers suitable to support anticipated weights.

M. Flush Mounted:

1. Install with concealed conduit.
2. Holes in surrounding surface shall be no larger than required to receive box.
3. Make edges of boxes flush with final surface.

N. Mounting Hardware:

1. Noncorrosive Interior Areas: Galvanized.
2. All Other Areas: Stainless steel.

O. Location/Type:

1. Finished, Indoor, Dry: NEMA 250, Type 1.
2. Unfinished, Indoor, Dry: NEMA 250, Type 12.
3. Unfinished, Indoor and Outdoor, Wet and Corrosive: NEMA 250, Type 4X.
4. Unfinished, Indoor and Outdoor, Wet, Dust, or Oil: NEMA 250, Type 13.
5. Unfinished, Indoor and Outdoor, Hazardous: NEMA 250, Type 7 and Type 9, where indicated.
6. Underground Conduit: Concrete Encased.
7. Corrosive Locations: Nonmetallic or stainless steel.
8. If inside lift station wetwell, junction box shall be explosion proof.

3.04 WIRING DEVICES

A. Switches:

1. Mounting Height: See Paragraph OUTLET AND DEVICE BOXES.
2. Install with switch operation in vertical position.
3. Install single-pole, two-way switches such that toggle is in up position when switch is on.

B. Receptacles:

1. Install with grounding slot down except where horizontal mounting is shown, in which case install with neutral slot up.
2. Ground receptacles to boxes with grounding wire only.
3. Weatherproof Receptacles:
   a. Install in cast stainless steel box.
   b. Install such that hinge for protective cover is above receptacle opening.
4. Ground Fault Interrupter: Install feed-through model at locations where ground fault protection is specified for "downstream" conventional receptacles.
5. Special-Purpose Receptacles: Install in accordance with manufacturer's instructions.

C. Multi-outlet Surface Raceway System:

1. Install in accordance with manufacturer's instructions.

2. Wire alternate outlets to each circuit where two-circuit, three-wire supply is shown.

3.05 DEVICE PLATES

A. Securely fasten to wiring device; ensure a tight fit to the box.

B. Flush Mounted: Install with all four edges in continuous contact with finished wall surfaces without use of mats or similar materials. Plaster fillings will not be acceptable.

C. Surface Mounted: Plate shall not extend beyond sides of box unless plates have no sharp corners or edges.

D. Install with alignment tolerance to box of 1/16 inch.

E. Engrave with designated titles.

F. Types (Unless Otherwise Shown):

1. Office: Stainless Steel.
2. Exterior: Weatherproof.
3. Interior:
   a. Surface Mounted, Sheet Steel Boxes: Stainless Steel.

3.06 PUSHBUTTON, INDICATING LIGHT, AND SELECTOR SWITCH

A. Heavy-Duty, LED Type: Locations (Unless Otherwise Shown): Nonhazardous, indoor, dry locations, including motor control centers, control panels, and individual stations.

B. Heavy-Duty, Watertight, and Corrosion-Resistant Type:

1. Locations (Unless Otherwise Shown): Nonhazardous, outdoor, or normally wet areas.
2. Mounting: NEMA 250, Type 4X enclosure

3.07 TERMINAL JUNCTION BOX

A. Install in accordance with Paragraph JUNCTION AND PULL BOXES.

B. Label each block and terminal with permanently attached, nondestructible tag.

C. Do not install on finished outdoor surfaces.

D. Location:

1. Finished, Indoor, Dry: NEMA 250, Type 1.
2. Unfinished, Indoor, Dry: NEMA 250, Type 12.
3. Unfinished, Indoor and Outdoor, Wet and Corrosive: NEMA 250, Type 4X.
4. Unfinished, Indoor and Outdoor, Wet, Dust, or Oil: NEMA 250, Type 13.

3.08 SUPPORT AND FRAMING CHANNEL

A. Furnish 316 stainless steel unistrut for mounting and supporting electrical equipment and raceway systems.

3.09 MOTOR SURGE PROTECTION

A. Ground in accordance with NFPA 70.

B. Low Voltage: Ground terminals to equipment bus.

- END OF SECTION -

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SECTION 16110

RACEWAYS

PART 1 - GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO): Division I, Standard Specifications for Highway Bridges, Fourteenth Edition.
2. American National Standards Institute (ANSI):
   a. C80.1, Rigid Steel Conduit-Zinc Coated.
   b. C80.3, Electrical Metallic Tubing-Zinc Coated.
   c. CS0.5, Rigid Aluminum Conduit.
   d. C80.6, Intermediate Metal Conduit (IMC)-Zinc Coated.
3. American Society for Testing and Materials (ASTM):
   a. A123 El, Standard Specification for Zinc-Coated (Galvanized) Coatings on Iron and Steel Products.
   b. C857, Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
4. National Electrical Contractor's Association, Inc. (NECA): 5055, Standard of Installation.
5. National Electrical Manufacturers Association (NEMA):
   a. RN 1, Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
   b. TC 2, Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
   c. TC 3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.
   d. TC 6, PVC and ABS Plastic Utilities Duct for Underground Installation.
   e. VE 1, Metallic Cable Tray Systems.
6. National Fire Protection Association (NFPA): 70, National Electrical Code. (NEC)
7. Underwriters Laboratories, Inc. (UL):
   a. 1, Standard for Safety Flexible Metal Conduit.
   b. 6, Standard for Safety Rigid Metal Conduit.
   c. 360, Standard for Safety Liquid-Tight Flexible Steel Conduit.
   d. 514B, Standard for Safety Fittings for Conduit and Outlet Boxes.
   e. 514C, Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers.
   f. 651, Standard for Safety Schedule 40 and 80 PVC Conduit.
   g. 651A, Standard for Safety Type EB and Rigid PVC Conduit and HDPF Conduit.
   h. 797, Standard for Safety Electrical Metallic Tubing.
   i. 870, Standard for Safety Wireways, Auxiliary Gutters, and Associated Fittings.
   j. 1242, Standard for Safety Intermediate Metal Conduit.

k. 1660, Standard for Safety Liquid-Tight Flexible Nonmetallic Conduit.

1.02 SUBMITTALS

A. Shop Drawings:

1. Manufacturer's Literature:
   a. Rigid galvanized steel conduit.
   b. Electric metallic tubing.
   c. Rigid aluminum conduit.
   d. PVC Schedule 40 conduit.
   e. PVC-coated rigid galvanized steel conduit.
   f. Flexible metal, liquid-tight conduit.
   g. Flexible, nonmetallic, liquid-tight conduit.
   h. Conduit fittings.
   i. Wireways.
2. Precast Manholes and Handholes:
   a. Dimensional drawings and descriptive literature.
   b. Traffic loading calculations.
   c. Accessory information.
3. Cable Tray Systems:
   a. Dimensional drawings, calculations, and descriptive information.
   b. NEMA load/span designation and how it was selected.
   c. Support span length and pounds-per-foot actual and future cable loading at locations, with safety factor used.
   d. Location and magnitude of maximum simple beam deflection of tray for loading specified.
   e. Layout drawings and list of accessories being provided.
4. Conduit Layout:
   a. Plan and section type, showing arrangement and location of conduit and duct bank required for:
      1) Low and medium voltage feeder and branch circuits.
      2) Instrumentation and control systems.
      3) Communications systems.
      4) Empty conduit for future use.
   b. Reproducible mylar; scale not greater than 1 inch equals 20 feet.
      1) Equipment and machinery proposed for bending metal conduit.
      2) Method for bending PVC conduit less than 30 degrees.

1.03 UL COMPLIANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

PART 2 - PRODUCTS

2.01 CONDUIT AND TUBING

A. Rigid Galvanized Steel Conduit (RGS):

1. Meet requirements of ANSI C80.1 and UL6.
2. Material: Hot-dip galvanized, with chromated protective layer.

B. PVC Schedule 40 Conduit:

1. Meet requirements of NEMA TC 2 and UL 651.
2. UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors.

C. Flexible Metal, Liquid-Tight Conduit:

1. UL 360 listed for 105 degrees C insulated conductors.
2. Material: Galvanized steel, with an extruded PVC jacket.

2.02 FITTINGS

A. Rigid Galvanized Steel and Intermediate Metal Conduit:

1. General:
   a. Meet requirements of UL 514B.
   b. Type: Threaded, galvanized. Set screw fittings not permitted.
2. Bushing:
   a. Material: Malleable iron with integral insulated throat, rated for 150 degrees C.
   b. Manufacturers:
      1) Thomas & Betts; Type BIM.
      2) O.Z./Gedney; Type HB.
3. Grounding Bushing:
   a. Material: Malleable iron with integral insulated throat rated for 150 degrees C, with solderless lugs.
   b. Manufacturers:
      1) Appleton; Series GIB.
      2) O.Z. Gedney; Type HBLG.
4. Conduit Hub:
   a. Material: Malleable iron with insulated throat.
   b. Manufacturers:
      1) O.Z. Gedney; Series CH.
      2) T & B; Series 370.
5. Conduit Bodies:
   a. Material: Malleable iron, sized as required by NFPA 70.
   b. Manufacturers (For Normal Conditions):
      1) Appleton; Form 35 threaded Unilets.
      2) Crouse-Hinds; Form 7 or 8 threaded condulets.
      3) Killark; Series O Electrolets.
   c. Manufacturers (For Hazardous Locations):
      1) Appleton.
      2) Crouse-Hinds.
      3) Killark.
6. Couplings: As supplied by conduit manufacturer.
7. Conduit Sealing Fitting Manufacturers:
   a. Appleton; Type EYF, EYM, or ESU.

b. Crouse-Hinds; Type EYS or EZS.
c. Killark; Type EY or EYS.

8. Drain Seal Manufacturers:
   a. Appleton; Type SF.
   b. Crouse-Hinds; Type EYD or EZD.
9. Drain/Breather Fitting Manufacturers:
   a. Appleton; Type ECDB.
   b. Crouse-Hinds; ECD.
10. Expansion Fitting Manufacturers:
   a. Deflection/Expansion Movement:
      1) Appleton; Type DF.
      2) Crouse-Hinds; Type XD.
   b. Expansion Movement Only:
      1) Appleton; Type XJ.
      2) Crouse-Hinds; Type XJ.
11. Cable Sealing Fittings:
   a. To form watertight nonslip cord or cable connection to conduit.
   b. For Conductors with OD of 1/2 Inch or Less: Neoprene bushing at connector entry.
   c. Manufacturers:
      1) Crouse-Hinds; CGBS.
      2) Appleton; CG-S.

B. PVC Conduit and Tubing:

1. Meet requirements of NEMA TC-3.
2. Type: PVC, slip-on.

C. Flexible Metal, Liquid-Tight Conduit:

1. Metal insulated throat connectors with integral nylon or plastic bushing rated for 105 degrees C.
2. Insulated throat and sealing O-rings.
3. Long design type extending outside of box or other device at least 2 inches.
4. Manufacturer: T & B; Series 5300.

D. Watertight Entrance Seal Device:

1. New Construction:
   a. Material: Oversized sleeve, malleable iron body with sealing ring, pressure ring, grommet seal, and pressure clamp.
   b. Manufacturer: O.Z./Gedney; Type FSK or WSK, as required.
2. Gored-Hole Application:
   a. Material: Assembled dual pressure disks, neoprene sealing ring, and membrane clamp.
   b. Manufacturer: O.Z./Gedney; Series CSM.

E. Hazardous Locations: Approved for use in the atmosphere involved.

1. Manufacturer: Crouse-Hinds; Type EYSR.

2.03 ACCESSORIES

A. Duct Bank Spacers:

1. Type: Nonmetallic, interlocking, for multiple conduit sizes.
2. Suitable for all types of conduit.
3. Manufacturer: Underground Device, Inc.; Type WUNPEECE.

B. Identification Devices:

1. Raceway Tags:
   a. Material: Permanent, nylon.
   b. Shape: Round.
   c. Raceway Designation: Pressure stamped, embossed, or engraved.
   d. Tags relying on adhesives or taped-on markers not permitted.
2. Electric Detectable Warning Tape:
   a. Material: Polyethylene, 4-mil gauge with solid aluminum foil core.
   b. Color: Red, unless otherwise noted.
   c. Width: Minimum 6-inch.
   d. Designation: Warning on tape that electric circuit is located below tape.
   e. Manufacturers:
      1) Blackburn.
      2) Griffolyn Co.
      3) Or approved equal.
3. Buried Raceway Marker:
   a. Material: 6”x6”x12” concrete monument, consisting of double-ended arrows, straight for straight runs and bent at locations where runs change direction.
   b. Designation: Incise to depth of 3/32 inch, ELECTRIC CABLES in letters 1/4-inch high.
   c. Minimum Dimension: 1/4-inch thick, 10 inches long, and 3/4-inch wide.

C. Raceway Coating:

1. Material: Bitumastic or plastic tape coating.
2. Manufacturers:
   a. Koppers bitumastic; No. 505.
   b. Scotchwrap; No. 51, plastic tape.

D. Wraparound Duct Band:

1. Material: Heat-shrinkable, cross-linked polyolefin, precoated with hot-melt adhesive.
2. Manufacturer: Raychem; Type TWDB.

PART 3 - EXECUTION

3.01 GENERAL

A. Conduit and Tubing sizes shown are based on the use of copper conductors. Reference Section 16120, CONDUCTORS, concerning conduit sizing for aluminum conductors.

B. All installed Work shall comply with NECA 5055.

C. Crushed or deformed raceways not permitted.

D. Maintain raceway entirely free of obstructions and moisture.

E. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.

F. Aluminum Conduit: Do not install in direct contact with concrete.

G. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.

H. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.

I. Group raceways installed in same area.

J. Proximity to Heated Piping: Install raceways minimum 12 inches from parallel runs.

K. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.

L. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.

M. Block Walls: Do not install raceways in same horizontal course with reinforcing steel.

N. Install watertight fittings in outdoor, underground, or wet locations.

O. Paint threads, before assembly of fittings, of galvanized conduit or IMC installed in exposed or damp locations with zinc-rich paint or liquid galvanizing compound.

P. All metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.

Q. Do not install raceways in concrete equipment pads, foundations, or beams.

R. Horizontal raceways installed under floor slabs shall lie completely under slab, with no part embedded within slab.

S. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.

3.02 INSTALLATION IN CAST-IN-PLACE STRUCTURAL CONCRETE

A. Minimum cover 1-1/2 inches.

B. Provide support during placement of concrete to ensure raceways remain in position.

C. Floor Slabs:

1. Outside diameter of conduit not to exceed one-third of the slab thickness.
2. Separate conduit by minimum six times conduit outside diameter, except at crossings.

3.03 CONDUIT APPLICATION

A. Diameter: Minimum 3/4 inch.

B. Exterior, Exposed:

1. PVC Coated Rigid galvanized steel.

C. Interior, Exposed:

1. PVC Coated Rigid galvanized steel.

D. Aboveground, Embedded in Concrete Walls, Ceilings, or Floors: PVC Schedule 40.

E. Direct Earth Burial: PVC Schedule 40.

F. Concrete-Encased Raceways: PVC Schedule 40.

G. Under Slabs-On-Grade: PVC Schedule 40.

3.04 CONNECTIONS

A. For motors, wall or ceiling mounted fans and unit heaters, dry type transformers, electrically operated valves, instrumentation, and other equipment where flexible connection is required to minimize vibration:

1. Conduit Size 4 Inches or Less: Flexible metal, liquid-tight conduit.
2. Conduit Size Over 4 Inches: Nonflexible.
3. Corrosive Areas: Flexible, nonmetallic, liquid or PVC-coated metallic, liquid-tight.
4. Length: 18-inch minimum, 60-inch maximum, of sufficient length to allow movement or adjustment of equipment.

B. Lighting Fixtures in Dry Areas: Flexible steel, nonliquid-tight conduit.

C. Outdoor Areas, Process Areas Exposed to Moisture, and Areas Required to be Oiltight and Dust-Tight: Flexible metal, liquid-tight conduit.

D. Transition From Underground or Concrete Embedded to Exposed: PVC Coated Rigid galvanized steel conduit.

E. Under Equipment Mounting Pads: Rigid galvanized steel conduit.

F. Exterior Light Pole Foundations: Rigid galvanized steel conduit.

3.05 PENETRATIONS

A. Make at right angles, unless otherwise shown.

B. Notching or penetration of structural members, including footings and beams, not permitted.

C. Fire-Rated Walls, Floors, or Ceilings: Fire-stop openings around penetrations to maintain fire-resistance rating.

D. Apply single layer of wraparound duct band to all metallic conduit in contact with concrete floor slabs to a point 2 inches above concrete surface.

E. Concrete Walls, Floors, or Ceilings (Aboveground): Provide nonshrink grout dry-pack, or use watertight seal device.

F. Entering Structures:

1. General: Seal raceway at the first box or outlet with minimum 2 inches thick expandable plastic compound to prevent the entrance of gases or liquids from one area to another.
2. Concrete Roof or Membrane Waterproofed Wall or Floor:
   a. Provide a watertight seal.
   b. Without Concrete Encasement: Install watertight entrance seal device on each side.
   c. With Concrete Encasement: Install watertight entrance seal device on the accessible side.
   d. Securely anchor malleable iron body of watertight entrance seal device into construction with one or more integral flanges.
   e. Secure membrane waterproofing to watertight entrance seal device in a permanent, watertight manner.
3. Heating, Ventilating, and Air Conditioning Equipment:
   a. Penetrate equipment in area established by manufacturer.
   b. Terminate conduit with flexible metal conduit at junction box or condulet attached to exterior surface of equipment prior to penetrating equipment.
   c. Seal penetration with silicone type sealant as specified in Section 07270, FIRE STOPPING.
4. Corrosive-Sensitive Areas:
   a. Seal all conduit passing through chlorine and ammonia room walls.
   b. Seal all conduit entering equipment panel boards and field panels containing electronic equipment.
   c. Seal penetration with silicone type sealant as specified in Section 07270, FIRE STOPPING.

5. Existing or Precast Wall (Underground): Core drill wall and install a watertight entrance seal device.
6. Nonwaterproofed Wall or Floor (Underground, without Concrete Encasement):
   a. Provide Schedule 40 galvanized pipe sleeve, or watertight entrance seal device.
   b. Fill space between raceway and sleeve with an expandable plastic compound on each side.
7. Manholes and Handholes:
   a. Metallic Raceways: Provide insulated grounding bushings.
   b. Nonmetallic Raceways: Provide bell ends flush with wall.
   c. Install such that raceways enter as near as possible to one end of wall, unless otherwise shown.

3.06 SUPPORT

A. Support from structural members only, at intervals not exceeding NFPA 70 requirements, and in any case not exceeding 10 feet. Do not support from piping, pipe supports, or other raceways.

B. Multiple Adjacent Raceways: Provide ceiling trapeze. For trapeze-supported conduit, allow 40 percent extra space for future conduit.

C. Provide and attach wall brackets, strap hangers, or ceiling trapeze as follows:

1. Wood: Wood screws.
2. Hollow Masonry Units: Toggle bolts.
3. Concrete or Brick: Expansion shields, or threaded studs driven in by powder charge, with lock washers and nuts.
4. Steelwork: Machine screws.

C. Nails or wooden plugs inserted in concrete or masonry for attaching raceway not permitted. Do not weld raceways or pipe straps to steel structures. Do not use wire in lieu of straps or hangers.

3.07 BENDS

A. Install concealed raceways with a minimum of bends in the shortest practical distance.

B. Make bends and offsets of longest practical radius.

C. Install with symmetrical bends or cast metal fittings.

D. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.

E. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.

F. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run, and raceways are same size.

G. PVC Conduit:

1. Bends 30-Degree and Larger: Provide factory-made elbows.
2. 90-Degree Bends: Provide rigid steel elbows.
3. Use manufacturer's recommended method for forming smaller bends.

H. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

3.08 EXPANSION/DEFLECTION FITTINGS

A. Provide on all raceways at all structural expansion joints, and in long tangential runs.

B. Provide expansion/deflection joints for 50 degrees F maximum temperature variation.

C. Install in accordance with manufacturer's instructions.

3.09 PVC CONDUIT

A. Solvent Welding:

1. Provide manufacturer recommended solvent; apply to all joints.
2. Install such that joint is watertight.

B. Adapters:

1. PVC to Metallic Fittings: PVC terminal type.
2. PVC to Rigid Metal Conduit or IMC: PVC female adapter.

C. Belied-End Conduit: Bevel the unbelled end of the joint prior to joining.

3.10 TERMINATION AT ENCLOSURES

A. Cast Metal Enclosure: Provide manufacturer's premolded insulating sleeve inside metallic conduit terminating in threaded hubs.

B. Sheet Metal Boxes, Cabinets, and Enclosures:

1. Rigid Galvanized Conduit:
   a. Provide one lock nut each on inside and outside of enclosure.
   b. Install grounding bushing.
   c. Provide bonding jumper from grounding bushing to equipment ground bus or ground pad; if neither ground bus nor pad exists, connect jumper to lag bolt attached to metal enclosure.
   d. Install insulated bushing on ends of conduit where grounding is not required.
   e. Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.
2. Flexible Metal Conduit: Provide two screw type, insulated, malleable iron connectors.

3. PVC Schedule 40 Conduit: Provide PVC terminal adapter with lock nut.

C. Motor Control Center, Switchboard, Switchgear, and Free-Standing Enclosures: Terminate conduit entering bottom with grounding bushing; provide a grounding jumper extending to equipment ground bus or grounding pad.

3.11 UNDERGROUND RACEWAYS

A. Grade: Maintain minimum grade of 4 inches in 100 feet, either from one manhole, handhole, or pull box to the next, or from a high point between them, depending on surface contour.

B. Cover: Maintain minimum 2-foot cover above conduit and concrete encasement, unless otherwise shown.

C. Make routing changes as necessary to avoid obstructions or conflicts.

D. Couplings: In multiple conduit runs, stagger so that couplings in adjacent runs are not in same transverse line.

E. Union type fittings not permitted.

F. Spacers:

1. Provide preformed, nonmetallic spacers, designed for such purpose, to secure and separate parallel conduit runs in a trench or concrete encasement.
2. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 10 feet.

G. Support conduit so as to prevent bending or displacement during backfilling or concrete placement.

H. Installation with Other Piping Systems:

1. Crossings: Maintain minimum 12-inch vertical separation.
2. Parallel Runs: Maintain minimum 12-inch separation.
3. Installation over valves or couplings not permitted.

I. Metallic Raceway Coating: At couplings and joints and along entire length, apply wraparound duct band with one-half tape width overlap to obtain two complete layers.

J. Concrete Encasement: As specified in Section 03300, CAST-IN-PLACE CONCRETE.

1. Concrete Color: Gray, dust top of concrete ductbank with powdered red concrete dye before concrete sets and trowel dry onto top of ductbank.

K. Backfill:

1. As specified in Section 02225, TRENCH BACKFILL.

2. Do not backfill until inspected by ENGINEER.

3.14 EMPTY RACEWAYS

A. Provide permanent, removable cap over each end.

B. Provide PVC plug with pull tab for underground raceways with end bells.

C. Provide nylon pull cord.

D. Identify, as specified in Paragraph IDENTIFICATION DEVICES, with waterproof tags attached to pull cord at each end, and at intermediate pull point.

3.15 IDENTIFICATION DEVICES

A. Raceway Tags:

1. Identify origin and destination.
2. Install at each terminus, near midpoint, and at minimum intervals of every 50 feet of exposed Raceway, whether in ceiling space or surface mounted.
3. Provide nylon strap for attachment.

B. Electric Detectable Warning Tape: Install approximately 12 inches above underground or concrete-encased raceways. Align parallel to, and within 12 inches of, centerline of runs.

C. Buried Raceway Markers:

1. Install at grade to indicate direction of underground raceways.
2. Install at all bends and at intervals not exceeding 100 feet in straight runs.

3.16 PROTECTION OF INSTALLED WORK

A. Protect products from effects of moisture, corrosion, and physical damage during construction.

B. Provide and maintain manufactured watertight and dust-tight seals over all conduit openings during construction.

C. Touch up painted conduit threads after assembly to cover nicks or scars.

D. Touch up damage to coating on PVC-coated conduit with patching compound approved by manufacturer.

END OF SECTION -

SECTION 16120

CONDUCTORS

PART 1 - GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American National Standards Institute (ANSI): 386, Standard for Separable Insulated Connector Systems for Power Distribution Systems above 600V.
2. American Society for Testing and Materials (ASTM):
   a. A167, Standard Specification for Stainless and Heat Resisting Chromium-Nickel-P1ated Steel Plate, Sheet, and Strip.
   b. B3, Standard Specification for Soft or Annealed Copper Wire.
   c. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
   d. B263, Standard Test Method for Determination of Cross- Sectional Area of Stranded Conductors.
3. Association of Edison Illuminating Companies (AEIC):
   a. CS 5, Crosslinked Polyethylene Insulated Shielded Power Cables Rated 5 Through 35 kV.
   b. CS 6, Ethylene- Propylene-Rubber-Insulated Shielded Power Cables Rated 5 Through 69 kV.
4. Insulated Cable Engineer's Association, Inc. (ICEA): T-29-250, Procedure for Conducting Vertical Cable Tray Flame Test with a Theoretical Heat Input of 210,000 Btu/hour.
5. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. 48, Standard Test Procedures and Requirements or High-Voltage Alternating Current Cable Terminations.
   b. 404, Standard for Cable Joints for Use with Extruded Dielectric Cable Rated 5,000V through 46,000V and Cable Joints for Use with Laminated Dielectric Cable Rated 2,500V through 500,000V.
6. National Electrical Contractors Association, Inc. (NECA): 5055, Standard of Installation.
7. National Electrical Manufacturers' Association (NEMA):
   a. CC 1, Electric Power Connectors for Substations.
   b. WC 3, Rubber-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
   c. WC 5, Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
   d. WC 7, Crosslinked-Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
   e. WC 8, Ethylene-Propylene-Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
   f. WC 55, Instrumentation Cables and Thermocouple Wire.
8. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
9. Underwriters Laboratories, Inc. (UL):
   a. 13, Standard for Safety Power-Limited Circuit Cables.
   b. 44, Standard for Safety Rubber-Insulated Wires and Cables.

c. 62, Standard for Safety Flexible Cord and Fixture Wire.
d. 486A, Standard for Safety Wire Connector and Soldering Lugs for Use with Copper Conductors.
e. 486B, Standard for Safety Wire Connectors and Soldering Lugs for Use with Aluminum Conductors.
f. 510, Standard for Safety Insulating Tape.
g. 854, Standard for Safety Service-Entrance Cables.
h. 910, Standard for Safety Test Method for Fire and Smoke Characteristics of Electrical and Optical-Fiber Cables Used in Air Handling Spaces.
i. 1072, Standard for Safety Medium-Voltage Power Cables.
j. 1277, Standard for Safety Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.
k. 1581, Standard for Safety Reference Standard for Electrical Wires, Cables, and Flexible Cords.

1.02 SUBMITTALS

A. Shop Drawings:

1. Wire and cable descriptive product information.
2. Wire and cable accessories descriptive product information.
3. Cable fault detection system descriptive product information.
4. Manufactured wiring systems descriptive product information.
5. Manufactured wire systems rating information.
6. Manufactured wire systems dimensional drawings.
7. Manufactured wire systems special fittings.
8. Busway descriptive product information.
9. Busway rating information.
10. Busway dimensional drawings.
11. Busway special fitting information.
12. Busway-equipment interface information for equipment to be connected to busways.

B. Quality Control Submittals:

1. Certified Factory Test Report for conductors 600 volts and below.
2. Certified Factory Test Report per AEIC CS6, including AEIC qualification report for conductors above 600 volts.

1.03 UL COMPLIANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

PART 2 - PRODUCTS

2.01 CONDUCTORS 600 VOLTS AND BELOW

A. Conform to applicable requirements of NEMA WC 3, WC 5, and WC 7.

B. Conductor Type:

1. 120- and 277-Volt Lighting, No. 10 AWG and Smaller: Stranded copper.
2. 120-Volt Receptacle Circuits, No. 10 AWG and Smaller: Stranded copper.
3. All Other Circuits: Stranded copper.

C. Insulation: Type XHHW-2 insulation for all power and control application. No other type of wire shall be used without written approval from the CITY Instrumentation, Controls and Electrical manager.

D. Flexible Cords and Cables:

1. Type SOW-A50 with ethylene propylene rubber insulation in accordance with UL 62.
2. Conform to physical and minimum thickness requirements of NEMA WC 8.

2.02 <u>600-VOLT RATED CABLE</u>

A. General:

1. Type: TC, meeting requirements of UL 1277, including Vertical Tray Flame Test at 20,000 Btu/hr, and NFPA 70, Article 340, or UL 13 Listed Power Limited Circuit Cable meeting requirements of NFPA 70, Article 725.
2. Permanently and legibly marked with manufacturer's name, maximum working voltage for which cable was tested, type of cable, and UL listing mark.
3. Suitable for installation in open air, in cable trays, or conduit.
4. Minimum Temperature Rating: 90 degrees C dry locations, 75 degrees C wet locations.
5. Overall Outer Jacket: PVC, flame-retardant, sunlight- and oil-resistant.

B. Wire and Connectors:

1. Cable shall be rated for 600 volts and shall meet the requirements below:
2. Conductors shall be stranded
3. All wire shall be brought to the job in unbroken packages and shall bear the data of manufacturing; not older than 12 months.
4. Type of wire shall be XHHW-2, rated 75 degrees C suitable for wet locations except where required otherwise by the drawings.
5. No wire smaller than No. 12 gauge shall be used unless specifically indicated.
6. Conductor metal shall be copper.
7. All conductors shall be megger tested after installation and insulation must be in compliance with the Insulated Power Cable Engineers Association Minimum Values of Insulation Resistance.

C. Type I-Multiconductor Control Cable:

1. Conductors:
   a. No. 14 AWG, seven-strand copper.
   b. Insulation: 15-mil PVC with 4-mil nylon.
   c. UL 1581 listed as Type XHHW-2 rated VW-I.
   d. Conductor group bound with spiral wrap of barrier tape.
   e. Color Code: In accordance with NEMA WC 5, Method 1, Sequence K-2.
2. Cable: Passes the ICEA T-29-520 210,000 Btu/hr Vertical Tray Flame Test.

3. Cable Sizes:

No. of Conductors	Max. Outside Diameter (inches)	Jacket Thickness (mils)
3	0.41	45
5	0.48	45
7	0.52	45
12	0.72	60
19	00.83	60
25	1.00	60
37	1.15	80

5. Manufacturers:
   a. Okonite Co.
   b. Rome Cable.

D. Type 2-Multiconductor Power Cable:

1. Conductors:
   a. Class B stranded, coated copper.
   b. Insulation: Chemically crosslinked ethylene-propylene with Hypalon jacket.
   b. UL 1581 listed as Type EPR, rated VW-1.
   c. Color Code: Conductors, size No. 8 AWG and smaller, colored conductors, NEMA WC5 Method 1, color 5 per Article POWER CONDUCTOR COLOR
   d. CODING. Conductors, size No. 6 AWG and larger, NEMA WC5, Method 4.
2. Cable pass the ICEA T-29-520 210,000 Btu/hr Vertical Tray Flame Test.
3. Cable Sizes:

Conductor Size	**Minimum Ground Wire Size**	**No. of Conductors**	**Max.Outside Diameter (Inches)**	**Nominal Jacket Thickness (Mils)**
12	12	2 3 4	0.42 0.45 0.49	45 45 45
10	10	2 3 4	0.54 0.58 0.63	60 60 60
8	10	3 4	0.66 0.72	60
6	8	3 4	0.74 0.81	60
4	6	3 4	0.88 0.97	60 80
2	6	3 4	1.01 1.11	80
1/0	6	3 4	1.22 1.35	80
2/0	4	3 4	1.32 1.46	80
4/0	4	3 4	1.56 1.78	80

3. Manufacturers:
   a. Okonite Co.
   b. Pome Cable.

E. Type B-No. 16 AWG, Twisted, Shielded Pair, Instrumentation Cable: Single pair, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 55 requirements.

1. Outer Jacket: 45-mil nominal thickness.
2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer overlapped to provide 100 percent coverage.
3. Dimension: 0.31-inch nominal OD.
4. Conductors:
   a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8
   b. 20 AWG, seven-strand tinned copper drain wire.
   c. Insulation: 15-mil nominal PVC.
   d. Jacket: 4-mil nominal nylon.
   e. Color Code: Pair conductors black and red.
5. Manufacturers:
   a. Okonite Co.
   b. Alpha Wire Corp.
6. The following test shall be performed on instrumentation and control system cables. All tests shall be end-to-end test of installed cables with the ends supported in free air, not adjacent to any ground object. All test data shall be recorded on forms acceptable to the ENGINEER. Complete records of all tests shall be made and delivered to the ENGINEER.
   a. Continuity tests shall be performed by measuring wire/shield loop resistances of signal cable as the wires, taken one at a time, are shorted to the channel shield. No loop resistance measurement shall carry by more than $\pm$2 ohms from the calculated average loop resistance valve.
   b. Insulation resistance tests shall be performed by using a 500 volt megohmeter to measure the insulation resistance between each channel wire and channel shield, between individual channel shields in a multi-channel cable, between each individual channel and the overall cable shield in multi-channel cable, between each wire and ground, and between each shield and ground. Values of resistance less than 10 megohms shall be unacceptable.

F. Type B1-No. 16 AWG, Twisted, Shielded Triad Instrumentation Cable: Single triad, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 55 requirements.

1. Outer Jacket: 45-mil nominal.
2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer, overlapped to provide 100 percent coverage.
3. Dimension: 0.32-inch nominal OD.
4. Conductors:
   a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8.
   b. 20 AWG, seven-strand, tinned copper drain wire.

c. Insulation: 15-mil nominal PVC.
d. Jacket: 4-mil nylon.
e. Color Code: Triad conductors black, red, and white.

5. Manufacturers:
a. Okonite Co.
b. Alpha Wire Corp.

G. Type B2-No. 18 AWG, Multi-Twisted, Shielded Pairs with a Common, Overall Shield Instrumentation Cable: Designed for use as instrumentation, process control, and computer cable, meeting NEMA WC 55 requirements.

1. Conductors:
a. Bare soft annealed copper, Class B, seven-strand concentric, in accordance with ASTM B8
b. Tinned copper drain wires.
c. Pair drain wire size AWG 20, group drain wire size AWG 18.
d. Insulation: 15-mil PVC.
e. Jacket: 4-mil nylon.
f. Color Code: Pair conductors black and red with red conductor numerically printed for group identification.
g. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer.

2. Cable Shield: 2.35-mil, double-faced aluminum/synthetic polymer, overlapped for 100 percent coverage.

3. Cable Sizes:

Number of Pairs	Maximum Outside Diameter (inches)	Nominal Jacket Thickness (mils)
4	0.50	45
8	0.68	60
12	0.82	60
16	0.95	80
24	1.16	80
36	1.33	80
50	1.56	80

4. Manufacturers:
a. Okonite Co.
b. Alpha Wire Corp.

H. Type B3-No. 18 AWG, Multi-twisted Pairs with a Common Overall Shield Instrumentation Cable: Designed for use as instrumentation, process control, and computer cable meeting NEMA WC 55.

1. Conductors:
a. Bare soft annealed copper, Class B, seven-strand concentric, in accordance with ASTM B8.
b. Tinned copper drain wire size 18 AWG
c. Insulation: 15-mil nominal PVC.
d. Jacket: 4-mil nylon.

e. Color Code: Pair conductors black and red, with red conductor numerically printed for group identification.

2. Cable Shield: 2.35-mil, double-faced aluminum/synthetic polymer, overlapped for 100 percent coverage.
3. Cable Sizes:

Number Of Pairs	Maximum Outside Diameter (inches)	Nominal Jacket Thickness (mils)
4	0.46	45
8	0.63	60
12	0.75	60
16	0.83	60
24	1.06	80
36	1.21	80
50	1.42	80

3. Manufacturers:
   a. Okonite Co.
   b. Alpha Wire Corp.

2.03 GROUNDING CONDUCTORS

A. Equipment: Stranded copper with green, Type USE/RHH/RHW-XLPE or XHHW-2, insulation.

B. Direct Buried: Bare stranded copper.

2.04 ACCESSORIES FOR CONDUCTORS 600 VOLTS AND BELOW

A. Tape:

1. General Purpose, Flame Retardant: 7-mil, vinyl plastic, Scotch Brand 33, rated for 90 degrees C minimum, meeting requirements of UL 510.
2. Flame Retardant, Cold and Weather Resistant: 8.5-mil, vinyl plastic, Scotch Brand 88.
3. Arcs and Fireproofing:
   a. 30-mil, elastomer
   b. Manufacturers and Products:
      1) Scotch; Brand 77, with Scotch Brand 69 glass cloth tape binder.
      2) Plytnount; Plyarc 30, with Plymount Plyglas glass cloth tape binder.

B. Identification Devices:

1. Sleeve: Permanent, PVC, yellow or white, with legible machine-printed black markings.
2. Marker Plate: Nylon, with legible designations permanently hot stamped on plate.
3. Grounding Conductor: Permanent green heat-shrink sleeve, 2-inch minimum.

C. Connectors and Terminations:

1. Nylon, Self-Insulated Crimp Connectors:
   a. Manufacturers and Products:
      1) Thomas & Betts; Sta-Kon.
      2) Burndy; Insulink.
      3) ILSCO.
2. Nylon, Self-Insulated, Crimp Locking-Fork, Torque-Type Terminator:
   a. Manufacturers and Products:
      1) Thomas & Betts; Sta-Kon.
      2) Burndy; Insulink.
      3) ILSCO.

D. Cable Lugs:

1. In accordance with NEMA CC I.
2. Rated 600 volts of same material as conductor metal.
3. Insulated, Locking-Fork, Compression Lugs:
   a. Manufacturers and Products:
      1) Thomas & Betts; Sta-Kon.
      2) ILSCO; ILSCONS.
4. Un-insulated Crimp Connectors and Terminators:
   a. Manufacturers and Products:
      1) Square D; Versitide.
      2) Thomas & Betts; Color-Keyed.
      3) ILSCO.
5. Un-insulated, Bolted, Two-Way Connectors and Terminators:
   a. Manufacturers and Products:
      1) Thomas & Betts; Locktite.
      2) Burndy; Quiklug.
      3) ILSCO.

E. Cable Ties: Nylon, adjustable, self-locking, and reusable.

1. Manufacturers and Product: Thomas & Betts; TY-RAP.

F. Heat Shrinkable Insulation: Thermally stabilized, crosslinked polyofin.

1. Manufacturers and Product: Thomas & Betts; SHRINK-KON.

2.05 PULLING COMPOUND

A. Nontoxic, non-corrosive, noncombustible, nonflammable, wax-based lubricant; UL listed.

B. Suitable for rubber, neoprene, PVC, polyethylene, hypalon, CPE, and lead-covered wire and cable.

C. Suitable for zinc-coated steel, aluminum, PVC, bituminized fiber, and fiberglass raceways.

D. Manufacturers and Products:

1. Ideal Co.; Yellow 77.
2. Polywater, Inc.

3. Cable Grip Co.

2.06 WARNING TAPE

A. As specified in Section 16110, RACEWAYS.

2.07 SOURCE QUALITY CONTROL

A. Conductors 600-Volts and Below: Test in accordance with UL 44 and 854 Standards.

PART 3 - EXECUTION

3.01 GENERAL

A. Conductor installation to be in accordance with NECA 5055.

B. Conductor and cable sizing shown is based on copper conductors, unless noted otherwise.

C. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii.

D. Tighten screws and terminal bolts in accordance with UL 486A for copper conductors.

E. Cable Lugs: Provide with correct number of holes, bolt size, and center-to-center spacing as required by equipment terminals.

F. Bundling: Where single conductors and cables in manholes, hand holes, vaults, and other indicated locations are not wrapped together by some other means, bundle conductors from each conduit throughout their exposed length with cable ties placed at intervals not exceeding 18 inches on center.

G. Ream, remove burrs, and clear interior of installed conduit before pulling wires or cables.

H. Concrete-Encased Raceway Installation: Prior to installation of conductors, pull through each raceway a mandrel approximately 1/4-inch smaller than raceway inside diameter.

3.02 POWER CONDUCTOR COLOR CODING

A. Conductors 600 Volts and Below:

1. No. 6 AWG and Larger: Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering an area 1-1/2 to 2 inches wide.
2. No. 8 AWG and Smaller: Provide colored conductors.

3. Colors:

System	Conductor	Color
All Systems	Equipment Grounding	Green
240/120 Volts Single-Phase, Three-Wire	Grounded Neutral One Hot Leg Other Hot Leg	White Black Red
208Y/120 Volts Three-Phase, Four-Wire	Grounded Neutral Phase A Phase B Phase C	White Black Red Blue
240/120 Volts Three-Phase, Four-Wire Delta, Center Tap Ground on Single-Phase	Grounded Neutral Phase A High (wild) Leg Phase C	White Black Orange Blue
480Y/277 Volts Three-Phase, Four-Wire	Grounded Neutral Phase A Phase B Phase C	Gray Brown Orange Yellow
NOTE: Phase A, B, C implies direction of positive phase rotation. Coordinate with local code for wire color and adjust accordingly.		

4. Tracer: Outer covering of white with an identifiable colored strip other than green in accordance with NFPA 70.

3.03 CIRCUIT IDENTIFICATION

A. Circuits Appearing in Circuit Schedules: identify power, instrumentation, and control conductor circuits, using circuit schedule designations, at each termination and in accessible locations such as manholes, hand holes, panels, switchboards, motor control centers, pull boxes, and terminal boxes.

B. Circuits Not Appearing in Circuit Schedules:

1. Assign circuit name based on device or equipment at load end of circuit.
2. Where this would result in same name being assigned to more than one circuit, add number or letter to each otherwise identical circuit name to make it unique.

C. Method:

1. Conductors No. 3 AWG and Smaller: Identify with sleeves.
2. Cables, and Conductors No. 2 AWG and Larger:
   a. Identify with marker plates.
   b. Attach marker plates with nylon tie cord.
3. Taped-on markers or tags relying on adhesives not permitted.

3.04 CONDUCTORS 600 VOLTS AND BELOW

A. Install 10 AWG or 12 AWG conductors for branch circuit power wiring in lighting and receptacle circuits.

B. Do not splice incoming service conductors and branch power distribution conductors No. 6 AWG and larger unless specifically indicated or approved by ENGINEER.

C. Connections and Terminations:

1. Install wire nuts only on solid conductors.
2. Install nylon self-insulated crimp connectors and terminators for instrumentation, control, and power circuit conductors No. 6 AWG and smaller.
3. Install un-insulated crimp connectors and terminators for instrumentation, control, and power circuit conductors No. 4 AWG through No. 2/0 AWG.
4. Install un-insulated, bolted, two-way connectors and terminators for power circuit conductors No. 4/0 AWG and larger.
5. Install un-insulated bolted, two-way connectors for motor circuit conductors No. 12 and larger.
6. Tape insulates all un-insulated connections.
7. Place no more than one conductor in any single-barrel pressure connection.
8. Install crimp connectors with tools approved by connector manufacturer.
9. Install terminals and connectors acceptable for type of material used.
10. Compression Lugs
    a. Attach with a tool specifically designed for purpose.
    b. Tool shall provide complete controlled crimp and shall not release until crimp is complete.
    c. Do not use plier type crimpers.

D. Do not use soldered mechanical joints.

E. Splices and Terminations:

1. Indoors: Use general purpose, flame retardant tape.
2. Outdoors: Use flame retardant, cold- and weather-resistant tape.

F. Cap spare conductors and conductors with UL listed end caps.

G. Cabinets, Panels, and Motor Control Centers:

1. Remove surplus wire, bridle and secure.
2. Where conductors pass through openings or over edges in sheet metal, remove bums, chamfer edges, and install bushings and protective strips of insulating material to protect the conductors.

H. Control and Instrumentation Wiring:

1. Where terminals provided will accept such lugs, terminate control and instrumentation wiring, except solid thermocouple leads, with insulated, locking-fork compression lugs.
2. Terminate with methods consistent with terminals provided, and in accordance with terminal manufacturer's instructions.
3. Locate splices in readily accessible cabinets or junction boxes using terminal strips.
4. Where connections of cables installed under this section are to be made under Section 13000, PROCESS INSTRUMENTATION AND CONTROL SYSTEMS, leave pigtails of adequate length for bundled connections.
5. Cable Protection:-

a. Under Infinite Access Floors: May be installed without bundling.
b. All Other Areas: Install individual wires, pairs, or triads in flex conduit under the floor or grouped into bundles at least 1/2-inch in diameter.
c. Maintain integrity of shielding of instrumentation cables.
d. Ensure grounds do not occur because of damage to jacket over the shield.

I. Extra Conductor Length: For conductors to be connected by others, install minimum 6 feet of extra conductor in freestanding panels and minimum 2 feet in other assemblies.

3.05 FIELD QUALITY CONTROL

A. Visual and Mechanical Inspection:

1. Inspect Each Individual Exposed Power Cable No. 6 and Larger For:
   a. Physical damage.
   b. Proper connections in accordance with single-line diagram.
   c. Cable bends not in conformance with manufacturer's minimum allowable bending radius where applicable.
   d. Color coding conformance with specifications.
   e. Proper circuit identification.
2. Mechanical Connections For:
   a. Proper lug type for conductor material.
   b. Proper lug installation.
   c. Bolt torque level in accordance with NETA ATS, Table 10. 1, unless otherwise specified by manufacturer.
3. Shielded Instrumentation Cables For:
   a. Proper shield grounding.
   b. Proper terminations.
   c. Proper circuit identification.
4. Control Cables For:
   a. Proper termination.
   b. Proper circuit identification.
5. Cables Terminated Through Window Type CTs: Verify that neutrals and grounds are terminated for correct operation of protective devices.

B. Electrical Tests for Conductors No. 6 and Larger:

1. Insulation Resistance Tests:
   a. Test each conductor with respect to ground and to adjacent conductors per IEEE 118 procedures for 1 minute.
   b. Evaluate ohmic values by comparison with conductors of same length and type.
   c. Investigate values less than 50 megohms.
   d. Utilize 1,000V dc megohmmeter for 600V insulated conductors.
2. Continuity test by ohmmeter method to ensure proper cable connections.

- END OF SECTION -

SECTION 16405

ELECTRIC MOTORS

PART 1 - GENERAL

1.01 RELATED SECTIONS

A. This section applies only when referenced by a motor-driven equipment specification. Application, horsepower, enclosure type, mounting, shaft type, synchronous speed, and any deviations from this section will be listed in the equipment specification. Where such deviations occur, they shall take precedence over this section.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Anti-Friction Bearing Manufacturers' Association (AFBMA):
   a. 9, Load Ratings and Fatigue Life for Ball Bearings.
   b. 11, Load Rating and Fatigue Life for Roller Bearings.
2. American National Standards Institute (ANSI): C50.41, Polyphase Induction Motors for Power Generating Stations.
3. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. 85, Test Procedure for Airborne Sound Measurements on Rotating Machines.
   b. 112, Standard Test Procedures for Polyphase Induction Motors and Generators.
   c. 114, Standard Test Procedures for Single-Phase Induction Motors.
   d. 620, Guide for Construction and Interpretation of Thermal Limit Curves for Squirrel-Cage Motors Over 500 Horsepower.
   e. 841, Recommended Practice for Chemical Industry Severe-Duty Squirrel-Cage Induction Motors, 600V and Below.
4. National Electrical Manufacturers Association (NEMA):
   a. MG 1, Motors and Generators.
   b. MG 13, Frame Assignments for Alternating Current Integral Horsepower Induction Motors.
   c. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
5. National Fire Protection Association (NFPA): 70, National Electrical Code. (NEC)
6. Underwriters Laboratories (UL):
   a. 547, Thermal Protectors for Electric Motors.
   b. 674, Electric Motors and Generators Used in Hazardous (Classified) Locations.

1.03 DEFINITIONS

A. CISD-TEFC: Chemical industry, severe-duty enclosure.

B. DIP: Dust-ignition-proof enclosure.

C. EXP: Explosion-proof enclosure.

D. ODP: Open drip-proof enclosure.

E. TEFC: Totally enclosed, fan cooled enclosure.

F. TENV: Totally enclosed, nonventilated enclosure.

G. WPI: Open weather protected enclosure, Type I.

H. WPII: Open weather protected enclosure, Type II.

I. Motor Nameplate Horsepower: That rating after any derating required to allow for extra heating caused by the harmonic content in the voltage applied to the motor by its controller.

1.04 SUBMITTALS

A. Shop Drawings:

1. Descriptive information.
2. Nameplate data in accordance with NEMA MG 1.
3. Additional Rating Information:
   a. Service factor.
   b. Locked rotor current.
   c. No load current.
   d. Safe stall time for motors 200 horsepower and larger.
   e. Multispeed load classification (e.g., variable torque).
   f. Adjustable frequency drive motor load classification (e.g., variable torque) and minimum allowable motor speed for that load classification.
4. Enclosure type and mounting (e.g. horizontal, vertical).
5. Dimensions and total weight.
6. Conduit box dimensions and usable volume as defined in NEMA MG 1 and NFPA 70.
7. Bearing type.
8. Bearing lubrication.
9. Bearing life.
10. Space heater voltage and watts.
11. Description and rating of motor thermal protection.
12. Motor sound power level in accordance with NEMA MG 1.
13. Maximum brake horsepower required by the equipment driven by the motor.
14. Description and rating of submersible motor moisture sensing system.

B. Quality Control Submittals:

1. Factory test reports, certified.
2. Manufacturer's Certificate of Proper Installation, 100 horsepower and larger.
3. Operation and Maintenance Manual.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. General Electric.

B. Reliance.

C. MagneTek.

D. Siemens.

E. Baldor.

F. U.S. Motors.

G. Westinghouse.

H. Toshiba.

2.02 GENERAL

A. For multiple units of the same type of equipment, furnish identical motors and accessories of a single manufacturer.

B. In order to obtain single source responsibility, utilize a single supplier to provide a drive motor, its driven equipment, and specified motor accessories.

C. Meet requirements of NEMA MG 1.

D. Frame assignments in accordance with NEMA MG 13.

E. Provide motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing mark.

F. Motors shall be specifically designed for the use and conditions intended, with a NEMA design letter classification to fit the application.

G. Lifting lugs on all motors weighing 100 pounds or more.

H. Operating Conditions:

1. Maximum ambient temperature not greater than 50 degrees C.
2. Motors shall be suitable for operating conditions without any reduction being required in the nameplate rated horsepower or exceeding the rated temperature rise.
3. Overspeed in either direction in accordance with NEMA MG 1.

2.03 HORSEPOWER RATING

A. As designated in motor-driven equipment specifications.

B. Constant Speed Applications: Brake horsepower of the driven equipment at any head capacity point on the pump curve not to exceed motor nameplate horsepower rating, excluding any service factor.

C. Adjustable Frequency, Adjustable Speed Applications: Driven equipment brake horsepower at any head capacity point on the pump curve not to exceed motor nameplate horsepower rating, excluding any service factor.

2.04 SERVICE FACTOR

A. 1.15 minimum at rated ambient temperature, unless otherwise indicated.

2.05 VOLTAGE AND FREQUENCY RATING

A. System Frequency: 60-Hz.

B. Voltage Rating: Unless otherwise indicated in motor-driven equipment specifications:

Size	Voltage	Phases
1/2 hp and smaller	115	1
3/4 hp through 400 hp	460	3
450 hp and larger	4,000	3

C. Suitable for full voltage starting.

D. One hundred horsepower and larger also suitable for reduced voltage starting with 65 or 80 percent voltage tap settings on reduced inrush motor starters.

E. Suitable for accelerating the connected load with supply voltage at motor starter supply terminals dipping to 90 percent of motor rated voltage.

2.06 EFFICIENCY AND POWER FACTOR

A. For all motors except single-phase, under 1 horsepower, multispeed, short-time rated and submersible motors, or motors driving gates, valves, elevators, cranes, trolleys, and hoists:

1. Efficiency:
   a. Tested in accordance with NEMA MG 1, paragraph 12.54.1.
   b. Guaranteed minimum at full load in accordance with Table 1 or as indicated in motor-driven equipment specifications.
2. Power Factor: Guaranteed minimum at full load in accordance with Table 1 or as indicated in motor-driven equipment specifications.

2.07 LOCKED ROTOR RATINGS

A. Locked rotor kVA Code F or lower if motor horsepower not covered by NEMA MG 1 tables.

B. Safe stall time 15 seconds or greater.

2.08 INSULATION SYSTEMS

A. Single-Phase, Fractional Horsepower Motors: Manufacturer's standard winding insulation system.

B. Motors rated over 600 Volts: Sealed windings in accordance with NEMA MG 1.

C. Three-Phase and Integral Horsepower Motors, Unless Otherwise Indicated in Motor-Driven Equipment Specifications: Class F with Class B rise at nameplate horsepower and designated operating conditions, except EXP and DIP motors which must be Class B with Class B rise.

2.09 ENCLOSURES

A. All enclosures to conform to NEMA MG 1.

B. Unless otherwise noted, all motors shall be TEFC and shall furnish with a drain hole with porous drain/weather plug.

C. Explosion-Proof (EXP):

1. TEFC listed to meet UL 674 and NFPA 70 requirements for Class 1, Division 1, Group C and D hazardous locations.
2. Drain holes with drain and breather fittings.
3. Integral thermostat opening on excessive motor temperature in accordance with UL 547 and NFPA 70.
4. Thermostat leads to terminate in a terminal box separate from main terminal box.

D. Dust-Ignition-Proof (DIP):

1. TEFC listed to meet UL 674 and NFPA 70 requirements for Class II, Division 1, Group E, F, G.
2. Integral thermostat opening on excessive motor temperature in accordance with UL 547 and NFPA 70.
3. Thermostat leads to terminate in a terminal box separate from main terminal box.

E. Submersible: In accordance with Paragraph SPECIAL MOTORS.

F. Chemical Industry, Severe-Duty (CISD-TEFC): In accordance with Paragraph SPECIAL MOTORS.

2.10 TERMINAL (CONDUIT) BOXES

A. Oversize main terminal boxes for all motors.

B. Diagonally split, rotatable to each of four 90-degree positions. Threaded hubs for conduit attachment.

C. Except ODP, furnish gaskets between box halves and between box and motor frame.

D. Minimum usable volume in percentage of that specified in NEMA MG 1-11.06 and 20.62 and NFPA 70, Article 430:

Voltage	Horsepower	Percentage
Below 600	15 thru 125	500
Below 600	150 thru 300	275
Below 600	350 thru 600	225
Above 600	All Sizes	200

E. Terminal for connection of equipment grounding wire in each terminal box.

2.11 BEARINGS AND LUBRICATION

A. Horizontal Motors:

1. 3/4 horsepower and Smaller: Permanently lubricated and sealed ball bearings, or regreasable ball bearings in labyrinth sealed end bells with removable grease relief plugs.
2. 1 Through 400 horsepower: Regreasable ball bearings in labyrinth sealed end bells with removable grease relief plugs.
3. Above 400 horsepower: Regreasable antifriction bearings in labyrinth sealed end bells with removable grease relief plugs.
4. Minimum 100,000 hours L-10 bearing life for ball and roller bearings as defined in AFBMA 9 and 11.

B. Vertical Motors:

1. Thrust Bearings:
   a. Antifriction bearing.
   b. Manufacturer's standard lubrication 100 horsepower and larger.
   c. Oil lubricated 125 horsepower and larger.
   d. Minimum 50,000 hours L-10 bearing life.
2. Guide Bearings:
   a. Manufacturer's standard bearing type.
   b. Manufacturer's standard lubrication 200 horsepower and larger.
   c. Oil lubricated 250 horsepower and larger.
   d. Minimum 100,000 hours L-1O bearing life.

C. Regreasable Antifriction Bearings:

1. Readily accessible, grease injection fittings.
2. Readily accessible, removable grease relief plugs.

D. Oil Lubrication Systems:

1. Oil reservoirs with sight level gauge.
2. Oil fill and drain openings with opening plugs.
3. Provisions for necessary oil circulation and cooling.

2.12 NOISE

A. Measured in accordance with IEEE 85 and NEMA MG 1.

B. Motors controlled by adjustable frequency drive systems shall not exceed sound levels of 3 dBA higher than NEMA MG 1.

2.13 BALANCE AND VIBRATION CONTROL

A. In accordance with NEMA MG 1-12.06.

2.14 EQUIPMENT FINISH

A. External Finish: Prime and finish coat manufacturer's standard. Field painting in accordance with Section 09900, PAINTING AND PROTECTIVE COATINGS.

B. Internal Finish: Bore and end turns coated with clear polyester or epoxy varnish.

2.15 SPECIAL FEATURES AND ACCESSORIES

A. Screen Over Air Openings: Stainless steel on motors with ODP, WPI, and WPII enclosures meeting requirements for Guarded Machine in NEMA MG 1.

B. Winding Thermal Protection:

1. Thermostats:
   a. Motors for constant speed and adjustable speed application 30 through 75 horsepower.
   b. Bi-metal disk or rod type thermostats embedded in stater windings (normally closed contact).
   c. Automatic reset contacts rated 120 volts ac, 5 amps minimum, opening on excessive temperature. (Manual reset will be provided at motor controller.)

C. Nameplates:

1. Raised or stamped letters on stainless steel or aluminum.
2. Display all motor data required by NEMA MG 1-10.37 and NEMA MG 1-10.38 in addition to bearing numbers for both bearings.
3. Premium efficiency motor nameplates to also display NEMA nominal efficiency, full load power factor, and maximum allowable kVAR for power factor correction capacitors.

2.16 SPECIAL MOTORS

A. Requirements in this article take precedence over conflicting features specified elsewhere in this section.

B. Submersible Pump Motors:

1. Manufacturers:
   a. Reliance.

b. Flygt.

2. At 100 Percent Load:

Horsepower	Guaranteed Minimum Efficiency	Guaranteed Minimum Power Factor
5 thru 10	80	82
10.1 thru 50	85	82
50. 1 thru 100	87	82
Over 100	89	82

3. Insulation System: Manufacturer's standard Class B or Class F.
4. Motor capable of running dry continuously.
5. Enclosure:
   a. Hermetically sealed, watertight, for continuous submergence up to 65-foot depth.
   b. Listed to meet UL 674 and NFPA 70 requirements for Class 1, Division 1, Group D hazardous atmosphere.

   c. Seals: Tandem mechanical.
6. Bearing and Lubrication:
   a. Permanently sealed and lubricated, replaceable antifriction guide and thrust bearings.
   b. Minimum 15,000 hours L-10 bearing life.
7. Inrush kVA/horsepower no greater than NEMA MG 1 and NFPA 70, Code F.
8. Winding Thermal Protection:
   a. Thermal sensor and switch assembly, one each phase, embedded in stater windings and wired in series.
   b. Switches normally closed, open upon excessive winding temperature, and automatically reclose when temperature has cooled to safe operating level.
   c. Switch contacts rated at 5 amps, 120 volts ac.
9. Motor Seal Failure Moisture Detection:
   a. Probes or sensors to detect moisture beyond seals.
   b. Probe or sensor monitoring module for mounting in motor controller, suitable for operation from 120-volt ac supply.
   c. Monitoring module with control power transformer, probe test switch and test light, and two independent 120-volt ac contacts, one opening and one closing when the flux of moisture is detected.
10. Bearing Overtemperature Protection for Motors Larger than 100 Horsepower:
    a. Sensor on lower bearing housing monitoring bearing temperature.

    b. Any monitoring relay necessary to provide 120-volt ac contact opening on bearing overtemperature.
11. Winding thermal protection, moisture detection, and bearing overtemperature specified above may be monitored by a single device providing two independent 120-volt ac contacts, one closing and one opening on malfunction.
12. Connecting Cables:

a. One cable containing power, control, and grounding conductors.
b. Each cable suitable for hard service, submersible duty with watertight seal where cable enters motor.
c. Length: 30 feet minimum, coordinate proper length.
d. UL 1 listed and sized in accordance with NFPA 70.

2.17 FACTORY TESTING

A. Tests:

1. In accordance with IEEE 112 for polyphase motors and IEEE 114 for single-phase motors.
2. Routine (production) tests on all motors in accordance with NEMA MG 1, plus no load power at rated voltage and polyphase, rated voltage measurement of locked rotor current. Test multispeed motors at all speeds.
3. For energy efficient motors, test efficiency at 50, 75, and 100 percent of rated horsepower:
   a. In accordance with IEEE 112, Test Method B, and NEMA MG 1, paragraphs 12.54 and 12.57.
   b. For motors 500 horsepower and larger where facilities are not available to test by dynamometer (Test Method B), determine efficiency by IEEE 112, Test Method F.

4. Power factor:
   a. Speed.
   b. Current at rated horsepower.
   c. kW input at rated horsepower.
   d. On motors of 100 horsepower and smaller, furnish a certified copy of a motor efficiency test report on an identical motor.

B. Test Report Forms:

1. Routine Tests: IEEE 112, Form A-1.

PART 3 - EXECUTION

3.01 INSTALLATION

A. In accordance with manufacturer's instructions and recommendations.

B. Align motor carefully and properly with driven equipment.

C. Secure equipment to mounting surface with anchor bolts. Provide anchor bolts meeting manufacturer's recommendations and of sufficient size and number for the specified seismic conditions.

3.02 FIELD QUALITY CONTROL

A. General: Inspection and testing limited to motors rated 5 horsepower and larger.

B. Visual and Mechanical Inspection:

1. Proper electrical and grounding connections.
2. Shaft alignment.
3. Blockage of ventilating air passageways.
4. Operate Motor and Check For:
   a. Excessive mechanical and electrical noise.
   b. Overheating.
   c. Correct rotation.
   d. Check vibration detectors, resistance temperature detectors, or motor inherent protectors for functionability and proper operation.
   e. Excessive vibration.
5. Check operation of space heaters.

C. Electrical Tests:

1. Insulation Resistance Tests:
   a. In accordance with IEEE 43 at test voltages established by NETA ATS, Table 10.2 for:
      1) Motors above 200 horsepower for l0-minute duration with resistances tabulated at 30 seconds, 1 minute, and 10 minutes.
      2) Motors 200 horsepower and less for 1-minute duration with resistances tabulated at 30 and 60 seconds.
   b. Insulation resistance values equal to, or greater than, ohmic values established by manufacturers.
2. Calculate polarization index ratios for motors above 200 horsepower. Investigate index ratios less than 1.5 for Class A insulation and 2.0 for Class B insulation.
3. Insulation resistance test on insulated bearings in accordance with manufacturer's instructions.
4. Measure running current and voltage, and evaluate relative to load conditions and nameplate full-load amperes.
5. Overpotential Tests:
   a. Applied dc voltage in accordance with IEEE 95.
   b. Limited to 4,000-volt motors rated 1,000 horsepower and greater.
   c. Test results evaluated on pass/fail basis.

3.03 SUPPLEMENTS

A. Table supplements, following "END OF SECTION," are a part of this Specification.

END OF SECTION

TABLE 1									
MOTOR PERFORMANCE REQUIREMENTS									
		% Guar. Min. Full Load Efficiency				%Guar. Min. Full Load Power Factor			
		Horizontal		Vertical		Horizontal		Vertical	
hp	Nom.Speed rpm	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC
1	1800	80.0	81.5			Mfr.'s Std.	Mfr.'s Std.		
	1200	78.5	79.3			Mfr.'s Std.	Mfr.'s Std.		
1.5	3600	79.3	81.5			Mfr.'s Std.	Mfr.'s Std.		
	1800	79.3	82.0			Mfr.'s Std.	Mfr.'s Std.		
	1200	82.5	84.0		82.0	Mfr.'s Std.	Mfr.'s Std.		Mfr.'s Std.
2	3600	82.0	84.0			Mfr.'s Std.	Mfr.'s Std.		
	1800	81.5	83.7			Mfr.'s Std.	Mfr.'s Std.		
	1200	85.5	85.5	83.7	83.7	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	900	82.9	82.5	82.9	81.7	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
3	3600	82.0	84.0	82.0	82.0	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1800	84.8	86.5	84.8	84.8	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1200	87.5	88.1	87.5	86.6	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	900	84.1	82.9	84.1	82.9	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
5	3600	84.8	86.5	84.8	84.8	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1800	86.5	86.5	84.8	84.8	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1200	87.5	88.1	87.5	86.6	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	900	87.5	86.5	87.5	86.6	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
7.5	3600	86.5	88.1	84.8	86.6	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1800	89.3	89.5	89.3	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1200	88.5	88.5	88.4	87.5	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	900	87.5	86.5	87.5	86.6	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
10	3600	89.3	89.5	89.3	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.

TABLE 1									
MOTOR PERFORMANCE REQUIREMENTS									
		% Guar. Min. Full Load Efficiency				%Guar. Min. Full Load Power Factor			
		Horizontal		Vertical		Horizontal		Vertical	
hp	Nom.Speed rpm	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC
	1800	89.3	89.5	89.3	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1200	89.5	89.5	89.3	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	900	89.3	88.5	89.3	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
15	3600	88.5	89.8	88.4	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1800	91.0	91.0	90.9	90.2	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1200	90.2	90.2	90.2	89.3	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	900	89.3	88.5	89.3	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
20	3600	91.0	90.6	90.9	89.3	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1800	91.7	91.7	91.7	90.9	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1200	91.0	90.6	90.2	89.3	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	900	90.2	89.5	89.3	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
25	3600	91.7	91.0	91.7	90.2	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1800	92.4	92.4	92.4	91.7	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1200	91.7	91.0	90.9	89.3	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	900	90.2	89.5	89.3	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
30	3600	91.7	91.4	89.5	88.4	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1800	92.4	92.4	92.4	91.7	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	1200	91.7	91.0	91.7	90.2	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
	900	91.7	91.7	90.9	90.9	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.	Mfr.'s Std.
40	3600	91.7	91.7	90.2	89.3	86.6	86.1	87.0	89.0
	1800	93.6	93.0	92.8	91.7	78.2	78.2	83.0	84.5
	1200	92.4	92.4	91.7	90.9	81.5	81.5	81.5	81.5
	900	91.7	91.0	90.9	90.2	70.0	70.5	70.0	70.5
50	3600	92.0	92.0	90.2	89.3	85.1	86.7	89.0	89.0
	1800	93.6	93.0	92.8	91.7	79.5	79.4	82.5	82.5
	1200	92.4	92.4	91.7	90.9	81.5	81.5	81.5	81.5

TABLE 1									
MOTOR PERFORMANCE REQUIREMENTS									
		% Guar. Min. Full Load Efficiency				%Guar. Min. Full Load Power Factor			
		Horizontal		Vertical		Horizontal		Vertical	
hp	Nom.Speed rpm	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC
	900	91.7	91.7	90.9	90.9	78.5	72.9	78.5	80.0
60	3600	92.7	93.0	91.7	90.9	85.8	88.3	87.5	89.0
	1800	93.6	94.1	93.5	92.8	80.5	79.9	80.5	80.5
	1200	93.0	93.0	92.8	91.7	81.5	81.5	81.5	81.5
	900	92.4	91.7	91.7	90.9	79.5	73.2	79.5	79.5
70	3600	93.6	93.6	91.7	91.7	87.1	88.5	88.5	88.5
	1800	94.5	94.5	93.5	93.5	81.0	81.5	81.0	81.5
	1200	93.6	93.5	93.5	92.8	82.0	82.0	82.0	82.0
	900	92.8	92.4	92.8	91.7	80.5	74.5	80.5	81.0
100	3600	93.6	93.3	91.7	90.7	87.0	88.2	87.0	88.5
	1800	95.1	94.5	94.0	93.5	81.0	81.0	81.0	81.0
	1200	93.6	93.6	92.8	92.8	82.1	81.7	85.5	85.5
	900	93.5	92.4	92.8	91.7	77.0	77.3	77.0	80.0
125	3600	93.6	93.7	91.7	91.7	86.4	89.1	87.0	90.5
	1800	94.5	94.7	93.5	92.8	85.4	85.5	87.5	86.0
	1200	93.6	94.1	93.5	92.8	82.7	82.3	85.5	85.5
	900	93.5	93.0	92.8	92.4	78.5	78.5	78.5	78.5
150	3600	93.6	93.7	92.4	91.7	86.5	90.0	86.5	90.5
	1800	95.0	95.2	94.5	94.0	82.5	85.0	84.5	85.0
	1200	94.5	94.5	93.5	94.0	81.5	81.5	81.5	81.5
	900	93.5	93.0	92.8	92.4	78.0	78.5	78.0	78.5
200	3600	94.3	94.3	92.4	93.0	87.8	89.4	91.0	91.0
	1800	95.0	95.2	94.0	94.0	85.2	86.5	87.0	87.0
	1200	94.5	94.5	93.5	93.5	79.0	82.5	79.0	82.5
250	3600	94.3	94.7	91.7	92.4	85.0	86.5	85.0	96.5

TABLE 1									
MOTOR PERFORMANCE REQUIREMENTS									
		% Guar. Min. Full Load Efficiency				%Guar. Min. Full Load Power Factor			
		Horizontal		Vertical		Horizontal		Vertical	
hp	Nom.Speed rpm	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC	Drip-proof ODP	TEFC
	1800	85.4	95.4	94.5	94.5	79.0	79.0	79.0	79.0
	1200	95.0	94.5	94.5	93.5	82.0	82.0	82.0	82.0
300	3600	93.7	94.3			89.8	89.9		
	1800	95.4	95.2	94.5	94.0	80.0	80.0	800	80.0
	1200	93.7	93.7			84.5	90.1		
350	3600	94.3	94.7			89.4	85.9		
	1800	94.7	94.7			85.9	85.9		
400	3600	94.3				88.4			
	1800	9437				86.8			
450	3600	94.7				89.1			
500	3600	94.7				88.3			

SECTION 16450
GROUNDING

PART 1 -- GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American National Standards Institute (ANSI): C2, National Electrical Safety Code (NESC).
2. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).

1.02 SUBMITTALS

A. Shop Drawings:

1. Product Data:
   a. Exothermic weld connectors.
   b. Mechanical connectors.

1.03 UL COMPLIANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

PART 2 -- PRODUCTS

2.01 GROUND ROD

A. Material: Copper clad.

B. Diameter: 3/4 inch.

C. Length: 20 feet.

2.02 GROUND CONDUCTORS

A. As specified in Section 16120, CONDUCTORS.

2.03 CONNECTORS

A. Exothermic Weld Type:

1. Outdoor Weld: Suitable for exposure to elements or direct burial.
2. Indoor Weld: Utilize low-smoke, low-emission process.
3. Manufacturers:
   a. Erico Products, Inc.; Cadweld amd Cadweld Exolon.
   b. Thermoweld.

B. Mechanical Type: Split-bolt, saddle, or cone screw type; copper alloy material.

1. Manufacturers:
   a. Burndy Corp.
   b. Thomas and Betts Co.

2.04 GROUNDING WELLS

A. Ground rod box complete with cast iron riser ring and traffic cover marked GROUND ROD.

B. Manufacturers:

1. Christy Co.; No. G5.
2. Lightning and Grounding Systems, Inc.; I-R Series.

PART 3 - EXECUTION

3.01 GENERAL

A. Grounding shall be in compliance with NFPA 70 and ANSI C2.

B. Ground electrical service neutral at service entrance equipment to supplementary grounding electrodes.

C. Ground each separately derived system neutral to nearest effectively grounded building structural steel member or separate grounding electrode.

D. Bond together system neutrals, service equipment enclosures, exposed non-current-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.

E. Shielded Power Cables: Ground shields at each splice or termination in accordance with recommendations of splice or termination manufacturer.

F. Shielded Control Cables:

1. Ground shield to ground bus at power supply for analog signal.
2. Expose shield minimum I inch at termination to field instrument and apply heat shrink tube.
3. Do not ground control cable shield at more than one point.

3.02 WIRE CONNECTIONS

A. Ground Conductors: Install in conduit containing power conductors and control circuits above 50 volts.

B. Nonmetallic Raceways and Flexible Tubing: Install an equipment grounding conductor connected at both ends to non current-carrying grounding bus.

C. Connect ground conductors to raceway grounding bushings.

D. Extend and connect ground conductors to ground bus in all equipment containing a ground bus.

E. Connect enclosure of equipment containing ground bus to that bus.

F. Bolt connections to equipment ground bus.

G. Bond grounding conductors to metallic enclosures at each end, and to intermediate metallic enclosures.

H. Junction Boxes: Furnish materials and connect to equipment grounding system with grounding clips mounted directly on box, or with 3/8-inch machine screws.

3.03 MOTOR GROUNDING

A. Extend equipment ground bus via grounding conductor installed in motor feeder raceway; connect to motor frame.

B. Nonmetallic Raceways and Flexible Tubing: Install an equipment grounding conductor connected at both ends to non current-carrying grounding bus.

C. Motors Less Than 10 hp: Furnish mechanical-type terminal connected to conduit box mounting screw.

D. Motors 10 hp and above: Tap motor frame or equipment housing; furnish mechanical-type terminal connected with minimum 5/16-inch brass threaded stud with bolt and washer.

E. Circuits 20 Amps or Above: Tap motor frame or equipment housing; install solderless terminal with minimum 5/16-inch diameter bolt.

3.04 GROUND RODS

A. Install full length with conductor connection at upper end.

B. Install with connection point below finished grade, unless otherwise shown.

3.05 GROUNDING WELLS

A. Install inside buildings, asphalt, and paved areas.

B. Install riser ring and cover flush with surface.

C. Place 9 inches crushed rock in bottom of each well.

3.06 CONNECTIONS

A. General:

1. Above grade Connections: Use either exothermic weld or mechanical-type connectors.
2. Below grade Connections: Install exothermic weld type connectors.
3. Remove paint, dirt, or other surface coverings at connection points to allow good metal-to-metal contact.
4. Notify ENGINEER prior to backfilling ground connections.

B. Exothermic Weld Type:

1. Wire brush or file contact point to bare metal surface.
2. Use welding cartridges and molds in accordance with manufacturer's recommendations.
3. Avoid using badly worn molds.
4. Mold to be completely filled with metal when making welds.
5. After completed welds have cooled, brush slag from weld area and thoroughly clean joint.

C. Mechanical Type:

1. Apply homogeneous blend of colloidal copper and rust and corrosion inhibitor before making connection.
2. Install in accordance with connector manufacturer's recommendations.
3. Do not conceal mechanical connections.

3.07 METAL STRUCTURE GROUNDING

A. Ground metal sheathing and exposed metal vertical structural elements to grounding system.

B. Bond electrical equipment supported by metal platforms to the platforms.

C. Provide electrical contact between metal frames and railings supporting pushbutton stations, receptacles, and instrument cabinets, and raceways carrying circuits to these devices.

3.08 TRANSFORMER GROUNDING

A. Bond neutrals of transformers within buildings to system ground network, and to any additional indicated grounding electrodes.

B. Bond neutrals of substation transformers to substation grounding grid and system grounding network.

C. Bond neutrals of pad-mounted transformers to four locally driven ground rods and buried ground wire encircling transformer and system ground network.

3.09 SURGE PROTECTION EQUIPMENT GROUNDING

A. Connect surge arrestor ground terminals to equipment ground bus.

3.10 INSTRUMENT GROUND - SURGE SUPPRESSION

A. Connect all instrument surge protection with #6 insulated copper ground wire (in conduit where above grade) to closest plant ground system.

3.11 BONDING

A. Bond to Main Conductor System:

1. All roof mounted ventilators, fans, air handlers, masts, flues, cooling towers, handrails, and other sizeable metal objects.
2. Roof flashing, gravel stops, insulation vents, ridge vents, roof drains, soil pipe vents, and other small metal objects if located within 6 feet of main conductors or another grounded object.
3. Provide air terminals as required.

B. Bond steel columns or major framing members to grounding system per National Electrical Code.

C. Bond each main down conductor to grounding system.

3.12 GROUNDING SYSTEM

A. Grounding Conductor:

1. Completely encircle building structure.
2. Bury minimum 30” below finished grade.
3. Minimum 2 feet distance from foundation walls.

B. Interconnect ground rods by direct-buried copper cables.

C. Connections:

1. Install ground cables continuous between connections.
2. Exothermic welded connections to ground rods, cable trays, structural steel, handrails, and buried and nonaccessible connections.
3. Provide bolted clamp type mechanical connectors for all exposed secondary connections.
4. Use bolded offset parapet bases or through-roof concealed base assemblies for air terminal connections.
5. Provide interconnections with electrical and telephone systems and all underground water and metal pipes.
6. Provide electric service arrestor ground wire to building water main.

3.13 FIELD QUALITY CONTROL

A. Visual and Mechanical Inspection:

1. Equipment and circuit grounds in motor control centers, panelboards, switchboards, and switchgear assemblies for proper connection and tightness.
2. Ground bus connections in motor control centers, panelboards, switchboards, and switchgear assemblies for proper termination and tightness,
3. Effective transformer core and equipment grounding.
4. Accessible connections to grounding electrodes for proper fit and tightness.
5. Accessible exothermic-weld grounding connections to verify that molds were fully filled and proper bonding was obtained.

B. Electrical Tests:

1. Fall-Of-Potential Test:

a. In accordance with IEEE 81, Section 8.2.1.5 for measurement of main ground system's resistance.
b. Main ground electrode system resistance to ground to be no greater than 5 ohms.

2. Two-Point Direct Method Test:
   a. In accordance with IEEE 81, Section 8.2. 1.1 for measurement of ground resistance between main ground system, equipment frames, and system neutral and derived neutral points.
   b. Equipment ground resistance shall not exceed main ground system resistance by 0.50 ohm.

- END OF SECTION -

SECTION 16485

VARIABLE FREQUENCY DRIVES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all labor, materials, equipment and incidentals required, and install, place in operation and field test variable frequency drive(s) (VFD's).

B. The variable frequency drive shall be a space vector Pulse-Width Modulated (PWM) design. Modulation methods which incorporate "gear-changing" techniques are not acceptable. The final responsibility of distributor or packager modifications to a third-party standard product will reside with the VFD manufacturer. The VFD manufacturer shall have overall responsibility for the drives. All drives shall be supplied by one manufacturer. The VFD shall be manufactured within the United States of America to alleviate concerns of future serviceability and parts availability.

C. VFD's shall be six (6) pulse units.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Pumps, General

1.03 QUALITY ASSURANCE

A. The entire VFD system as described in section 2.01B shall be factory assembled and system tested by the VFD manufacturer to assure a properly coordinated system.

B. Codes: Provide equipment in full accordance with the latest applicable rules, regulations, and standards of:

1. Local Laws and Ordinances.
2. State and Federal Laws.
3. National Electric Code (NEC).
4. Underwriters Laboratories (UL).
5. American National Standards Institute (ANSI).
6. National Electrical Manufacturers Association (NEMA).
7. Institute of Electrical and Electronics Engineers (IEEE).

C. The complete drive system shall be UL listed.

D. Acceptable Manufacturers:

1. Allen Bradley.
2. No Approved "or Equal"

1.04 SUBMITTALS

A. Submittals shall be custom prepared by the VFD manufacturer for this specific application.

B. Submittal information shall include, but not be limited to:

1. Equipment dimensions, including stub-up locations, shipping splits and shipping weights.
2. Catalog cuts of major components.
3. Spare parts list, per Paragraph 3.03.
4. Certifications, including:
   a. Warranty, per section 1.04.
   b. Efficiencies, per section 2.02.A.1.
5. Harmonic Distortion Analysis, per section 2.01D.

1.05 WARRANTY

A. All equipment furnished under this section shall be warranted for on site parts and labor by the CONTRACTOR and the equipment manufacturers for a period of five (5) years after completion of startup.

PART 2 - PRODUCTS

2.01 MATERIAL AND EQUIPMENT

A. Any modifications to a standard product required to meet this specification shall be performed by the VFD manufacturer only. Distributor or system integrator changes to the VFD manufacturer's product are specifically disallowed.

B. The VFD system shall consist of a power factor correction / harmonic filter unit, input rectifier-grade phase-shifting transformer, 6 pulse converter section, output inverter and control logic section, harmonic filtering unit, and input line reactor. All components listed including power factor correction / harmonic filter shall be integral to the VFD lineup, factory wired and tested as a complete system. The entire VFD system shall meet the requirements of NEC article 409 and IEEE 508A for fault current withstand ratings as indicated on the project electrical drawings.

C. Input circuit breaker, interlocked with the enclosure door, with through-the-door handle to provide positive disconnect of incoming AC power and shall be capable of being locked in the open position.

D. VFD system shall maintain a 0.95 minimum true power factor throughout the entire speed range.

2.02 VARIABLE FREQUENCY DRIVES

A. Ratings

1. The drive system shall be 96% efficient at full load and full speed and 95.5% efficient at 51% load and 80% speed. Losses to be utilized in drive system efficiency calculation shall include input transformer, harmonic filter and power

factor correction if applicable, VFD converter and output filter if applicable. Auxiliary controls, such as internal VFD control boards, cooling fans or pumps, shall be included in all loss calculations.

2. Rated Input Power: 460 Volts 60 Hz, +10%, -5% at rated load, 3-phase.
   a. Voltage Dip Ride-Through: VFD shall be capable of sustaining continued operation with a 40% dip in nominal line voltage. Output speed may decline only if current limit rating of VFD is exceeded.
   b. Power Loss Ride-through: VFD shall be capable of a minimum 3 cycle power loss ride-through without fault activation.
3. Output Power: As required by motors supplied.
4. Ambient Temperature Range: 0 to 40°C.
5. Elevation: Up to 3300 feet (1000 meters) above MSL without derating.
6. Atmosphere: Non-condensing relative humidity to 95%.
7. AC Line Frequency Variation: +/- 3 Hertz.
8. Power Unit Rating Basis: 110% rated current continuous, 150% rated current for one minute, at rated temperature.

B. Construction

1. The controller shall produce an adjustable AC voltage/frequency output. It shall have an output voltage regulator to maintain correct output V/Hz ratio despite incoming voltage variations.
2. The controller shall have a continuous output current rating of 100% of motor nameplate current.
3. The converter section shall be 6 pulse minimum utilizing diodes.
4. The inverter output shall be generated by IGBTs. Pulse Width Modulation strategy will be of the space vector type implemented to generate a sine-coded output voltage. The VFD shall not induce excessive power losses in the motor. The worst case RMS motor line current measured at rated speed, torque and voltage shall not exceed 1.05 times the rated RMS motor current for pure sine wave operation. The inverters shall be able to sustain 1600 volt surges.
5. The controller(s) shall be suitable for use with any standard NEMA-B squirrel-cage induction motor(s) having a 1.15 Service Factor or with existing standard NEMA-B squirrel-cage induction motor(s) with nameplate data as shown on the plans. Provide drives with dV/dT output filters manufactured by Trans-Coil type KLC if the pump is more than 50ft of cable length from VFD. At any time in the future, it shall be possible to substitute any standard motor (equivalent horsepower, voltage and RPM) in the field.
6. The control logic section shall be fully digital and not require analog adjustment pots or fixed selector resistors. A power failure will not necessitate a reload of any drive parameter or configuration.
7. Minimum Starting Speed: When called to operate, the VFD shall immediately ramp to a minimum speed. The minimum speed shall be adjustable but initially set at 70% of maximum speed. The 4-20 MA speed signal from the PLC and potentiometer on the front of the drive shall modulate the signal between the minimum speed setpoint and the maximum output speed of the drive; i.e., at the 4 MA signal, the VFD shall run at the minimum speed. At the 20 MA signal, the VFD shall run at full speed. The potentiometer shall also adjust speed between the minimum speed setpoint and the maximum running speed. Below the minimum speed setpoint, the potentiometer shall have no effect.
8. All 6-pulse VFD's shall be provided with 3% input line reactors.

C. Basic Features

1. The VFD shall include a customer selectable automatic restart feature. When enabled, the VFD shall automatically attempt to restart after a trip condition resulting from instantaneous overcurrent, overvoltage, out of saturation or overload. For safety, the drive shall shut down and require manual reset and restart if the automatic reset/restart function (programmable for up to 3 attempts) is not successful within a customer programmable time period. Auto-Restart shall be programmable to allow for individual fault selection.
2. A door-mounted membrane keypad with integral 2-line minimum, 24-character LCD display shall be furnished, capable of controlling the VFD and setting drive parameters. The keypad shall include the following features:
   a. The digital display must present all diagnostic message and parameter values in English engineering units when accessed, without the use of codes.
   b. The digital keypad shall allow the operator to enter exact numerical settings in English engineering units. A user menu written in plain English (rather than codes) shall be provided in software in nonvolatile memory as a guide to parameter setting and resettable in the field through the keypad. Multiple levels of password security shall be available to protect drive parameters from unauthorized personnel. The drive set up parameters must be able to be transferred to new boards to reprogram spare boards.
   c. The following digital door-mounted keypad indications may be selectively displayed:
      1) Speed demand in percent.
      2) Output current in amperes.
      3) Output Frequency in hertz.
      4) Input voltage.
      5) Output voltage.
      6) Total 3-phase KW.
      7) Kilowatt hour meter
      8) Elapsed time running meter.
      9) RPM.
      10) DC bus voltage.
   d. VFD shall have the capability of communicating via an RS-232, RS-422, or RS-485 port.
   e. VFD parameters, fault log and diagnostic log shall be downloadable via the RS-232, RS-422, or RS-485 port.
3. Refer to the VFD wiring diagram in the drawings for remote signals and alarms.

D. Enclosure

1. All VFD components shall be factory mounted and wired on a dead front, grounded, NEMA-1 enclosure. If a free-standing enclosure is provided, it shall be suitable for mounting on a concrete housekeeping pad.

E. Protective Features and Circuits: The controller shall include the following alarms and protective features:

1. Instantaneous overcurrent and overvoltage trip.
2. Undervoltage and power loss protection.

3. Power unit overtemperature alarm and protection. Upon sensing an overtemperature condition, the VFD is to automatically trip.
4. Electronic motor inverse time overload protection.
5. Responsive action to motor winding temperature detectors or thermostatic switches. A dry contact (NC) input to the VFD is required.
6. When power is restored after a complete power outage, the VFD shall be capable of catching the motor while it is still spinning and restoring it to proper operating speed without the use of an encoder.
7. The VFD shall be protected from damage due to the following, without requiring an output contactor:
   a. Three-phase short circuit on VFD output terminals.
   b. Loss of input power due to opening of VFD input disconnecting device or utility power failure during VFD operation.
   c. Loss of one (1) phase of input power.
8. The VFD shall continue to operate at a reduced capacity under a single-phase fault condition.
9. The VFD shall be able to withstand the following fault conditions without damage to the power circuit components:
   a. Failure to connect a motor to the VFD output.
   b. VFD output open circuit that may occur during operation.
   c. VFD output short circuit that may occur during operation.
10. Provide input line reactors (3% impedance) when no 12 or 18 pulse transformers are supplied or required.
11. Three phase lightning and surge protection across the line input at each VFD. Lea International TVSS #GB-100.
12. Provide 120V motor heater power that is active when the motor is off and is off when the motor is active.

F. Parameter Settings

1. The following system configuring settings shall be provided and field adjustable, without exception, through the keypad/display unit. Except for Motor Nameplate Data, all parameters must be adjustable while the processor is on-line and the drive is running.
   a. Motor Nameplate Data.
      1) Motor frequency.
      2) Number of poles.
      3) Full load speed.
      4) Motor volts.
      5) Motor full load amps.
      6) Motor HP.
      7) Current limit, max.
   b. VFD Configuration Parameters.
      1) Independent accelerate/decelerate rates.
      2) Max/Min speed (frequency).
      3) Catch-a spinning load selection.
      4) No load boost.
      5) Full load boost.
      6) Volts/Hertz ratio.
      7) Overspeed trip.
      8) Overload trip curve selection.

9) Overload trip time selection.

c. Automatic VFD Control.

1) PID utilizing an internal or external setpoint.
2) Three selectable critical speed avoidance bands with programmable bandwidths.
3) Auto start functions: On/Off, Delay On/Off. Operable from a 4-20mA signal or from the PID output, command, or feedback signal.
4) Speed Profile: Programmable entry and exit points.
5) Programmable loss of signal control: Stop, maintain last speed, or default to preselected setpoint.

2. All drive setting adjustments and operation parameters shall be stored in a parameter log which lists allowable maximum and minimum points as well as the present set values. This parameter log shall be accessible via a RS-232, RS-422, or RS-485 serial port as well as on the keypad display.

G. Input/Output Features

1. Two programmable analog inputs: VFD speed in, spare.
2. Three programmable analog outputs: VFD speed output, Drive (output) current in Amps, spare.
3. Two programmable digital inputs: Run, spare.
4. Ten programmable digital outputs: VFD fault, VFD running, VFD in remote, 6 spare.
5. One Pot input (three wire control, +10 V, wiper and common).
6. System Program providing built-in drive control or application specific configuration capability.

H. Diagnostic Features and Fault Handling

1. The VFD shall include a comprehensive microprocessor based digital diagnostic system that monitors its own control functions and displays faults and operating conditions.
2. A “Fault Log” shall be accessible via a RS-232, RS-422, or RS-485 serial link as well as line-by-line on the keypad display. The "FAULT LOG" shall record, store, display and output to a serial port upon demand, the following for the 64 most recent events:
   a. Date and time of day.
   b. Type of fault.
   c. All faults and events shall be stored and displayed in English, not fault codes.
3. A "HISTORIC LOG" shall record, store, and output to a RS-232, RS-422, or RS-485 serial link port upon demand, the following selectable control variables at 1 msec. intervals for the 58 intervals immediately preceding and the 20 intervals immediately following a fault trip:
   a. Torque demand.
   b. Torque command.
   c. Torque feedback.
   d. Torque error.
   e. Torque maximum.
   f. Current demand.
   g. Peak current.

h. Motor current.
i. DC bus voltage.
j. Line voltage.
k. Velocity demand.
l. Velocity reference.
m. PI min/max limit.
n. Boost.
o. VFD mode (Auto/Manual).

PART 3 - EXECUTION

3.01 FACTORY TESTING

A. The VFD manufacturer shall provide as a minimum, the following quality assurance steps within his factory:

1. Incoming inspection of components and raw materials based on strategic supplier base and experience. Sampling plans based on MIL STD 105E.
2. MIL STD 45662 calibration system.
3. All products subject to 100% testing and final inspection; no sampling plans permitted.

3.02 PRE-DELIVERY TESTING COORDINATION

A. One VFD unit of each specified type and application shall be shipped to the pump manufacturer's test facility for complete operational testing. The VFD Manufacturer shall provide a qualified representative at the pump Manufacturer's test facility during testing. All costs incurred by the VFD Manufacturer to meet this requirement shall be included in the bid.

B. Certified test reports shall be submitted to the ENGINEER before the equipment is shipped to the project site.

3.03 STARTUP AND TRAINING

A. VFD manufacturer shall provide the services of a factory technician for startup assistance and training. Verification of VFD input harmonic voltage and current distortion limits specified must be verified as part of final startup and acceptance. If harmonic distortion requirements are not met, it is the responsibility of the VFD supplier to meet the specification at the supplier's expense. A recording type Fluke 41 or equivalent harmonic analyzer displaying individual and total harmonic currents and voltages must be utilized.

B. A 10% payment retainage will be released upon field test verification of harmonic specification requirements and final acceptance.

3.04 SPARE PARTS

A. The following spare parts shall be furnished:

1. Three of each type of fuse rated 460V or less.
2. Two of each type of converter power semiconductor.

3. Two of each type of inverter power semiconductor.
4. One of each type of type control printed circuit board and gate firing boards.
5. One keypad assembly.

3.05 FIELD QUALITY CONTROL

A. Functional Test:

1. Conduct on each VFD.
2. Inspect controller for electrical supply termination connections, interconnections, proper installation, and quiet operation.
3. Vibration Test: Complete assembly, consisting of motor, load, and flexible shafting, connected and in normal operation, shall not develop amplitudes of vibration exceeding limits recommended by current edition of Hydraulic Institute Standards. Where pumps and motors are separated by intermediate flexible shafting, measure vibration both at top motor bearing and at two points on top pump bearing, 90 degrees apart.
4. Record test data for report.

B. Performance Test:

1. Conduct on each VFD.
2. Perform under actual or approved simulated operating conditions.
3. Test for continuous 48-hour period without malfunction.
4. Demonstrate performance by operating the continuous period while varying the application load, as the input conditions allow, in order to verify system performance.
5. Record test data for report.

- END OF SECTION -

PROJECT 12133

SECTION 16490

SOLID STATE REDUCED VOLTAGE STARTER

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide the solid state reduced voltage starter (SSRVS) as shown on the drawings and/or as specified herein. The SSRVS shall be microprocessor controlled suitable for use with three phase induction motors rated 600 VAC or less. It shall provide a closed loop current ramp for smooth and stepless motor acceleration and deceleration.

1.02 SYSTEM DESCRIPTION AND QUALIFICATIONS

A. The SSRVS shall be the product of a manufacturer who has produced SSRVS for a minimum of 10 years (consecutive).

B. The SSRVS shall be manufactured by

1. Benshaw, Inc., Redi-Start Micro Series
2. or ENGINEER approved equal

C. The SSRVS shall be U.L. labeled where U.L. has such a listing.

D. The SSRVS shall be designed, manufactured and tested to conform, where applicable, with the following industry standards and specifications:

1. Local Laws and Ordinances.
2. State and Federal Laws.
3. National Electrical Code (NEC).
4. State Fire Marshal.
5. Underwriters' Laboratories (UL).
6. National Electrical Safety Code (NESC).
7. American National Standards Institute (ANSI).
8. National Electrical Manufacturer's Association (NEMA).
9. National Electrical Contractor’s Association (NECA) Standard of Installation.
10. Institute of Electrical and Electronics Engineers (IEEE).
11. Insulated Cable Engineers Association (ICEA).
12. Occupational Safety and Health Act (OSHA).
13. National Electrical Testing Association (NETA).
14. American Society for Testing and Materials (ASTM).
15. Florida Building Code, including Local County amendments.

E. SSRVS performance requirements

1. Nominal operating ambient temperatures: 0 - 40 deg C (32 deg F to 104 deg F) with relative humidity of up to 95% (noncondensing).
2. Power: Operate with three phase AC power at nominal voltages 200 through 600 VAC.
3. Frequency: operates on 25 through 70 Hz.
4. Meet Uniform Building Code on Non-building structures, section 2338 for Zone 1.

2, 3, and 4 requirements.

F. Design Criteria:

DESCRIPTION	SPECIFICATION
Horsepower	HP: as shown on plans
Power Ratings	500% for 30 sec. and 125% cont.
PIV	2.5 x line voltage or 1200 PIV min.
Starting Torque	0 to 100%
Ramp Time	0 to 120 seconds
Decel Time	0 to 60 seconds
Nominal ratings	200 through 600 VAC. 25 through 70 Hz. With frequency tracking within this range
Standard Insulation Test	2500 VAC minimum
Overall Efficiency	Average 99.7%
SCR Firing Technique	Hard Drive with "picket fence"
Transient Voltage Protection	DV/DT=s or SIOV=s
Diagnostics and LEDs	Power On Gate Power Micro Computer Fault SCR Condition LCD display (16 char. X two lines.)
Control Input	120 VAC or dry contact, 2/3 wire.

1.03 SUBMITTALS

A. The following drawings/information shall he supplied by the SSRVS manufacturer in the shop drawings and with the shipment of each starter:

1. Elementary wiring diagrams.
2. Wiring and interconnect diagrams.
3. Enclosure frontal elevation and dimension drawings.
4. Internal component layout diagrams
5. Available conduit entry and exit locations.
6. Instruction manuals required for proper operation of the SSRVS.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualification: The manufacturer of the SSRVS shall be a firm experienced in manufacturing the equipment as specified herein for this project and who has a record of successful in-service performance.

1.05 DELIVERY, STORAGE AND HANDLING

A. Handling and shipment of the equipment shall be in such a manner to prevent internal component damage, breakage, and denting and scoring of the enclosure finish.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Benshaw, Inc.

B. ENGINEER approved equal.

2.02 GENERAL.

A. Provide SSRVS where and as shown on the plans and as described by frontal elevation drawings, one-line diagrams, and/or equipment schedules.

B. The SSRVS assembly shall include the necessary interface relays, timers, and those additional items necessary for interface to the pumps controls as identified on the plans.

C. The complete SSRVS shall be rated for an available fault current of 100,000 asymmetrical.

2.03 BYPASS CONTACTORS

A. A bypass contactor shall be supplied. This bypass contactor shall bypass the SCRs of the SSRVS once the motor is up to speed. The effect of the bypass contactor during run shall eliminate the heat buildup resulting from the voltage drop across the SCRs of the SSRVS.

B. It is the intent of the OWNER to use the bypass contactor also as a means of starting the motor should problems be encountered with the SSRVS. Therefore, the bypass contactor shall be rated for motor starting duty and a selector switch shall be mounted inside the enclosure such that the starting means can be selected as being either via the SSRVS or via the contactor as across-the-line.

2.04 SSRVS LOGIC CONTROL CONFIGURATION

A. Description

1. The SSRVS shall be supplied standard with programming buttons and local start/stop buttons on one main keypad with LCD display.
2. Standard starter control logic shall be located on a microprocessor-based PC card, which provides the sequential logic for the starter and gate signals to the power card, which is used to drive the SCRs.
3. Design control logic to perform timing required for operation of the SSRVS and bypass contactor while continuously monitoring motor and starter for faults. If a fault is detected, the control logic of the SSRVS shall provide fault indication via an LCD display. In the event of a fault condition, the control logic shall safely shut down the starter to disable the motor.
4. The PC cards of the SSRVS shall be interchangeable with other control logic cards on starters of a similar design.

B. Electrical

1. The logic control of the SSRVS shall incorporate a micro computer which consists of

all circuitry required to drive the power semiconductors and provide motor and starter monitoring functions.

2. The SSRVS logic shall provide the following standard features:
   a. Adjustable Ramp Time (0-120 seconds)
   b. Adjustable Initial Current (50-400% of motor FLA)
   c. Adjustable Max Current (200-600% of motor FLA)
   d. Adjustable Decel Profile for Pumps
   e. Line Phase Loss Detection
   f. Adjustable Line Current Imbalance Detection (10-40%)
   g. Adjustable Over/Under Line Voltage Protection (10-30%)
   h. Up To Speed Indication
   i. Line Phase Sequence Sensitivity or Insensitivity
   j. Selectable Solid State Overload Class (10, 20, 30, None)
   k. Selectable Motor Service Factor (1.0, 1.15, or 1.25)
   l. Adjustable Motor Full Load Amperes
   m. Adjustable Current Transformer Ratio
   n. Battery "Backup" of Set Starter Parameters
   o. Selectable Passcode Protection of Set Starter Parameters
   p. Line Voltage Independent Operation
   q. Line Frequency Tracking (25Hz Through 70Hz)
   r. Instantaneous Overcurrent Detection
   s. Shorted SCR Detection
   t. Software Selectable (Via LCD) Relay Outputs
   u. ""Revolving" Event Recorder (99 most recent events)
   v. LCD Status Display
3. Standard features shall operate concurrently.
4. The following optional features shall be included with each SSRVS:
   a. Selectable Automatic Energy Savings Feature
   b. Over/Under Current Fault Protection used in pumping applications for indicating pump jam
   c. Starts Per Hour Limiter
   d. Elapsed Time Meter (Via LCD Display)
   e. Time Between Starts Limiter

C. Software Selectable Relay Outputs

1. Two selectable relay outputs shall be provided with each SSRVS.
2. Relay outputs shall be selectable via LCD display.
3. Selectable relay outputs shall be from the following menu:
   a. Run
   b. Up To Speed
   c. Shorted SCR Trip
   d. Motor Thermal Overload Trip
   e. Motor Thermal Overload Warning
   f. Motor Thermal Overload Lockout
   g. SHT Fault Relay
4. The selectable relay outputs shall be in addition to one fixed general fault relay output. This general fault relay shall indicate any of the following faults:
   a. Line Phase Loss
   b. Line Phase Imbalance
   c. Low Three Phase Line
   d. Line Phase Sequence Change

e. Motor Thermal Overload Trip
f. Battery Backup Failure (Computer PC Card)
g. Instantaneous Overcurrent
h. Shorted SCR Fault
i. Three Phase Line Frequency Deviation
j. Control Power Failure
k. Computer Error
l. Up To Speed Fault (Stall Time Has Expired)

5. Contact ratings for output relays shall be rated 5 Amps inductive and 10 Amps resistive.

D. LCD Status Display

1. Each SSRVS shall have a keyboard/LCD display assembly designed to:
   a. Set or examine operating parameters.
   b. Provide starter status information.
   c. Provide real-time information about line current, voltage and frequency.
   d. Provide a means to start and stop the SSRVS.
2. The LCD display for the SSRVS shall be mounted on the deadfront inside the control panel.

E. LED Indicators

1. The following LED indicators shall be provided for advisory status and fault annunciation:
   a. Power On
   b. Micro Computer Fault
   c. SCR Gate Drive Power
   d. SCR Condition

PART 3- EXECUTION

3.01 SHIPPING AND HANDLING

A. All equipment parts shall be properly protected in accordance with Manufacturer requirements so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

B. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the ENGINEER.

C. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

D. Each box or package shall be properly marked to show its net weight in addition to its contents.

E. All scratched or otherwise marred painted surfaces shall be touched-up after installation to match original finishes.

3.02 INSTALLATION AND STARTUP

A. The Manufacturer, through the CONTRACTOR, shall examine all areas and conditions under which the SSRVS and motors are to be installed. The Manufacturer shall notify the CONTRACTOR, in writing of conditions detrimental to the proper completion of the work. No work shall proceed until all unsatisfactory conditions have been corrected in a manner acceptable to the CONTRACTOR.

B. If there are any difficulties in installation or operation of the equipment due to the Manufacturer's design or fabrication, additional services shall be provided at no cost or expense to the OWNER.

C. The CONTRACTOR shall be responsible for furnishing a Manufacturer's engineer to assist in installation, to inspect and adjust the equipment before initial service, and during startup. Testing, checkout, and start-up of the SSRVS system shall be performed under the technical direction of the manufacturer's service engineer. Under no circumstances, are any portions of the system to be energized without authorization from the manufacturer's representative.

D. Install SSRVS's and motors in accordance with the equipment Manufacturer's written instructions and with recognized industry practices; complying with applicable requirements of NEC, U.L. and NEMA standards, to insure that products fulfill requirements.

E. Tighten connectors and terminals, including screws and bolts, in accordance with equipment Manufacturer's published torque tightening values for equipment connectors. Where Manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in U.L. Standards 486A and B, and the National Electrical Code. The SSRVS enclosure shall not be used as a raceway for wiring unless a dedicated wiring space is provided. Wiring shall not run through or between components not served.

F. Prior to energization of SSRVS equipment, check with ground resistance tester, phase-to-phase and phase-to-ground insulation resistance levels to ensure requirements are fulfilled. Check circuitry for electrical continuity, and for short-circuits, and ensure that direction of rotation of each motor fulfills requirements.

G. Provide equipment grounding connections for SSRVS equipment as indicated. Tighten connections to comply with tightening torques specified in U.L. Standard 486A to assure permanent and effective grounding.

H. Upon completion of installation of SSRVS equipment and electrical circuitry, energize SSRVS circuitry and demonstrate functioning of equipment in accordance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and retest to demonstrate compliance.

3.03 SERVICES OF MANUFACTURER'S REPRESENTATIVE

A. The CONTRACTOR shall provide the services of a qualified Manufacturer's technical representative who shall adequately supervise the installation and testing of and start up of all equipment furnished under this Contract and instruct the CONTRACTOR's personnel and the OWNER's operating personnel in its maintenance and operation as outlined in the General Conditions. The services of the Manufacturer's representative

shall be provided for the periods stated in the following schedule:

	INSTALLATION TRIP (DAYS)	OPERATION TRIP* (DAYS)	GUARANTEE PERIOD TRIP (DAYS)
For each Type of SSRVS	2	2	2

* During the operation trip, the Manufacturer shall instruct OWNER's personnel.

A total of six (6) service days (48 hours) shall be provided by the Manufacturer's representative.

B. The Manufacturer's representative shall direct all final adjustments necessary for the drive system to meet all operational and performance requirements outlined herein.

C. Any additional time required to achieve successful installation and operation shall be at the expense of the CONTRACTOR. The Manufacturer's representative shall sign in and out at the office of the resident representative on each day of arrival at the project.

3.04 WARRANTY

A. Equipment furnished under this Section shall be guaranteed for two (2) years from the date of substantial completion.

B. Work shall include labor, materials, and travel time for necessary repairs at the job site.

END OF SECTION

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PROJECT 12133

SECTION 16810
CONTROL PANELS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide, install, and test all control panels and appurtenances as shown on the Drawings and as hereinafter specified.

1.02 STANDARDS

A. Control panels shall be in accordance with the National Electric Code and NEMA as applicable.

1.03 QUALITY ASSURANCE

A. The control panel manufacturer shall have total system control responsibility. The manufacturer shall have local experience in providing control panels of the types and functions as specified herein.

B. All control panels shall be either UL 508 listed or constructed by an UL approved shop and labeled accordingly.

1.04 CONTROL PANEL FUNCTIONS

A. The panel builder shall provide functions as described using his own standard schematics and arrangements. All wires shall be numbered and brought to numbered terminals. Complete schematics and outline Drawings shall be provided for approval.

PART 2 - PRODUCTS

2.01 CONSTRUCTION

A. All panels furnished shall be of the arrangement and design as shown on the Drawings and specified herein.

B. Panel construction shall be NEMA 4X 316 stainless steel with drip shield kit, 316 stainless steel, with door gasket and three (3) point stainless steel latch, handle with nylon rollers and drip edge. Internal components shall be mounted on a back panel and selector switches, lights, etc., mounted on an interior dead-front panel. Enclosure shall be painted white and have sun shields on top and sides.

C. Access doors or panels shall have continuous stainless steel hinges. Fabrication shall be of 11 gauge thick, sheet steel with stainless steel hardware, suitably braced internally for structural rigidity and strength. Front panels or sections containing instruments shall be not less than 7 gauge thick stretcher leveled sheet steel or 1/4 inch thick anodized aluminum, reinforced to prevent warping or distortion. All sections shall be descaled, degreased, filled, ground and finished with two rust-resistant phosphate prime coats and two (2) air dry silicone alkyd finish coats of enamel which shall be applied by either the hot air spray or conventional cold spray methods. The final finish shall be smooth, free of runs, and uniform in tone and thickness. Unless otherwise noted, the colors to be used shall be selected by the OWNER from color chips supplied by the panel

manufacturer. All cutouts shall be properly finished, including deburring and touch-up painting.

D. Nameplates shall be provided for all flush mounted equipment. The nameplates shall be constructed of black and white laminated, phenolic material having engraved letters approximately 1/4 inch high, extending through the black face into the white layer. Nameplates shall be attached to panels by self-tapping stainless steel screws.

E. Print storage pockets shall be provided on the inside of each panel. Its size shall be sufficient to hold all of the prints required to service the equipment. Reduced drawings shall be provided to be stored in these pockets.

F. All panel equipment shall be mounted and wired on or within the cabinet. All wiring within the panel shall be grouped together with harnesses or ducts and secured to the structure. All wiring shall be numbered in accordance with the numbering system used on the wiring/connection diagrams. Power and low voltage DC signal wiring shall be routed in separate wire ways. Crossing of the two system wires shall be at right angles. Parallel troughs of different systems shall be separated by a minimum of 12 inches. Wiring through for supporting internal wiring shall be plastic type with snap-on covers. The side walls shall be open-top type to permit wire changing without disconnecting. Wiring troughs shall not be filled to more than 60 percent visible fill. Wiring through covers shall be match marked to identify placement. If component identification is shown on covers for visibility, the ID shall also appear on the mounting sub-panel.

G. Power wire shall be minimum 12 AWG stranded, insulated for not less than 600 volts unless specified otherwise. Control wire shall be 14 AWG stranded, insulated and twisted shielded wire shall be 16 AWG. Use type XHHW-2 for outside to panel application and type MTW for wiring inside the panel. No THHN or other type of wire shall be used inside the control panel without the CITY approval. Wire color shall be, Line Power - Black; Neutral or common - White; AC Control - Red; DC Control - Blue; Equipment or Chassis Ground - Green; specified externally powered circuits - Orange.

H. All wiring shall terminate in a master terminal board, rigid type and numbered. The master terminal board shall have a minimum of 25 percent spares. Terminal blocks shall be arranged in horizontal rows and separated into groups. (Power, AC control, DC signal, and alarm). Terminal blocks shall be barrier type with the appropriate voltage rating (600 volts minimum) and shall be the raised channel mounted type. Wire connectors shall be the hook fork type with non insulated barrel for crimp type compression connection to the wire. Wire and tube markers shall be the sleeve type with heat impressed letters and members. Direct interlock wiring between equipment will not be allowed. Only one side of a terminal block row shall be used for internal wiring. The field wiring side of the terminal shall not be within six (6) inches of the side panel or adjacent terminal.

I. All components shall be mounted in a manner that shall permit servicing, adjustment, testing and removal without disconnecting, moving or removing any other component. Components mounted on the inside panels shall be mounted on removable plates and not directly to the enclosure. Mounting shall be rigid and stable unless shock mounting is required by the manufacturer to protect equipment from vibration. Component mounting shall be oriented in accordance with the component manufacturer's and industries' standard practices. All internal components shall be identified with suitable plastic or metal engraved tags attached with drive pins adjacent to (not on) each component identifying the component in accordance with the drawing, specifications, and supplier's data.

2.02 PUSH BUTTONS

A. Push buttons shall be heavy-duty, oil tight, with momentary contacts. Switches shall be supplied with the number of poles required for the application, an escutcheon plate, and contacts rated for 10 amperes at 120 volts AC. Push buttons shall be as manufactured by Square-D, Class 9001, Type K or approved equal by CITY.

2.03 ROTARY HAND SWITCHES

A. Rotary selector switches shall be heavy duty oil tight, with the number of poles and number of positions as required. Switches shall have a pistol grip handle and be of the maintained contact type rated for 10 amps at 120 volts AC. The switches required for "electronic duty" shall have low, stable, contact resistance and gold contacts. Provide make-before-break bridging contacts where required. Rotary hand switches shall be as manufactured by Square-D, Class 9001, Type K, standard knob, or approved equal by CITY.

2.04 LED PILOT LIGHTS

A. LED indicating lights shall be provided as shown on the Drawings. Units shall be approximately 1/2 inch diameter. Bulbs shall be of the push-to-test type shall be as manufactured by Square-D, unless otherwise noted on the drawings, or approved equal by CITY.

2.05 RELAYS

A. Relays shall be double pole, double throw, octal plug-in type with a transparent dust cover. The relay shall be equipped with an indicating light to indicate when its coil is energized. The relays shall have 10 amperes 120 volt AC contacts. Relays shall be as manufactured by Square D, Class 8501, Type KP, unless otherwise noted on the drawings, or approved equal by CITY.

2.06 TIME DELAY RELAYS

A. Time delay relays shall be of the pneumatic type with time delay and instantaneous contacts. Time delay relays shall be double pole, double throw with output contacts rated at 10 amperes, 120 volt AC minimum. The time delay relays shall be set for sixty seconds except where otherwise shown on the Drawings but shall be adjustable from 0 to 180 seconds. Time delay relays shall be as manufactured by Square-D, Class 9050, Type A, unless otherwise noted on the drawings, or approved equal by CITY.

2.07 TIMERS

A. Timers shall be plug-in type with a dust and moisture resistant case. The timers shall be of the multirange/analog or digital type with selectable ranges. The output contacts shall be rated at 10 amperes 120 volt AC minimum. The timer shall have a "timing in progress" indication. Timers shall be manufactured by Square D, or approved equal by CITY.

2.08 CIRCUIT BREAKERS

A. Circuit breakers shall be thermal-magnetic, molded case, permanent trip. Voltage, current, interrupting ratings, and number of poles required shall be as shown on the Drawings. Circuit breakers used in 120/240 volt control panels shall be UL listed and

have an interrupting capacity of not less than 18,000 amperes, RMS, symmetrical. Circuit breakers shall be manufactured by Square D, or approved equal by CITY.

B. Do not substitute single-pole circuit breakers with handle ties for multi-pole breakers.

2.09 SURGE PROTECTIVE DEVICE (SPD) POWER APPLICATIONS

A. Refer to specification 16050.

2.10 PHASE MONITOR

A. Phase monitor shall be a three phase solid state device with voltage sensing capabilities. Phase monitor shall have undervoltage capabilities with a UL listed relay. The monitor shall protect the motor against phase loss, phase unbalance, phase reversal, and undervoltage. Phase monitor shall be manufactured by ACT, or approved equal by CITY.

2.11 MOTOR STARTER

A. The motor starter shall be a full voltage non reversing, NEMA rated, three phase starter with thermal motor overload units. Overload units shall have manual resets. Motor starter shall be manufactured by Square D, or approved equal by CITY.

2.12 CONTROL POWER TRANSFORMER

A. If applicable, control power transformer shall be rated for 240x480V/120V A.C. and shall be rated with the appropriate kVA rating as called out in drawings. Control power transformer shall be manufactured by Square D, or approved equal by CITY.

2.13 DUPLEX RECEPTACLE

A. A 20A duplex receptacle shall be installed within the control panel. Receptacle shall be GFCI Type and shall be manufactured by Leviton Company Type 6599-I, unless otherwise noted on the drawings, or approved equal by CITY.

2.14 INTRINSICALLY SAFE RELAYS

A. Intrinsically safe control relays shall be as manufactured by Pepperl + Fuchs, unless otherwise noted on the drawings, or approved equal by CITY.

2.15 ELAPSED TIME METER

A. Elapsed time meter shall be as manufactured by Yokogawa Type 240, unless otherwise noted on the drawings, or approved equal by CITY.

2.16 TERMINAL BLOCKS

A. Terminal blocks shall be as manufactured by Square D Class 9080, unless otherwise noted on the drawings, or approved equal by CITY.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Seal all conduit entrances into control panels using sealing fittings as detailed on the drawings.

3.02 TESTS

A. The supplier shall test all equipment at the factory prior to shipment. Coordinate with pump supplier for testing and startup at the site for each lift station.

3.03 ACCEPTANCE

A. Upon successful completion of operation test and subsequent review and approval of the complete system's final documentation, the system shall be considered as acceptable.

- END OF SECTION -

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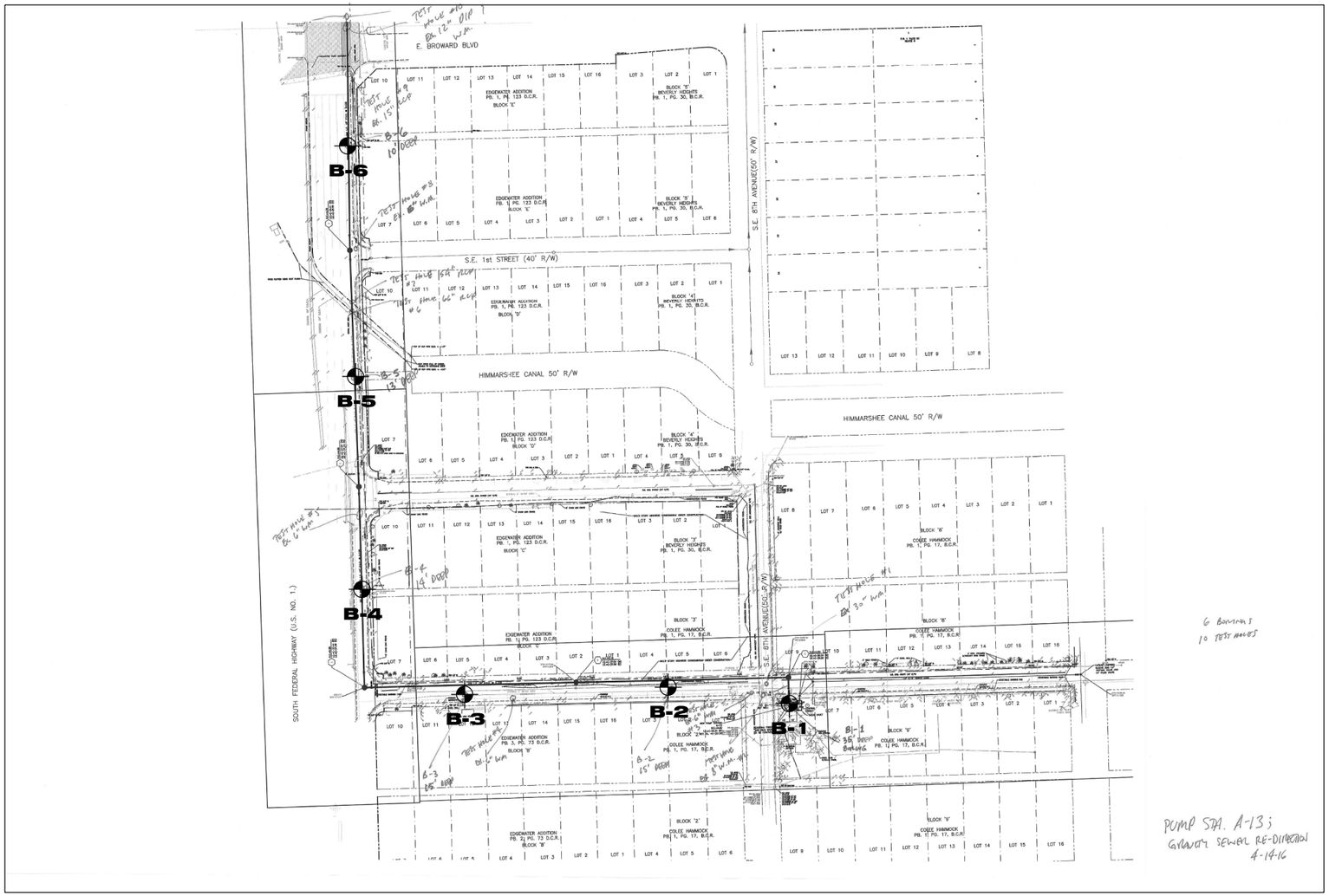
APPENDIX A

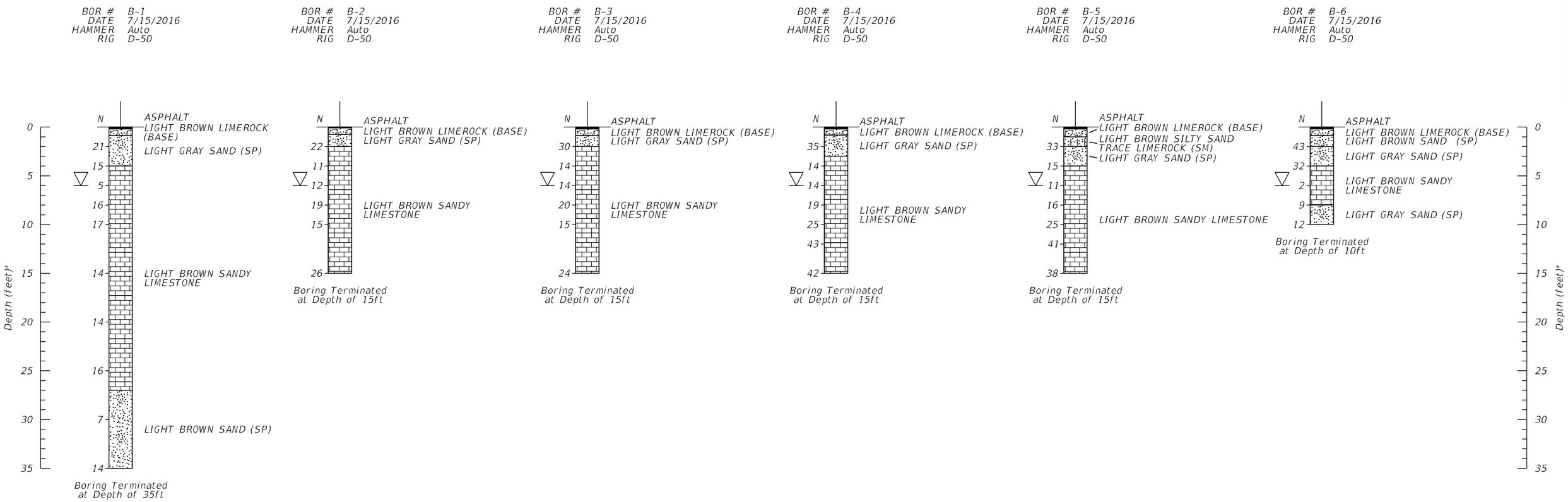
GEOTECHNICAL REPORT BY TIERRA



BORING LOCATION PLAN

Approximate Location of SPT Boring

DRAWN BY:	APPROVED BY:	ENGINEER OF RECORD:		SCALE:	PROJECT NUMBER:	GEOTECHNICAL ENGINEERING SERVICES	Sheet:
NG	RK		RAMAKUMAR VEDULA, P.E. P.E. LICENSE NUMBER 54873 TIERRA SOUTH FLORIDA 2765 VISTA PARKWAY, S-10 WEST PALM BEACH, FL 33411 CERTIFICATE OF AUTHORIZATION 28073	NTS	7111-16-150	PUMP STATION A-13 GRAVITY SEWER RE-DIRECTION FORT LAUDERDALE , FLORIDA	1
CHECKED BY: MP 6/15/2017 12:06 PM	DATE: 07-25-2016						



Asphalt

Sandy Gravel

Sand

Limestone Hard

Silty Sand

NOTES

∇ ENCOUNTERED GROUNDWATER TABLE

NC NUMBERS TO THE LEFT OF BORINGS INDICATE CORRECTED SPT VALUE FOR 12" PENETRATION USING AN AUTOMATIC HAMMER CORRECTION FACTOR OF 1.24

* DENOTES DEPTH IN FEET FROM EXISTING GROUND SURFACE

DRAWN BY: NG CHECKED BY: MP 6/15/2017 12:06 PM	APPROVED BY: RK DATE: 07-25-2016	ENGINEER OF RECORD:	RAMAKUMAR VEDULA, P.E. P.E. LICENSE NUMBER 54873 TIERRA SOUTH FLORIDA 2765 VISTA PARKWAY, S-10 WEST PALM BEACH, FL 33411 CERTIFICATE OF AUTHORIZATION 28073	SCALE: NTS	PROJECT NUMBER: 7111-16-150	GEOTECHNICAL ENGINEERING SERVICES **PUMP STATION A-13** **GRAVITY SEWER RE-DIRECTION** FORT LAUDERDALE , FLORIDA

Sheet: 2

APPENDIX B

TESTHOLE REPORT BY INFRAMAP

InfraMap CORP

Complete Utility Infrastructure Surveying and Mapping Since 1987

TEST HOLE INVENTORY

PROJECT: A-13 PUMP STATION EAST OF FEDERAL HIGHWAY
CLIENT: CRAVEN THOMPSON AND ASSOCIATES

PROJECT MANAGER: ANDRES GARCIA
PROJECT NO.: PF05916

DATE: 06-24-2016

* NO SURVEY REQUIRED.
* SPECIFIC TEST HOLE NOTES FOLLOWING INVENTORY

NOTE: INDIVIDUAL TEST HOLE MARKERS INCLUDE: PK NAIL, HUB & TACK, CHIS "X", STEEL PIN OR SPIKE.
THESE ARE SET OVER THE CROWN OR EDGE OF THE UTILITY FOUND. (SEE COLUMN LABELED TEST HOLE MARKER OR NOTES.)

LEGEND	H/T	HUB & TACK TEST HOLE MARKER
	PK	PK NAIL TEST HOLE MARKER
	DBC	DIRECT BURIED CABLE
	X	CHIS "X" TEST HOLE MARKER
	SPK	SPIKE TEST HOLE MARKER
	RCP	REINFORCED CONCRETE PIPE
UTILITY COMPANIES	WATER	CITY OF FORT LAUDERDALE
	SANITARY FORCE MAIN	CITY OF FORT LAUDERDALE
	FIBER OPTIC	UNKNOWN UTILITY OWNER

TH#	TYPE OF UTILITY	SIZE & MATERIAL	QTY.	UTILITY DIRECTION	COVER	TOP OF UTIL ELEV	NORTHING & EASTING	SURVEY PIN ELEV	TEST HOLE MARKER
1	SANITARY FORCE MAIN	36"± DUCTILE IRON	1	N/S	4.14	N/A	N/A	N/A	SEE NOTE
2	WATER	6" DUCTILE IRON	1	E/W	2.79	N/A	N/A	N/A	PK CROWN
3	WATER	30" DUCTILE IRON	1	N/S	5.02	N/A	N/A	N/A	PK CROWN
4	WATER	DUCTILE IRON	1	N/S	5.04	N/A	N/A	N/A	SEE NOTE
5	WATER	8" DUCTILE IRON	1	N/S	4.90	N/A	N/A	N/A	PK CROWN
6	WATER	6" DUCTILE IRON	1	E/W	2.66	N/A	N/A	N/A	PK CROWN
7	WATER	6" DUCTILE IRON	1	E/W	2.55	N/A	N/A	N/A	SEE NOTE
8	FIBER OPTIC	4" PVC (ORANGE & GRAY)	2	N/S	5.10	N/A	N/A	N/A	SEE NOTE
9	WATER	6" DUCTILE IRON	1	E/W	3.43	N/A	N/A	N/A	PK CROWN
10	WATER	6" DUCTILE IRON	1	N/S	3.88	N/A	N/A	N/A	PK CROWN
11	WATER	6" CAST IRON	1	N/S	3.66	N/A	N/A	N/A	PK CROWN
12	UNKNOWN	12" ASBESTOS CEMENT	1	N/S	3.20	N/A	N/A	N/A	SEE NOTE
13	STORM	48" RCP	1	NW/SE	4.95	N/A	N/A	N/A	SEE NOTE
14	STORM	SEE NOTE / RCP	1	NW/SE	4.45	N/A	N/A	N/A	SEE NOTE
15	WATER	6" CAST IRON	1	N/S	1.83	N/A	N/A	N/A	PK CROWN
16	WATER	6" CAST IRON	1	N/S	2.92	N/A	N/A	N/A	SEE NOTE
17	STORM	15" RCP	1	NW/SE	2.20	N/A	N/A	N/A	SEE NOTE
18	WATER	12" DUCTILE IRON	1	E/W	3.40	N/A	N/A	N/A	SEE NOTE

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TEST HOLE NOTES

TEST HOLE # 1	SANITARY FORCE MAIN	NOTE: 30" SANITARY FORCE MAIN REQUESTED AT THIS LOCATION. TEST HOLE REVEALED A 37"± O.D. SANITARY FORCE MAIN AT THIS LOCATION. UNABLE TO OBTAIN ACCURATE SIZE DUE TO SOLID ROCK SURROUNDING UTILITY. PK SET OVER CROWN OF UTILITY.
TEST HOLE # 4	WATER	NOTE: UNABLE TO OBTAIN SIZE DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. PLANS INDICATE A 30" WATER AT THIS LOCATION. PK SET OVER APPROXIMATE CROWN OF UTILITY.
TEST HOLE # 7	WATER	NOTE: 8" WATER REQUESTED AT THIS LOCATION. TEST HOLE REVEALED A 6"' DUCTILE IRON WATER. TEST HOLE ALSO REVEALED (8) 4" PVC (GRAY) UNKNOWN (POSSIBLE TELEPHONE), RUNNING NORTH-SOUTH, 0.40' WEST OF PK. TOTAL WIDTH = 2.00. COVER = 3.14. UNABLE TO OBTAIN BOTTOM COVER DUE TO TRENCH WALL. PK SET OVER CROWN
TEST HOLE # 8	FIBER OPTIC	NOTE: TEST HOLE MOVED 20' NORTH OF REQUESTED AREA DUE TO DECORATIVE PAVING. TOTAL WIDTH = 0.80. POSSIBLE ADDITIONAL CONDUITS BELOW, UNABLE TO DETERMINE DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. CHIS "X" SET OVER CROWN OF WESTERN MOST 4" PVC (ORANGE) FIBER OPTIC CONDUIT.
TEST HOLE # 12	UNKNOWN	NOTE: 6" WATER REQUESTED AT THIS LOCATION. TEST HOLE EXCAVATED ON WATER LOCATOR MARKS. TEST HOLE REVEALED A 12" ASBESTOS CEMENT UNKNOWN (POSSIBLE SLEEVE FOR 6" WATER). PK SET OVER CROWN OF 12" UNKNOWN.
TEST HOLE # 13	STORM	NOTE: SIZE OBTAINED AT CROWN OF EAST END OF SOUTHERN MOST 48" RCP OUTFALL. NOTE WE WERE UNABLE TO LOCATE THE SOUTHERN MOST 48" RCP WEST OF TEST HOLE 13. (SEVERAL ATTEMPTS WERE MADE). PK SET OVER APPROXIMATE CROWN OF PIPE.
TEST HOLE # 14	STORM	NOTE: TEST HOLE REVEALED LARGE RCP STORM PIPE. UNABLE TO OBTAIN SIZE DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. HUB SET OVER TOP OF
TEST HOLE # 16	WATER	NOTE: TEST HOLE ALSO REVEALED A 2" STEEL UNKNOWN (POSSIBLE STREET LIGHTING) CONDUIT, RUNNING NORTH-SOUTH, 0.15' WEST OF CHIS "X". COVER = 0.72. CHIS "X" SET OVER CROWN OF 6" WATER.
TEST HOLE # 17	STORM	NOTE: 15" PIPE SIZE OBTAINED IN STORM DRAIN INLET. PK SET OVER CROWN OF PIPE.
TEST HOLE # 18	WATER	NOTE: TEST HOLE MOVED 15' EAST OF REQUESTED LOCATION DUE TO DECORATIVE PAVING. PK SET OVER CROWN OF 12" WATER.

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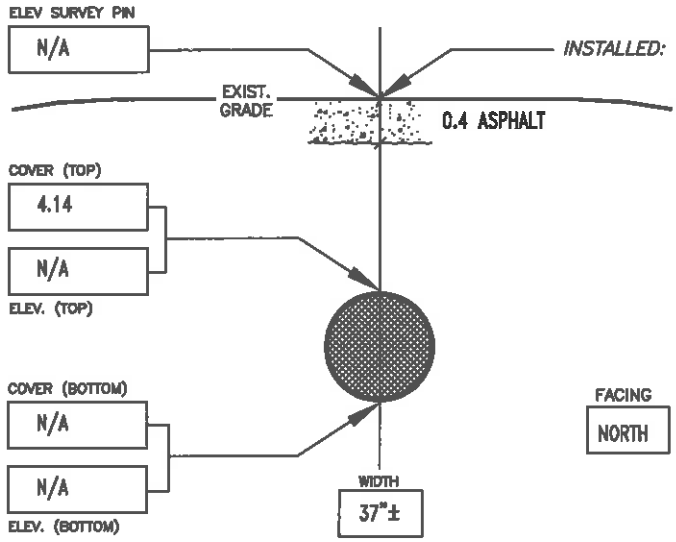
PN: PF05916 **VACUUM TEST HOLE REPORT NO.:** 1

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	30" SANITARY FORCE MAIN	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	SANITARY FORCE MAIN	FORM BY:	BP ASSISTED BY: ML MP # OF HOLES: 1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	GOOD DATE DUG: 6-6-16
SIZE AS FOUND:	36"±	SOIL CONDITIONS:	HARD DRY ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: GREEN

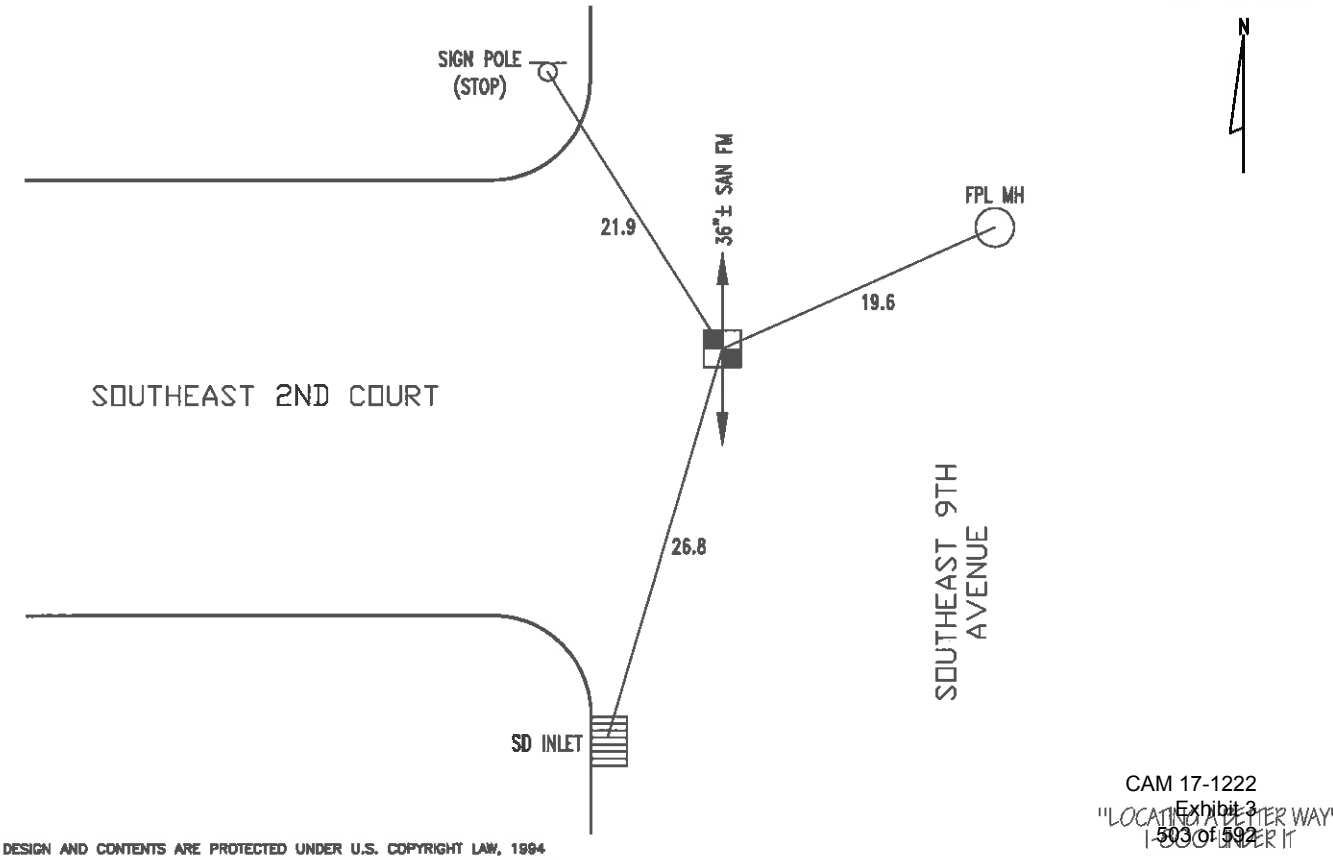
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: 30" SANITARY FORCE MAIN REQUESTED AT THIS LOCATION. TEST HOLE REVEALED A 37"± O.D. SANITARY FORCE MAIN AT THIS LOCATION. UNABLE TO OBTAIN ACCURATE SIZE DUE TO SOLID ROCK SURROUNDING UTILITY. PK SET OVER CROWN OF UTILITY.

NOT TO SCALE



"LOCATING A BETTER WAY"
1-800-UNDER IT

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PN: PF05916 **VACUUM TEST HOLE REPORT NO.:** 2

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A
		WORK ORDER #	N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	6" WATER	SHEET #:	N/A OF N/A
		PROPOSED:	UTILITY WORK
UTILITY FOUND:	WATER	FORM BY:	BP
		ASSISTED BY:	MP
		# OF HOLES:	1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	GOOD
		DATE DUG:	6-4-16
SIZE AS FOUND:	6"	SOIL CONDITIONS:	SOFT DRY SAND
		UTILITY CONDITION:	GOOD

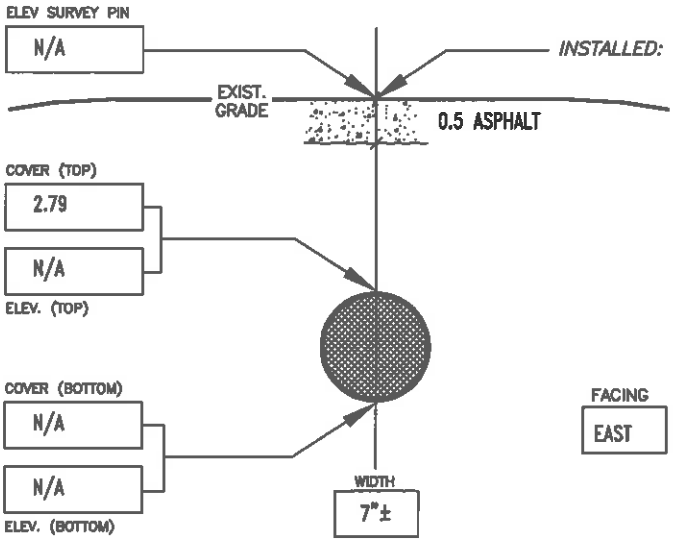
INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

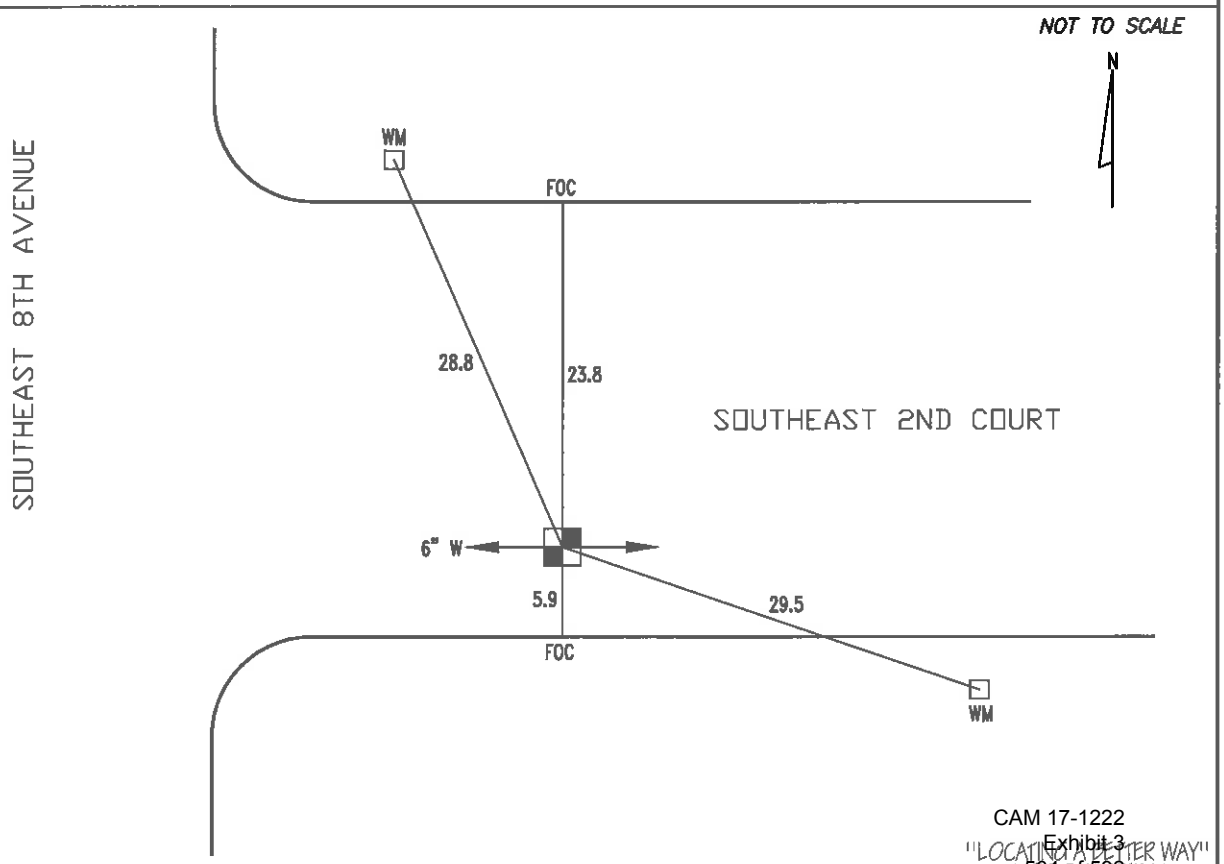
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:





"LOCATING A BETTER WAY"
1-800 UNDER IT

InfraMap CORP

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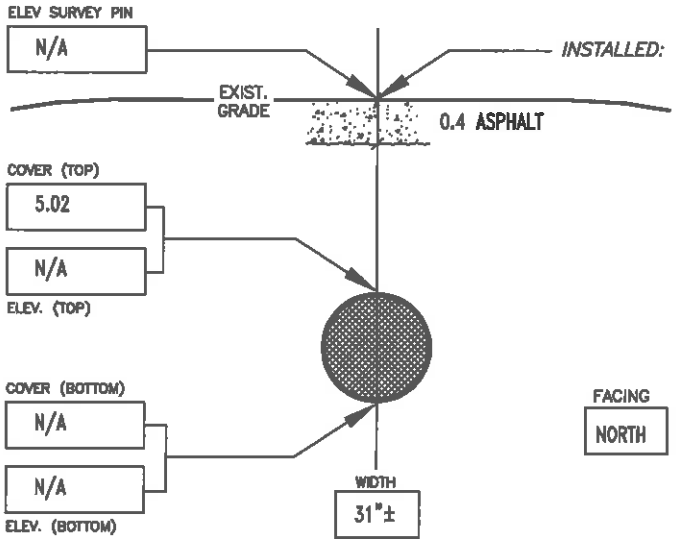
PN: PF05916 **VACUUM TEST HOLE REPORT NO.:** 3

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	WORK ORDER #	N/A
UTILITY REQUESTED:	30" WATER	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY FOUND:	WATER	SHEET #: N/A OF N/A	PROPOSED: UTILITY WORK
MATERIAL AS FOUND:	DUCTILE IRON	FORM BY: BP ASSISTED BY: ML MP	# OF HOLES: 1
SIZE AS FOUND:	30"	PAVING CONDITION: GOOD	DATE DUG: 6-6-16
		SOIL CONDITIONS:	HARD MOIST SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

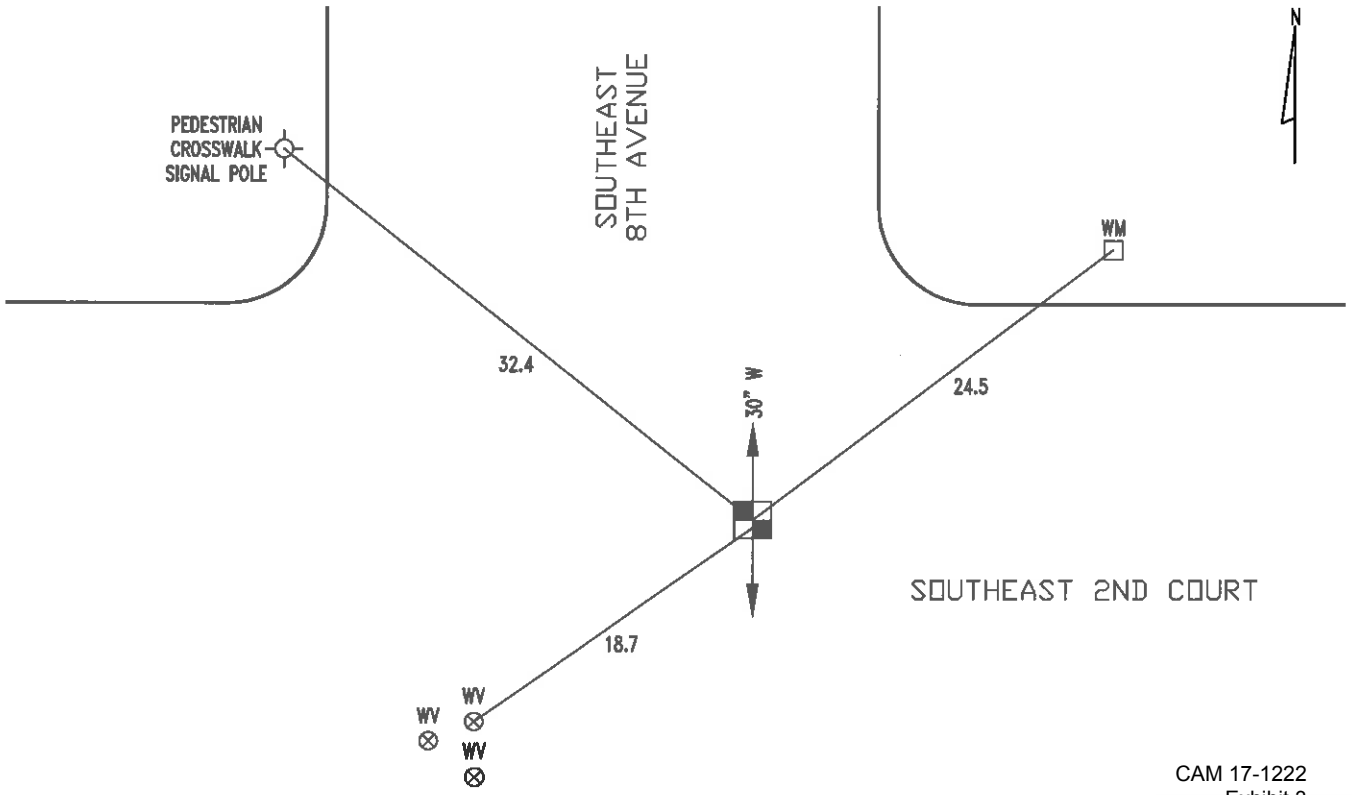
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:

NOT TO SCALE



"LOCATING A BETTER WAY"
"SEE UNDER IT"

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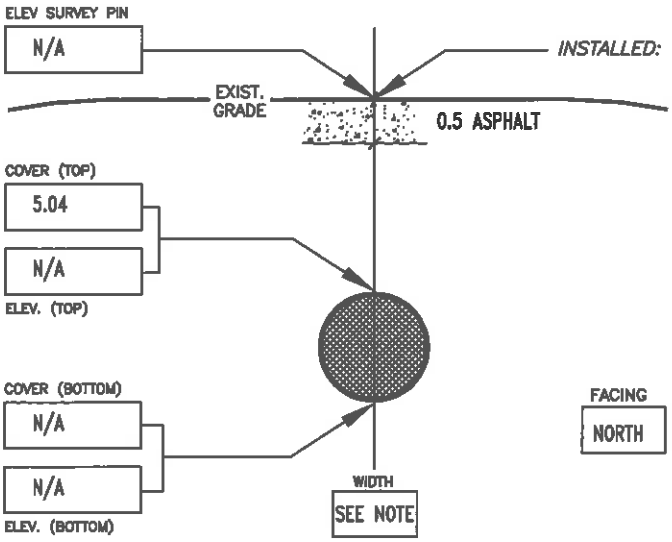
PN: PF05916 VACUUM TEST HOLE REPORT NO.: 4

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	30" WATER	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	WATER	FORM BY:	BP ASSISTED BY: MP # OF HOLES: 1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	GOOD DATE DUG: 6-4-16
SIZE AS FOUND:	SEE NOTE	SOIL CONDITIONS:	HARD WET SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

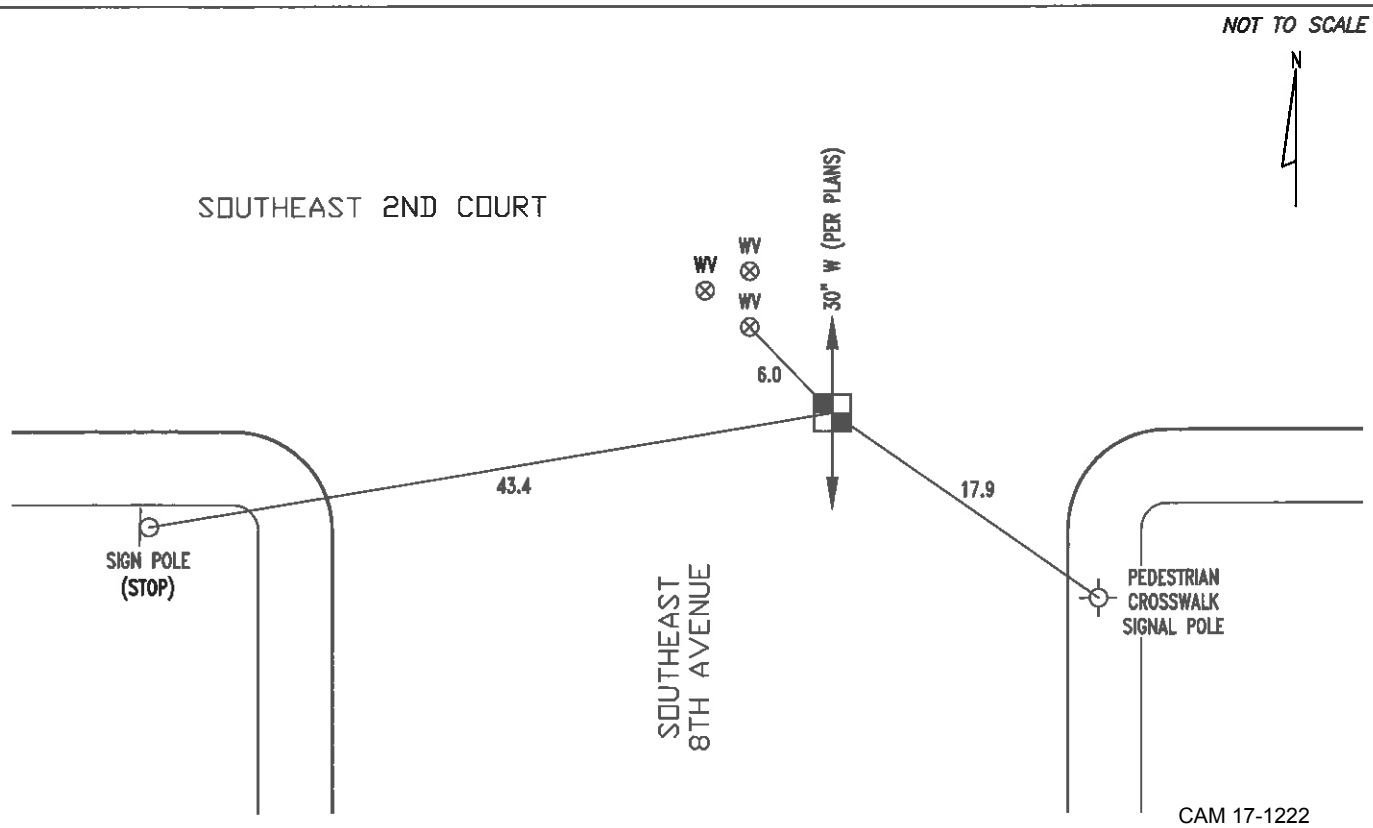
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: UNABLE TO OBTAIN SIZE DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. PLANS INDICATE A 30" WATER AT THIS LOCATION. PK SET OVER APPROXIMATE CROWN OF UTILITY.

NOT TO SCALE



"LOCATING A BETTER WAY"
I SEE UNDER IT

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PN: PF05916 VACUUM TEST HOLE REPORT NO.: 5

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	WATER	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	WATER	FORM BY:	BP ASSISTED BY: MP # OF HOLES: 1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	GOOD DATE DUG: 6-4-16
SIZE AS FOUND:	8"	SOIL CONDITIONS:	SOFT MOIST SAND ROCKY
		UTILITY CONDITION:	GOOD

ELEV SURVEY PIN: N/A

INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

EXIST. GRADE — 0.5 ASPHALT

COVER (TOP): 4.90

ELEV. (TOP): N/A

COVER (BOTTOM): N/A

ELEV. (BOTTOM): N/A

WIDTH: 9"±

FACING: NORTH

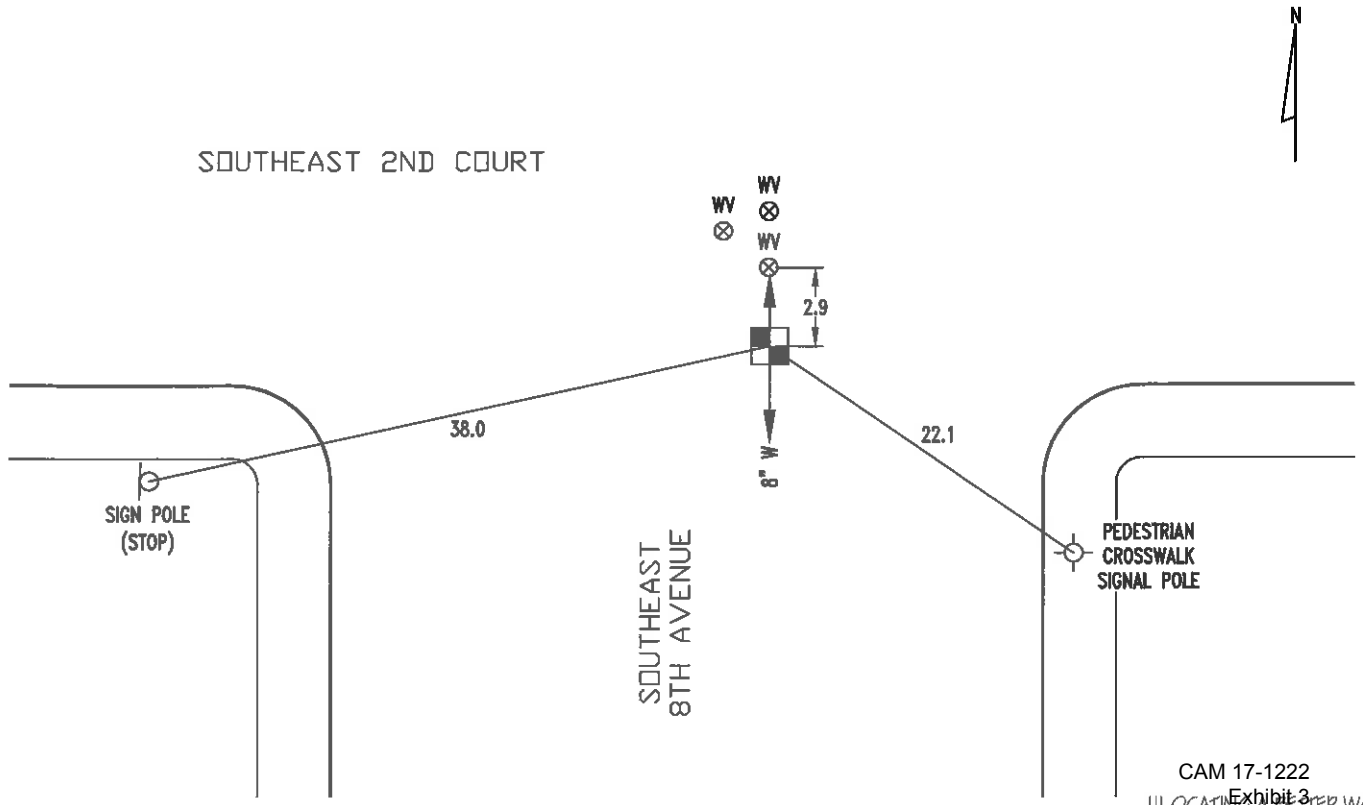
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:

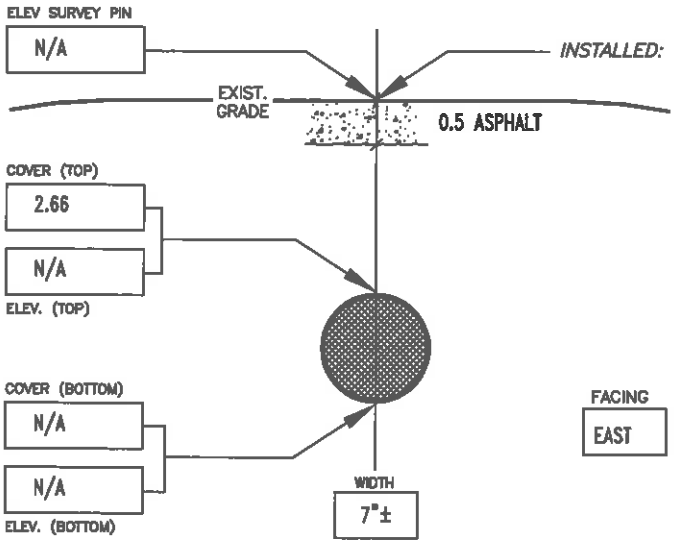
NOT TO SCALE



"LOCATING A BETTER WAY"
1-800 UNDER IT

PN: PF05916 VACUUM TEST HOLE REPORT NO.: 6

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	WORK ORDER #	N/A
UTILITY REQUESTED:	6" WATER	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY FOUND:	WATER	SHEET #: N/A OF N/A	PROPOSED: UTILITY WORK
MATERIAL AS FOUND:	DUCTILE IRON	FORM BY: BP ASSISTED BY: ML MP	# OF HOLES: 1
SIZE AS FOUND:	6"	PAVING CONDITION: GOOD	DATE DUG: 6-6-16
		SOIL CONDITIONS:	HARD DRY SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

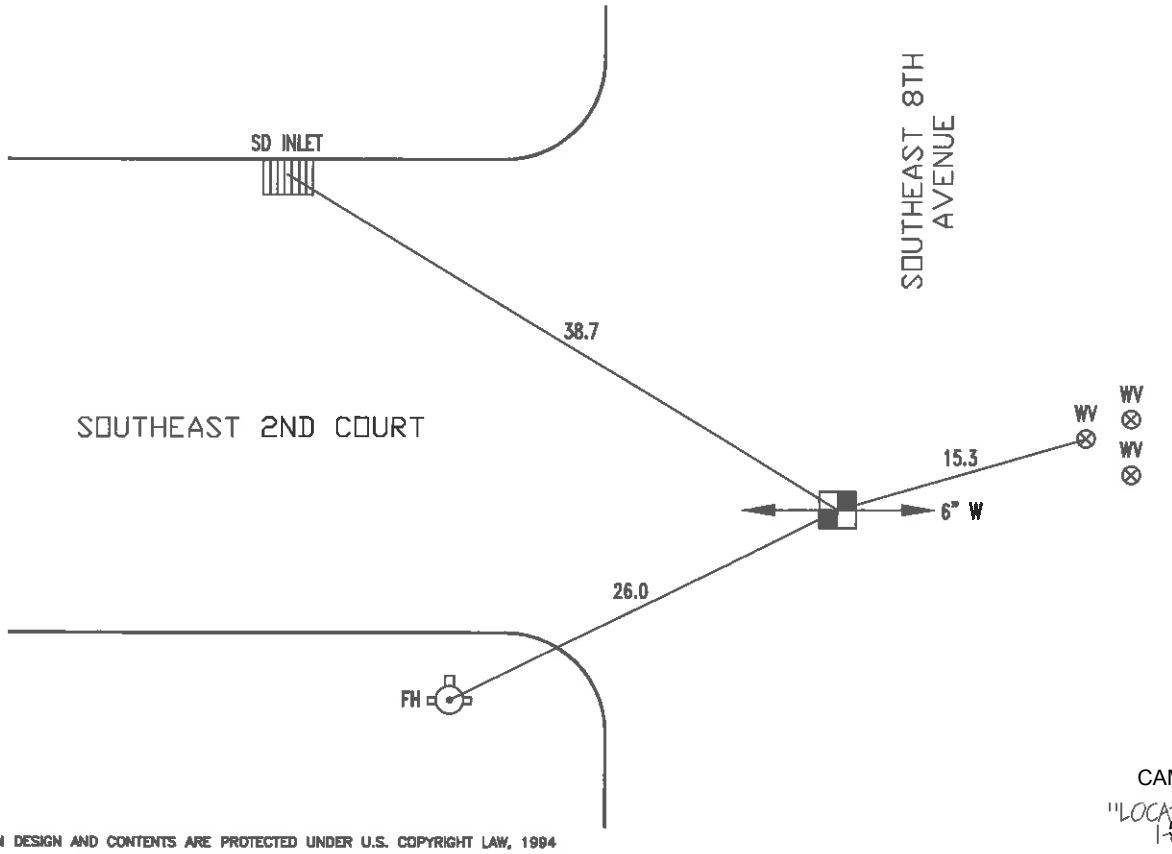
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:

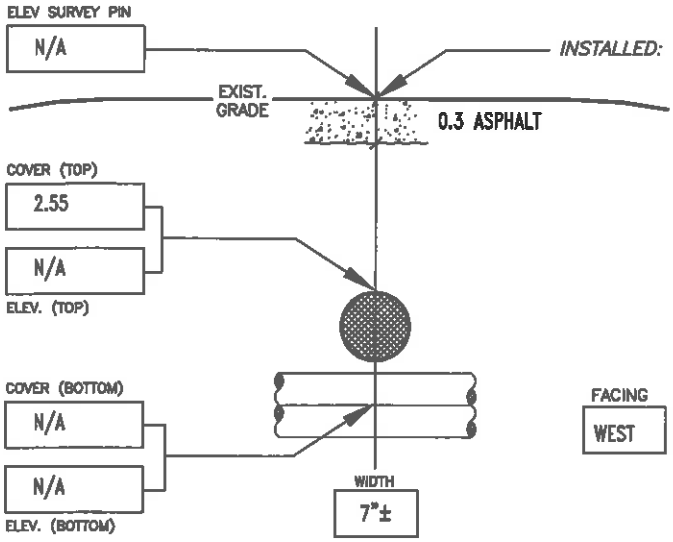
NOT TO SCALE



"LOCATING A BETTER WAY" I SEE UNDER IT

PN: PF05916 VACUUM TEST HOLE REPORT NO.: 7

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	8" WATER	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	WATER (SEE NOTE)	FORM BY:	BP ASSISTED BY: ML MP # OF HOLES: 1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	GOOD DATE DUG: 6-6-16
SIZE AS FOUND:	6"	SOIL CONDITIONS:	HARD DRY SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

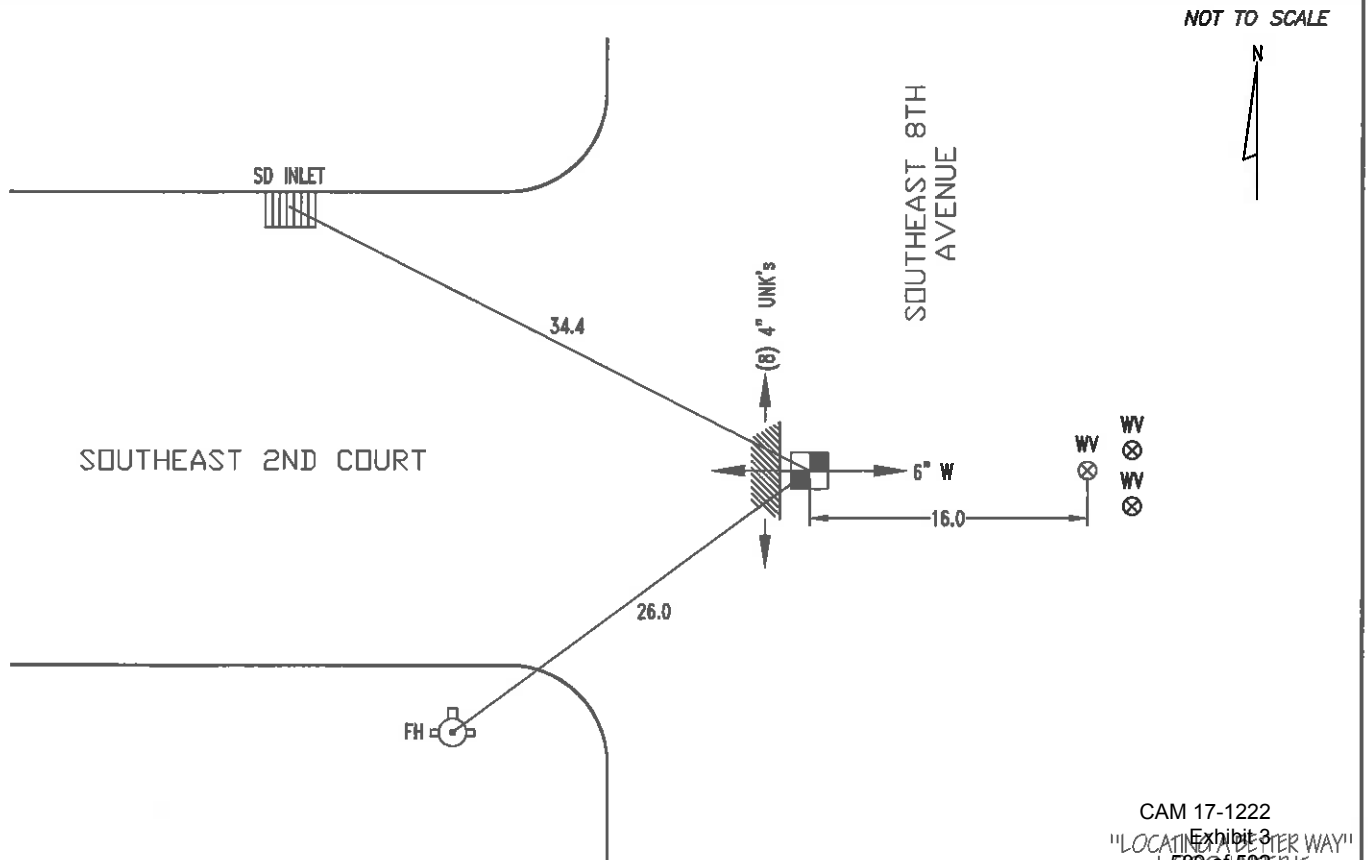
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: 8" WATER REQUESTED AT THIS LOCATION. TEST HOLE REVEALED A 6"' DUCTILE IRON WATER. TEST HOLE ALSO REVEALED (8) 4" PVC (GRAY) UNKNOWN (POSSIBLE TELEPHONE), RUNNING NORTH-SOUTH, 0.40' WEST OF PK. TOTAL WIDTH = 2.00. COVER = 3.14. UNABLE TO OBTAIN BOTTOM COVER DUE TO TRENCH WALL. PK SET OVER CROWN OF 6" WATER.

NOT TO SCALE



PN: PF05916 VACUUM TEST HOLE REPORT NO.: 8

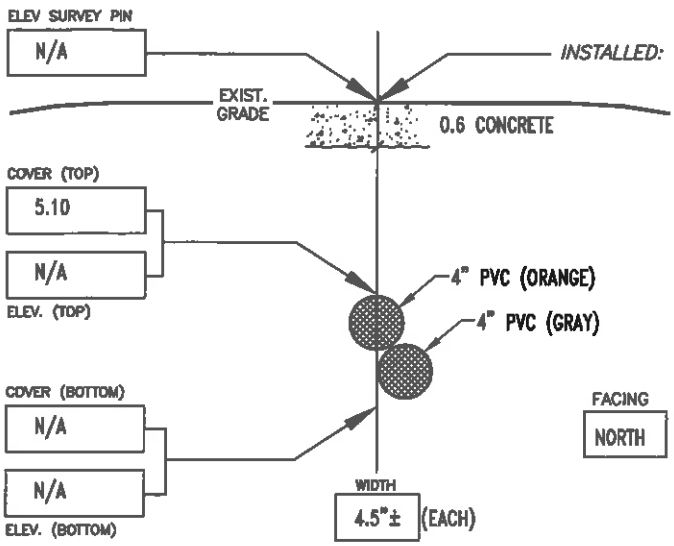
PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	FIBER OPTIC	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	FIBER OPTIC	FORM BY:	BP ASSISTED BY: ML MP # OF HOLES: 1
MATERIAL AS FOUND:	PVC (ORANGE) & (GRAY)	PAVING CONDITION:	GOOD DATE DUG: 6-6-16
SIZE AS FOUND:	(2) 4"	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	GOOD

INSTALLED: CHIS "X" AT: CROWN OF UTILITY. MARKING TAPE: ORANGE

SURVEY PIN LOCATED BY: N/A

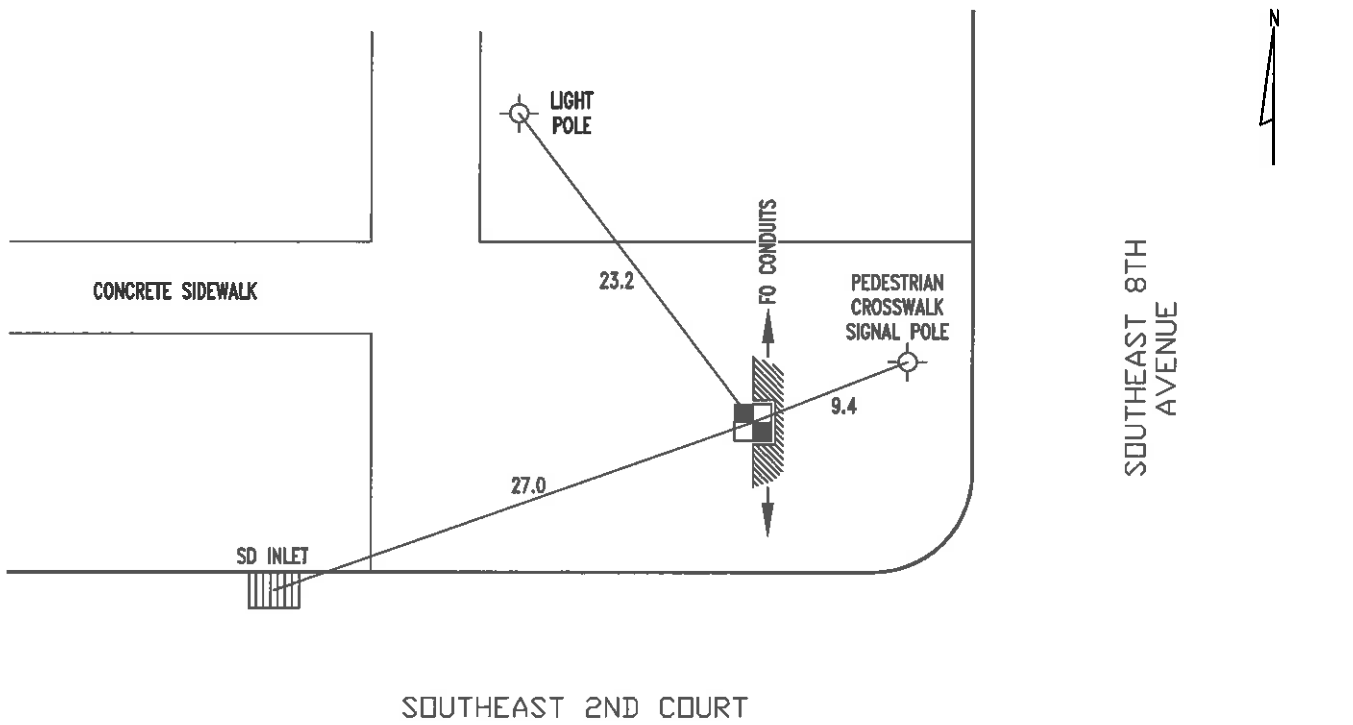
SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.



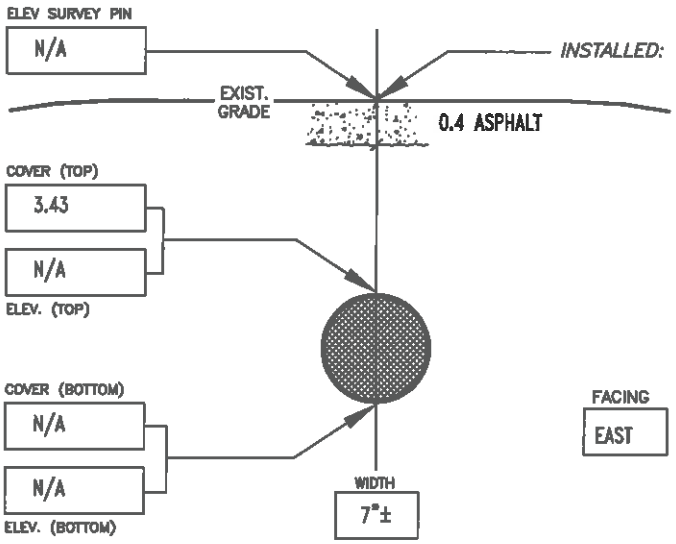
NOTES: TEST HOLE MOVED 20' NORTH OF REQUESTED AREA DUE TO DECORATIVE PAVING. TOTAL WIDTH = 0.80. POSSIBLE ADDITIONAL CONDUITS BELOW, UNABLE TO DETERMINE DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. CHIS "X" SET OVER CROWN OF WESTERN MOST 4" PVC (ORANGE) FIBER OPTIC CONDUIT.

NOT TO SCALE



PN: PF05916 VACUUM TEST HOLE REPORT NO.: 9

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	6" WATER	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	WATER	FORM BY:	BP ASSISTED BY: ML MP # OF HOLES: 1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	GOOD DATE DUG: 6-7-16
SIZE AS FOUND:	6"	SOIL CONDITIONS:	SOFT DRY SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

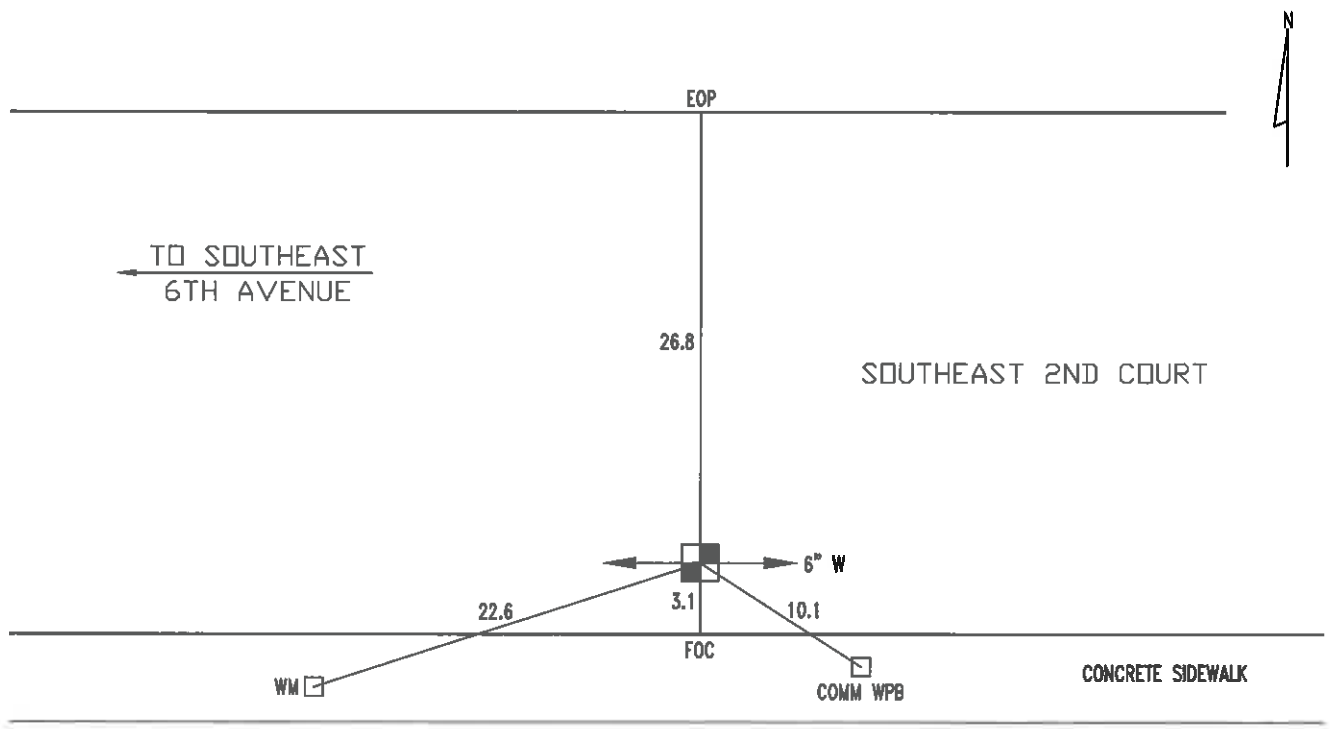
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:

NOT TO SCALE



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PN: PF05916 **VACUUM TEST HOLE REPORT NO.:** 10

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A
		WORK ORDER #	N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	6" WATER	SHEET #:	N/A OF N/A
		PROPOSED:	UTILITY WORK
UTILITY FOUND:	WATER	FORM BY:	BP
		ASSISTED BY:	ML MP
		# OF HOLES:	1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	GOOD
		DATE DUG:	6-7-16
SIZE AS FOUND:	6"	SOIL CONDITIONS:	SOFT DRY SAND ROCKY
		UTILITY CONDITION:	GOOD

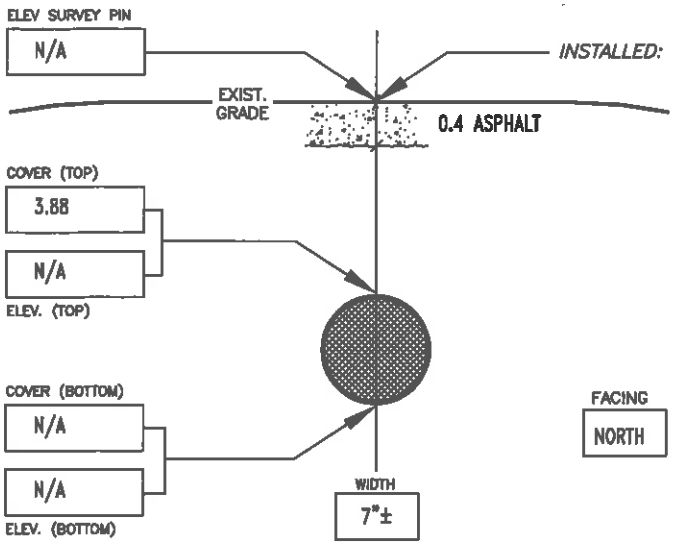
INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

SURVEY PIN LOCATED BY: N/A

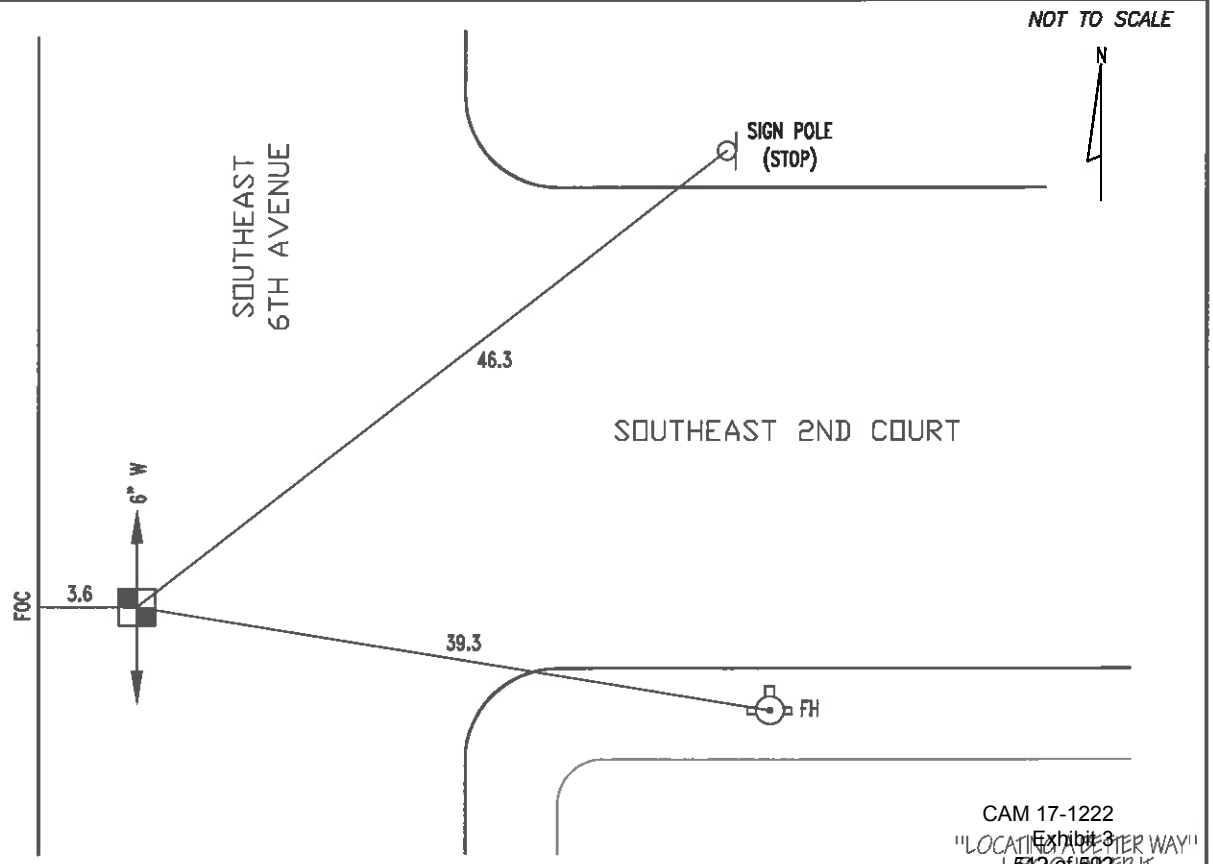
SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:



NOT TO SCALE



"LOCATING A BETTER WAY"

PN: PF05916 VACUUM TEST HOLE REPORT NO.: 11

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	WATER	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	WATER	FORM BY:	ER ASSISTED BY: JC JT # OF HOLES: 1
MATERIAL AS FOUND:	CAST IRON	PAVING CONDITION:	GOOD DATE DUG: 6-6-16
SIZE AS FOUND:	6"	SOIL CONDITIONS:	SOFT DRY SAND ROCKY
		UTILITY CONDITION:	GOOD

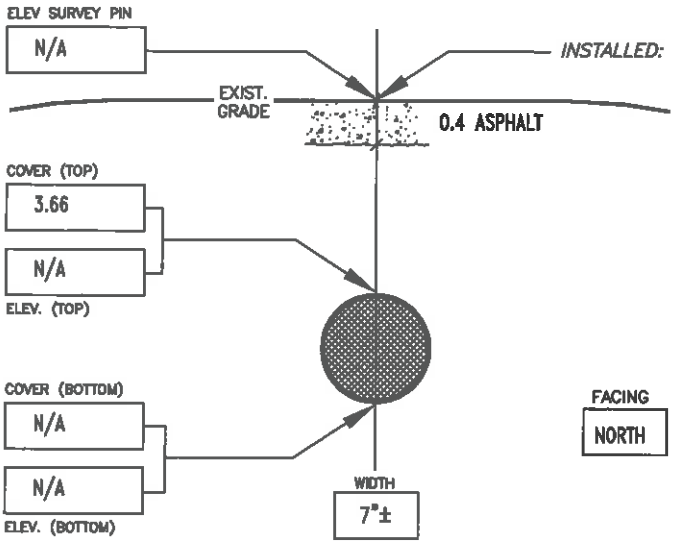
INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

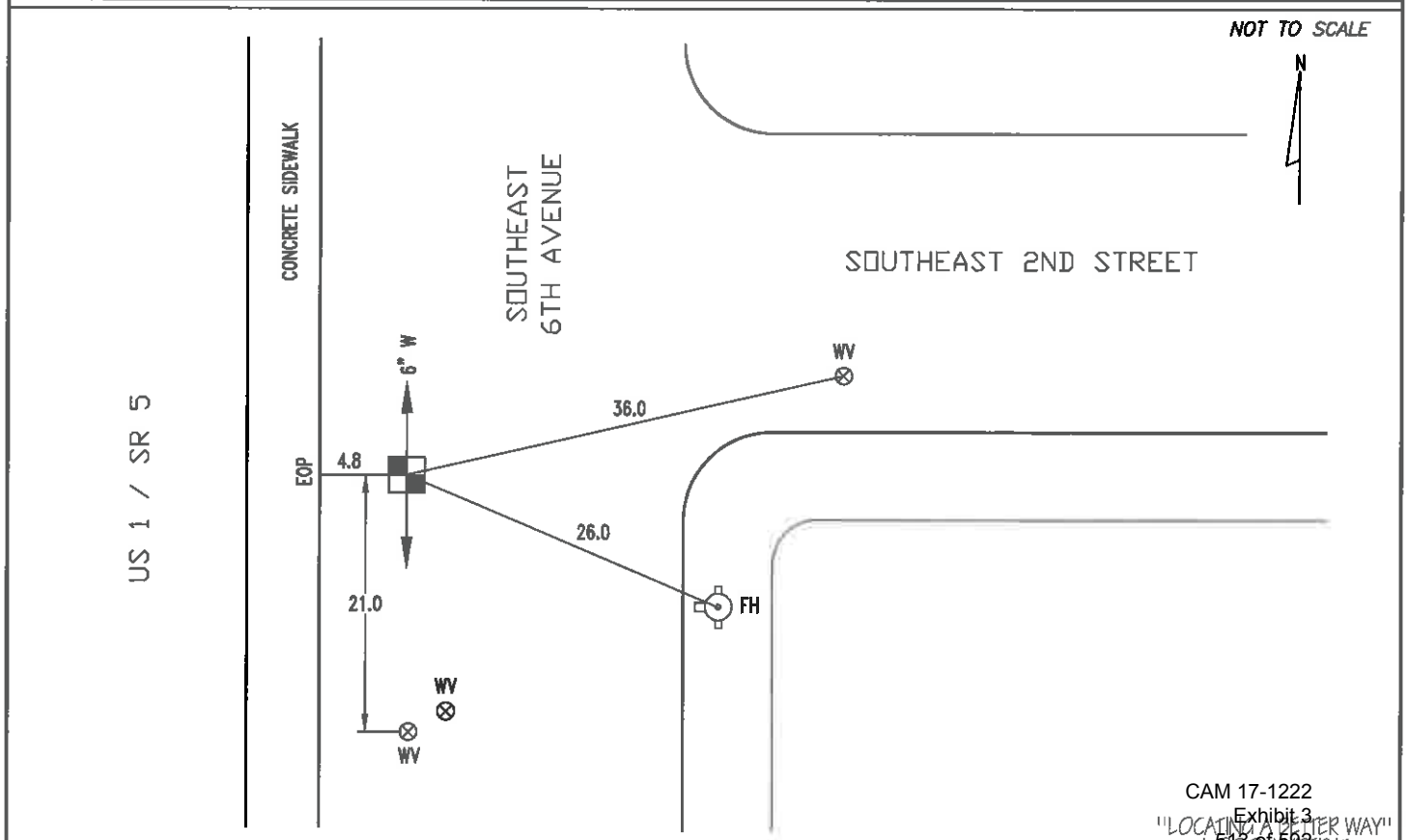
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

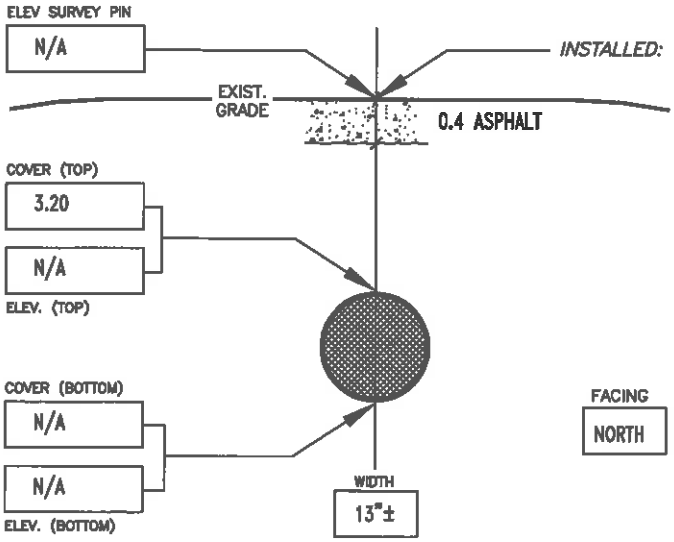
NOTES:





PN: PF05916 VACUUM TEST HOLE REPORT NO.: 12

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	WORK ORDER #	N/A
UTILITY REQUESTED:	6" WATER	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY FOUND:	UNKNOWN (SEE NOTE)	SHEET #:	N/A OF N/A
MATERIAL AS FOUND:	ASBESTOS CEMENT	PROPOSED:	UTILITY WORK
SIZE AS FOUND:	12"	FORM BY:	ER
		ASSISTED BY:	JC JT
		# OF HOLES:	1
		PAVING CONDITION:	GOOD
		DATE DUG:	6-6-16
		SOIL CONDITIONS:	SOFT DRY SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: PINK

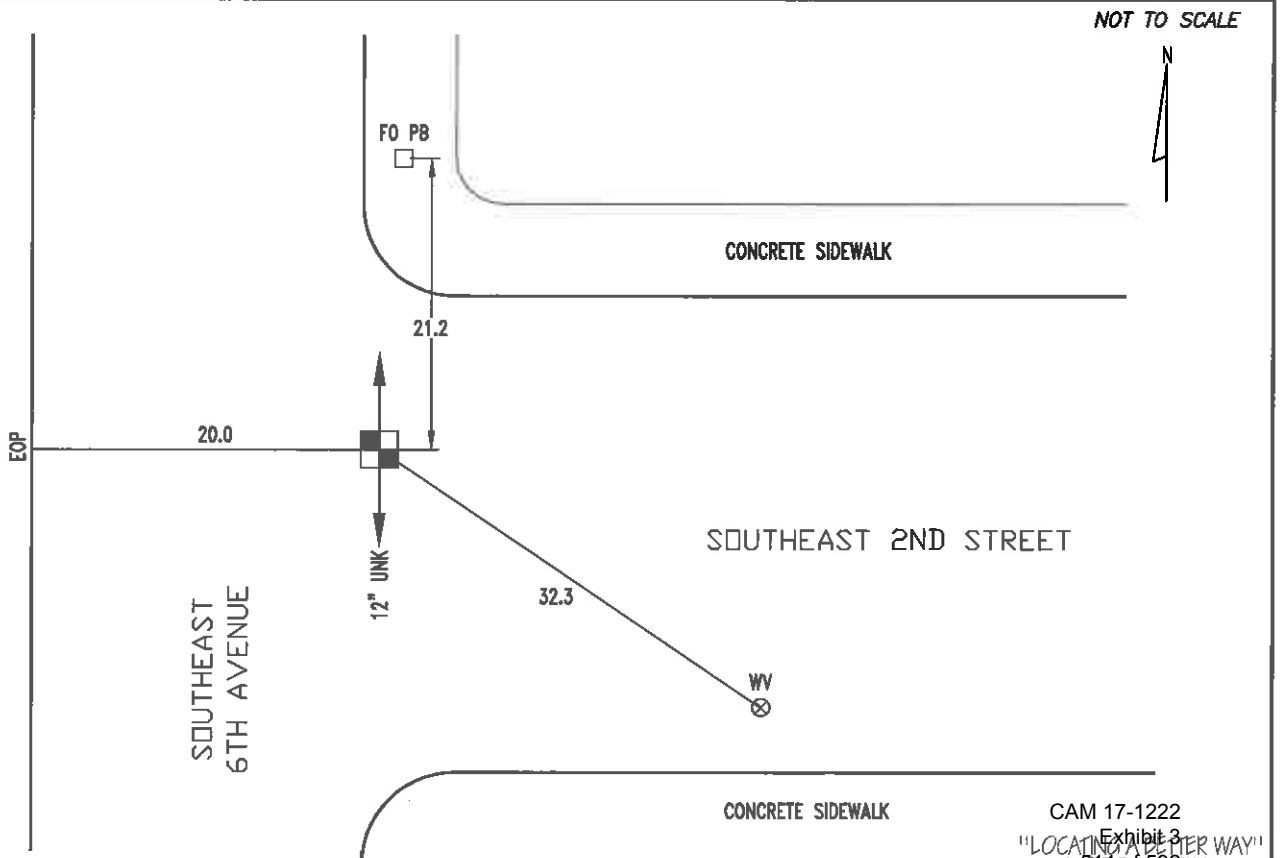
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: 6" WATER REQUESTED AT THIS LOCATION. TEST HOLE EXCAVATED ON WATER LOCATOR MARKS. TEST HOLE REVEALED A 12" ASBESTOS CEMENT UNKNOWN (POSSIBLE SLEEVE FOR 6" WATER). PK SET OVER CROWN OF 12" UNKNOWN.

NOT TO SCALE



PN: PF05916 VACUUM TEST HOLE REPORT NO.: 13

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	STORM	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	STORM	FORM BY:	ER ASSISTED BY: ML JT # OF HOLES: 1
MATERIAL AS FOUND:	REINFORCED CONCRETE	PAVING CONDITION:	GOOD DATE DUG: 6-14-16
SIZE AS FOUND:	48" (SEE NOTE)	SOIL CONDITIONS:	SOFT DRY SAND ROCKY
		UTILITY CONDITION:	GOOD

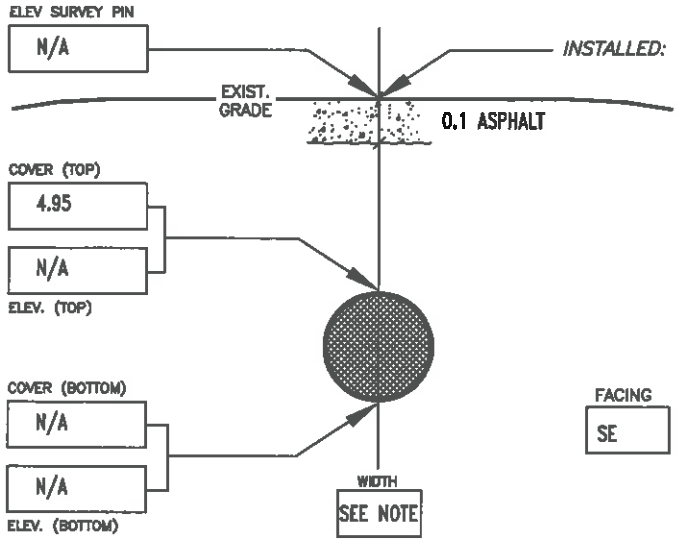
INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: GREEN

SURVEY PIN LOCATED BY: N/A

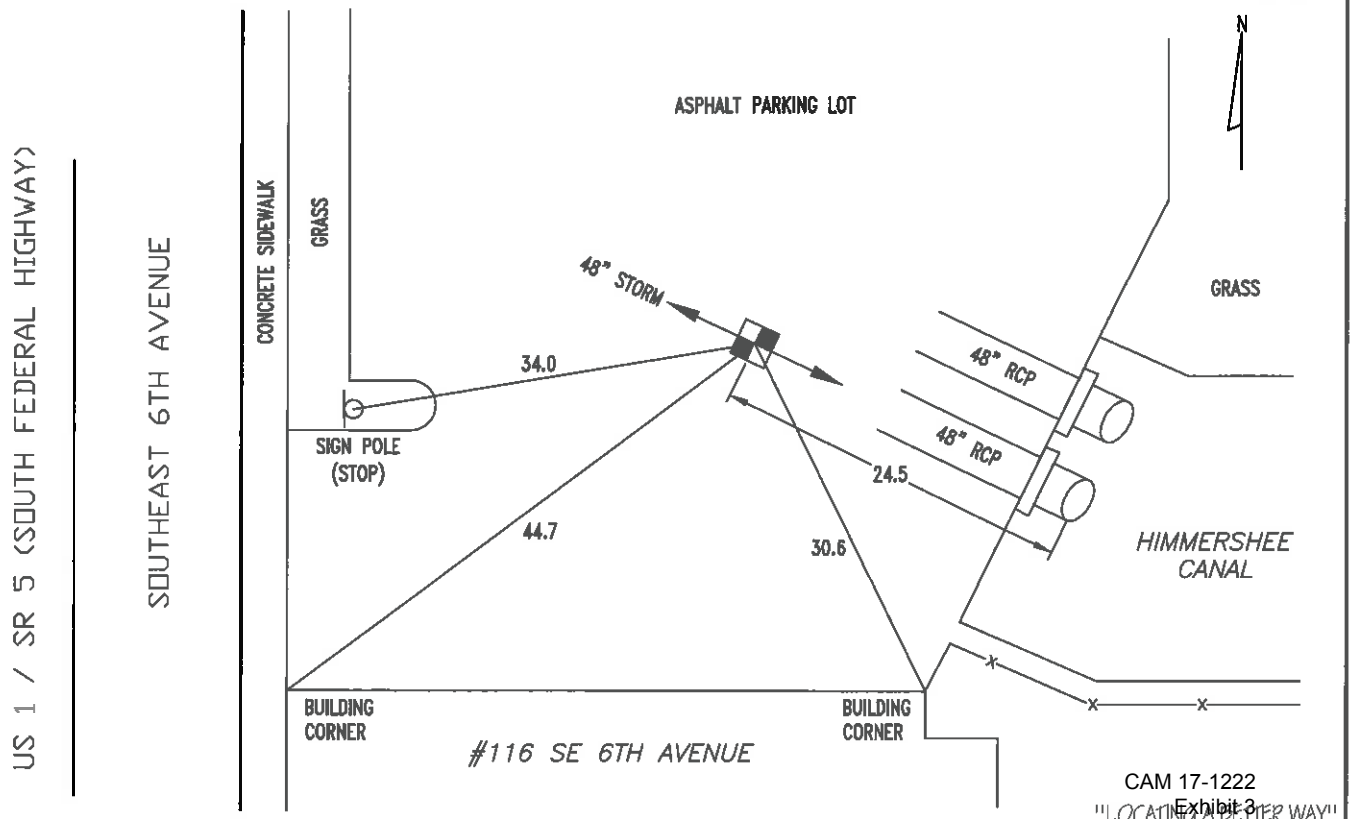
SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: SIZE OBTAINED AT CROWN OF EAST END OF SOUTHERN MOST 48" RCP OUTFALL. NOTE WE WERE UNABLE TO LOCATE THE SOUTHERN MOST 48" RCP WEST OF TEST HOLE 13. (SEVERAL ATTEMPTS WERE MADE). PK SET OVER APPROXIMATE CROWN OF PIPE.

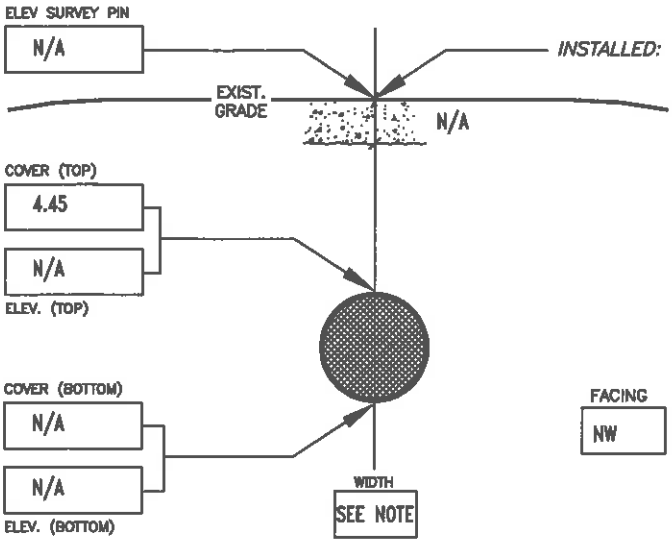


NOT TO SCALE



PN: PF05916 VACUUM TEST HOLE REPORT NO.: 14

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	STORM	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	STORM	FORM BY:	ER ASSISTED BY: JC JT # OF HOLES: 1
MATERIAL AS FOUND:	REINFORCED CONCRETE	PAVING CONDITION:	N/A DATE DUG: 6-7-16
SIZE AS FOUND:	SEE NOTE	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	SEE NOTE
		HUB & TACK AT:	TOP OF UTILITY. MARKING TAPE: GREEN
		SURVEY PIN LOCATED BY:	N/A

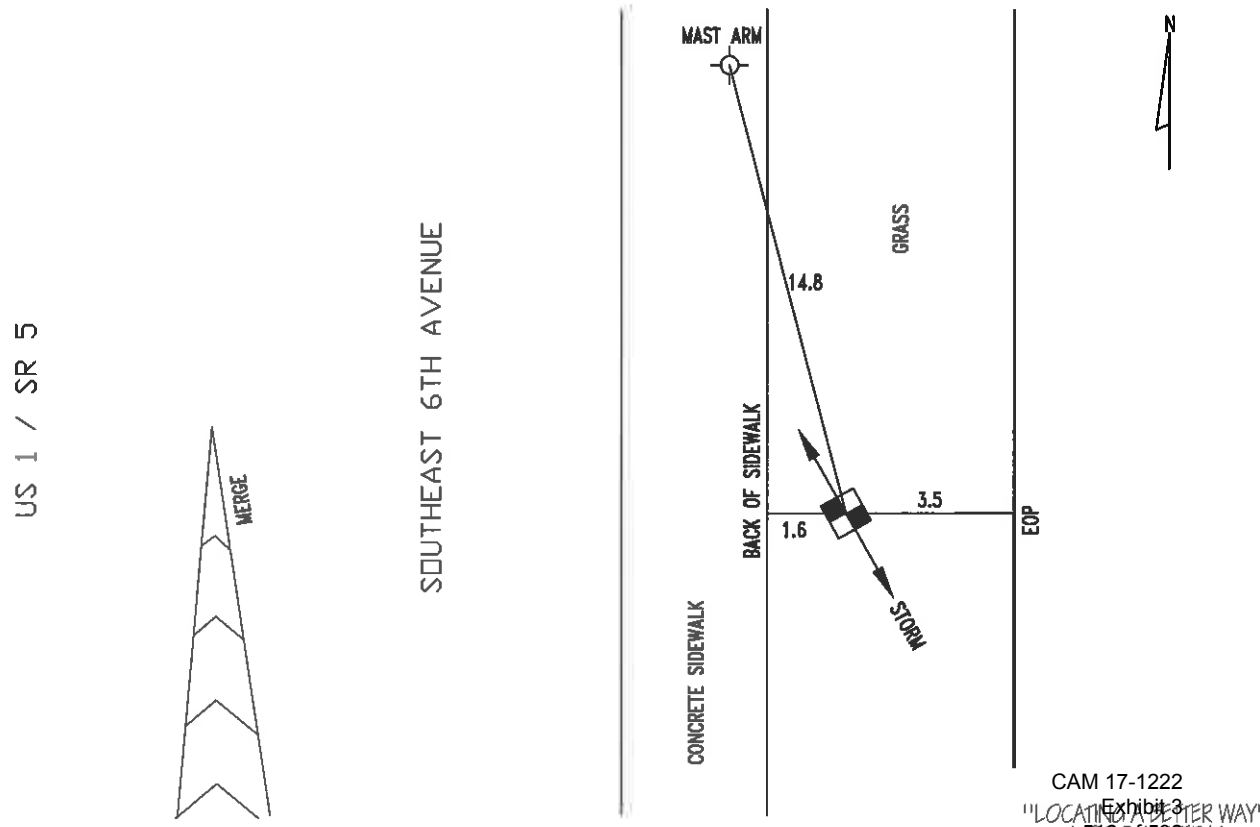


SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: TEST HOLE REVEALED LARGE RCP STORM. UNABLE TO OBTAIN SIZE DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. HUB SET OVER TOP OF UTILITY.

NOT TO SCALE



"LOCATING A BETTER WAY" 1-800-GINFMAP

PN: PF05916 VACUUM TEST HOLE REPORT NO.: 15

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	6" WATER	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	WATER	FORM BY:	ER ASSISTED BY: JC JT # OF HOLES: 1
MATERIAL AS FOUND:	CAST IRON	PAVING CONDITION:	GOOD DATE DUG: 6-6-16
SIZE AS FOUND:	6"	SOIL CONDITIONS:	SOFT DRY SAND ROCKY
		UTILITY CONDITION:	GOOD

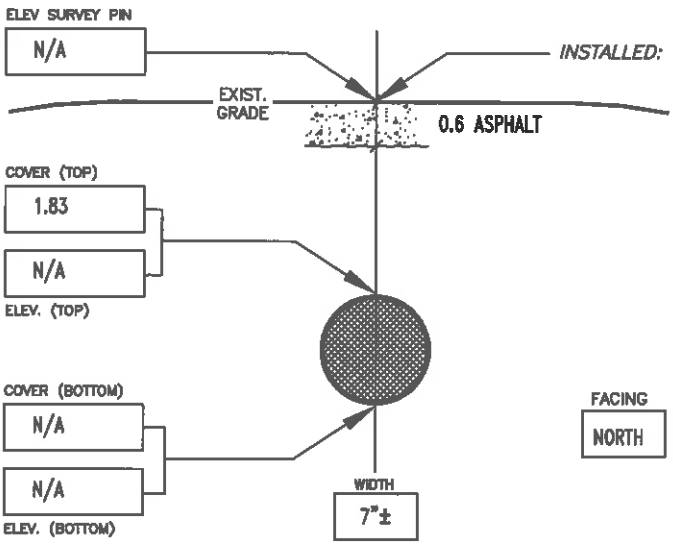
INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

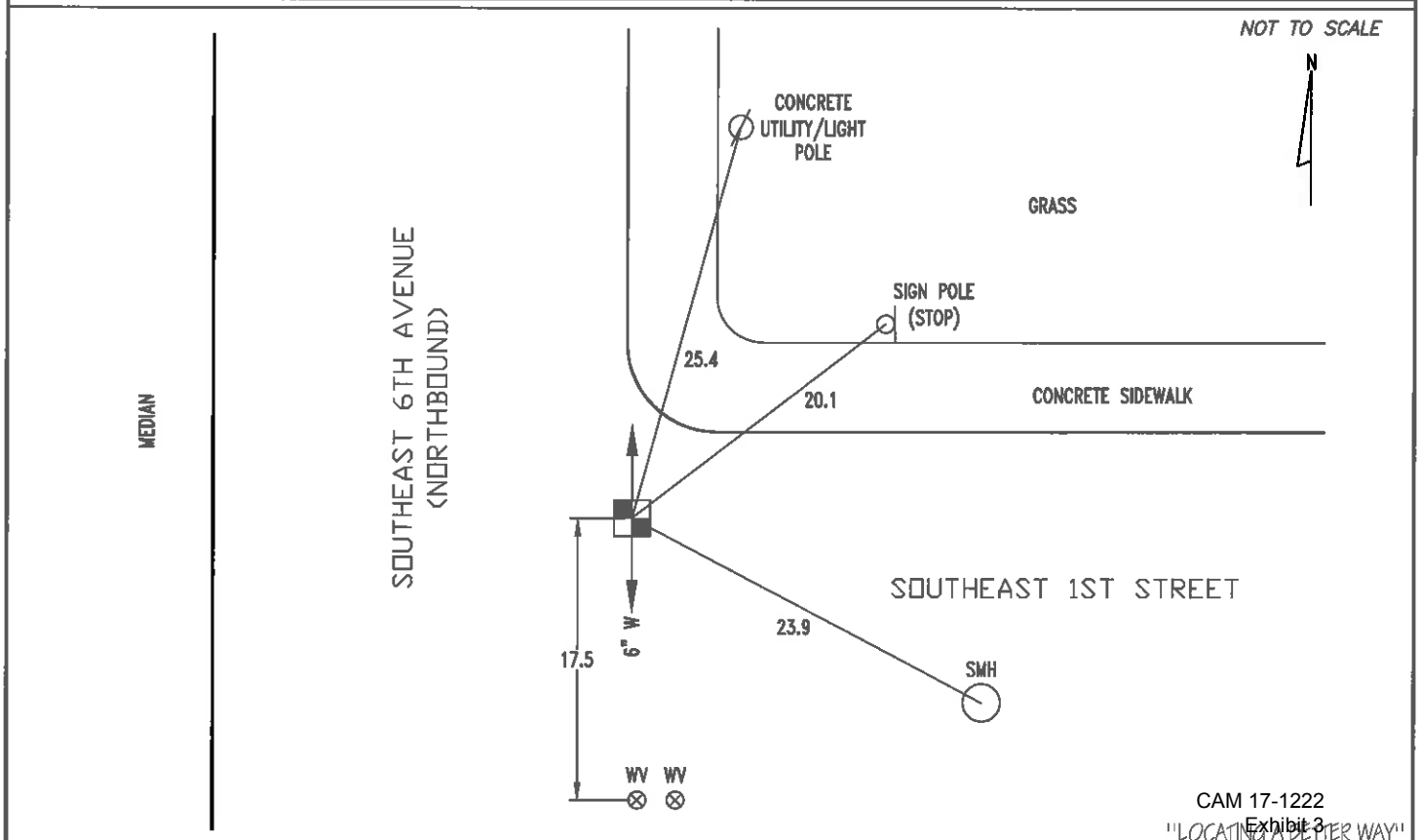
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:





PN: PF05916 VACUUM TEST HOLE REPORT NO.: 16

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	6" WATER	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	WATER (SEE NOTE)	FORM BY:	ER ASSISTED BY: JC JT # OF HOLES: 1
MATERIAL AS FOUND:	CAST IRON	PAVING CONDITION:	GOOD DATE DUG: 6-7-16
SIZE AS FOUND:	6"	SOIL CONDITIONS:	SOFT MOIST SAND ROCKY
		UTILITY CONDITION:	GOOD

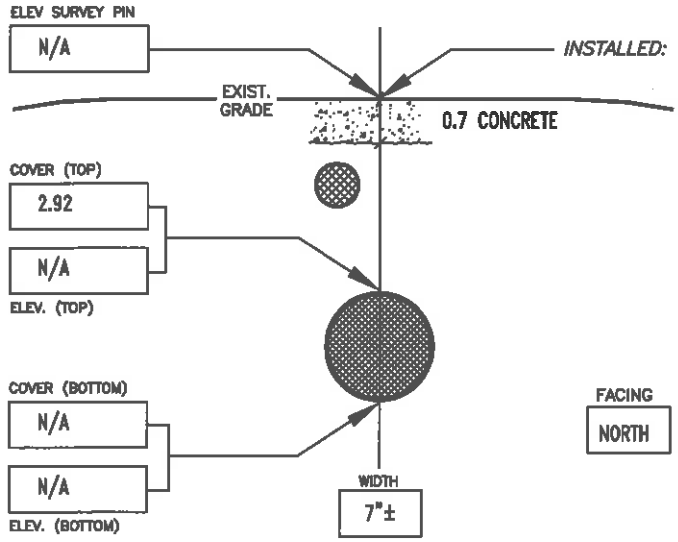
INSTALLED: CHIS "X" AT: CROWN OF UTILITY. MARKING TAPE: BLUE

SURVEY PIN LOCATED BY: N/A

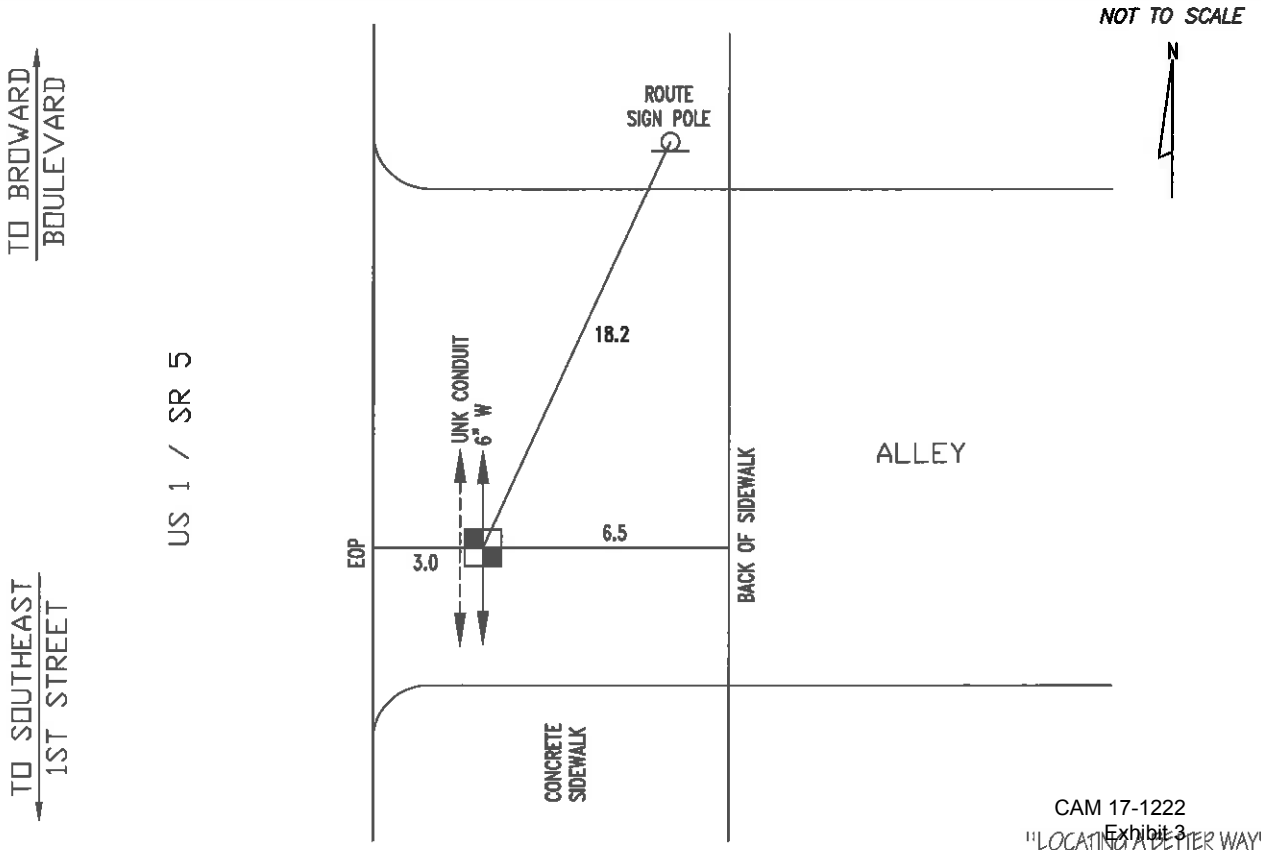
SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: TEST HOLE ALSO REVEALED A 2" STEEL UNKNOWN (POSSIBLE STREET LIGHTING) CONDUIT, RUNNING NORTH-SOUTH, 0.15' WEST OF CHIS "X". COVER = 0.72. CHIS "X" SET OVER CROWN OF 6" WATER.



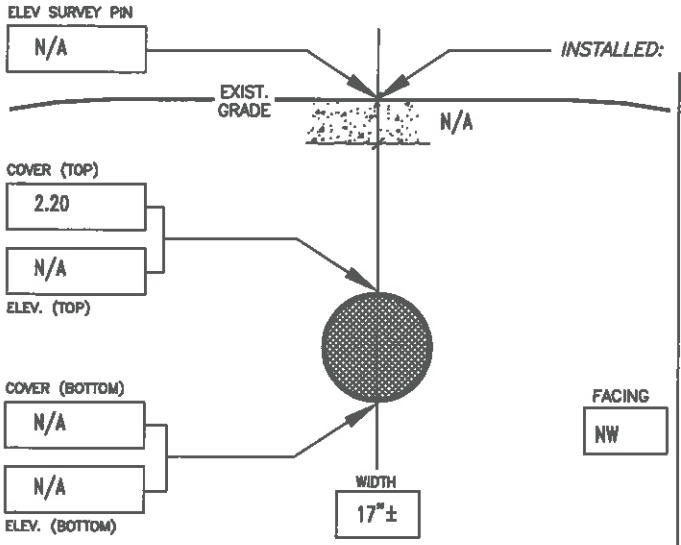
NOT TO SCALE



"LOCATING A BETTER WAY"
1-800 UNDER IT

PN: PF05916 VACUUM TEST HOLE REPORT NO.: 17

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	WORK ORDER #	N/A
UTILITY REQUESTED:	15" STORM	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY FOUND:	STORM	SHEET #: N/A OF N/A	PROPOSED: UTILITY WORK
MATERIAL AS FOUND:	REINFORCED CONCRETE	FORM BY: BP ASSISTED BY: ML MP	# OF HOLES: 1
SIZE AS FOUND:	15" (SEE NOTE)	PAVING CONDITION: GOOD	DATE DUG: 6-7-16
		SOIL CONDITIONS:	HARD DRY SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: GREEN

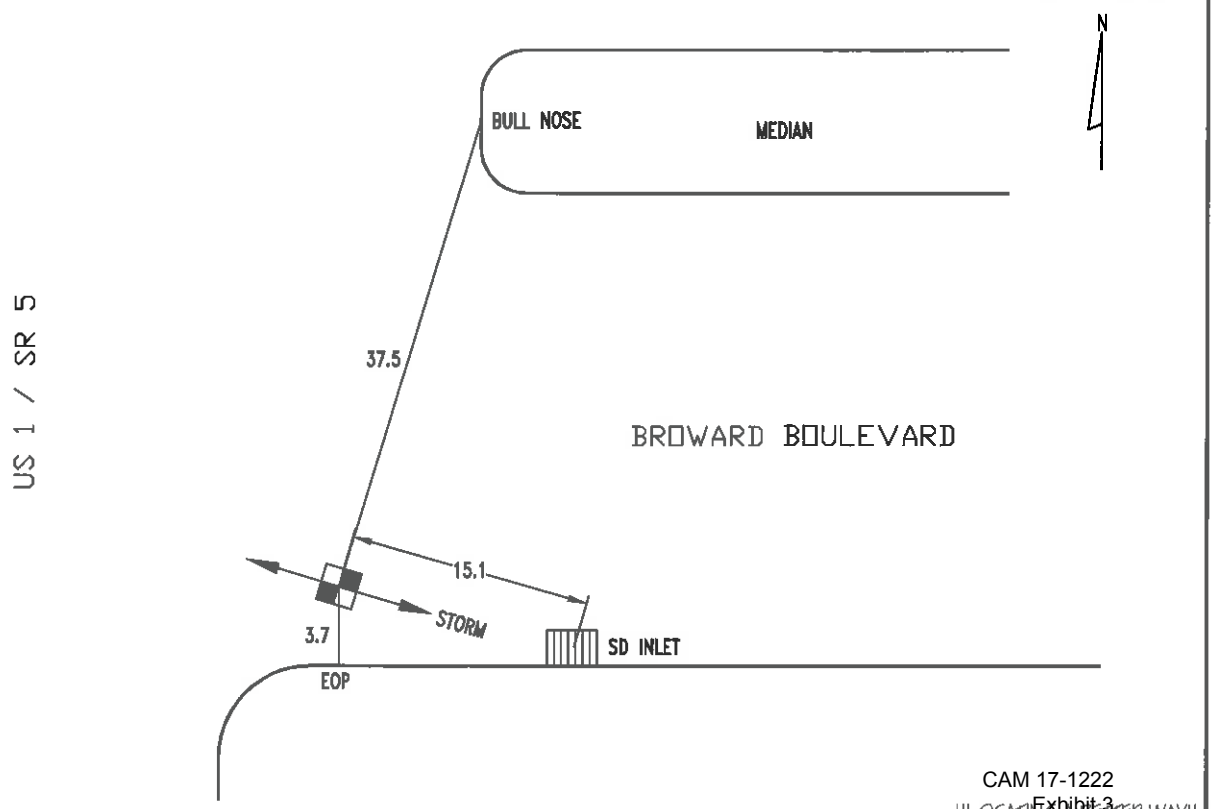
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: 15" PIPE SIZE OBTAINED IN STORM DRAIN INLET. PK SET OVER CROWN OF PIPE.

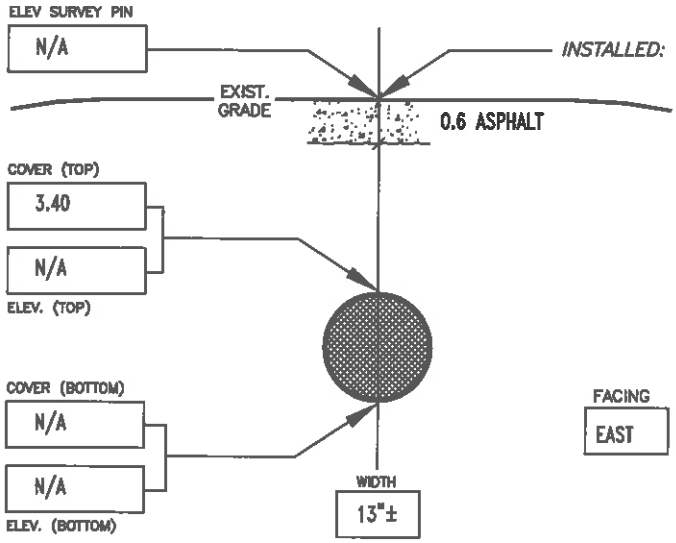
NOT TO SCALE



"LOCATING A BETTER WAY"
1-800 UNDER IT

PN: PF05916 VACUUM TEST HOLE REPORT NO.: 18

PROJECT NAME:	A-13 PUMP STATION EAST OF FEDERAL HIGHWAY	CLIENT JOB#	N/A WORK ORDER # N/A
LOCATE REQUESTED BY:	CRAVEN THOMPSON AND ASSOCIATES	PROJECT LOCATION:	FORT LAUDERDALE, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	12" WATER	SHEET #:	N/A OF N/A PROPOSED: UTILITY WORK
UTILITY FOUND:	WATER	FORM BY:	BP ASSISTED BY: ML MP # OF HOLES: 1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	GOOD DATE DUG: 6-7-16
SIZE AS FOUND:	12"	SOIL CONDITIONS:	SOFT DRY SAND
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

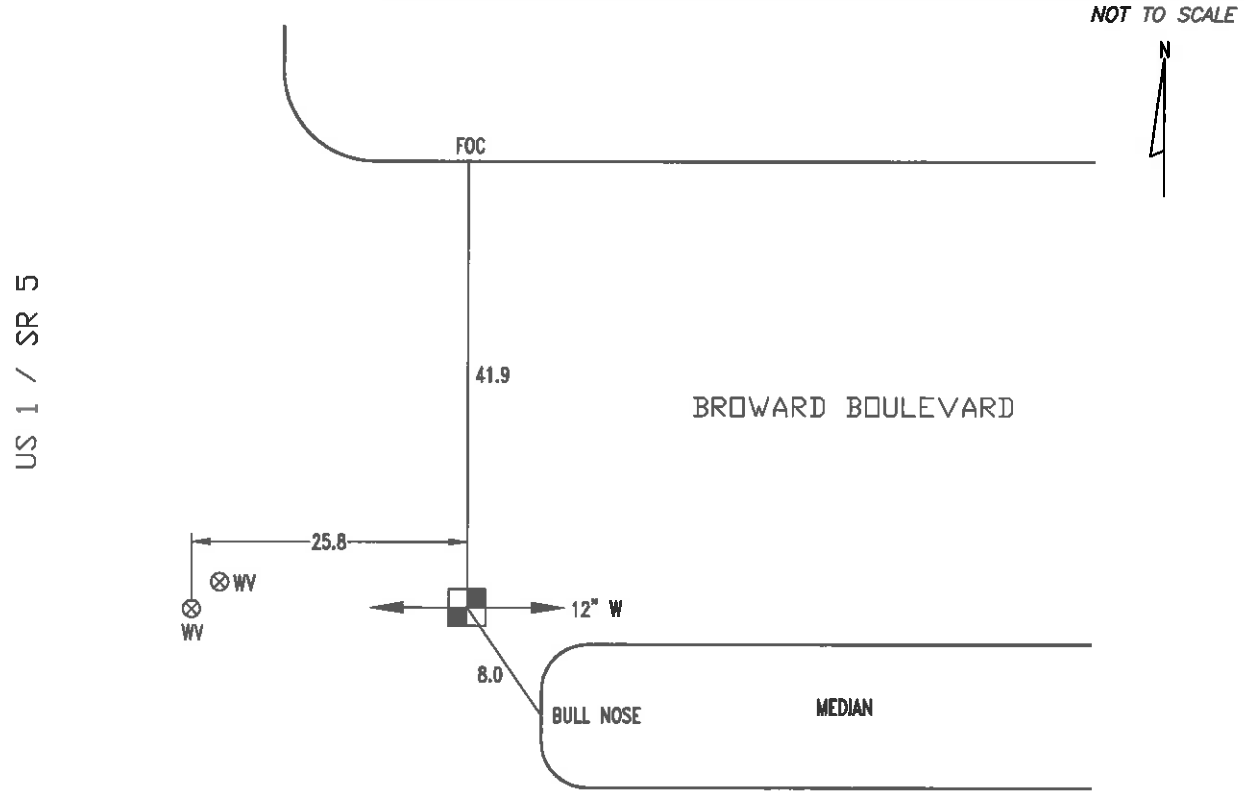
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: TEST HOLE MOVED 15' EAST OF REQUESTED LOCATION DUE TO DECORATIVE PAVING. PK SET OVER CROWN OF 12" WATER.

NOT TO SCALE



APPENDIX C

BROWARD COUNTY ENVIRONMENTAL PROTECTION AND GROWTH MANAGEMENT DEPARTMENT SEWER PERMIT

BROWARD COUNTY FLORIDA
Environmental Protection and Growth Management Department
Environmental Licensing and Building Permitting Division
1 North University Drive, Suite 201-A • Plantation, Florida 33324 • 954-519-1483 • FAX 954-519-1412

LICENSE FOR INSTALLATION OF WASTEWATER COLLECTION/TRANSMISSION SYSTEM

APPLICANT:
City of Fort Lauderdale
Attention: Mr. Paul A. Berg, Acting Public Works Director
100 N. Andrews Ave
Fort Lauderdale, FL 33301

BC-DER LICENSE NO.: WW-62250
EXPIRATION DATE: 08/29/2021
DEP ID NO.: GTL #054569-613
SEC-TWP-RNG: 11-50-42
PROJECT: City of Fort Lauderdale New Pump Station A-13 Sewer Redirection - East of Federal Highway

This license is issued under the provisions of Chapter 27 of the Broward County Code of Ordinances. The above named-applicant, hereinafter called licensee, is hereby authorized to perform the work shown on the approved drawing(s), plans, documents, and specifications submitted by applicant and made a part hereof and described specifically below. If no objection to this license is received within 14 days you will be deemed to have accepted it and all the attached terms and conditions.

Your notification of Intent to Use General Permit for construction of the referenced wastewater collection system has been evaluated. This project complies with the Department of Environmental Protection General Permit conditions of the Florida Administrative Code rule chapters 62-4, Part II., or for Individual Permit, under FS 403.87 and FAC 62-4, 62-600 and 62-604.

GRAVITY SEWER:	1,513 LF of 18" PVC @ 0.12% Minimum Slope (5 Manholes) 30 LF of 18" DIP @ 0.12% Minimum Slope
FORCE MAIN:	400 LF of 14" DIP
LIFT STATION:	One VFD Triplex: 2,087 GPM @ 79' TDH

SUBJECT TO SPECIFIC CONDITIONS # 1 through # 7.

In accordance with:	Plans, Sheets C01 thru C13 of 13, E01 thru E14 of 14, I01 and I02 of 02 (Received 06/02/2016 and Revised 07/26/2016). None Attached. Craven Thompson & Associates, Inc. Project #: 4-139-49.
Located at:	216 SE 8TH AVE, Fort Lauderdale 33301
Serving:	Existing Flow Redirection from PS A-7 to New PS A-13. No Additional Development Flows for Project #12133.

Issued this 30th day of August, 2016.

Environmental Protection and Growth Management Dept.
Prepared by Yvel Rocher, P.E.

Garth Hinckle, Jr., P.E., Supervisor
Domestic Wastewater Program

cc: FDEP/WPB
Asif Ali, DMD Front Desk
Craven Thompson & Associates, Inc.

CAM 17-1222
Exhibit 3
522 of 592

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations and restrictions set forth herein are accepted by the licensee and enforceable by the EPD pursuant to Chapter 27 of the Broward County Code of Ordinances. The EPD will review this license periodically and may revoke the license, initiate administrative and/or judicial action for any violation of the conditions by the licensee, its agents, employees, servants or representatives.
2. This license is valid only for the specific uses set forth in the license application and any deviation from the approved uses may constitute grounds for revocation and enforcement action by the EPD.
3. In the event the Licensee is temporarily unable to comply with any of the conditions of the license, the licensee shall notify the Broward County Environmental Protection Department within 8 hours. Within 3 working days of the event, the licensee shall submit a written report to the Broward County Environmental Protection Department that describes the incident, its cause, the measures being taken to correct the problem and prevent its reoccurrence, the owner's intention toward repair, replacement, and reconstruction of destroyed facilities, and a schedule of events leading toward operation within the license condition.
4. The issuance of this license does not convey any vested rights or exclusive privileges, nor does it authorize any injury to public or private property or any invasion of personal rights, or any violations of federal, state or local laws or regulations.
5. This license must be available for inspection on Licensee's premises during the entire life of the license.
6. By accepting this license, the Licensee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, that are submitted to the EPD, may be used by the EPD as evidence in any enforcement proceeding arising under Chapter 27 of the Broward County Code of Ordinances, except where such use is prohibited by Section 403.111, Florida Statues.
7. This Licensee agrees to comply with Chapter 27, Broward County Code of Ordinances, as amended.
8. Any new owner of a licensed facility shall apply by letter for a transfer of license within thirty (30) days after sale or legal transfer. The transferor shall remain liable for performance in accordance with the license until the transferee applies for, and is granted a transfer of license. The Transferee shall also be liable for performance in accordance with the license.
9. The licensee, by acceptance of this license, specifically agrees to allow access to the licensed source at reasonable times by EPD personnel for the purposes of inspection and testing to determine compliance with this license and Chapter 27 of the Broward County Code of Ordinances.
10. This license does not constitute a waiver or approval of any other license that may be required for other aspects of the total project.
11. If the Licensee wishes to renew the license or extend it terms, he shall make application 60 days prior to its expiration. Expired licenses are not renewable.
12. In addition to the general conditions set forth above, each license issued by the EPD shall contain specific conditions determined by site conditions and requirements pursuant to the regulations as determined by the Broward County Environmental Protection Department. Licensee agrees that specific conditions are enforceable by the EPD for any violation thereof.

SPECIFIC CONDITIONS:

1. This license is valid for construction of the sewage collection/transmission system only. All connections to the system must be approved by the Broward Environmental Protection Department prior to the issuance of a building permit.
2. Any deviation from approved plans or specifications affecting capacity, flow or operation of units shall be submitted to and approved by the Broward County Environmental Protection Department before such changes are made.
3. The applicant shall be responsible for supplying as-built drawing to the Broward County Environmental Protection Department on completion of the project. Such drawing will be signed and sealed by an engineer registered in the state of Florida and shall be based on accurate records maintained by the engineer or by a land surveyor currently registered in the state of Florida. Such drawing will indicate locations and elevations of all pipe line, manholes, pump stations and appurtenance installed under this project. No connections to the system Will Be Approved until the above Described As-built Drawings Have Been Delivered to and Approved by the Broward County Environmental Protection Department.

APPLICANT:
City of Fort Lauderdale
Attention: Mr. Paul A. Berg, Acting Public Works Director
100 N. Andrews Ave
Fort Lauderdale, FL 33301

BC-DER LICENSE NO.: WW-62250
EXPIRATION DATE: 08/29/2021
DEP ID NO.: GTL #054569-613
SEC-TWP-RNG: 11-50-42
PROJECT: City of Fort Lauderdale New Pump Station A-13 Sewer Redirection - East of Federal Highway

SPECIFIC CONDITIONS (Continued From Page 2)

4. (Lift Stations) One (1) complete set of the operation & maintenance manual must be submitted along with the required as-built or record drawings in an electronic format (PDF sent via email or a disc file). Sections of the manual should include: (1) service agreements; (2) pump station specifications and start up report; (3) pump station operation and maintenance plan; (4) monthly reports - inserted monthly; (5) general correspondence and service records - insert as received; and other sections as deemed necessary. The Engineer must distribute the operation & maintenance manuals as prescribed on the DEP Form 62-604.300(8)(a), Part III (1) and (2) under his seal and signature.

5. (Publicly Maintained Lift Station) Signage is required in a conspicuous location at the lift station. It shall indicate the lift station designation and emergency contact phone number(s).

6. NOTE: Future enforcement of violations may be minimized by recording all proper maintenance procedures.

7. An electronic document of the as-built site plan which clearly displays the contents of the project as well as its service boundaries shall be submitted to ELBPD by email or via a disc file at the time of certification. At least one of the nearest street intersections shall be also labeled on the exhibit for ease of geographical reference.

Florida Department of Environmental Protection

Southeast District Office
3301 Gun Club Road, MSC 7210-1
West Palm Beach, Florida 33406

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

CERTIFIED MAIL

In the Matter of an
Application for Permit by:

City of Fort Lauderdale
Attention: Mr. Paul A. Berg, Acting Public Works Director
100 N. Andrews Ave
Fort Lauderdale, FL 33301

NOTICE OF PERMIT ISSUANCE

PERMIT NUMBER:	GTL #054569-613
ELBPD LICENSE:	WW-62250
ISSUANCE DATE:	08/30/2016
EXPIRATION DATE:	08/29/2021
COUNTY:	BROWARD
PROJECT:	City of Fort Lauderdale New Pump Station A-13 Sewer Redirection - East of Federal Highway
CONNECTED TO:	G T L

The Department's proposed agency action shall become final unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57, Florida Statutes, within fourteen days of receipt of notice. The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received by the clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000.

Petitions by the applicant or any of the persons listed below must be filed within fourteen days of receipt of this written notice. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), Florida Statutes, must be filed within fourteen days of publication of the notice or within fourteen days of receipt of the written notice, whichever occurs first. Under Section 120.60(3), Florida Statutes, however, any person who has asked the Department for notice of agency action may file a petition within fourteen days of receipt of such notice, regardless of the date of publication.

The petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within fourteen days of receipt of notice shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, Florida Statutes. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information:

(a) The name, address, and telephone number of each petitioner; the name, address, and telephone number of the petitioner's representative, if any; the Department permit identification number and the county in which the subject matter or activity is located;

(b) A statement of how and when each petitioner received notice of the Department action;

PERMITEE: City of Fort Lauderdale PERMIT NUMBER: GTL #054569-613

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

(e) A statement of facts that the petitioner contends warrant reversal or modification of the Department action;

(f) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and

(g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wants the Department to take.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation under Section 120.573, Florida Statutes, is not available for this proceeding.

This permit action is final and effective on the date filed with the clerk of the Department unless a petition is filed in accordance with the above. Upon the timely filing of a petition this permit will not be effective until further order of the Department.

Any party to the permit has the right to seek judicial review of the permit action under Section 120.68, Florida Statutes, by the filing of a notice of appeal under Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000; and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within 30 days from the date when this permit action is filed with the clerk of the Department.

Executed in Plantation, Florida

BROWARD COUNTY
Environmental Protection and Growth Management Department

as delegated agent for:
STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Garth Hinckle Jr., P.E., Supervisor
Environmental Licensing and Building Permitting Division

CAM 17-1222
Exhibit 3
526 of 592

Florida Department of Environmental Protection

Southeast District Office
3301 Gun Club Road, MSC 7210-1
West Palm Beach, Florida 33406

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

State of Florida
Domestic Wastewater Collection/Transmission Individual Permit

PERMITTEE:

City of Fort Lauderdale
Attention: Mr. Paul A. Berg, Acting Public Works Director
100 N. Andrews Ave
Fort Lauderdale, FL 33301

PERMIT NUMBER:	GTL #054569-613
ELBPD LICENSE:	WW-62250
ISSUANCE DATE:	08/30/2016
EXPIRATION DATE:	08/29/2021
COUNTY:	BROWARD
PROJECT:	City of Fort Lauderdale New Pump Station A-13 Sewer Redirection - East of Federal Highway

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Chapters 62-4 and 62-604, Florida Administrative Code (F.A.C.). The Broward County Environmental Protection & Growth Management Department (EPGMD) issues this permit as a delegated local program of the Florida Department of Environmental Protection (Department).

The above named permittee is hereby authorized to construct the facilities shown on the application and other documents on file with the Department and/or EPGMD and made a part hereof and specifically described as follows:

DESCRIPTION OF PROJECT:	GRAVITY SEWER:	1,513 LF of 18" PVC @ 0.12% Minimum Slope (5 Manholes) 30 LF of 18" DIP @ 0.12% Minimum Slope
	FORCE MAIN:	400 LF of 14" DIP
	LIFT STATION:	One VFD Triplex: 2,087 GPM @ 79' TDH
TO SERVE:		Existing Flow Redirection from PS A-7 to New PS A-13. No Additional Development Flows for Project #12133.
LOCATION OF PROJECT:		216 SE 8TH AVE, Fort Lauderdale 33301
IN ACCORDANCE WITH:		The limitations, requirements and other conditions set forth in this permit.

ELBPD License No. WW-62250 has also been issued for this project.

PERMITTEE:

City of Fort Lauderdale
Attention: Mr. Paul A. Berg, Acting Public Works Director
100 N. Andrews Ave
Fort Lauderdale, FL 33301

PERMIT NUMBER:	GTL #054569-613
ELBPD LICENSE:	WW-62250
ISSUANCE DATE:	08/30/2016
EXPIRATION DATE:	08/29/2021
COUNTY:	BROWARD
PROJECT:	City of Fort Lauderdale New Pump Station A-13 Sewer Redirection - East of Federa Highway

PERMIT CONDITIONS:

1. This permit is subject to the general conditions of Rule 62-4.160, F.A.C., as applicable. This rule is available at the Department's Internet site at: http://www.dep.state.fl.us/legal/Rules/shared/62-4/62-4.pdf [62-4.160]

2. Upon completion of construction of the collection/transmission system project, and before placing the facilities into operation for any purpose other than testing for leaks or testing equipment operation, the permittee shall submit to EPGMD Form 65-604.300(8)(b), Request for Approval to Place a Domestic Wastewater Collection/Transmission System into Operation. This form is available at the Department's Internet site at: http://www.dep.state.fl.us/water/wastewater/dom/dw-forms.htm [62-604.700(2)]

3. The new or modified collection/transmission facilities shall not be placed into service until EPGMD clears the project for use. [62.604.700(3)]

4. Permit revisions shall only be made in accordance with Rule 62-4.050(4)(s), F.A.C. Request for revisions shall be made to EPGMD in writing and shall include the appropriate fee. Revisions not covered under Rule 62-4.050(4)(s), F.A.C., shall require a new permit. [62-604.600(8)]

5. Abnormal events shall be reported to the Department's West Palm Beach District Office in accordance with Rule 62-604.550, F.A.C. For unauthorized spills of wastewater in excess of 1000 gallons per incident, or where information indicates that public health or the environment may be endangered, oral reports shall be provided to the STATE WATCH OFFICE TOLL FREE NUMBER (800) 320-0519 as soon as practical, but no later than 24 hours from the time the permittee or other designee becomes aware of the circumstances. Unauthorized releases or spills less than 1000 gallons per incident are to be reported orally to the Department's West Palm Beach District Office within 24 hours from the time the permittee, or other designee becomes aware of the circumstances. [62-604.550]

PERMITTEE:

City of Fort Lauderdale
Attention: Mr. Paul A. Berg, Acting Public Works Director
100 N. Andrews Ave
Fort Lauderdale, FL 33301

PERMIT NUMBER:	GTL #054569-613
ELBPD LICENSE:	WW-62250
ISSUANCE DATE:	08/30/2016
EXPIRATION DATE:	08/29/2021
COUNTY:	BROWARD
PROJECT:	City of Fort Lauderdale New Pump Station A-13 Sewer Redirection - East of Federa Highway

Executed in Plantation, Florida

BROWARD COUNTY
Environmental Protection and Growth Management Department

Garth Hinckle Jr., P.E., Supervisor

As delegated agent for:
State of Florida,
Department of Environmental Protection

DATE: 8/30/2016

CAM 17-1222
Exhibit 3
529 of 592

APPENDIX D

FLORIDA DEPARTMENT OF TRANSPORTATION UTILITY PERMIT

RULE 14-46

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

710-010-85
UTILITIES
OGC – 08/10

UTILITY PERMIT

PERMIT NO.: 2016-H-491-194	**SECTION NO.:** 86010000	**STATE ROAD** 5	**COUNTY** BROWARD
FDOT construction is proposed or underway.	☒ **Yes**	☐ **No**	**Financial Project ID**: 42872415203
Is this work related to an approved Utility Work Schedule?	☐ **Yes**	☒ **No**	**If yes, Document Number**:
PERMITTEE:	City of Fort Lauderdale		
ADDRESS:	100 N Andrews Ave	**TELEPHONE NUMBER**: (954) 828-6134	
CITY/STATE/ZIP:	Fort Lauderdale , FL 33301		

The above PERMITTEE requests permission from the State of Florida Department of Transportation, hereinafter called the FDOT, to construct, operate and maintain the following: The permittee requests to install a 18" gravity sewer main to run in and along U.S. No. 1 from Broward Boulevard South to SE 2nd ... (see cont. page)

FROM: Broward Boulevard	**TO**: SE 2nd Court

Submitted for the PERMITTEE by: Name and Company (Typed or Printed Legibly)	Contact Information Address/Telephone/E-Mail (if applicable)	Signature	Date
DIANA CARRILLO	3563 NW 53rd Steet Fort Lauderdale, FL 33309	DIANA CARRILLO (sig)	07/11/2016

1. The Permittee declares that prior to filing this application, the location of all existing utilities that it owns or has an interest in, both aerial and underground, are accurately shown on the plans and a letter of notification was mailed on 07/16/2015 to the following utilities known to be involved or potentially impacted in the area of the proposed installation: FPL.
2. The local Maintenance or Resident Engineer, hereafter referred to as the FDOT Engineer, shall be notified a minimum of forty eight (48) hours in advance prior to starting work and again immediately upon completion of work. The FDOT's Engineer is Jean-Brucely Joseph, located at 5548 NW 9th Avenue Ft. Lauderdale, FL 33309, Telephone Number (954) 940-7587. The Permittee's employee responsible for MOT is _____, Telephone Number _____ (This name may be provided at the time of the forty eight (48) hour advance notice prior to starting work).
3. All work, materials, and equipment shall be subject to inspection and approval by the FDOT Engineer.
4. All plans and installations shall conform to the requirements of the FDOT's UAM in effect as of the date this permit is approved by FDOT, and shall be made a part of this permit. This provision shall not limit the authority of the FDOT under Paragraph 8 of this Permit.
5. This Permittee shall commence actual construction in good faith within 120 days after issuance of permit, and shall be completed within 330 days after the permitted work has begun. If the beginning date is more than sixty (60) days from the date of permit approval, the Permittee must review the permit with the FDOT Engineer to make sure no changes have occurred to the Transportation Facility that would affect the permitted construction.
6. The construction and maintenance of such utility shall not interfere with the property and rights of a prior Permittee.
7. It is expressly stipulated that this permit is a license for permissive use only and that the placing of utilities upon public property pursuant to this permit shall not operate to create or vest any property right in said holder, except as provided in executed subordination and Railroad Utility Agreements.
8. Pursuant to Section 337.403, Florida Statutes, any utility placed upon, under, over, or along any public road or publicly owned rail corridor that is found by FDOT to be unreasonably interfering in any way with the convenient, safe, or continuous use, or maintenance, improvement, extension, or expansion, of such public road or publicly owned rail corridor shall, upon thirty (30) days written notice to the utility or its agent by FDOT, be removed or relocated by such utility at its own expense except as provided in Section 337.403(1), Florida Statutes, and except for reimbursement rights set forth in previously executed subordination and Railroad Utility Agreements, and shall apply to all successors and assigns for the permitted facility.
9. It is agreed that in the event the relocation of said utilities are scheduled to be done simultaneously with the FDOT's construction work, the Permittee will coordinate with the FDOT before proceeding and shall cooperate with the FDOT's contractor to arrange the sequence of work so as not to delay the work of the FDOT's contractor, defend any legal claims of the FDOT's contractor due to delays caused by the Permittee's failure to comply with the approved schedule, and shall comply with all provisions of the law and the FDOT's current UAM. The Permittee shall not be responsible for delay beyond its control.
10. In the case of non-compliance with the FDOT's requirements in effect as of the date this permit is approved, this permit is void and the facility will have to be brought into compliance or removed from the R/W at no cost to the FDOT, except for reimbursement rights set forth in previously executed subordination and Railroad Utility Agreements. This provision shall not limit the authority of the FDOT under Paragraph 8 of this Permit.
11. It is understood and agreed that the rights and privileges herein set out are granted only to the extent of the State's right, title and interest in the land to be entered upon and used by the Permittee, and the Permittee will, at all times, and to the extent permitted by law, assume all risk of and indemnify, defend, and save harmless the State of Florida and the FDOT from and against any and all loss, damage, cost or expense arising in any manner on account of the exercise or attempted exercises by said Permittee of the aforesaid rights and privileges.
12. During construction, all safety regulations of the FDOT shall be observed and the Permittee must take measures, including placing and the display of safety devices that may be necessary in order to safely conduct the public through the project area in accordance with the Federal MUTCD, as amended by the UAM.
13. Should the Permittee be desirous of keeping its utilities in place and out of service, the Permittee, by execution of this permit acknowledges its present and continuing ownership of its utilities located between Broward Boulevard and SE 2nd Court within the FDOT's R/W as set forth above. Whenever the Permittee removes its facilities, it shall be at the Permittee's sole cost and expense. The Permittee, at its sole expense, shall promptly remove said out of service utilities whenever the FDOT determines said removal is in the public interest.
14. In the event contaminated soil is encountered by the Permittee or anyone within the permitted construction limits, the Permittee shall immediately cease work and notify the FDOT. The FDOT shall notify the Permitee of any suspension or revocation of the permit to allow contamination assessment and remediation. Said suspension or revocation shall remain in effect until otherwise notified by FDOT
15. For any excavation, construction, maintenance, or support activities performed by or on behalf of the FDOT, within its R/W, the Permittee may be required by the FDOT or its agents to perform the following activities with respect to a Permittee's facilities: physically expose or direct exposure of underground facilities, provide any necessary support to facilities and/or cover, de-energize or alter aerial facilities as deemed necessary for protection and safety.

RULE 14-46 STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION 710-010-85 UTILITIES OGC – 08/10

UTILITY PERMIT

16. Pursuant to Section 337.401(2), Florida Statutes, the permit shall require the permit holder to be responsible for damage resulting from the issuance of the permit. The FDOT may initiate injunctive proceedings as provided in s.120.69 to enforce provisions of this subsection or any rule or order issued or entered into pursuant thereto.
17. Pursuant to Section 337.402, Florida Statutes, when any public road or publicly owned rail corridor is damaged or impaired in any way because of the installation, inspection, or repair of a utility located on such road or publicly owned rail corridor, the owner of the utility shall, at his or her own expense, restore the road or publicly owned rail corridor to its original condition before such damage. If the owner fails to make such restoration, the authority is authorized to do so and charge the cost thereof against the owner under the provisions of s.337.404.
18. The Permittee shall comply with all provisions of Chapter 556, Florida Statutes, Underground Facilities Damage Prevention and Safety Act.
19. Special FDOT instructions: _____

Special Conditions: 1. Permittee is cautioned that utilities may be located within the construction area. 2. A copy of this permit and plans will be on the job site at all times during the construction of this facility 3. Lane closure request must be submitted 14 days prior to date of closure. Lane closure hours are from 9:00am to 4:00pm. Night time lane ... (see special instructions cont. page)

It is understood and agreed that commencement by the Permittee is acknowledgment and acceptance of the binding nature of all the above listed permit conditions and special instructions.

20. By receipt of this permit, the Permittee acknowledges responsibility to comply with Section 119.07, Florida Statutes.
21. By the below signature, the Permittee hereby represents that no change to the FDOT's standard Utility Permit form, as incorporated by reference into Rule 14-46.001, for this Utility Permit has been made which has not been previously called to the attention of the FDOT (and signified to by checking the appropriate box below) by a separate attached written document showing all changes and the written and dated approval of the FDOT Engineer. Are there attachments reflecting change/s to the standard form? ☒NO ☐ YES If Yes, _____ pages are attached.

PERMITTEE	City of Fort Lauderdale	**SIGNATURE**	City of Fort Lauderdale	**DATE:**	07/11/2016
	Name & Title of Authorized Permittee or Agent (Typed or Printed Legibly)				
APPROVED BY:	Jean-Brucely Joseph (sig)			**ISSUE DATE:**	06/12/2017
	District Maintenance Engineer or Designee				

UTILITY PERMIT FINAL INSPECTION CERTIFICATION

DATE:	
DATE WORK STARTED:	
DATE WORK COMPLETED:	
INSPECTED BY:	
(Permittee or Agent)	
CHANGE APPROVED BY: N/A	**DATE:**
District Maintenance Engineer or Designee	

I the undersigned Permittee do hereby CERTIFY that the utility construction approved by the above numbered permit was inspected and installed in accordance with the approved plans made a part of this permit and in accordance with the FDOT's current UAM. All plan changes have been approved by the FDOT's Engineer and are attached to this permit. I also certify that the work area has been left in as good or better condition than when the work was begun.

PERMITTEE: City of Fort Lauderdale	**SIGNATURE:** City of Fort Lauderdale	**DATE:**
Name & Title of Authorized Permittee or Agent (Typed or Printed Legibly)		

CC: District Permit Office
Permittee

UTILITY PERMIT

PERMIT NO.:	2016-H-491-194
Financial Project ID:	42872415203, 42872415201, 42872415901, 42872415701, 42872615901, 42872615201, 43641415901, 43641415201
COUNTY:	
SECTION NO.:	
STATE ROAD:	

Preferred Contact	Address	Telephone	E-Mail
ROBERT CONNORS	3563 NW 53rd Steet Fort Lauderdale, FL 33309	(954) 739-6400 ext.308	CONNORS@CRAVENTHOMPSON.CO

The above PERMITTEE requests permission from the State of Florida Department of Transportation, hereinafter called the FDOT, to construct, operate and maintain the following (continued):

The permittee requests to install a 18" gravity sewer main to run in and along U.S. No. 1 from Broward Boulevard South to SE 2nd Court. The project will require road restoration for limits of pipe installation in the right of way.

Location from/to:

Utilities notified (continuation of provision 1):

FPL (7/16/2015 12:00:00 AM), ATT (6/16/2015 12:00:00 AM), BCTE (6/16/2015 12:00:00 AM), Comcast (6/16/2015 12:00:00 AM), FDOT (6/16/2015 12:00:00 AM), level 3 (6/16/2015 12:00:00 AM), MCI (6/16/2015 12:00:00 AM), Teco (6/16/2015 12:00:00 AM), Fiberlight (6/16/2015 12:00:00 AM), FPL Fibernet (6/16/2015 12:00:00 AM), American Traffic Solutions (6/16/2015 12:00:00 AM), XO communications (6/16/2015 12:00:00 AM)

Ownership of utilities located at (continuation of provision 13):

Broward Boulevard SE 2nd Court

Supporting documents attached:

American Traffic Solutions_Santiago Martinez.pdf, Civil Plans 8-2-16.pdf, IMG_4157.JPG, IMG_4160.JPG, Approval Package Supplemental Information.pdf

UTILITY PERMIT

PERMIT NO.: 2016-H-491-194

The complete special instructions could not fit in the space allotted on Page 2 of the Utility Permit so they are displayed below.

Special FDOT Instructions

Special Conditions: 1. Permittee is cautioned that utilities may be located within the construction area. 2. A copy of this permit and plans will be on the job site at all times during the construction of this facility 3. Lane closure request must be submitted 14 days prior to date of closure. Lane closure hours are from 9:00am to 4:00pm. Night time lane closure can be requested only between the hours of 9:00pm to 5:00am. 4. Permittee must schedule a pre-construction meeting with FDOT prior to the commencement of permitted work. 5. Permittee shall notify the FDOT a minimum of 2 work days prior to starting work and again immediately upon completion work. Vikrant.Srivastava@dot.state.fl.us ; Roberto.Betancourt@dot.state.fl.us ; Don.Preston@dot.state.fl.us ; Rauxge.Wiley@dot.state.fl.us ; Valerie.Garland@dot.state.fl.us 6. Permittee will coordinate (Preconstruction meetings, inspections, final acceptance of work, etc) all permitted work with Broadspectrum. Attn: David Moore, <david.moore@broadspectrum.com> (954)317-8044/ Fax (954)978-9840.

July 16, 2015

Mr. Santiago Martinez
American Traffic Solutions

RE: CITY OF FORT LAUDERDALE, FL
PUMP STATION A-13
DESIGN TICKET #: 197506383
CT&A PROJECT NO. 15-0051-001-01

Dear Mr. Martinez:

CRAVEN THOMPSON
& ASSOCIATES INC.
Engineers
Planners
Surveyors
Landscape Architects

Craven Thompson & Associates, Inc. is presently collecting and compiling utility information for the above referenced project. The project is located in the City of Fort Lauderdale and encompasses installation of gravity sanitary sewer, force main, a new lift station and roadway repair. The project is bounded to the North by Broward Boulevard, to the South by Las Olas Boulevard, to the West by Federal Highway and to the East by SE 9th Avenue.

The projects will involve excavation within public right of way; as a result adequate information on existing underground utilities within the project area must be identified to avoid potential conflicts. Please find the enclosed aerial exhibit which shows the exact areas of interest.

Please furnish copies of as-built plans showing your facilities within the project. If unavailable, please indicate the precise location, burial depths, size and other relevant information related to your facilities.

We thank you for your cooperation and immediate attention to this request. Please do not hesitate to contact me at etoebe@craventhompson.com or (954) 739-6400 if you have any questions, comments, or require any additional information. Thank you for your time.

Sincerely,

CRAVEN THOMPSON & ASSOCIATES, INC.

Eric Toebe

ERIC TOEBE, E.I.
Project Engineer

ET/fd

Enclosure

3563 N.W. 53rd Street
Fort Lauderdale, FL 33309-6311
(954)739-6400
Fax (954) 739-6409

DRAWING INDEX

000	COVER SHEET
C01	GENERAL NOTES AND SPECIFICATIONS
C02	SANITARY SEWER PLAN
C03	SANITARY SEWER PLAN
C04	SANITARY SEWER PLAN
C05	SANITARY SEWER PLAN
C06	SANITARY SEWER PROFILE
C07	SANITARY SEWER PROFILE
C08	SANITARY SEWER PROFILE
C09	PUMP STATION SITE PLAN
C10	PUMP STATION DETAILS
C11	SANITARY SEWER DETAILS
C12	SANITARY SEWER DETAILS
C13	SANITARY SEWER DETAILS
C14	SANITARY SEWER DETAILS
E01	LIFT STATION ELECTRICAL GENERAL NOTES
E02	LIFT STATION ELECTRICAL LEGEND AND NOTES
E03	LIFT STATION ELECTRICAL SITE PLAN
E04	LIFT STATION ELECTRICAL ONE-LINE AND DIAGRAMS
E05	LIFT STATION ELECTRICAL SCHEMATIC AND NOTES
E06	LIFT STATION ELECTRICAL TRIPLEX CONTROL DIAGRAM
E07	LIFT STATION ELECTRICAL TRIPLEX CONTROL DIAGRAM
E08	LIFT STATION ELECTRICAL TRIPLEX CONTROL DIAGRAM
E09	CONTROL PANEL TERMINAL BLOCK WIRING
E10	CONTROL PANEL LAYOUT
E11	CONTROL PANEL LAYOUT
E12	BILL OF MATERIAL, COMMUNICATIONS AND PNEUMATIC DETAIL
E13	ELECTRICAL DETAILS
I01	INSTRUMENTATION NOTES AND LEGEND
I02	INSTRUMENTATION P&ID
LS01	LANDSCAPE PLAN
LS02	LANDSCAPE NOTES AND DETAILS
LS03	LANDSCAPE NOTES AND DETAILS

R:\STD ENG-ARCH TEMPLATES\CFLSTDCVR2010.DWT

CITY OF FORT LAUDERDALE

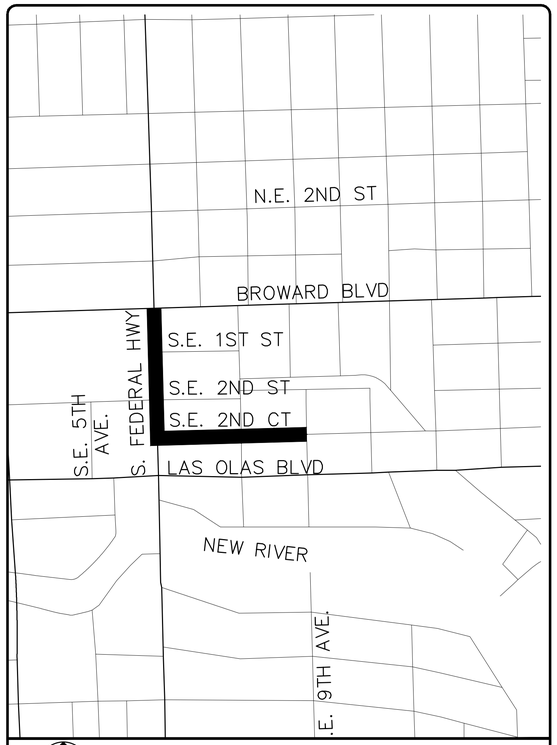
PROJECT #12133
A-13 NEW PUMP STATION, SEWER REDIRECTION - EAST OF FED. HWY

FORT LAUDERDALE, FLORIDA

Robert M. Connors
Florida P.E. No. 41863

Always call 811 two full business days before you dig to have underground utilities located and marked.
Sunshine811.com

CRAVEN • THOMPSON AND ASSOCIATES, INC.
ENGINEERS • PLANNERS • SURVEYORS
3563 N.W. 53RD STREET, FORT LAUDERDALE, FLORIDA 33309
FAX: (954) 739-6409 TEL.: (954) 739-6400
FLORIDA LICENS.E.D ENGINEERING, SURVEYING & MAPPING BUSINESS No. 271
FLORIDA LICENS.E.D LANDSCAPE ARCHITECTURE BUSINESS No. C000114



NORTH **LOCATION SKETCH** SCALE: 1"=500'

PROJECT #12133
A-13 NEW PUMP STATION, SEWER
REDIRECTION - EAST OF FEDERAL HWY

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

FORT LAUDERDALE CITY COMMISSION

JOHN P. "JACK" SEILER	MAYOR
BRUCE G. ROBERTS	COMMISSIONER - DISTRICT I
DEAN J. TRANTALIS	COMMISSIONER - DISTRICT II
ROBERT L. McKINZIE	COMMISSIONER - DISTRICT III
ROMNEY ROGERS	COMMISSIONER - DISTRICT IV

PROJECT MANAGER	JOB TITLE	PHONE NO.

DATE: JULY 15, 2016
CAD FILE: 12133-000-029COVR
DRAWING FILE No.: 4-139-49

PERMIT SET

APPROVED
2016-H-491-194
Jean-Brucely Joseph
6/12/2017

CAM 17-1222
Exhibit 3
536 of 592

I. APPLICABLE CODES

A. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO CITY STANDARDS AND SPECIFICATIONS, AND ALL OTHER LOCAL, STATE AND NATIONAL CODES WHERE APPLICABLE. ALL CONSTRUCTION WITHIN FDOT R/W SHALL BE CONSTRUCTED PER FDOT MINIMUM STANDARDS. ALL CONSTRUCTION WITHIN BROWARD COUNTY R/W SHALL BE CONSTRUCTED PER BROWARD COUNTY MINIMUM STANDARDS.

B. ALL CONSTRUCTION SHALL BE DONE IN A SAFE MANNER AND IN STRICT COMPLIANCE WITH ALL THE REQUIREMENTS OF FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, AND ALL STATE AND LOCAL SAFETY AND HEALTH REGULATIONS.

C. ALL ELEVATIONS SHOWN ON THE CONSTRUCTION DRAWINGS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988, (N.A.V.D.), UNLESS OTHERWISE NOTED.

D. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO CITY, BROWARD COUNTY AND/OR FDOT SPECIFICATIONS (WHICHEVER APPLIES).

E. CITY, BROWARD COUNTY AND/OR FDOT SPECIFICATIONS SHALL DICTATE WHEN IN CONFLICT WITH ANY OF THE FOLLOWING SPECIFICATIONS.

F. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COMPLIANCE WITH THE STATE OF FLORIDA TRENCH SAFETY ACT.

II. PRECONSTRUCTION RESPONSIBILITIES

A. UPON THE RECEIPT OF THE "NOTICE TO PROCEED", THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD AND ARRANGE A PRECONSTRUCTION CONFERENCE TO INCLUDE ALL INVOLVED GOVERNMENTAL AGENCIES, UTILITY OWNERS, THE OWNER AND THE ENGINEER OF RECORD.

B. THE CONTRACTOR SHALL OBTAIN A SUNSHINE STATE ONE CALL OF FLORIDA CERTIFICATION NUMBER AT LEAST 48 HOURS PRIOR TO BEGINNING ANY EXCAVATION, CALL 1-800-432-4770.

C. ALL UTILITY EASEMENTS TO BE SECURED PRIOR TO CONSTRUCTION (IF REQUIRED).

D. LOCATION OF EXISTING FACILITIES AS SHOWN ON CONSTRUCTION DRAWINGS ARE DRAWN FROM AVAILABLE RECORDS. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE FACILITIES SHOWN OR FOR ANY FACILITY NOT SHOWN. THE CONTRACTOR SHALL VERIFY, IF POSSIBLE, THE ELEVATIONS AND LOCATIONS OF EXISTING FACILITIES PRIOR TO CONSTRUCTION. IF AN EXISTING FACILITY IS FOUND TO CONFLICT WITH THE PROPOSED CONSTRUCTION UPON EXCAVATION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF RECORD SO THAT APPROPRIATE MEASURES CAN BE TAKEN TO RESOLVE THE PROBLEM.

E. A SEPARATE CALCULATED SITE PLAN WILL BE REQUIRED PRIOR TO CONSTRUCTION TO VERIFY PROPOSED BUILDING, CURB, AND SITE WORK LOCATIONS.

F. AT LEAST TWO (2) DAYS PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR SHALL SUBMIT A CGP "NOTICE OF INTENT (N.O.I) TO USE GENERAL PERMIT FOR STORMWATER DISCHARGE FROM CONSTRUCTION ACTIVITIES THAT DISTURB AN ACRE OR MORE OF LAND" FORM (DEP FORM 62-621.300(4)(B)) TO FDEP NOTICES CENTER. THE CONTRACTOR WILL BE RESPONSIBLE FOR: (1) IMPLEMENTATION OF A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) THAT IS REQUIRED TO BE DEVELOPED PRIOR TO THE N.O.I. SUBMITTAL, AND (2) RETENTION OF RECORDS REQUIRED BY THE PERMIT, INCLUDING RETENTION OF A COPY OF THE SWPPP AT THE CONSTRUCTION SITE FROM THE DATE OF PROJECT INITIATION TO THE DATE OF FINAL SITE STABILIZATION. A "NOTICE OF TERMINATION (N.O.T.) OF GENERIC PERMIT COVERAGE" FORM (DEP FORM 62-621.300(6)) MUST BE SUBMITTED TO FDEP TO DISCONTINUE PERMIT COVERAGE, SUBSEQUENT TO COMPLETION OF CONSTRUCTION. FOR ADDITIONAL INFORMATION SEE FDEP WEBSITE: http://www.dep.state.fl.us/water/stormwater/npdes. CONTRACTOR SHALL BE RESPONSIBLE TO PREPARE A SWPPP AND SUBMIT TO THE ENGINEER FOR APPROVAL AND COMPLY WITH ALL PROVISIONS OF CHAPTER 62-621.

G. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED DEWATERING PERMITS AND TREE REMOVAL / RELOCATION PERMITS.

III. INSPECTIONS

A. THE CONTRACTOR SHALL NOTIFY THE CITY'S ENGINEERING DEPARTMENT, BROWARD COUNTY, THE ENGINEER OF RECORD, FDOT, AND ANY OTHER GOVERNMENTAL AGENCIES HAVING JURISDICTION AT LEAST 24 HOURS PRIOR TO BEGINNING CONSTRUCTION AND PRIOR TO THE INSPECTION OF THE FOLLOWING ITEMS, WHERE APPLICABLE:

1. CLEARING AND FILLING
2. STORM DRAINAGE SYSTEM
3. SANITARY SEWER SYSTEM
4. WATER DISTRIBUTION SYSTEM
5. SUBGRADE
6. LIMEROCK BASE
7. ASPHALTIC CONCRETE / PAVER BRICK COURSE
8. SIDEWALK
9. FINAL

IV. SHOP DRAWINGS

A. PRIOR TO THEIR CONSTRUCTION OR INSTALLATION, SHOP DRAWINGS SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER OF RECORD FOR THE FOLLOWING: SANITARY MANHOLES, STORM DRAIN MANHOLES, CATCH BASINS, FIRE HYDRANTS, PIPING, VALVES AND ALL REQUIRED ACCESSORIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL OTHER AGENCY APPROVALS IF REQUIRED.

V. TEMPORARY FACILITIES

A. TEMPORARY FACILITIES:

1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE FOR OR SUPPLY TEMPORARY WATER SERVICE, SANITARY FACILITIES, TELEPHONE SERVICE AND ELECTRICITY.

B. TRAFFIC REGULATION:

1. MAINTENANCE OF TRAFFIC IN THE PUBLIC RIGHTS-OF-WAY SHALL BE IN ACCORDANCE WITH M.U.T.C.D.
2. ALL OPEN TRENCHES AND HOLES ADJACENT TO ROADWAYS OR WALKWAYS SHALL BE PROPERLY MARKED AND BARRICADED TO ASSURE THE SAFETY OF BOTH VEHICULAR AND PEDESTRIAN TRAFFIC.
3. NO TRENCHES OR HOLES NEAR WALKWAYS, IN ROADWAYS OR THEIR SHOULDERS ARE TO BE LEFT OPEN DURING NIGHTTIME HOURS WITHOUT EXPRESS PERMISSION OF THE CITY.
4. IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR FOR ANY NECESSARY CONSTRUCTION, PAVEMENT MARKING AND SIGNAGE OR ANY PEDESTRIAN SIGNALIZATION AND/OR SIGNAL MODIFICATION TO ACCOMMODATE AN ALTERNATE SAFE WALK ROUTE.

VI. WATER DISTRIBUTION SYSTEM

A. CITY STANDARDS AND SPECIFICATIONS SHALL GOVERN & SUPERCEDE ALL OTHER REQUIREMENTS FOR WATERMAIN CONSTRUCTION.

B. SEPARATION OF WATER AND SEWER MAINS

1. SANITARY SEWERS, STORM SEWERS, AND FORCE MAINS SHOULD CROSS UNDER WATER MAINS WHENEVER POSSIBLE. SANITARY SEWERS, STORM SEWERS, AND FORCE MAINS CROSSING WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE WHENEVER POSSIBLE.
2. WHERE SANITARY SEWERS, STORM SEWERS, OR FORCE MAINS MUST CROSS A WATER MAIN WITH LESS THAN 18 INCHES VERTICAL DISTANCE, BOTH THE SEWER AND THE WATER MAIN SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE (DIP) AT THE CROSSING. SUFFICIENT LENGTHS OF DIP MUST BE USED TO PROVIDE A MINIMUM SEPARATION OF 10 FEET BETWEEN ANY TWO JOINTS. ALL JOINTS ON THE WATER MAIN WITHIN 20 FEET OF THE CROSSING MUST BE MECHANICALLY RESTRAINED. A MINIMUM VERTICAL CLEARANCE OF 6 INCHES MUST BE MAINTAINED AT ALL CROSSINGS.
3. ALL CROSSING SHALL BE ARRANGED SO THAT THE SEWER PIPE JOINTS AND THE WATER MAIN PIPE JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING (PIPES CENTERED ON THE CROSSING).
4. WHERE A NEW PIPE CONFLICTS WITH AN EXISTING PIPE WITH LESS THAN 18 INCHES VERTICAL CLEARANCE, THE NEW PIPE SHALL BE CONSTRUCTED OF DIP, AND THE CROSSING SHALL BE ARRANGED TO MEET THE REQUIREMENTS ABOVE.
5. A MINIMUM 10-FOOT HORIZONTAL SEPARATION SHALL BE MAINTAINED BETWEEN ANY TYPE OF SEWER AND WATER MAIN IN PARALLEL INSTALLATIONS WHENEVER POSSIBLE.
6. IN CASES WHERE IT IS NOT POSSIBLE TO MAINTAIN A 10 FOOT HORIZONTAL SEPARATION, THE WATER MAIN MUST BE LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE SEWER OR FORCE MAIN AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER.
7. WHERE IT IS NOT POSSIBLE TO MAINTAIN A VERTICAL DISTANCE OF 18 INCHES IN PARALLEL INSTALLATIONS, THE WATER MAIN SHALL BE CONSTRUCTED OF DIP AND THE SANITARY SEWER OR THE FORCE MAIN SHALL BE CONSTRUCTED OF DIP WITH A MINIMUM VERTICAL DISTANCE OF 6 INCHES. THE WATER MAIN SHOULD ALWAYS BE ABOVE THE SEWER. JOINTS ON THE WATER MAIN SHALL BE LOCATED AS FAR APART AS POSSIBLE FROM JOINTS ON THE SEWER OR FORCE MAIN (STAGGERED JOINTS).
8. CONTRACTOR SHALL MAINTAIN WATER SERVICE TO ALL EXISTING FACILITIES DURING CONSTRUCTION.

C. MATERIALS:

1. ALL PIPE LARGER THAN 12" DIAMETER MUST BE DUCTILE IRON (MIN. CLASS 50). 8" AND 10" DIP (MIN. CLASS 50) 4" AND 6" DIP (MIN. CLASS 52). ALL DUCTILE IRON PIPE SHALL CONFORM TO THE REQUIREMENTS OF ANSI/AWWA C151/A21.51-02 AND CEMENT MORTAR LINED AND SEAL COATED PER ANSI/AWWA C104/A21.4-03. SEE CITY AND BROWARD COUNTY STANDARDS & SPECIFICATIONS FOR FURTHER D.I.P. REQUIREMENTS.
2. FITTINGS SHALL BE COMPACT DUCTILE IRON MECHANICAL JOINT TYPE AND SHALL BE CLASS 350 THROUGH 24" CONFORMING TO ANSI/AWWA C-153/A21.53-00 SPECIFICATIONS. FITTINGS MUST BE CEMENT LINED AND SEAL COATED PER ANSI/AWWA C104/A21.4-03.
3. VALVES SHALL BE GATE VALVES, IRON BODY, FULLY RESILIENT SEAT BRONZED MOUNTED NON-RISING STEM, RATED AT 150 PSI AND CONFORMING TO ANSI/AWWA C509-01 OR LATEST REVISION, AND SHALL HAVE MECHANICAL JOINTS.
    - a. GATE VALVES 4" AND LARGER SHALL BE MUELLER A-2370-20, RESILIENT SEATED GATE VALVES SHALL BE AMERICAN AFR2500 LINE OR CLOW F-6100, CONFORMING TO ANSI/AWWA C500-02. SEE BROWARD COUNTY, AND CITY CONSTRUCTION STANDARDS & SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
    - b. TAPPING VALVES SHALL BE MUELLER H615 OR APPROVED EQUAL.
    - c. GATE VALVES 3" OR LESS SHALL BE NIBCO T-133 OR T-136 WITH MALLEABLE HAND WHEELS. NO SUBSTITUTIONS ALLOWED.
4. TAPPING SLEEVES SHALL BE MUELLER H615, CLOW F-2505 OR APPROVED EQUAL. SEE BROWARD COUNTY, AND CITY CONSTRUCTION STANDARDS & SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
5. VALVE BOXES SHALL BE US FOUNDRY SERIES 7500 OR APPROVED EQUAL.
6. RETAINER GLANDS SHALL CONFORM TO ANSI/AWWA C111/A21.11-00 OR LATEST REVISION. ALL GLANDS SHALL BE MANUFACTURED FROM DUCTILE IRON AS LISTED BY UNDERWRITERS LABORATORIES FOR 250 PSI MINIMUM WATER PRESSURE RATING. CLOW CORPORATION MODEL F-1058, STANDARD FIRE PROTECTION EQUIPMENT COMPANY OR APPROVED EQUAL.
7. DRESSER COUPLINGS SHALL BE REGULAR BLACK COUPLINGS WITH PLAIN GASKETS FOR GALVANIZED STEEL PIPE. THEY SHALL BE DRESSER STYLE 90. NO SUBSTITUTIONS ALLOWED.
8. FIRE HYDRANTS SHALL BE MUELLER CENTURION TRAFFIC TYPE A-423 WITH 5 1/4" INTERNAL VALVE OPENING OR APPROVED EQUAL. MAIN VALVE OPENING TO BE DETERMINED BY THE WATER DEPARTMENT. PUMPER NOZZLE TO BE 18" FROM FINISHED GRADE. ALL HYDRANTS TO BE INSTALLED WITH CONTROL VALVE. RETAINER GLANDS ARE PREFERRED FOR RESTRAINING. FIRE HYDRANT SHALL COMPLY WITH ANSI/AWWA C502-05. SEE BROWARD COUNTY AND CITY CONSTRUCTION STANDARDS & SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

D. SERVICE CONNECTION:

1. SERVICE SADDLES SHALL BE STAINLESS STEEL STRAPS, SADDLES SHALL BE DOUBLE STRAP TYPE. ALL SERVICE SADDLES SHALL CONFORM TO ANSI/AWWA C111/A21.11-00 AND ASTM A-588.
2. SERVICE LINES SHALL BE POLYETHYLENE (3408), 250 PSI RATED, SDR9. PIPE JOINTS SHALL BE OF THE COMPRESSION TYPE TOTALLY CONFINED GRIP SEAL AND COUPLING NUT.
3. CORPORATION STOPS SHALL BE MANUFACTURED OF BRASS ALLOY IN ACCORDANCE WITH ASTM B-62 WITH THREADED ENDS, AS MANUFACTURED BY MUELLER B-25008 OR APPROVED EQUAL.
4. CURB STOPS SHALL BE MUELLER H10203 OR APPROVED EQUAL.
5. METER STOPS SHALL BE LOCKWING TYPE AND SHALL BE OF BRONZE CONSTRUCTION IN ACCORDANCE WITH ASTM B-62. METER STOPS SHALL BE CLOSED BOTTOM DESIGN AND RESILIENT "0" RING SEALED AGAINST EXTERNAL LEAKAGE AT THE TOP. STOPS SHALL BE EQUIPPED WITH A METER COUPLING NUT ON THE OUTLET SIDES, AS MANUFACTURED BY MUELLER OR APPROVED EQUAL.

E. INSTALLATION:

1. ALL PVC PIPE SHALL BE INSTALLED IN ACCORDANCE WITH THE UNI-BELL PLASTIC PIPE ASSOCIATIONS "GUIDE FOR INSTALLATION OF PVC PRESSURE PIPE FOR MUNICIPAL WATER DISTRIBUTION SYSTEM." SEE BROWARD COUNTY AND CITY CONSTRUCTION STANDARDS & SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. ALL DIP SHALL BE INSTALLED IN ACCORDANCE WITH ANSI/AWWA C600-05 OR LATEST REVISION.
3. ALL WATER MAINS SHALL BE LAID WITH A MINIMUM 36" COVER FOR PVC AND 30" FOR DIP.
4. NO CONNECTIONS TO EXISTING LINES SHALL BE MADE UNTIL PRESSURE TESTS & BACTERIOLOGICAL TESTS HAVE BEEN PERFORMED AND THE SYSTEM IS ACCEPTABLE TO THE CITY OR BROWARD COUNTY BEACH AND PUBLIC HEALTH UNIT.
5. PIPE DEFLECTION SHALL NOT EXCEED 75% OF THE MAXIMUM DEFLECTION RECOMMENDED BY THE MANUFACTURER.
6. A CONTINUOUS AND UNIFORM BEDDING SHALL BE PROVIDED. BACKFILL MATERIAL SHALL BE TAMPED IN LAYERS AROUND THE PIPE AS SHOWN ON THE PLANS. STONES FOUND IN THE TRENCH SHALL BE REMOVED FOR A DEPTH OF AT LEAST 6" BELOW THE BOTTOM OF THE PIPE.
7. ALL VALVES SHALL BE INSTALLED WITH ADJUSTABLE CAST IRON VALVE BOXES WITH THE WORD "WATER" CAST IN THE COVER. U.S.F. OR APPROVED EQUAL.
8. ALL WATER MAIN INSTALLATIONS SHALL COMPLY WITH THE COLOR CODING REQUIREMENTS OF CHAPTER 62-555.320, FAC.

F. TESTING:

1. FOR TESTING REQUIREMENTS SEE CITY AND BROWARD COUNTY CONSTRUCTION STANDARDS & SPRCIFICATIONS.
2. BEFORE ANY PHYSICAL CONNECTIONS TO THE EXISTING WATER MAINS ARE MADE, THE COMPLETE WATER SYSTEM SHALL BE PRESSURE TESTED AND DISINFECTED. HYDROSTATIC TESTING OF NEW MAINS SHALL BE PERFORMED AT A MINIMUM STARTING PRESSURE OF 150 PSI FOR TWO HOURS IN ACCORDANCE WITH ANSI/AWWA C600-05 OR LATEST REVISION, THE PRESSURE TEST SHALL NOT VARY MORE THAN 5 PSI DURING THE TEST.
3. THE PRESSURE TEST SHALL BE WITNESSED BY A REPRESENTATIVE OF THE CITY OR BROWARD COUNTY AND THE ENGINEER OF RECORD.
4. BEFORE ACCEPTANCE FOR OPERATION, THE WATER SYSTEM SHALL BE DISINFECTED IN ACCORDANCE WITH THE ANSI/AWWA C651-05; 150 PSI MINIMUM STARTING PRESSURE TEST. METER RECONNECTIONS MAY BE MADE TO NEW LINES AFTER TWO CONSECUTIVE DAYS OF BACTERIOLOGICAL SAMPLES HAVE PASSED, AND COPIES OF RESULTS HAVE BEEN RECEIVED BY THE ENGINEER, CITY, AND HRS.
5. SAMPLING POINTS SHALL BE PROVIDED AT THE LOCATIONS SHOWN ON THE PLANS. IF NOT SPECIFIED, SAMPLING POINTS SHALL BE PROVIDED AT INTERVALS OF 1,200' MAXIMUM FOR LINES GREATER THAN 1,200' IN LENGTH.
6. THE ALLOWABLE LEAKAGE SHALL BE LESS THAN THE NUMBER OF GALLONS PER HOUR AS DETERMINED BY THE FORMULA:

$$L = \frac{S\,D\sqrt{P}}{148000}$$

IN WHICH L EQUALS THE ALLOWABLE LEAKAGE IN GALLONS PER HOUR. S EQUALS LENGTH OF PIPE (LINEAR FEET), D EQUALS NOMINAL DIAMETER OF PIPE (INCHES) AND P EQUALS THE AVERAGE TEST PRESSURE(POUNDS PER SQUARE INCH).

VII. GRAVITY SEWER COLLECTION SYSTEM

A. CITY AND BROWARD COUNTY CONSTRUCTION STANDARDS & SPECIFICATIONS SHALL GOVERN & SUPERCEDE ALL OTHER REQUIREMENTS FOR SANITARY SEWER CONSTRUCTION.

B. GENERAL:

1. DISTANCE AND LENGTHS SHOWN ON PLANS ARE REFERENCED TO THE CENTER OF STRUCTURES.

C. MATERIALS:

1. ALL SEWER PIPE AND FITTINGS SHALL BE PVC PIPE CONFORMING TO ASTM D 3034, SDR-35 WITH PUSH-ON RUBBER GASKET JOINTS, UNLESS OTHERWISE NOTED, OR DUCTILE IRON PIPE SHALL BE (MIN. CLASS 52), AS INDICATED ON THE DRAWINGS.
2. MANHOLES SHALL BE PRECAST PER ASTM C 478 WITH 4,000 PSI CONCRETE AND GRADE 60 STEEL. MONOLITHICALLY POURED BASES ONLY.
3. MANHOLES ARE TO BE SEALED WITH ANTI-HYDRO CEMENT OR APPROVED EQUAL - NO MOULDING PLASTER.

D. INSTALLATION:

1. PVC SEWER PIPE SHALL BE LAID IN ACCORDANCE WITH ASTM D 2321 AND THE UNI-BELL PLASTIC PIPE ASSOCIATION'S "RECOMMENDED PRACTICE FOR THE INSTALLATION OF PVC SEWER PIPE."
2. DUCTILE IRON PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ANSI/AWWA C600-05 OR LATEST REVISION.
3. PVC MANHOLE ADAPTOR SHALL BE GROUTED IN PLACE AT EACH PIPE CONNECTION INTO A MANHOLE WALL.
4. MANHOLES SHALL BE SET PLUMB TO LINE AND GRADE ON FIRM SUBGRADE PROVIDING UNIFORM BEARING UNDER THE BASE.
5. ALL OPENINGS AND JOINTS SHALL BE SEALED WATERTIGHT.
6. THE ENTIRE INSIDE AND OUTSIDE OF THE MANHOLES SHALL BE PAINTED WITH TWO COATS OF DIFFERENT COLORS (8 MILS EACH) OF KOPPERS 300-M BITUMASTIC PAINT OR ENGINEER'S APPROVED EQUAL.

E. TESTING:

1. AFTER CONSTRUCTION OF THE SEWER SYSTEM, THE ENGINEER MAY REQUIRE A VISUAL INFILTRATION AND/OR EXFILTRATION TEST TO BE PERFORMED ON THE ENTIRE SYSTEM OR ANY PART THEREOF.
2. AN AIR TEST MAY BE SUBSTITUTED FOR THE WATER EXFILTRATION TEST, UPON APPROVAL OF THE ENGINEER.
3. MANHOLE LEAKAGE TEST SHALL NOT EXCEED FOUR GALLONS PER DAY PER UNIT. NO VISIBLE LEAKAGE ALLOWED.
4. SEWER PIPE LEAKAGE ALLOWABLE SHALL NOT EXCEED 150 GALLONS PER DAY PER INCH DIAMETER PER MILE IN A TWO HOUR TEST PERIOD FOR ANY SECTION TESTED. NO VISIBLE LEAKAGE SHALL BE ALLOWED.
5. ALL SEWER PIPE SHALL BE VIDEO RECORDED AND GIVEN TO CITY FOR REVIEW AND APPROVAL AT THE CONTRACTORS EXPENSE.
6. SEE BROWARD COUNTY AND CITY CONSTRUCTION STANDARDS & SPECIFICATIONS FOR ADDITIONAL TESTING REQUIREMENTS.

VIII. STORM DRAINAGE

A. GENERAL:

1. DISTANCES AND LENGTHS SHOWN ON PLANS ARE REFERENCED TO THE CENTER OF STRUCTURES.

B. MATERIALS:

1. REINFORCED CONCRETE PIPE (R.C.P.) SHALL MEET THE REQUIREMENTS OF ASTM C-76, LATEST REVISION. RUBBER GASKETS OR OTHER MANUFACTURER SUPPLIED JOINT SEALER SHALL BE USED. FOR ADDITIONAL REQUIREMENTS SEE BROWARD COUNTY'S AND THE CITY'S STANDARDS AND SPECIFICATIONS.
2. ALL DRAINAGE CATCH BASINS AND STRUCTURES SHALL BE PRECAST CONCRETE AS MANUFACTURED BY U.S. PRECAST CORPORATION, UNLESS OTHERWISE NOTED ON THE PLANS. THE MINIMUM WALL AND SLAB THICKNESS SHALL BE 8 INCHES AND THE MINIMUM REINFORCING SHALL BE AS INDICATED ON THE STRUCTURE DETAIL. CONCRETE SHALL BE MINIMUM OF 400PSI AT 28 DAYS.

C. INSTALLATION:

1. PIPE SHALL BE PLACED ON A MINIMUM OF 8" STABLE GRANULAR MATERIAL FREE OF ROCK FORMATION AND OTHER FOREIGN FORMATIONS, AND CONSTRUCTED TO A UNIFORM GRADE AND LINE.
2. BACKFILL MATERIAL SHALL BE WELL GRADED GRANULAR MATERIAL, WELL TAMPED IN LAYERS NOT TO EXCEED 6 INCHES TO A HEIGHT OF 12 INCHES ABOVE PIPE AS SHOWN ON THE PLANS.
3. PROVIDE A MINIMUM PROTECTIVE COVER OF 18 INCHES OVER STORM SEWER AND AVOID UNNECESSARY CROSSING BY HEAVY CONSTRUCTION VEHICLES DURING CONSTRUCTION.
4. THE CONTRACTOR SHALL NOTIFY THE CITY'S ENGINEERING DEPARTMENT AT LEAST 7 DAYS PRIOR TO THE START OF THE CONSTRUCTION AND INSPECTION.

IX. PAVING

A. GENERAL:

1. BROWARD COUNTY AND THE CITY'S CONSTRUCTION STANDARDS & SPECIFICATIONS SHALL GOVERN.
2. ALL MUCK AND YIELDING MATERIAL WITHIN THE LIMIT OF CONSTRUCTION SHALL BE REMOVED AND REPLACED WITH CLEAN FILL MATERIAL WHICH SHALL BE COMPACTED AND SHAPED TO CONFORM TO THE REQUIRED SECTION. COMPACTED AREAS, AS SHOWN ON THE PLANS AND OR AS DETERMINED BY THE ENGINEER, SHALL BE COMPACTED TO NOT LESS THAN 98% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE, AS DETERMINED BY AASHTO T-180, LATEST REVISION. AREAS TO BE STABILIZED, AS DETERMINED BY THE ENGINEER, SHALL HAVE A MINIMUM LBR-40.
3. ALL UNDERGROUND UTILITIES SHALL BE COMPLETED PRIOR TO CONSTRUCTION OF LIMEROCK BASE.
4. ALL EXISTING PAVEMENT, CUT OR DAMAGED BY CONSTRUCTION, SHALL BE PROPERLY RESTORED AT THE CONTRACTOR'S EXPENSE.
5. WHERE ANY PROPOSED PAVEMENT IS TO BE CONNECTED TO EXISTING PAVEMENT, THE EXISTING EDGE OF PAVEMENT SHALL BE SAW CUT.

B. MATERIALS:

1. BASE COURSE SHALL BE CRUSHED LIMEROCK WITH A MINIMUM OF 70% CARBONATES OF CALCIUM AND MAGNESIUM.
2. ASPHALT SURFACES SHALL BE TYPE S-III ASPHALTIC CONCRETE, UNLESS OTHERWISE SPECIFIED ON THE PLANS, AND SHALL BE A MINIMUM OF 1-1/2" THICK.
3. MINIMUM SIDEWALK CONSTRUCTION SHALL BE 4 INCH THICK CONCRETE, MINIMUM 3000psi COMPRESSIVE STRENGTH AT 28 DAYS. SAWCUT CONSTRUCTION JOINTS 5 FOOT o.c. WITHIN 48 HOURS OF PLACING, EXPANSION JOINTS SHALL BE 20 FOOT o.c. SEE BROWARD COUNTY'S AND THE CITY'S SECTION ON CONSTRUCTION STANDARDS & SPECIFICATIONS FOR FURTHER REQUIREMENTS.
4. CURBS AND GUTTERS: CONCRETE 3000psi COMPRESSIVE STRENGTH AT 28 DAYS, SAWCUT CONSTRUCTION JOINTS 10 FOOT o.c. WITHIN 48 HOURS OF PLACING.
5. REINFORCED CONCRETE SLABS SHALL BE CONSTRUCTED OF CLASS I CONCRETE WITH A MINIMUM STRENGTH OF 3,000 PSI AND SHALL BE REINFORCED WITH A 6" x 6" NO. 6 GAUGE WIRE MESH.

C. INSTALLATION:

1. SUBGRADE FOR PAVEMENT AREAS SHALL BE COMPACTED TO A MINIMUM OF 98% OF THE MAXIMUM DENSITY (AASHTO T-99(c)), AND SHALL HAVE A MINIMUM LBR 40.
2. BASE COURSE MATERIAL FOR PAVED AREAS SHALL BE A MINIMUM THICKNESS OF 8" AND SHALL BE CONSTRUCTED IN TWO FOUR-INCH LIFTS.
3. BASE COURSE MATERIAL FOR CURBS AND GUTTERS SHALL BE A MINIMUM THICKNESS OF 6 INCH.
4. BASE COURSE SHALL BE COMPACTED TO 98% OF THE MAXIMUM DENSITY AS PER AASHTO T-180 AND SHALL HAVE A MINIMUM LBR OF 100.
5. INSTALLATION OF THE WEARING SURFACE SHALL CONFORM WITH THE REQUIREMENTS OF THE D.O.T. STANDARD SPECIFICATIONS FOR TYPE S-III ASPHALTIC CONCRETE.

D. TESTING:

1. THE FINISHED SURFACE OF THE BASE COURSE AND THAT OF THE WEARING SURFACE SHALL NOT VARY MORE THAN 1/4" FROM THE TEMPLATE. ANY IRREGULARITIES EXCEEDING THIS LIMIT SHALL BE CORRECTED.
2. DENSITY TESTS SHALL BE TAKEN BY AN INDEPENDENT TESTING LABORATORY CERTIFIED BY THE STATE OF FLORIDA, WHERE DIRECTED BY THE ENGINEER.
3. ALL TESTING COSTS (PAVING) SHALL BE PAID FOR BY THE CONTRACTOR.
4. DENSITY TESTS ON THE STABILIZED SUBGRADE SHALL BE SUPPLIED TO THE ENGINEER OF RECORD AND APPROVED BEFORE ANY LIMEROCK BASE IS CONSTRUCTED.
5. DENSITY TESTS AND AS-BUILTS ON THE FINISHED LIMEROCK BASE SHALL BE SUPPLIED TO THE ENGINEER OF RECORD, AND APPROVED BEFORE ANY ASPHALT PAVEMENT IS CONSTRUCTED.

X. DEWATERING

1. WHERE DEWATERING IS REQUIRED, THE CONTRACTOR IS RESPONSIBLE FOR DEWATERING IN SUCH A MANNER SO AS TO COMPLY WITH ANY AND ALL CITY, COUNTY, STATE AND FEDERAL DEWATERING REQULATIONS. CONTRACTOR MAY CONTACT THE BROWARD COUNTY DEPARTMENT OF PLANNING AND ENVIRONMENTAL PROTECTION AND THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTETCION FOR FURTHER INFORMATION.

XI. PAVEMENT MARKING AND SIGNAGE

1. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," LATEST EDITION; AND BROWARD COUNTY TRAFFIC ENGINEERING STANDARDS (CURRENT EDITION). STANDARDS & SPECIFICATIONS FOR PAVEMENT MARKING REQUIREMENTS.

XII. PROJECT CLOSEOUT

A. CLEANING UP:

1. DURING CONSTRUCTION, THE PROJECT SITE AND ALL ADJACENT AREAS SHALL BE MAINTAINED IN A NEAT AND CLEAN MANNER, AND UPON FINAL CLEAN-UP, THE PROJECT SITE SHALL BE LEFT CLEAR OF ALL SURPLUS MATERIAL OR TRASH. THE PAVED, PAVER BRICK, AND CONCRETE AREAS SHALL BE SWEPT BROOM CLEAN.
2. THE CONTRACTOR SHALL RESTORE OR REPLACE, WHEN AND AS DIRECTED, ANY PUBLIC OR PRIVATE PROPERTY DAMAGED BY HIS WORK, EQUIPMENT, OR EMPLOYEES, TO A CONDITION AT LEAST EQUAL TO THAT EXISTING IMMEDIATELY PRIOR TO THE BEGINNING OF OPERATIONS. TO THAT END, THE CONTRACTOR SHALL DO, AS REQUIRED, ALL NECESSARY HIGHWAY, DRIVEWAY, WALK AND LANDSCAPING WORK. SUITABLE MATERIALS AND METHODS SHALL BE USED FOR SUCH RESTORATION.
3. WHERE MATERIAL OR DEBRIS HAS WASHED OR FLOWED INTO OR HAS BEEN PLACED IN WATER COURSES, DITCHES, DRAINS, CATCH BASINS, OR ELSEWHERE AS A RESULT OF THE CONTRACTOR'S OPERATIONS, SUCH MATERIAL OR DEBRIS SHALL BE REMOVED AND SATISFACTORILY DISPOSED OF DURING THE PROGRESS OF THE WORK, AND THE AREA KEPT IN A CLEAN AND NEAT CONDITION.

B. ALL PROPERTY MONUMENTS OR PERMANENT REFERENCES, REMOVED OR DESTROYED BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE RESTORED BY A STATE OF FLORIDA REGISTERED LAND SURVEYOR AT THE CONTRACTOR'S EXPENSE.

C. ALL UNPAVED SURFACES DISTURBED AS A RESULT OF CONSTRUCTION ACTIVITIES SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THAT WHICH EXISTED BEFORE THE CONSTRUCTION.

XIII. ENGINEER'S AS BUILT REQUIREMENTS

1. DURING THE DAILY PROGRESS OF THE JOB, THE CONTRACTOR SHALL RECORD ON THEIR SET OF CONSTRUCTION DRAWINGS THE EXACT LOCATION, LENGTH, MATERIAL AND ELEVATION OF ANY FACILITY NOT BUILT EXACTLY ACCORDING TO PLANS.
2. AS BUILTS OF WATER LINES SHALL INCLUDE THE FOLLOWING
    - a. TOP OF PIPE ELEVATIONS EVERY 100 LINEAR FEET
    - b. LOCATIONS AND ELEVATIONS OF ALL FITTINGS INCLUDING BENDS, TEES, GATE VALVES, DOUBLE DETECTOR CHECK VALVES, FIRE HYDRANTS, ETC.
    - c. ALL TIE INS TO EXISTING LINES SHALL BE AS BUILT
    - d. THE TERMINATION OF ALL WATER SERVICES SHALL BE SHOWN
3. AS BUILTS OF ALL THE GRAVITY SANITARY SEWER LINES SHALL INCLUDE THE FOLLOWING INFORMATION
    - a. RIMS, INVERTS, AND LENGTH OF PIPING BETWEEN STRUCTURES, AS WELL AS PIPE SLOPES.
    - b. LOCATION OF ALL STUB ENDS OF ALL SEWER LATERALS INVERT ELEVATIONS AND LOCATION OF ALL CLEAN OUTS
    - c. LIFT STATION AS BUILTS SHALL CONSIST OF THE TOP OF WET WELL ELEVATION, INVERT ELEVATIONS OF THE INCOMING LINE, BOTTOM OF THE WET WELL AND AS BUILTS OF THE COMPOUND AREA
4. FORCE MAIN AS BUILTS SHALL BE PREPARED THE SAME AS THE WATER MAIN AS BUILTS DESCRIBED ABOVE
5. AS BUILTS OF ALL DRAINAGE LINES SHALL INCLUDE THE FOLLOWING INFORMATION
    - a. RIMS, INVERTS, AND LENGTH OF PIPING BETWEEN STRUCTURES, AND WEIR ELEVATIONS WHERE APPLICABLE
    - b. THE SIZE OF THE PIPING SHALL BE VERIFIED BY THE SURVEY FIELD CREW AT THE TIME OF AS BUILT
    - c. DRAINAGE WELL STRUCTURE AS BUILTS SHALL INCLUDE, BUT NOT BE LIMITED TO, TOP OF CASING ELEVATION, TOP AND BOTTOM ELEVATIONS OF THE BAFFLE WALLS, RIM ELEVATIONS, AND INVERTS OF PIPING
6. ALL ROCK AS BUILTS FOR PARKING LOT AREAS SHALL CONSIST OF THE FOLLOWING INFORMATION
    - a. ROCK ELEVATIONS AT ALL HIGH AND LOW POINTS, AND AT ENOUGH INTERMIEDIATE POINTS TO CONFIRM SLOPE CONSISTENCY
    - b. ROCK AS BUILTS SHALL BE TAKEN AT ALL LOCATIONS WHERE THERE IS A FINISHED GRADE ELEVATION SHOWN ON THE DESIGN PLANS
    - c. ALL CATCH BASIN AND MANHOLE RIM ELEVATIONS SHALL BE SHOWN
    - d. ELEVATIONS AROUND ISLANDS SHALL ALSO BE SHOWN
    - e. WHERE CONCRETE OR PAVER BRICK IS TO BE USED AS A FINISHED PRODUCT FOR THE ROADWAY OR PARKING LOT, ROCK AS BUILTS WILL BE REQUIRED AS INDICATED ABOVE, AS WELL AS BUILTS ON THE FINISHED CONCRETE OR PAVERS AT LOCATIONS WHERE THERE IS A FINISHED GRADE ELEVATION SHOWN ON THE DESIGN PLANS
    - f. AS BUILTS SHALL BE TAKEN ON ALL PAVED AND UNPAVED SWALES, PRIOR TO PLACEMENT OF ASPHALT OR TOPSOIL OR SOD, AT ENOUGH INTERMEDIATE POINTS TO CONFIRM SLOPE CONSISTENCY AND CONFORMANCE TO THE PLANS
7. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL PREPARE RECORD DRAWINGS, ON FULL SIZE REPRODUCIBLE MATERIAL. ONE SET OF REPRODUCIBLE RECORD DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD, ALONG WITH EIGHT SETS OF BLUE OR BLACK LINE DRAWINGS. THESE DRAWINGS SHALL BE SIGNED AND SEALED BY A FLORIDA REGISTERED LAND SURVEYOR. ADDITIONALLY, AN ELECTRONIC COPY OF THESE RECORD DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER IN AUTOCAD, ".DWG" OR ".DXF" FORMAT
8. IN ADDITION TO THE ABOVE THE CONTRACTOR SHALL ALSO CONFORM TO COUNTY AND/OR CITY AS-BUILT REQUIREMENTS.

CRAVEN • THOMPSON AND ASSOCIATES, INC.
ENGINEERS • PLANNERS • SURVEYORS
3563 N.W. 53RD STREET, FORT LAUDERDALE, FLORIDA 33309
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FLORIDA LICENSED ENGINEERING, SURVEYING & MAPPING BUSINESS No. 271
FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000114

CTA PROJECT NO. 15-0051-001-01

PERMIT SET

Robert M. Connors
Florida P.E. No. 41863

APPROVED
2016-H-491-194
Jean-Brucely Joseph
6/12/2017

DRAWN BY: JA	DATE: MM/DD/YY		
DESIGNED BY: RMC	SCALE:		
CHECKED BY: RMC		FIELD BOOK:	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
GENERAL NOTES & SPECIFICATIONS
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO. C01 OF 14
TOTAL: 32
CAD FILE: 12133-C01-NOTE
DRAWING FILE NO. 4-139-49

CAM 17-1222
Exhibit 3
537 of 592

PROJECT 12133							
TH#	TYPE OF UTILITY & OWNER	SIZE & MATERIAL	QTY.	UTILITY DIRECTION	COVER	TOP OF UTIL ELEV	NOTE
13	STORM	48" R.C.P.	1	NW/SE	4.95	(-)0.50	NOTE: SIZE OBTAINED AT CROWN OF EAST END OF SOUTHERN MOST 48" R.C.P. OUTFALL. NOTE WE WERE UNABLE TO LOCATE THE SOUTHERN MOST 48" R.C.P. WEST OF TEST HOLE 13. (SEVERAL ATTEMPTS WERE MADE). PK SET OVER APPROXIMATE CROWN OF PIPE.
14	STORM	66"/54" R.C.P.	1	NW/SE	4.45	(-)0.25	NOTE: TEST HOLE REVEALED LARGE R.C.P. STORM. UNABLE TO OBTAIN SIZE DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. HUB SET OVER TOP OF UTILITY.
15	WATER	6" CAST IRON	1	N/S	1.83	2.44	NOTE:
16	WATER	6" CAST IRON	1	N/S	2.92	1.28	NOTE: TEST HOLE REVEALED 2" STEEL UNKNOWN (POSSIBLE STREET LIGHTING) CONDUIT RUNNING NORTH-SOUTH, 0.15' WEST OF CHIS "X" . COVER =0.72. CHIS "X" SET OVER CROWN OF 6" WATER.
17	STORM	R.15" R.C.P.	1	NW/SE	2.20	1.52	NOTE: 15" PIPE SIZE OBTAINED IN STORM DRAIN INLET. PK SET OVER CROWN OF PIPE.
18	WATER	12" DUCTILE IRON	1	E/W	3.40	1.24	NOTE: TEST HOLE MOVED 15' EAST OF REQUESTED LOCATION DUE TO DECORATIVE PAVING. PK SET OVER CROWN OF 12" WATER.

NOTES:

1.) WATER AND SEWER SERVICE PROVIDED BY THE CITY OF FORT LAUDERDALE.

2.) ALL ELEVATIONS SHOWN HEREON REFER TO NAVD 1988 UNLESS OTHERWISE NOTED.

3.) ALL EXISTING UTILITIES (WATER, SEWER, DRAINAGE, GAS, ETC.) MUST BE MAINTAINED AND OPERATIONAL THROUGHOUT THE ENTIRE DURATION OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING AND MAINTAINING TEMPORARY RELOCATION/COORDINATION OF EXISTING UTILITIES (WATER & SEWER) AS REQUIRED TO FACILITATE PROPOSED SEWER IMPROVEMENTS.

4.) ALL TRENCH EXCAVATION SIDE WALLS SHALL BE SLOPED, SHORED, SHEETED, BRACED OR OTHERWISE SUPPORTED AS NEEDED TO FACILITATE PROPOSED SEWER IMPROVEMENTS.

5.) TEMPORARY RELOCATION OF EXISTING SERVICES AND LATERALS MAY BE REQUIRED TO FACILITATE CONSTRUCTION OF THE PROJECT. SEPARATE PAYMENT WILL NOT BE MADE FOR THIS WORK.

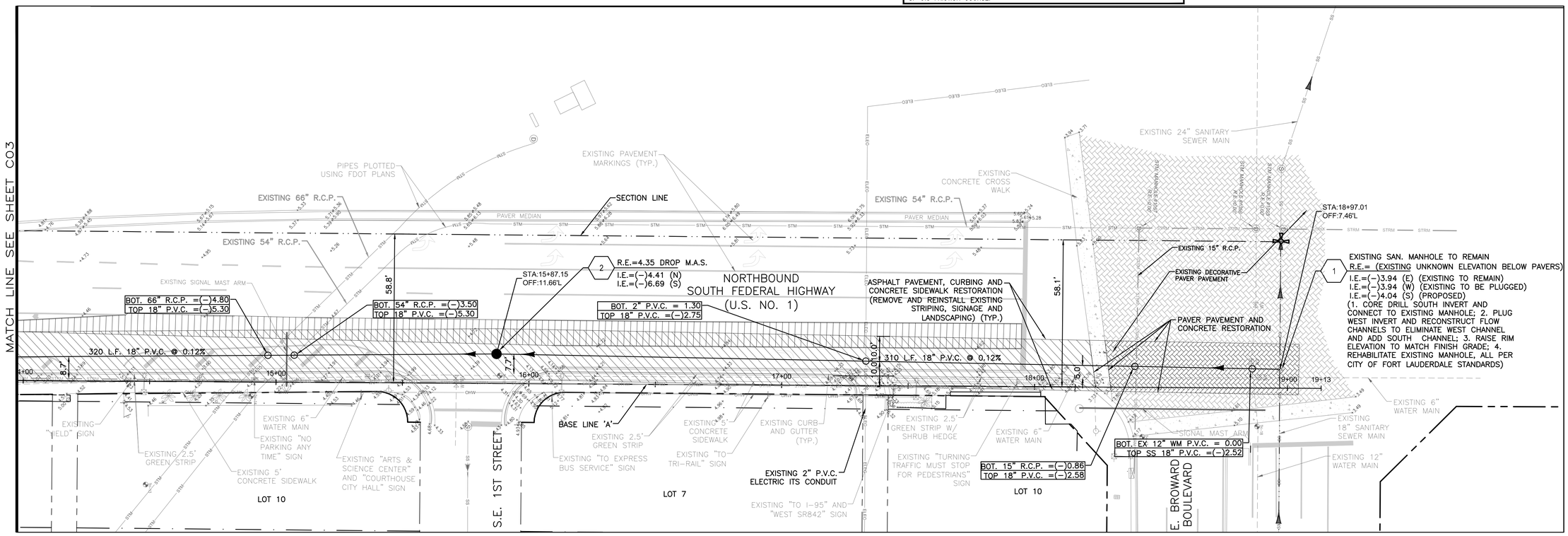
6.) ALL EXISTING UTILITIES SHOWN ON THIS PLAN WERE OBTAINED FROM THE SURVEY, CITY OF FORT LAUDERDALE ATLASES, AND CITY OF FORT LAUDERDALE AS-BUILTS.

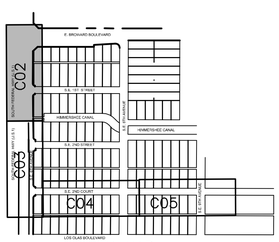
7.) ASPHALT PAVEMENT SECTION RESTORATION THAT IS LOCATED WITHIN S.E. 2ND COURT RIGHT OF WAY SHALL CONSIST OF COMPACTED SUBGRADE, 16" LIMEROCK BASE MEETING LBR 100, 1" SP 9.5 STRUCTURAL COURSE, AND 1" SP 9.5 FRICTION COURSE.

8.) ASPHALT PAVEMENT SECTION RESTORATION THAT IS LOCATED WITHIN U.S. 1 RIGHT OF WAY SHALL CONSIST OF 12" STABILIZED SUBGRADE MEETING LBR 40, 12" LIMEROCK BASE MEETING LBR 100, 2" SP 12.5 STRUCTURAL COURSE, AND 2" SP 12.5 2ND STRUCTURAL COURSE, AND 1.5" SP 9.5 FRICTION COURSE.

9.) ASHALT RESURFACING ASSOCIATED WITH MILLING AND RESURFACING SHALL BE 1.5" SP 9.5 FRICTION COURSE.

0 20' 40'





KEY MAP

EXISTING LEGEND:

- ANCHOR
- BLOW-OFF VALVE
- CATCH BASIN
- CONCRETE LIGHT POLE
- CONCRETE POST
- CONCRETE POWER POLE
- CURB INLET
- ELECTRICAL OUTLET
- ELECTRICAL PANEL
- ELECTRICAL PULL BOX
- ELECTRICAL MANHOLE
- GAS MARKER
- HEADWALL
- METAL LIGHT POLE
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- SANITARY SEWER CLEAN OUT
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- TELEPHONE MANHOLE
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- TELEPHONE PULL BOX
- TRAFFIC POLE
- TRAFFIC PULL BOX
- TRANSFORMER PAD
- WATER BLOW-OFF
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- TOP OF BANK
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- WATER MAIN
- GUARDRAIL
- NON-VEHICULAR ACCESS LINE

PROPOSED WATER AND SEWER LEGEND:

- FIRE HYDRANT ASSEMBLY
- GATE VALVE
- WATER METER
- SAMPLING POINT
- REDUCER
- BACKFLOW PREVENTER
- SIAMESE FIRE CONNECTION
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FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000114

CTA PROJECT NO. 15-0051-001-01

PERMIT SET

Robert M. Connors
Florida P.E. No. 41863

DRAWN BY: | DATE: MM/DD/YY
DESIGNED BY: | SCALE:
CHECKED BY: | FIELD BOOK:

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER PLAN
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO. C02 OF 14
TOTAL: 32
CAD FILE: 12133-MULTI-SSWR
DRAWING FILE NO.: 4-139-49

APPROVED
GAM 17-1226
Exhibit 2
Page 24 of 32
Joseph

N:\DWGS\ENG\PROJECTS\2015\15-0051-001-01 A-13 NEW PUMP STATION (FT. LAUDERDALE)\DRAWINGS\12133-MULTI-SSWR.DWG

PROJECT 12133							
TH#	TYPE OF UTILITY & OWNER	SIZE & MATERIAL	QTY.	UTILITY DIRECTION	COVER	TOP OF UTIL ELEV	NOTE
10	WATER	6" DUCTILE IRON	1	N/S	3.88	1.69	NOTE:
11	WATER	6" CAST IRON	1	N/S	3.66	0.90	NOTE:
12	WATER	ASBESTOS CEMENT	1	N/S	3.20	0.58	NOTE: 6" WATER REQUESTED AT THIS LOCATION. TEST HOLE EXCAVATED ON WATER LOCATION MARKS. TEST HOLE REVEALED A 12" ASBESTOS CEMENT UNKNOWN (POSSIBLE SLEEVE FOR 6" WATER). PK SET OVER CROWN OF 12" UNKNOWN.

1.) WATER AND SEWER SERVICE PROVIDED BY THE CITY OF FORT LAUDERDALE.

2.) ALL ELEVATIONS SHOWN HEREON REFER TO NAVD 1988 UNLESS OTHERWISE NOTED.

3.) ALL EXISTING UTILITIES (WATER, SEWER, DRAINAGE, GAS, ETC.) MUST BE MAINTAINED AND OPERATIONAL THROUGHOUT THE ENTIRE DURATION OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING AND MAINTAINING TEMPORARY RELOCATION/COORDINATION OF EXISTING UTILITIES (WATER & SEWER) AS REQUIRED TO FACILITATE PROPOSED SEWER IMPROVEMENTS.

4.) ALL TRENCH EXCAVATION SIDE WALLS SHALL BE SLOPED, SHORED, SHEETED, BRACED OR OTHERWISE SUPPORTED AS NEEDED TO FACILITATE PROPOSED SEWER IMPROVEMENTS.

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8.) ASPHALT PAVEMENT SECTION RESTORATION THAT IS LOCATED WITHIN U.S. 1 RIGHT OF WAY SHALL CONSIST OF 12" STABILIZED SUBGRADE MEETING LBR 40, 12" LIMEROCK BASE MEETING LBR 100, 2" SP 12.5 STRUCTURAL COURSE, AND 2" SP 12.5 2ND STRUCTURAL COURSE, AND 1.5" SP 9.5 FRICTION COURSE.

9.) ASHALT RESURFACING ASSOCIATED WITH MILLING AND RESURFACING SHALL BE 1.5" SP 9.5 FRICTION COURSE.

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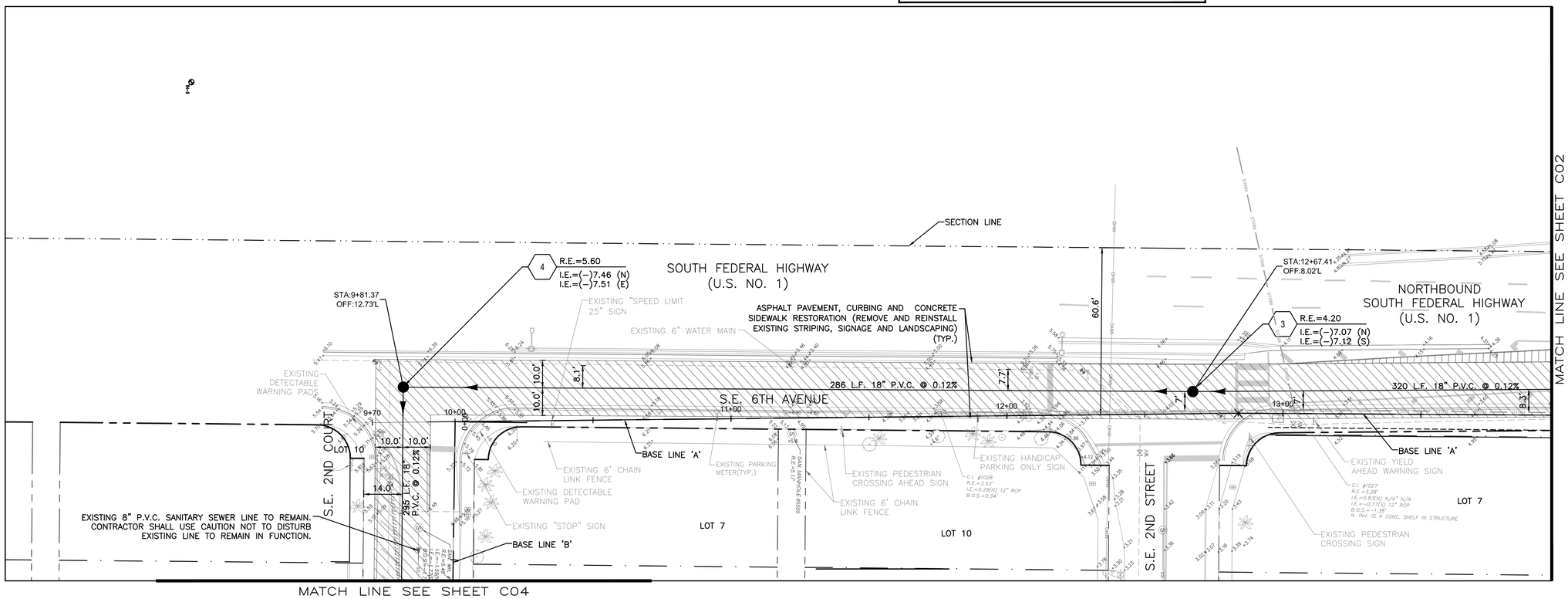

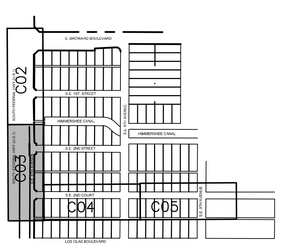

KEY MAP

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FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000114

CTA PROJECT NO. 15-0051-001-01

PERMIT SET

APPROVED
Robert M. Connors
Florida P.E. No. 41863
Jesus Arcely Joseph
6/12/2017

DRAWN BY:	DATE: MM/DD/YY
DESIGNED BY:	SCALE:
CHECKED BY:	
FIELD BOOK:	

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER PLAN
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO.	OF
C03	14
TOTAL:	32

CAD FILE: 12133-MULTI-SSWR
DRAWING FILE NO.: 4-139-49

PROJECT 12133							
TH#	TYPE OF UTILITY & OWNER	SIZE & MATERIAL	UTILITY QTY.	UTILITY DIRECTION	COVER	TOP OF UTIL ELEV	NOTE
2	WATER	6" DUCTILE IRON	1	-	2.79	-	NOTE:
3	WATER	30" CAST IRON	1	-	5.02	-	NOTE:
4	WATER	CAST IRON	1	-	5.04	-	NOTE: UNABLE TO OBTAIN SIZE DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. PLANS INDICATED A 30" WATER AT THIS LOCATION. PK SET OVER APPROXIMATE CROWN OF UTILITY.
5	WATER	8" DUCTILE IRON	1	-	4.90	-	NOTE:
7	WATER	6" DUCTILE IRON	1	-	2.55	-	NOTE: 8" WATER REQUESTED AT THIS LOCATION. TEST HOLE REVEALED A 6" DUCTILE IRON WATER. TEST HOLE ALSO REVEALED (8) 4" P.V.C. (GRAY) UNKNOWN (POSSIBLE TELEPHONE), RUNNING NORTH-SOUTH, 0.40' WEST OF PK. TOTAL WIDTH =2.00. COVER =3.14. UNABLE TO OBTAIN BOTTOM COVER DUE TO TRENCH WALL. PK SET OVER CROWN OF 6" WATER.
8	FIBER OPTIC	4" P.V.C. (ORANGE)&(GRAY)	2	-	5.10	-	NOTE: TEST HOLE MOVED 20' NORTH OF REQUESTED AREA DUE TO DECORATIVE PAVING. TOTAL WIDTH =0.80. POSSIBLE ADDITIONAL CONDUITS BELOW. UNABLE TO DETERMINE DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. CHIS "X" SET OVER CROWN OF WESTERN MOST 4" P.V.C. (ORANGE) FIBER OPTIC CONDUIT.
6	WATER	6" DUCTILE IRON	1	-	3.43	-	NOTE:

NOTES:

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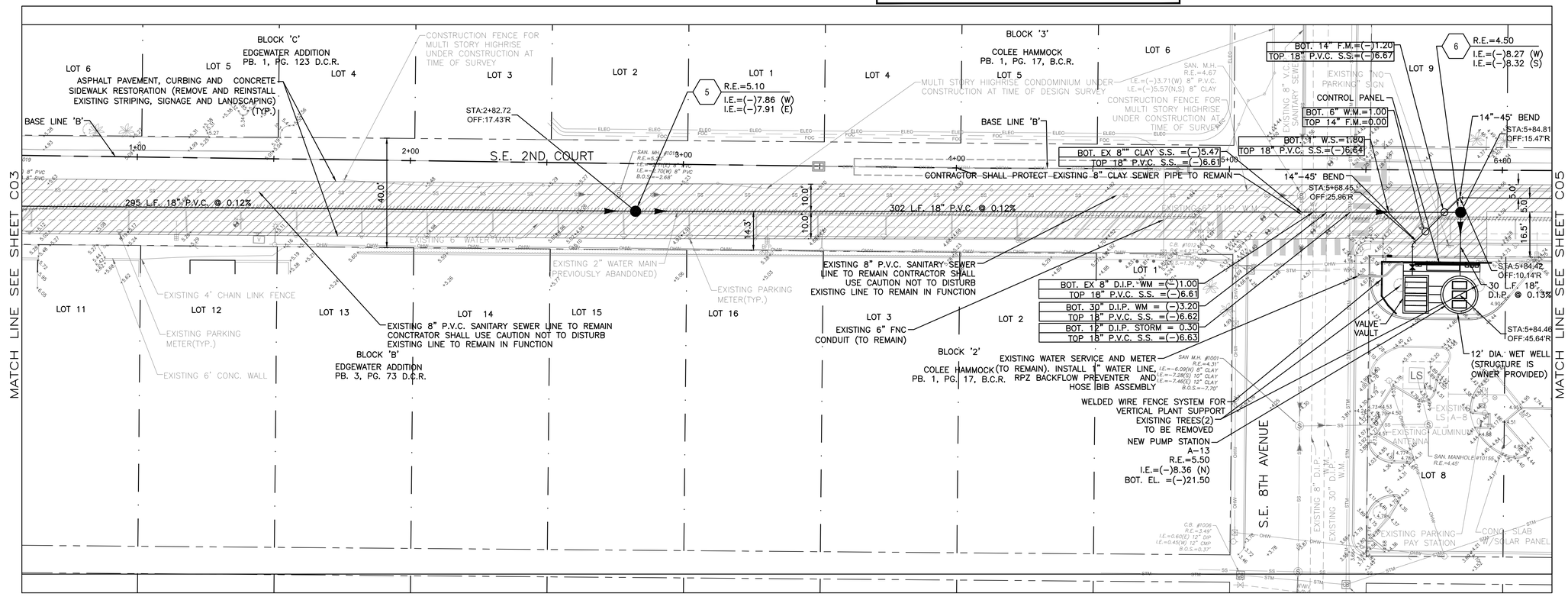
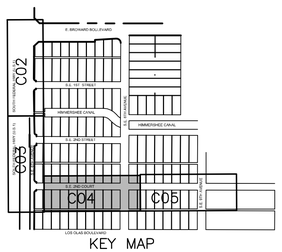
6.) ALL EXISTING UTILITIES SHOWN ON THIS PLAN WERE OBTAINED FROM THE SURVEY, CITY OF FORT LAUDERDALE ATLASES, AND CITY OF FORT LAUDERDALE AS-BUILTS.

7.) ASPHALT PAVEMENT SECTION RESTORATION THAT IS LOCATED WITHIN S.E. 2ND COURT RIGHT OF WAY SHALL CONSIST OF COMPACTED SUBGRADE, 16" LIMEROCK BASE MEETING LBR 100, 1" SP 9.5 STRUCTURAL COURSE, AND 1" SP 9.5 FRICTION COURSE.

8.) ASPHALT PAVEMENT SECTION RESTORATION THAT IS LOCATED WITHIN U.S. 1 RIGHT OF WAY SHALL CONSIST OF 12" STABILIZED SUBGRADE MEETING LBR 40, 12" LIMEROCK BASE MEETING LBR 100, 2" SP 12.5 STRUCTURAL COURSE, AND 2" SP 12.5 2ND STRUCTURAL COURSE, AND 1.5" SP 9.5 FRICTION COURSE.

9.) ASHALT RESURFACING ASSOCIATED WITH MILLING AND RESURFACING SHALL BE 1.5" SP 9.5 FRICTION COURSE.





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PERMIT SET

Robert M. Connors
Florida P.E. No. 41863

DRAWN BY:	DATE: MM/DD/YY
DESIGNED BY:	SCALE:
CHECKED BY:	
FIELD BOOK:	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS			
NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER PLAN
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO. C04 OF 14
TOTAL: 32
CAD FILE: 12133-MULTI-SSWR
DRAWING FILE NO: 4-139-49

City of Fort Lauderdale

N:\DWGS\ENG\PROJECTS\2015\15-0051-001-01 A-13 NEW PUMP STATION (FT. LAUDERDALE)\DRAWINGS\12133-MULTI-SSWR.DWG

PROJECT 12133							
TH#	TYPE OF UTILITY & OWNER	SIZE & MATERIAL	QTY.	UTILITY DIRECTION	COVER	TOP OF UTIL ELEV	NOTE
1	SANITARY FORCE MAIN	36" ± DUCTILE IRON	1	-	4.10	-	NOTE: 30" SANITARY FORCE MAIN REQUESTED AT THIS LOCATION. TEST HOLE REVEALED A 37"± O.D. SANITARY FORCE MAIN AT THIS LOCATION. UNABLE TO OBTAIN ACCURATE SIZE DUE TO SOLID ROCK SURROUNDING UTILITY. PK SET OVER CROWN OF UTILITY.

NOTES:

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8.) ASPHALT PAVEMENT SECTION RESTORATION THAT IS LOCATED WITHIN U.S. 1 RIGHT OF WAY SHALL CONSIST OF 12" STABILIZED SUBGRADE MEETING LBR 40, 12" LIMEROCK BASE MEETING LBR 100, 2" SP 12.5 STRUCTURAL COURSE, AND 2" SP 12.5 2ND STRUCTURAL COURSE, AND 1.5" SP 9.5 FRICTION COURSE.

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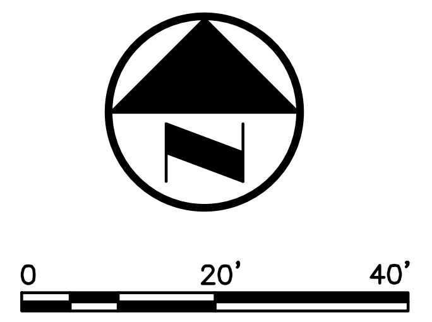

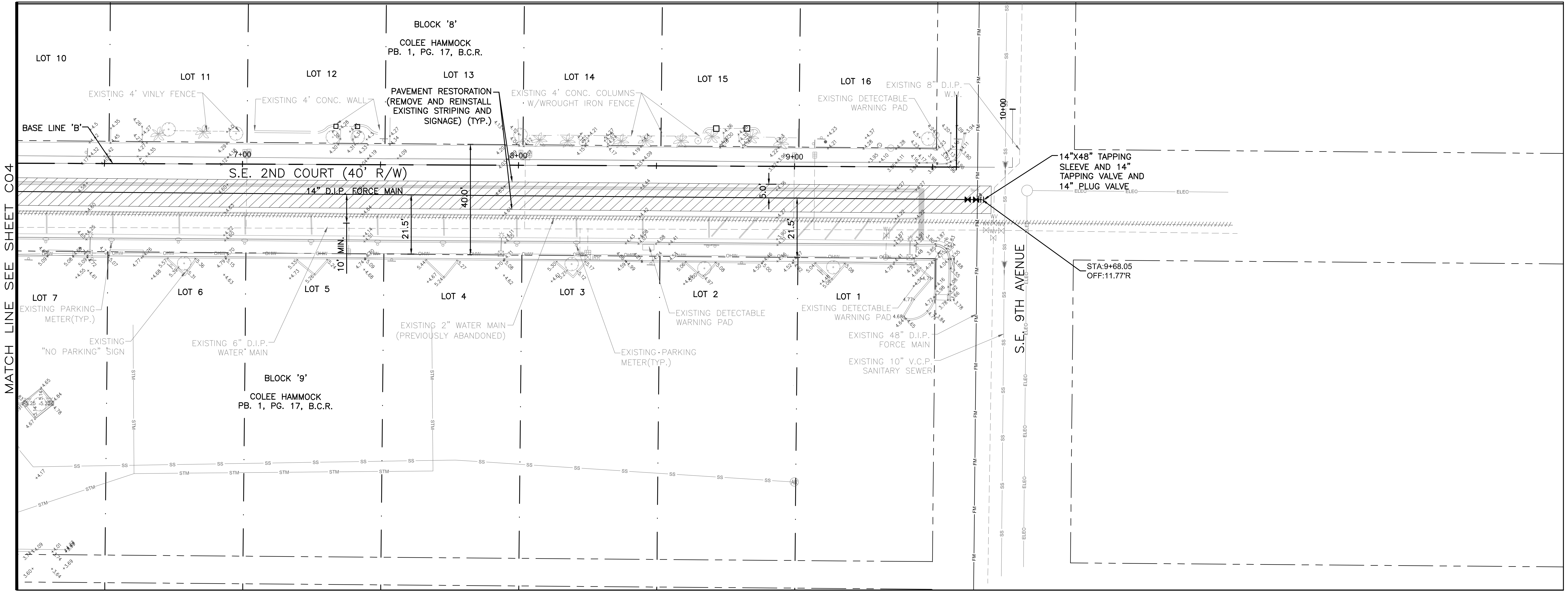

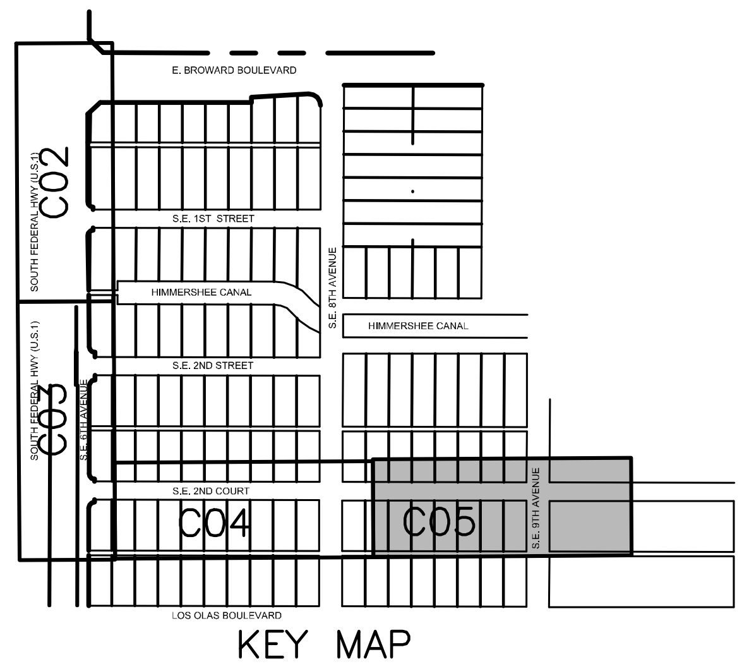

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- WATER BLOW-OFF
- WATER VALVE
- WOOD POWER POLE
- OHW OVER HEAD WIRES
- TOB TOP OF BANK
- TOE TOE OF SLOPE
- WM WATER MAIN
- GUARDRAIL
- NON-VEHICULAR ACCESS LINE

PROPOSED WATER AND SEWER LEGEND:

- FIRE HYDRANT ASSEMBLY
- GATE VALVE
- WATER METER
- SAMPLING POINT
- REDUCER
- BACKFLOW PREVENTER
- SIAMESE FIRE CONNECTION
- PLUG
- BOT. = X.XX / TOP = X.XX CROSSING CALLOUT
- ▨ ASPHALT PAVEMENT RESTORATION
- CONCRETE PAVERS RESTORATION
- CONCRETE PAVEMENT RESTORATION
- 1 SEWER STRUCTURE NUMBER
- R.E.= RIM ELEVATION
- I.E.= INVERT ELEVATION
- ● SANITARY SEWER MANHOLE
- ● CLEANOUT
- SANITARY SEWER PIPE FLOW DIRECTION
- SANITARY (SINGLE) SERVICE
- SANITARY (DOUBLE) SERVICE

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FLORIDA LICENSED ENGINEERING, SURVEYING & MAPPING BUSINESS No. 271
FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000114

CTA PROJECT NO. 15-0051-001-01

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Robert M. Connors
Florida P.E. No. 41863

APPROVED
2016-H-491-194
Jean-Brucely Joseph
6/12/2017

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DESIGNED BY:	SCALE:		
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FIELD BOOK:			

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

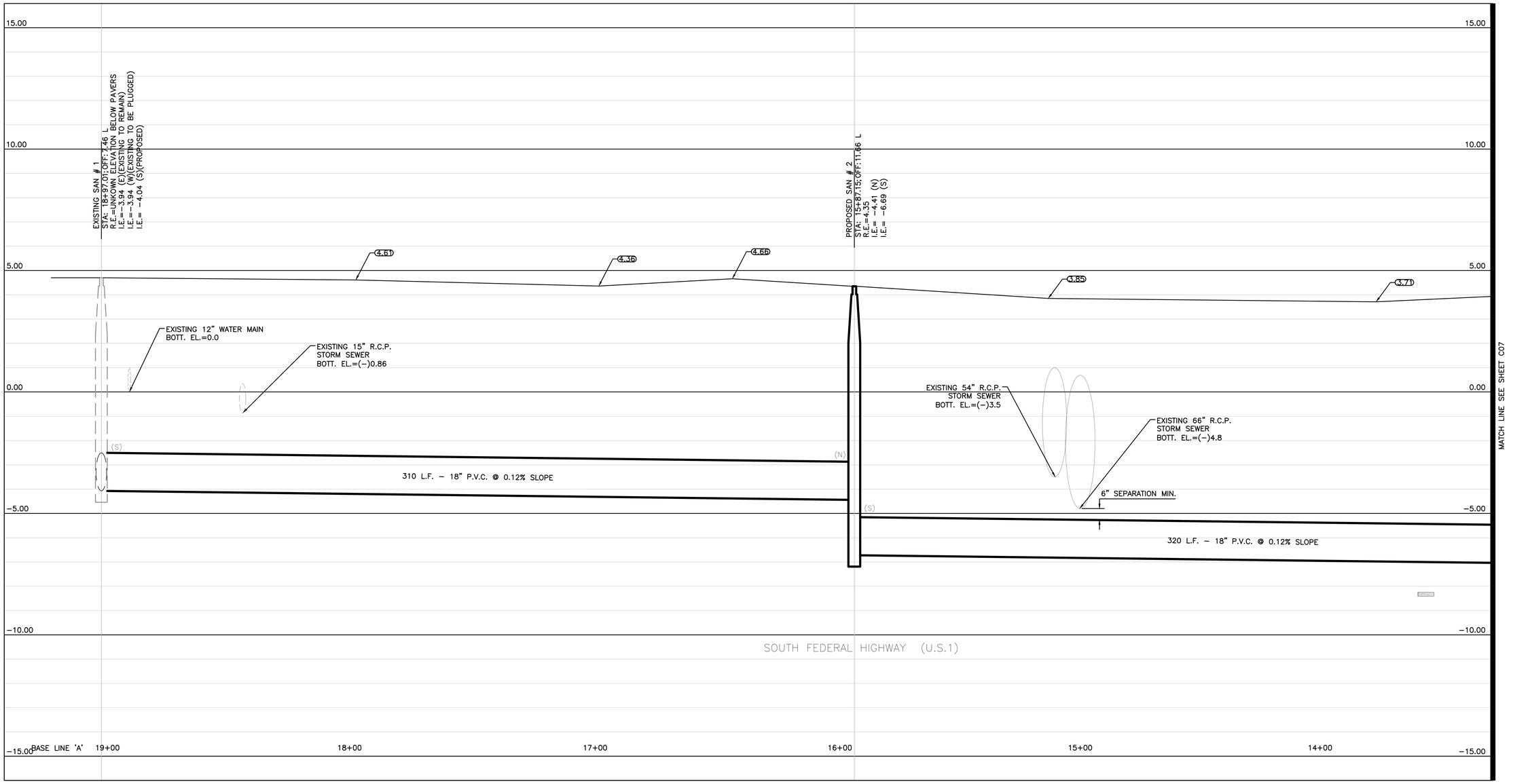
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER PLAN
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO. C05	OF 14
TOTAL:	32
CAD FILE: 12133-MULTI-SSWR	
DRAWING FILE NO. 4-139-49	

6/15/2017 12:06 PM



SCALE: 1"= 20' HORIZONTAL
1"= 2' VERTICAL

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FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000114

CTA PROJECT NO. 15-0051-001-01

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APPROVED
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Florida P.E. No. 41863
B-H-491-194
Jean-Frucely Joseph
6/15/2017

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PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

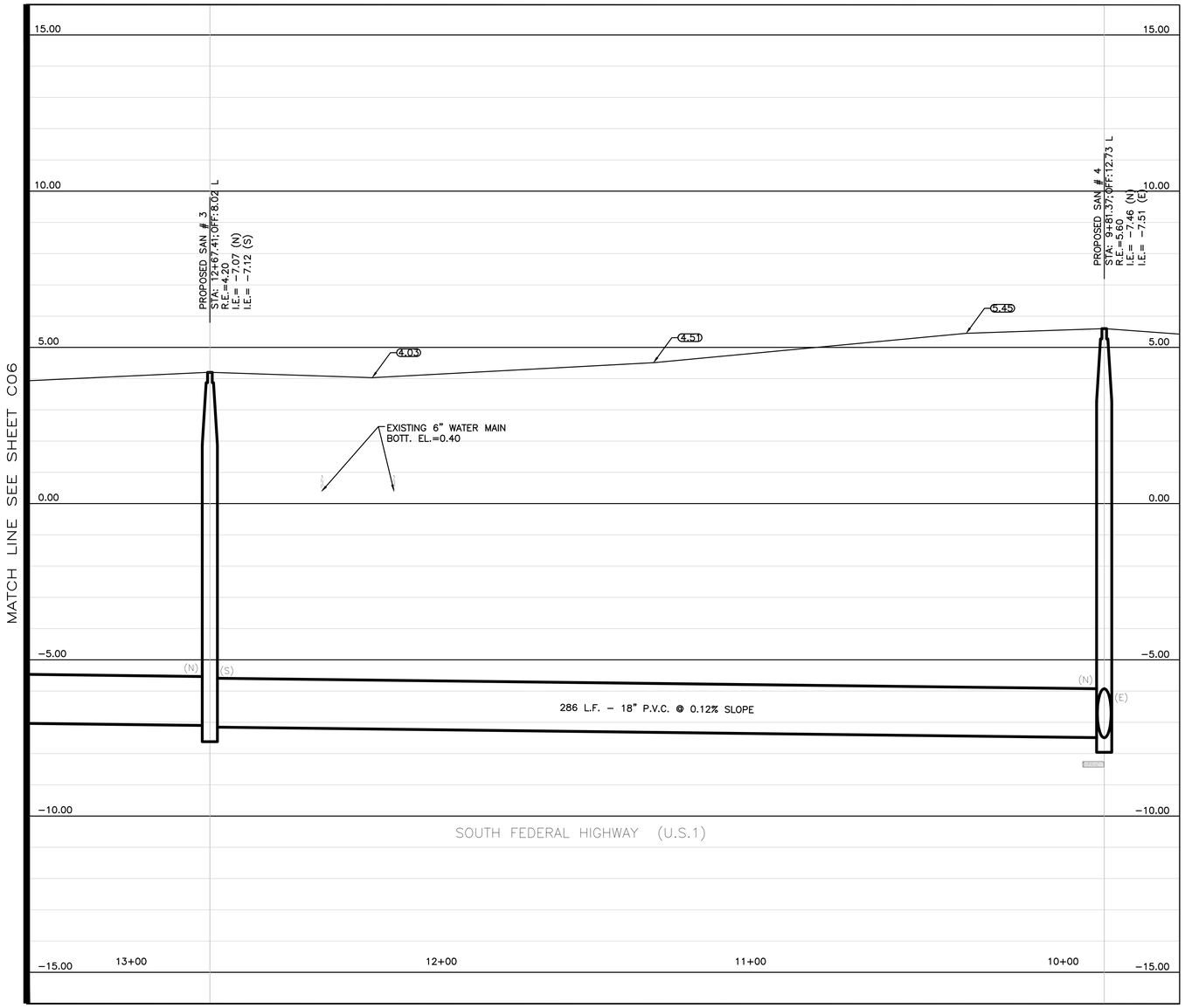
PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER PROFILE
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO.	OF
C06	14
TOTAL:	32

CAM # 17-0592
Exhibit 3
Page 542

CAD FILE: 12133-MULTI-PROF

DRAWING FILE NO: 4-139-49



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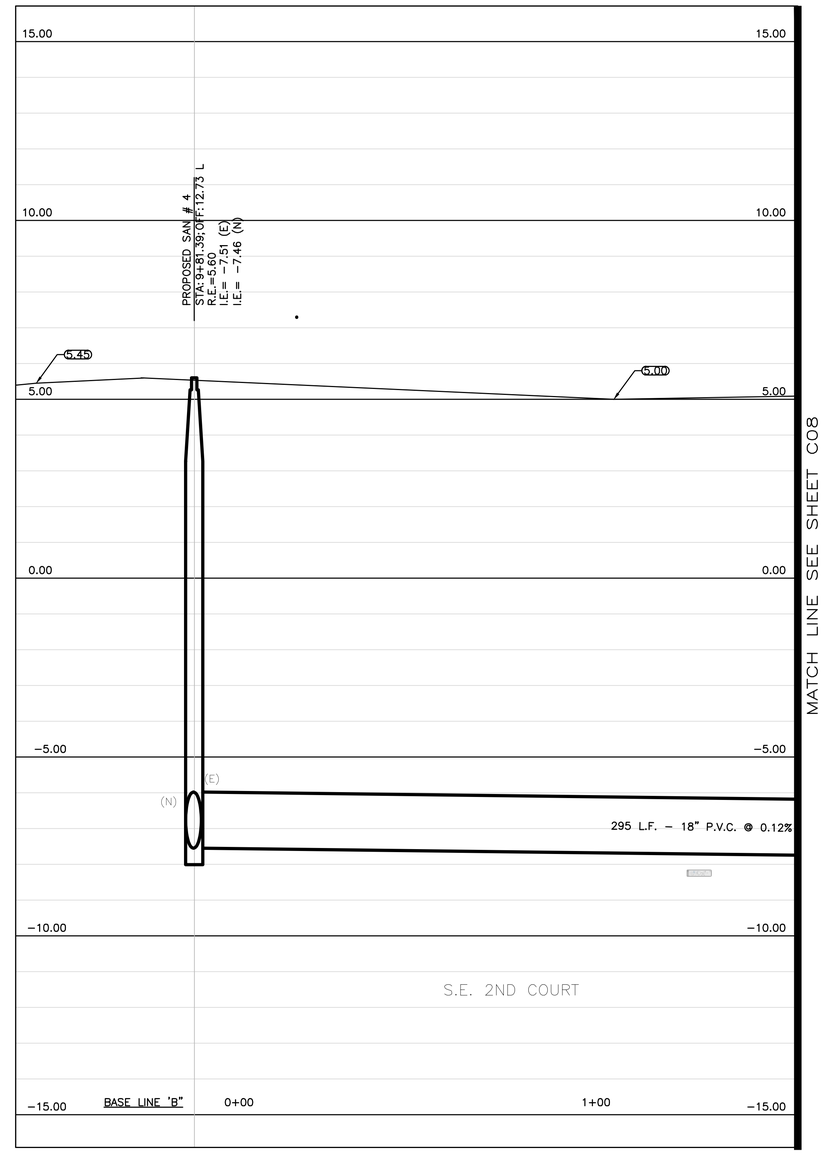
1"= 2' VERTICAL



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FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000114

CTA PROJECT NO. 15-0051-001-01

Robert M. Connors
Florida P.E. No. 41683

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B-H-491-194
Jean-Marcely Joseph
8/15/2017

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PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER PROFILE
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO.	OF
C07	14

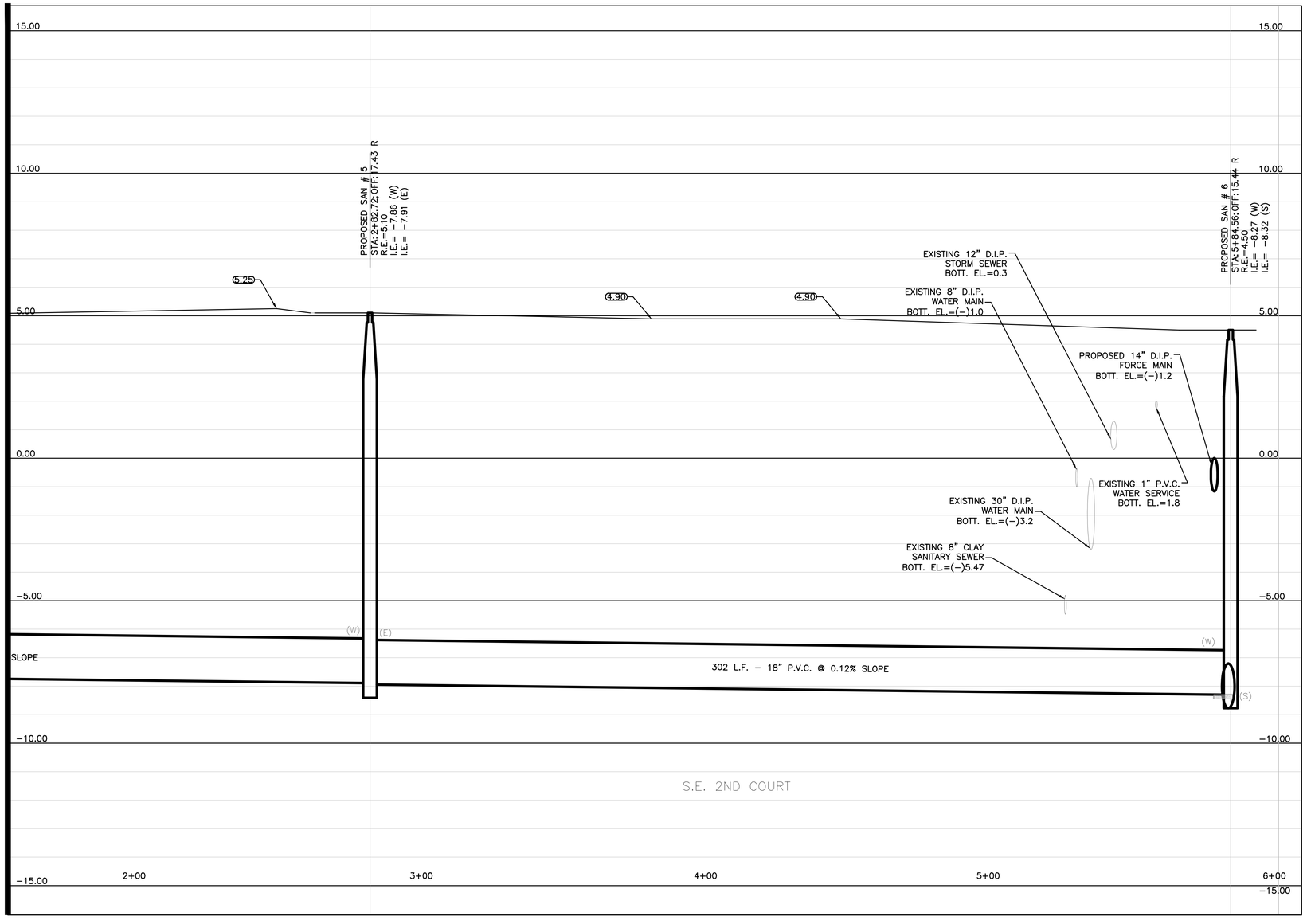
TOTAL: 32

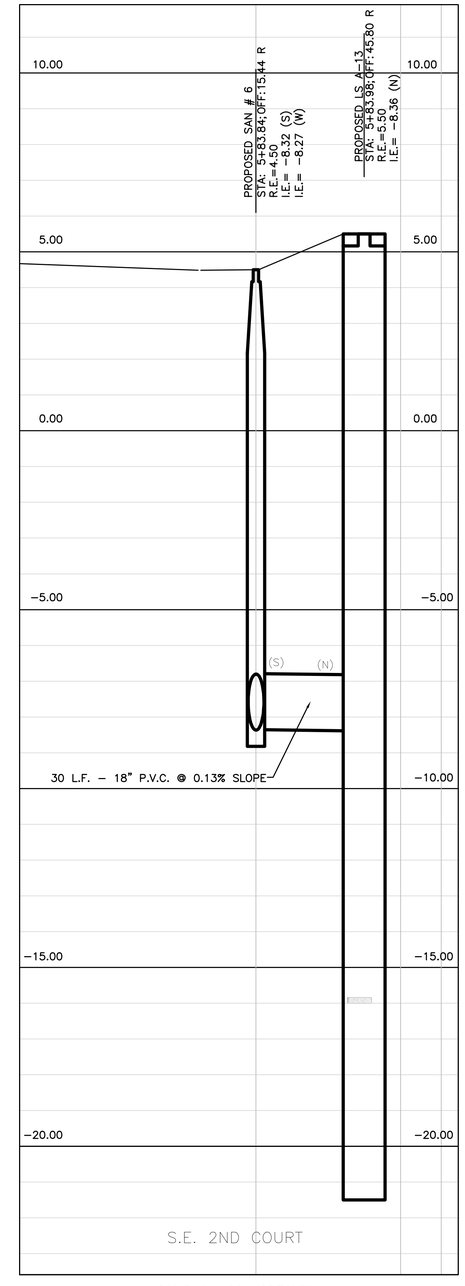
CAD FILE: 12133-MULTI-PROF

DRAWING FILE NO: 4-139-49

8/15/2017 12:06 PM

MATCH LINE SEE SHEET C07





SCALE: 1"= 20' HORIZONTAL
1"= 2' VERTICAL

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PUBLIC WORKS DEPARTMENT
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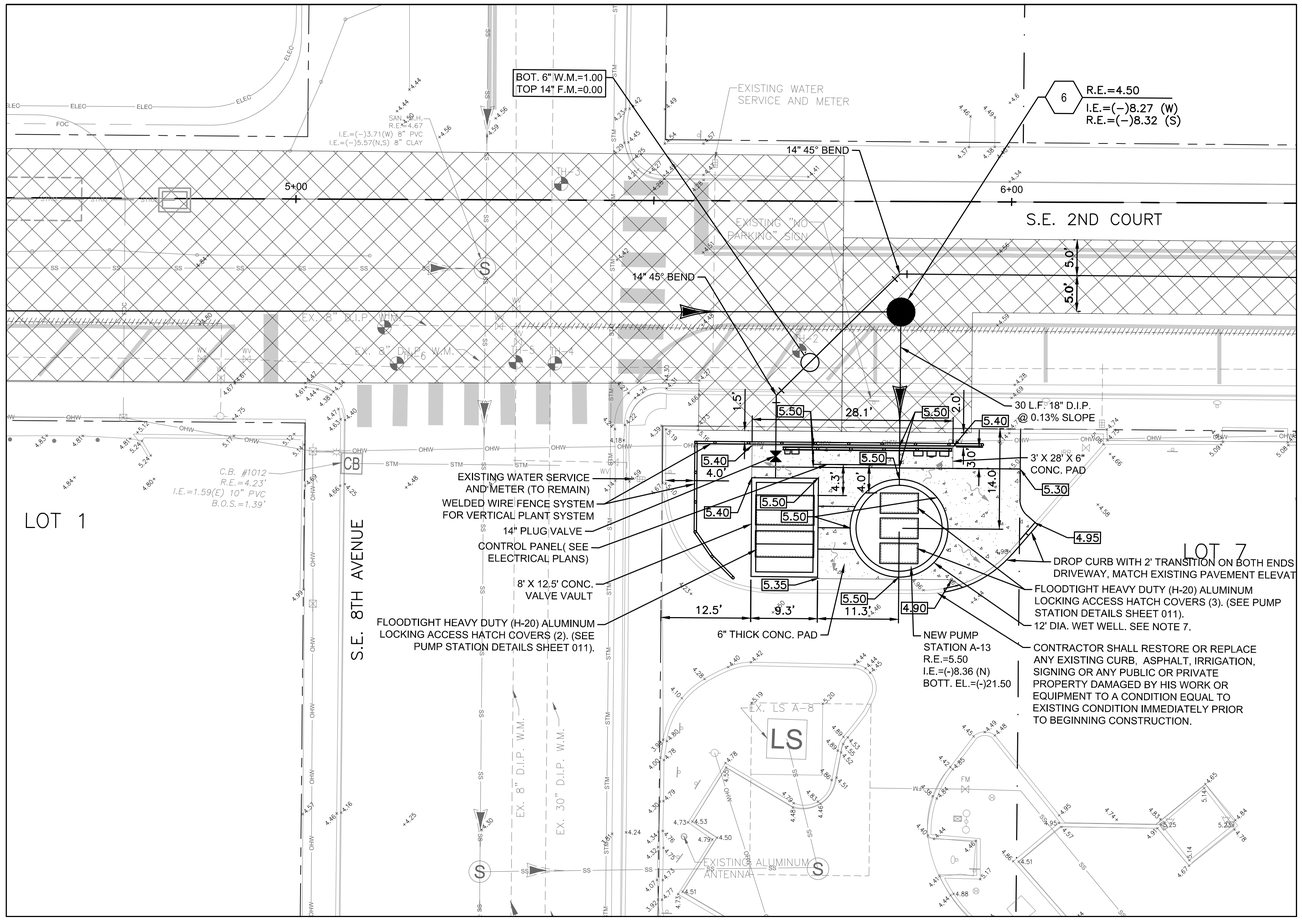
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER PROFILE
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO.	OF
C08	14
TOTAL:	32

CAD FILE: 12133-MULTI-PROF
DRAWING FILE NO: 4-139-49



NOTES:

1.) WATER AND SEWER SERVICE PROVIDED BY THE CITY OF FORT LAUDERDALE.

2.) ALL ELEVATIONS SHOWN HEREON REFER TO NAVD 1988 UNLESS OTHERWISE NOTED.

3.) ALL EXISTING UTILITIES (WATER, SEWER, DRAINAGE, GAS, ETC.) MUST BE MAINTAINED AND OPERATIONAL THROUGHOUT THE ENTIRE DURATION OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING AND MAINTAINING TEMPORARY RELOCATION/COORDINATION OF EXISTING UTILITIES (WATER & SEWER) AS REQUIRED TO FACILITATE PROPOSED SEWER IMPROVEMENTS.

4.) ALL TRENCH EXCAVATION SIDE WALLS SHALL BE SLOPED, SHORED, SHEETED, BRACED OR OTHERWISE SUPPORTED AS NEEDED TO FACILITATE PROPOSED SEWER IMPROVEMENTS.

5.) TEMPORARY RELOCATION OF EXISTING SERVICES AND LATERALS MAY BE REQUIRED TO FACILITATE CONSTRUCTION OF THE PROJECT. SEPARATE PAYMENT WILL NOT BE MADE FOR THIS WORK.

6.) ALL EXISTING UTILITIES SHOWN ON THIS PLAN WERE OBTAINED FROM THE SURVEY, CITY OF FORT LAUDERDALE ATLASES, AND CITY OF FORT LAUDERDALE AS-BUILTS.

7.) THE PROPOSED 12' DIAMETER WET WELL SHALL BE PROVIDED BY THE CITY, WITH THE EXCEPTION OF ONE (1) 6'-10" LENGTH OF WET WELL TO BE PROVIDED BY CONTRACTOR. THE EXISTING WET WELL STRUCTURE(S) IS LOCATED AT THE PROSPECT WELL FIELD, LOCATED ON THE NORTH SIDE OF PROSPECT ROAD AND THE WEST OF NW 31ST AVENUE IN FORT LAUDERDALE (WEST OF FORT LAUDERDALE EXECUTIVE AIRPORT). THE CONTRACTOR IS RESPONSIBLE FOR TRANSPORTING THE EXISTING STRUCTURE(S) FROM THE PROSPECT WELL FIELD TO THE PROJECT SITE. THE EXISTING WET WELL CONSISTS OF FOUR (4) SEGMENTS RANGING FROM 4' TO 8' IN LENGTH. TOTAL LENGTH OF EXISTING WET WELL NOT INCLUDING TOP SLAB IS 26'-2". EACH SEGMENT IS LINED WITH AGRU SURE-GRIP LINER SYSTEM. CONTRACTOR SHALL BE RESPONSIBLE FOR WELDING ALL LINER JOINTS AS PART OF INSTALLATION AND SHALL REPAIR DAMAGED LINER ON ONE OF THE EXISTING SEGMENTS. CONTRACTOR SHALL ALSO BE RESPONSIBLE TO PLUG ANY EXISTING OPENINGS AND CORE DRILL ANY NEW OPENINGS REQUIRED TO MAKE EXISTING WET WELL FIT THE PROPOSED INFLUENT PIPE ELEVATION AS WELL AS ANY OTHER PIPE OR CONDUIT WET WELL PENETRATIONS. A NEW OPENING FOR THE INFLUENT PIPE SHALL BE PROVIDED IN THE NEW 6'-10" LENGTH OF WET WELL. ALL OPENINGS SHALL BE SEALED PER LINER MANUFACTUTER'S SPECIFICATIONS.

EXISTING LEGEND:

- ANCHOR
- BLOW-OFF VALVE
- CATCH BASIN
- CONCRETE LIGHT POLE
- CONCRETE POST
- CONCRETE POWER POLE
- CURB INLET
- ELECTRICAL OUTLET
- ELECTRICAL PANEL
- ELECTRICAL PULL BOX
- ELECTRICAL MANHOLE
- GAS MARKER
- HEADWALL
- METAL LIGHT POLE
- MONITORING WELL
- PIPE
- PARKING LIGHT 2 SQUARE
- SANITARY MANHOLE
- SIGN
- SPOT-FLOOD LIGHT
- SANITARY SEWER CLEAN OUT
- STORM MANHOLE
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- TELEPHONE PULL BOX
- TRAFFIC POLE
- TRAFFIC PULL BOX
- TRANSFORMER PAD
- WATER BLOW-OFF
- WATER VALVE
- WOOD POWER POLE
- OVER HEAD WIRES
- TOP OF BANK
- TOE OF SLOPE
- WATER MAIN
- GUARDRAIL
- NON-VEHICULAR ACCESS LINE

PROPOSED WATER AND SEWER LEGEND:

- FIRE HYDRANT ASSEMBLY
- GATE VALVE
- WATER METER
- SAMPLING POINT
- REDUCER
- BACKFLOW PREVENTER
- SIAMESE FIRE CONNECTION
- PLUG
- BOT. = X.XX / TOP = X.XX — CROSSING CALLOUT
- ASPHALT PAVEMENT RESTORATION
- CONCRETE PAVERS RESTORATION
- CONCRETE PAVEMENT RESTORATION
- SEWER STRUCTURE NUMBER
- R.E.= RIM ELEVATION
- I.E.= INVERT ELEVATION
- SANITARY SEWER MANHOLE
- CLEANOUT
- SANITARY SEWER PIPE FLOW DIRECTION
- SANITARY (SINGLE) SERVICE
- SANITARY (DOUBLE) SERVICE

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CTA PROJECT NO. 15-0051-001-01

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Robert M. Connors
Florida P.E. No. 41863

APPROVED
CAM 17-1323
Exhibit 2
Page 25 of 92
Jeffrey Arucely Joseph
06/02/2017

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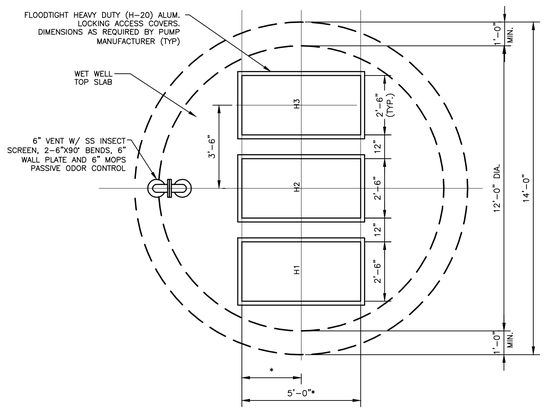
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

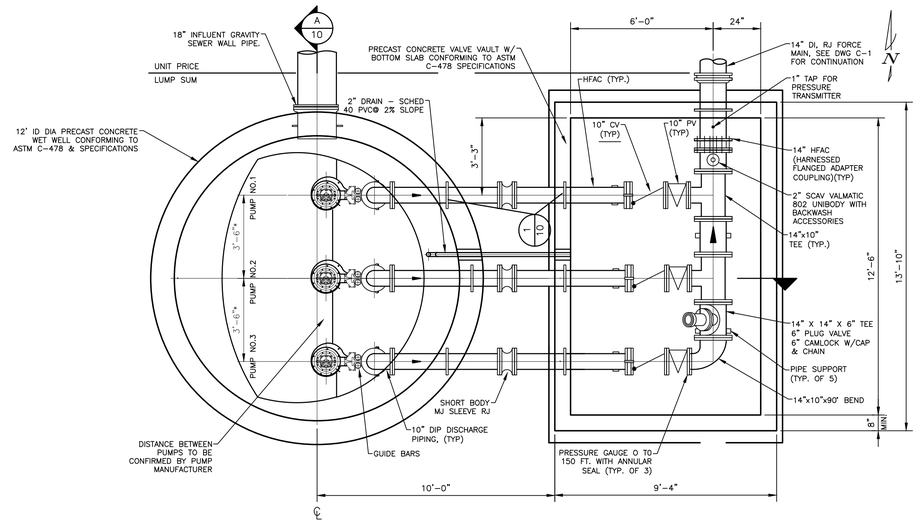
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

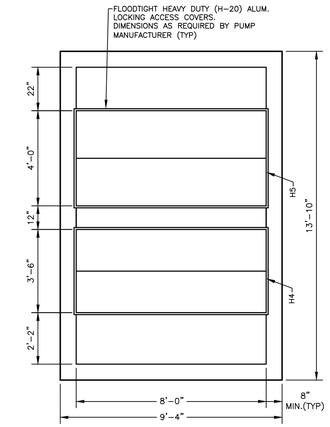
PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
PUMP STATION SITE PLAN
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO. C09 OF 14
TOTAL: 32
CAD FILE: 12133-C09-SITE
DRAWING FILE NO: 4-139-49





PLAN
3/8" = 1'-0"



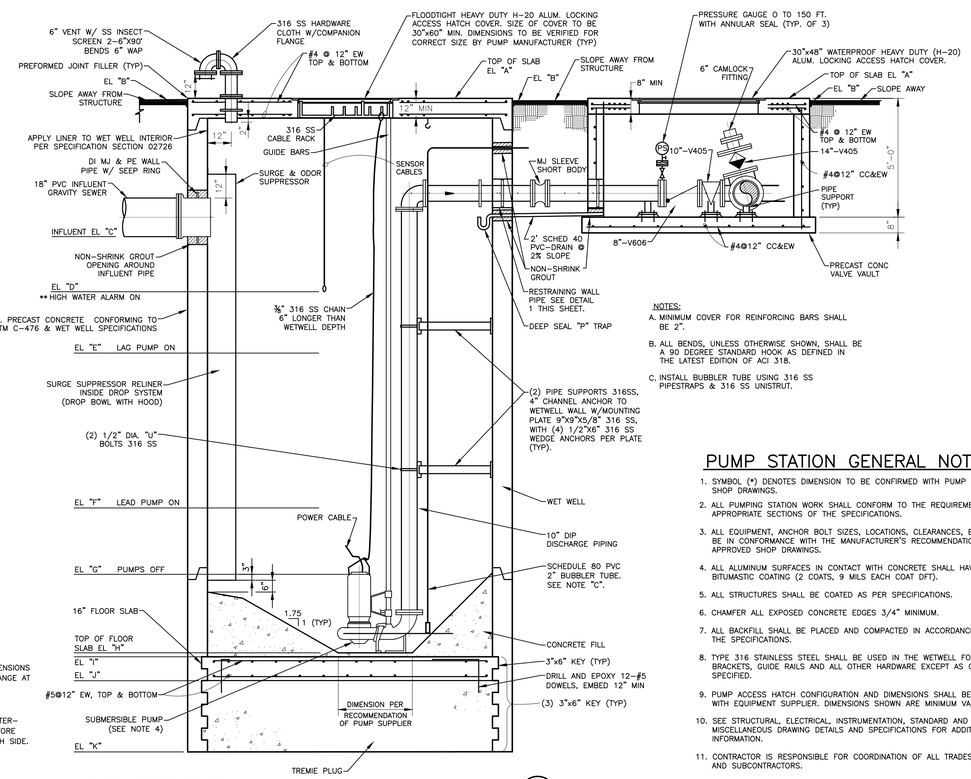
VALVE VAULT AND WET WELL TOP SLAB PLAN
3/8" = 1'-0"

V606 = CHECK VALVE

V405 = PLUG VALVE

PUMP OPERATIONAL SCHEME

THE OPERATIONS SCHEME FOR THE PUMP STATION IS: ONLY ONE PUMP WILL BE USED TO PUMP ALL THE FLOW AND THE SECOND PUMP BE CALLED UPON IF #1 CANNOT KEEP UP WITH THE FLOW, AFTER WHICH BOTH PUMPS WILL BE RUNNING TOGETHER AND SHARE THE LOAD AND DROP-OFF AS THE FLOW FALLS BELOW AN OPERATOR ENTERED WELL LEVEL SETPOINT. A MAX OF TWO PUMPS WILL RUN AT THE SAME TIME, THE THIRD PUMP IS ONLY USED AS A STANDBY BACKUP



SECTION A/12
3/8" = 1'

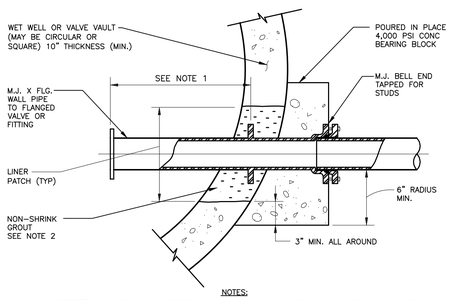
SAMPLE INSTALLATION

NOTES:

A. MINIMUM COVER FOR REINFORCING BARS SHALL BE 2".

B. ALL BENDS, UNLESS OTHERWISE SHOWN, SHALL BE A 90 DEGREE STANDARD HOOK AS DEFINED IN THE LATEST EDITION OF ACI 318.

C. INSTALL BUBBLER TUBE USING 316 SS PIPESTRAPS & 316 SS UNISTRUT.



RESTRAINING WALL PIPE DETAIL 1/10
NTS

NOTES:

1. VARIES- CONTRACTOR TO ORDER WALL PIPE WITH DIMENSIONS NECESSARY TO CENTER COLLAR IN WALL & PLACE FLANGE AT DESIRED LOCATION.
2. BREAK OUT CONC. WALL, REMOVING MIN. NECESSARY REINF. STEEL TO INSTALL PIPE. APPLY APPROVED WATER-PROOF BONDING AGENT TO EXIST CONC. SURFACE BEFORE PLACING NON-SHRINK GROUT. DRY PACK FROM EARTH SIDE.
3. APPLY APPROVED WATERPROOF COATING AS SPECIFIED TO ELIMINATE SEEPAGE INTO VAULT OR WET WELL FROM PIPE/CONDUIT PENETRATIONS.

SCHEDULE OF ELEVATIONS (FEET NAVD)

LETTER	LEVEL DESCRIPTION	PS (A-13)
A	TOP OF PUMP STATION & VAULT SLABS	5.50
B	FINISH GRADE ADJACENT SLAB	5.25
C	INFLUENT GRAVITY SEWER INVERT	(-8.36)
D	HIGH WATER ALARM	(-9.00)
E	LAG PUMP ON	(-10.50)
F	LEAD PUMP ON	(-12.50)
G	PUMPS OFF	(-17.00)
H	TOP OF FLOOR SLAB	(-21.50)
I	TOP OF KEY	(-21.50)
J	BOTTOM OF KEY	(-22.75
K	BOTTOM OF TREMIE PLUG	(-28.50)
	INSIDE DIAMETER PUMP STATION	12'
	DISCHARGE PIPING (D.I.P.)	10"
	PUMP OPERATION REQUIREMENTS VARIABLE SPEED (VFD)	2087 gpm @ 79' THD 70HP(MAX)

PUMP STATION GENERAL NOTES

1. SYMBOL (*) DENOTES DIMENSION TO BE CONFIRMED WITH PUMP MANUFACTURERS SHOP DRAWINGS.
2. ALL PUMPING STATION WORK SHALL CONFORM TO THE REQUIREMENTS OF THE APPROPRIATE SECTIONS OF THE SPECIFICATIONS.
3. ALL EQUIPMENT, ANCHOR BOLT SIZES, LOCATIONS, CLEARANCES, ETC. SHALL BE IN CONFORMANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THE APPROVED SHOP DRAWINGS.
4. ALL ALUMINUM SURFACES IN CONTACT WITH CONCRETE SHALL HAVE A BITUMASTIC COATING (2 COATS, 9 MILS EACH COAT DFT).
5. ALL STRUCTURES SHALL BE COATED AS PER SPECIFICATIONS.
6. CHAMFER ALL EXPOSED CONCRETE EDGES 3/4" MINIMUM.
7. ALL BACKFILL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE SPECIFICATIONS.
8. TYPE 316 STAINLESS STEEL SHALL BE USED IN THE WETWELL FOR FLANGE BOLTS, BRACKETS, GUIDE RAILS AND ALL OTHER HARDWARE EXCEPT AS OTHERWISE SPECIFIED.
9. PUMP ACCESS HATCH CONFIGURATION AND DIMENSIONS SHALL BE CONFIRMED WITH EQUIPMENT SUPPLIER. DIMENSIONS SHOWN ARE MINIMUM VALUES ONLY.
10. SEE STRUCTURAL, ELECTRICAL, INSTRUMENTATION, STANDARD AND MISCELLANEOUS DRAWING DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
11. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL TRADES AND SUBCONTRACTORS.
12. SEE ELECTRICAL PLAN DRAWINGS FOR LOCATION OF ELECTRICAL/ CONTROL PANEL AND CONNECTING CONDUITS.
13. DETAIL CONSTRUCTION PLANS, INCLUDING BUT NOT LIMITED TO EXCAVATION, SHEETING, SHORING, BRACING AND DEWATERING SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO CONSTRUCTION.
14. WETWELL AND VALVE VAULT MAY BE POURED IN PLACE OR PRECAST REINFORCED CONCRETE AT THE CONTRACTORS OPTION.
15. SMITH-BLAIR (TYP 913) OR DRESSER (STYLE 127) O/E, C.I. FLANGE ADAPTER COUPLINGS AND HARNESSED WITH A MINIMUM OF 4 LOCKING PINS. TEST PRESSURE RATING 150 PSI MINIMUM.
16. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS AGAINST FLOTATION OF WETWELL UNTIL ALL BACK FILL IS IN PLACE.
17. ALL CONCRETE SHALL BE CLASS A-A (5,000 PSI FOR PRECAST AND 4,000 PSI FOR CAST-IN-PLACE) UNLESS OTHERWISE SPECIFIED.
18. WET WELL WALL SHALL CONTAIN A MINIMUM OF 0.22 SQ. IN/LINEAR FOOT REINFORCEMENT, IN THE VERTICAL AND HORIZONTAL DIRECTIONS. MINIMUM COVER FOR REINFORCING BARS SHALL BE 2".
19. SURGE PROTECTION IS OUTLINED IN SPECIFICATIONS.
20. ALL EXTERIOR HOSE BIBS SHALL HAVE AN INTEGRAL RPZ BACKFLOW PREVENTER.
21. CONTRACTOR TO PROTECT WET WELL LINER/COATING DURING INSTALLATION AND REPAIR AS DIRECTED.
22. HATCH COVERS SHALL BE H-20 RATED FLOOD WATER AND VAPOR TIGHT AND PROVIDE UNRESTRICTED VERTICAL ACCESS TO PUMPS AND VALVES.
23. PROVIDE NON-SHRINK GROUT AT ALL OPENINGS INTO THE STRUCTURES.
24. ALL BENDS SHALL BE A 90° STD HOOK AS DEFINED IN THE LATEST EDITION OF ACI 318 UNLESS OTHERWISE SHOWN.
25. APPLY APPROVED WATERPROOF BONDING AGENT TO EXISTING CONCRETE SURFACE BEFORE PLACING NON-SHRINK GROUT, DRY-PACK FROM EARTH SIDE, APPLY APPROVED WATERPROOF COATING AS SPECIFIED TO ELIMINATE SEEPAGE INTO VAULT OR WET WELL FROM PIPE/CONDUIT PENTRATIONS.
26. CHECK VALVES SHALL BE LOCATED SO AS TO ALLOW PIN REMOVAL.
27. CONTRACTOR TO CORE VALVE VAULT AND WET WELL PENETRATIONS ONCE PUMPS AND PIPING HAVE BEEN LAID OUT.
28. CONTRACTOR SHALL SUBMIT SIGNED & SEALED DESIGN DRAWINGS & CALCULATIONS OF WET WELL STRUCTURE, INCLUDING FLOTATION CALCULATIONS.

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FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000114

CTA PROJECT NO. 15-0051-001-01

PERMIT SET

Robert M. Connors
Florida P.E. No. 41863

DRAWN BY:	DATE: MM/DD/YY
DESIGNED BY:	SCALE:
CHECKED BY:	
FIELD BOOK:	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
PUMP STATION DETAILS
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO.	OF
C10	14
TOTAL:	32

CAD FILE: 12133-C10-DETL
DRAWING FILE NO: 4-139-49

GENERAL CONSTRUCTION NOTES:

1 NO CONNECTIONS FOR THE PURPOSE OF OBTAINING WATER SUPPLY DURING CONSTRUCTION SHALL BE MADE TO ANY FIRE HYDRANT OR BLOW-OFF STRUCTURE WITHOUT FIRST OBTAINING PERMISSION AND A CONSTRUCTION METER FROM THE CITY OF FORT LAUDERDALE.

2 THE CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING, MOVING AND RELOCATING OR REPLACING ALL WATER SERVICES OR SEWER LATERALS WHICH ARE ENCOUNTERED DURING EXCAVATION. THE CONTRACTOR SHALL SUBMIT A WRITTEN PLAN FOR WATER SERVICE AND WASTEWATER SERVICE DISRUPTION FOR APPROVAL 7 (SEVEN) CALENDAR DAYS PRIOR TO THE ANTICIPATED DISRUPTION. THE CONTRACTOR SHALL NOTIFY THE PROPERTY OWNERS 48 HOURS IN ADVANCE OF ANY WORK ON THEIR SERVICES. THIS WORK SHALL BE CONSIDERED INCIDENTAL.

3 THE CONTRACTOR MUST USE EXTREME CARE TO AVOID DAMAGE OR DISRUPTION TO ANY EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT. ALL PLAN LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED. CONTRACTOR IS TO CONTACT SUNSHINE STATE ONE CALL OF FLORIDA AT 811 AND ALL OTHER PARTICIPATING UTILITIES 2 FULL BUSINESS DAYS PRIOR TO CONSTRUCTION FOR FIELD MARKUP LOCATIONS OF EXISTING UTILITIES AND
4 FACILITIES.

THE CONTRACTOR MUST INFORM THE CITY AT LEAST 48-HOURS IN ADVANCE OF CONSTRUCTION, IN WRITING IF ANY CONFLICT IS DISCOVERED DURING POT
5 HOLE OPERATIONS FOR CLARIFICATION BY THE CITY.

IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE UTILITIES DEPARTMENT OF THE CITY OF FORT LAUDERDALE AT LEAST TWO (2) BUSINESS DAYS IN ADVANCE TO COORDINATE ANY ACTIVITY TO BE PERFORMED
6 BY THE CITY'S UTILITIES DEPARMENT.

7 CONTRACTOR SHALL NOT DISTURB AREAS OUTSIDE EXISTING RIGHTS-OF-WAY.

IN GENERAL, EXISTING STRUCTURES AND UTILITIES ARE NOTED AS EXISTING
8 AND/OR SHOWN IN THIN LINES. NEW CONSTRUCTION IS IN HEAVY LINES AND/OR UNDERLINED.

9 ALL WORK WITHIN STATE DEPARTMENT OF TRANSPORTATION (FDOT) RIGHT-OF-WAYS SHALL BE IN CONFORMANCE WITH FDOT SPECIFICATIONS AND
10 PERMIT REQUIREMENTS.

ALL WORK WITHIN BROWARD COUNTY RIGHT-OF-WAYS SHALL BE IN CONFORMANCE WITH THE BROWARD COUNTY MINIMUM STANDARDS AND/OR
11 REQUIREMENTS.

CONTRACTOR SHALL COMPLY WITH ALL LOCAL CITY, COUNTY AND STATE REGULATIONS PERTAINING TO THE CLOSING OF PUBLIC STREETS FOR USE OF TRAFFIC DURING CONSTRUCTION.

12 CONTRACTOR SHALL PREPARE AND SUBMIT MAINTENANCE OF TRAFFIC (MOT) PLANS TO FDOT, CITY OF FORT LAUDERDALE, BROWARD COUNTY AS REQUIRED FOR WORK TO BE DONE WITHIN THEIR R/W PRIOR TO COMMENCEMENT OF WORK. SPECIFIC AGENCY MOT REQUIREMENTS ARE THE SOLE RESPONSIBILITY
13 OF THE CONTRACTOR.

14 STATIONS SHOWN ON THE DRAWINGS ARE BASED ON THE ESTABLISHED BASELINE AND SHALL NOT BE CONSIDERED AS DISTANCES OR AS A MEASURE
15 OF THE LINEAR FOOTAGE OF PIPE TO BE INSTALLED.

THE GENERAL INTENT IS TO PROVIDE SEWER SERVICE LATERALS FOR EACH PROPERTY. ALL LATERAL LOCATIONS SHALL BE FIELD ADJUSTED.

16 CONTRACTOR SHALL MAINTAIN ACCESS TO PRIVATE PROPERTY AT ALL TIMES.

17 ALL OPEN TRENCHES AND HOLES ADJACENT TO ROADWAY OR WALKWAY SHALL BE PROPERLY MARKED AND BARRICADED TO ASSURE THE SAFETY OF BOTH VEHICULAR AND PEDESTRIAN TRAFFIC.

TRENCHES OR HOLES NEAR WALKWAYS, IN ROADWAYS OR THEIR SHOULDERS SHALL NOT BE LEFT OPEN DURING NIGHT TIME HOURS WITHOUT ADEQUATE
18 PROTECTION.

CONTRACTOR SHALL PROMPTLY REPAIR AND RESTORE EXISTING PAVEMENT, SIDEWALKS, CURBS, DRIVEWAYS, PIPES, RESIDENTIAL AND COMMERCIAL
19 SPRINKLER LINES, CONDUIT, CABLES, ETC. AND LANDSCAPE AREAS DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES.

CONTRACTOR SHALL PROVIDE TEMPORARY FENCING AS REQUIRED BY AGENCIES HAVING JURISDICTION OVER THE PROJECT AND/OR WHEN REQUIRED FOR PUBLIC SAFETY.

20 THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES THROUGHOUT THE DURATION OF CONSTRUCTION AND UNTIL ACCEPTANCE OF WORK, FOR THE PROTECTION OF EXISTING AND NEWLY INSTALLED UTILITIES FROM DAMAGE OR
21 DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING SUCH MEASURES AS NECESSARY TO PROTECT THE HEALTH, SAFETY AND WELFARE OF THOSE PERSONS HAVING ACCESS TO THE WORK SITE.

LOCATION OF AIR RELEASE VALVES MAY BE FIELD ADJUSTED BY THE ENGINEER OR CITY OF FORT LAUDERDALE AS NECESSARY.

CONTRACTOR SHALL ADJUST TO GRADE ALL EXISTING UTILITY CASTINGS INCLUDING VALVE BOXES, MANHOLES, HAND HOLES, PULL BOXES, INLETS AND SIMILAR STRUCTURES IN CONSTRUCTION AREA TO BE OVERLAYED WITH ASPHALT.

22 EXISTING TRAFFIC SIGNS SHALL BE RESET UPON COMPLETION PER FDOT STANDARDS. COST SHALL BE CONSIDERED INCIDENTAL. CONTRACTOR SHALL REPAIR OR REPLACE DAMAGED TRAFFIC SIGNAL LOOPS PER BROWARD COUNTY TRAFFIC ENGINEERING SPECIFICATIONS; COST SHALL BE INCIDENTAL.

23 THE CONTRACTOR SHALL PAINT NEW TRAFFIC STRIPE MARKINGS WHERE EXISTING TRAFFIC STRIPE MARKINGS ARE DAMAGED OR REMOVED DURING CONSTRUCTION. THIS WORK SHALL BE CONSIDERED INCIDENTAL.

GENERAL NOTES – TRAFFIC CONTROL PLAN

1 THE TRAFFIC CONTROL PLANS FOR THE PROJECT SHALL COMPLY WITH THE LATEST EDITION OF THE ROADWAY AND TRAFFIC DESIGN STANDARDS, INDEX NO. 600-660. MUTCD AND THE STANDARD SPECIFICATIONS. THE CONTRACTOR'S RESPONSE TIME TO ALL REPORTED MALFUNCTIONS OF TRAFFIC SIGNALS WITHIN THE PROJECT LIMITS SHALL BE NO MORE THAN TWO (2) HOURS AND SHALL RESTORE ALL MALFUNCTIONING TRAFFIC SIGNAL EQUIPMENT TO ITS LEVEL OF OPERATION PRIOR TO THE MALFUNCTIONING WITHIN TWENTY-FOUR (24) HOURS. DURING THIS TIME THE CONTRACTOR SHALL PROVIDE AT HIS EXPENSE TEMPORARY TRAFFIC CONTROL DEVICES, FLAGLER PERSONNEL AND LAW ENFORCEMENT PERSONNEL AS NECESSARY TO MAINTAIN A SAFE AND EFFICIENT FLOW OF TRAFFIC AT THE AFFECTED WORK ZONE. THE ENGINEER OR THE CITY OF FORT LAUDERDALE SHALL APPROVE ALL MODIFICATIONS PRIOR TO THEIR IMPLEMENTATION.

2 THE CONTRACTOR SHALL MAINTAIN PROPER OPERATION OF ALL TRAFFIC SIGNAL LOOP ASSEMBLIES AND LOOP DETECTORS WITHIN THE PROJECT LIMITS. THE CONTRACTOR SHALL CORRECT ALL LOOP ASSEMBLY/DETECTOR MALFUNCTIONS WITHIN 24 HOURS OF NOTIFICATION OF SUCH MALFUNCTIONS BY THE ENGINEER.

3 THE AGENCY RESPONSIBLE FOR MAINTENANCE OF THE TRAFFIC SIGNALS AND RELATED EQUIPMENT IS BROWARD COUNTY TRAFFIC ENGINEERING.

4 A REGULATORY SPEED OF 25 MPH SHALL BE POSTED WITHIN THE LIMITS OF THE WORK ZONE.

5 EXISTING SIGNS AND PAVEMENT MARKINGS THAT CONFLICT WITH CONSTRUCTION SIGNS AND MARKINGS SHALL BE REMOVED DURING CONSTRUCTION. ALL EXISTING SIGNS THAT ARE REMOVED SHALL BE STOCKPILED IN A SECURE PLACE AND REINSTALLED AFTER CONSTRUCTION. REMOVE AND REPLACE ANY GROUND MOUNT SIGN BY USE OF INDEX NO. 611.

6 THE CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE PATTERNS AND PREVENT ADVERSE FLOODING OF THE TRAVEL LANES DURING CONSTRUCTION.

7 THE CONTRACTOR SHALL OBTAIN WRITTEN AUTHORIZATION FROM THE CITY OF FORT LAUDERDALE FOR ANY AND ALL CONSTRUCTION ACTIVITIES TO BE PERFORMED AT NIGHT. NO LANE CLOSURE SHALL BE ALLOWED BETWEEN THE HOURS OF 6:00 AM TO 9:00 AM AND 4:00 PM TO 7:00 PM, MONDAY THROUGH FRIDAY UNLESS APPROVED BY THE ENGINEER.

8 THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE UTILITY COMPANY TWO (2) BUSINESS DAYS IN ADVANCE OF ANY EXCAVATION INVOLVING ITS UTILITIES SO THAT A COMPANY REPRESENTATIVE CAN BE PRESENT. THE LOCATION OF THE UTILITIES SHOWN IN THE PLANS ARE APPROXIMATE ONLY. THE EXACT LOCATION SHALL BE DETERMINED BY THE CONTRACTOR DURING CONSTRUCTION. SEE SPECS FOR LIST OF UTILITY COMPANIES.

GENERAL PRESSURE PIPE NOTES

1 THERE SHALL BE 30" MINIMUM COVER FROM FINISHED GRADE TO TOP OF PIPE.

2 ALL TRENCHING, PIPE-LAYING, BACKFILL, PRESSURE TESTING MUST COMPLY WITH ALL APPLICABLE FEDERAL, STATE, COUNTY, CITY AND HEALTH DEPARTMENT STANDARDS AND REGULATIONS.

3 THESE NOTES AND THE DETAIL SHEETS THAT ACCOMPANY THESE PLANS ARE TYPICAL IN NATURE. THE MAIN PLANS AND SPECIFICATIONS PROVISIONS WILL TAKE PRECEDENCE OVER ANY NOTE CONTAINED ON THIS OR OTHER DETAIL SHEETS.

4 THE CONTRACTOR MUST POT HOLE AND VERIFY THE LOCATION, SIZE, AND ELEVATION OF EXISTING PRESSURE MAINS BEFORE MAKING A TIE-IN.

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FLORIDA LICENSED ENGINEERING, SURVEYING & MAPPING BUSINESS No. 271
FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000014

Robert M. Connors
Florida P.E. No. 41863

DRAWN BY:	DATE: MM/DD/YY
DESIGNED BY:	SCALE:
CHECKED BY:	
FIELD BOOK:	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER DETAILS
CITY OF FORT LAUDERDALE, FLORIDA

PERMIT SET

SHEET NO.	OF
C11	14

TOTAL: 32
CAD FILE: 12133-C11.DWG
DRAWING FILE NO: 4-139-49

APPROVED
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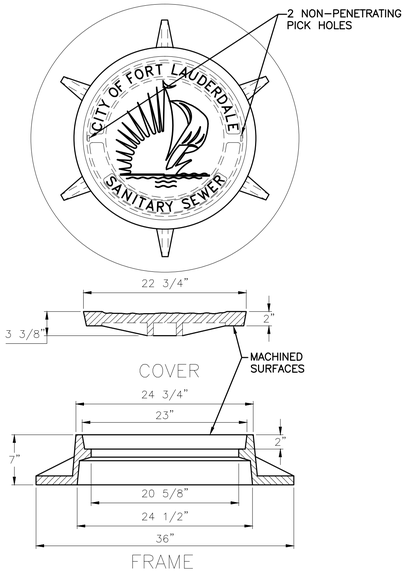
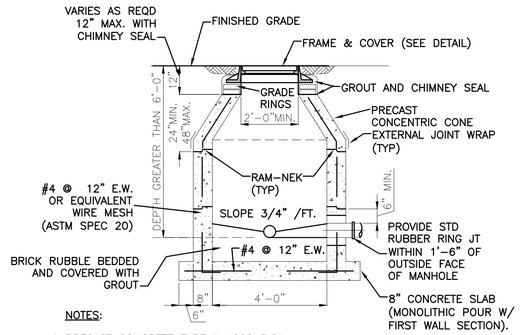
N:\DWGS\ENG\PROJECTS\2015\15-0051-001-01 A-13 NEW PUMP STATION (FT. LAUDERDALE)\DRAWINGS\12133-C11-DETL.DWG



NOTES:

1. MATERIAL: FRAME AND COVER AS SPECIFIED.
2. ADDITIONAL GRADE RINGS MAY BE USED TO ELEVATE EXISTING MANHOLE FRAMES TO RESURFACED GRADE (MAX. 4" HEIGHT).
3. ALL DIMENSIONS ARE NOMINAL.
4. OPTIONAL: HINGED FRAME AND COVER AS SPECIFIED.

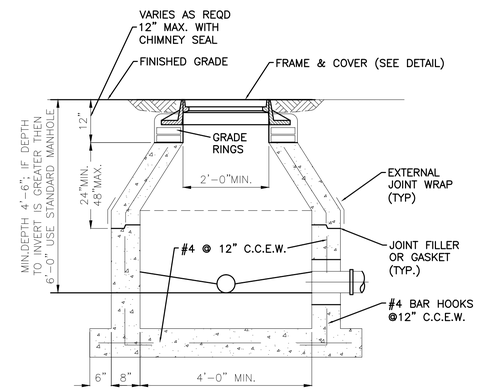
MANHOLE FRAME & COVER–PAVED AREAS (200)



NOTES:

1. PRECAST CONCRETE TYPE II 4000 P.S.I.
2. "RAM-NEK" OR EQUAL AT ALL RISER JOINTS (1/2" THICK WITH THE WIDTH AT LEAST 1/2 THE WALL THICKNESS).
3. ALL OPENINGS SHALL BE SEALED WITH A WATERPROOF NON-SHRINKING GROUT.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO
5. FLOW STREAM. (SEE DETAIL)
6. LIFT HOLES ARE PERMITTED.
7. ALL PIPE HOLES SHALL BE PRECAST OR CORE DRILLED.
   A. FOR PVC PIPE ENTERING MANHOLE WITH PRECAST HOLES USE THE APPROVED NON-ASBESTOS PVC-MANHOLE ADAPTER OR PRECAST FLEXIBLE MANHOLE SLEEVE FOR THE APPROPRIATE PIPE DIAMETER AND DIMENSION RATIO. THE ADAPTER SHALL NOT EXTEND MORE THAN 1" INTO THE MANHOLE. DOUBLE BANDING IS REQUIRED FOR FLEXIBLE MANHOLE SLEEVE.
   B. CONNECTION TO A MANHOLE WITH A CORE DRILLED HOLE SHALL BE MADE USING A 5' MIN. DUCTILE IRON PIPE SECTION (EPOXY LINED) OR THE APPROVED PVC-MANHOLE ADAPTER.
8. INSIDE DROPS SHALL NOT BE DESIGNED TO EXCEED 1.80 FEET AND NOT CONSTRUCTED TO EXCEED 2.0 FEET. MAX. 6" INSIDE DROP IS PERMITTED FOR MANHOLES WITH 3 OR MORE INVERTS AND MANHOLES WITH A CHANGE IN FLOW DIRECTION OF MORE THAN 45 DEGREES.
9. MANHOLE FABRICATION SHALL BE IN ACCORDANCE WITH ASTM C-478, LATEST STANDARD.
10. MINIMUM 5 FEET IS REQUIRED BETWEEN OUTSIDE OF MANHOLE AND SERVICE WYE.
11. MANHOLES TO BE PAINTED INSIDE AND OUTSIDE WITH 2 COATS OF AN APPROVED PROTECTIVE COATING. (ONE COAT RED, ONE COAT BLACK) MIN. 8-10 MILS D.F.T. PER COAT.
12. MANHOLE SHALL BE SET PLUMB TO LINE AND GRADE.

STANDARD MANHOLE (203)



NOTE:

ALL STANDARD MANHOLE NOTES AND DETAILS ARE APPLICABLE

SHALLOW MANHOLE (204)

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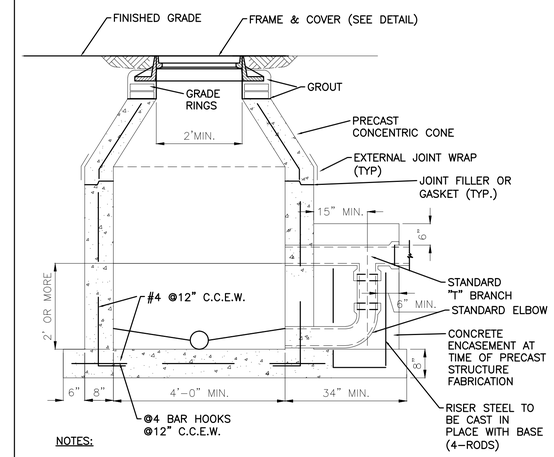
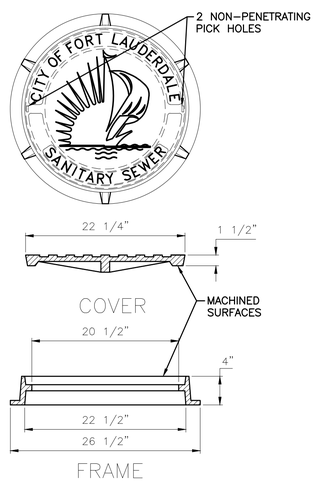


NOTES:

1. ALL DETAILS AND SPECIFICATIONS FOR STANDARD MANHOLES ARE APPLICABLE EXCEPT FOR REFERENCES TO DROP ASSEMBLY.
2. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT INVERT IS LOCATED 2.0 FEET OR MORE ABOVE THE MAIN INVERT CHANNEL. DROP CONNECTIONS SHOULD NOT BE DESIGNED FOR LESS THAN A 2.0 FOOT DROP.
3. SOLVENT TYPE JOINT PVC FITTINGS TO BE UTILIZED IN THE DROP ASSEMBLY ONLY.
4. THE PRECAST BASE SHALL EXTEND FULLY UNDER THE DROP ASSEMBLY AND BE CONSTRUCTED MONOLITHICALLY WITH THE BASE SECTION.
5. BRICK AND CONCRETE RUBBLE ARE PERMITTED AS FILLER IN DROP ENCASEMENT.

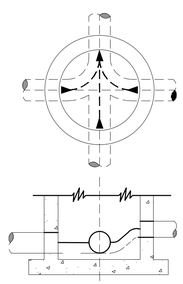
OUTSIDE DROP CONNECTION PRECAST MANHOLE – TYPE B (206)



NOTES:

1. MATERIAL: FRAME AND COVER AS SPECIFIED.
2. ADDITIONAL GRADE RINGS MAY BE USED TO ELEVATE EXISTING MANHOLE FRAMES TO RESURFACED GRADE (MAX. 4" HEIGHT).
3. ALL DIMENSIONS ARE NOMINAL.
4. OPTIONAL: HINGED FRAME AND COVER AS SPECIFIED.

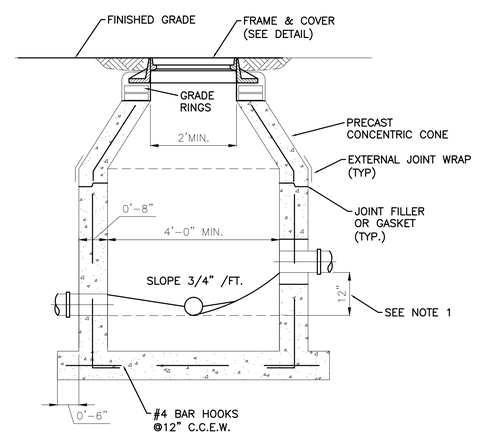
MANHOLE FRAME & COVER–UNPAVED AREAS (201)



NOTES:

1. ALL INVERT CHANNELS ARE TO BE CONSTRUCTED FOR SMOOTH FLOW WITHOUT OBSTRUCTION.
2. PROPERLY SHAPED SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS TO PROVIDE FOR SMOOTH FLOWS.
3. SERVICE LATERALS SHALL NOT ENTER MANHOLES UNLESS SPECIFIED ON PLANS AND THEN MUST BE TREATED AS MAINS. (ELEVATIONS SHOWN, PRECAST HOLE, FLOW CHANNEL)
4. BRICK RUBBLE PERMITTED AS FLOW CHANNEL BUILDUP.
5. SIDEWALLS OF FLOW CHANNEL SHALL BE AT LEAST HALF OF PIPE HEIGHT AT ALL POINTS.
6. NO INSIDE DROP LARGER THAN 6" SHALL BE ALLOWED WITH 3 OR 4 INVERTS AND MANHOLES WITH A CHANGE OF DIRECTION OF FLOW OF MORE THAN 45 DEGREES.

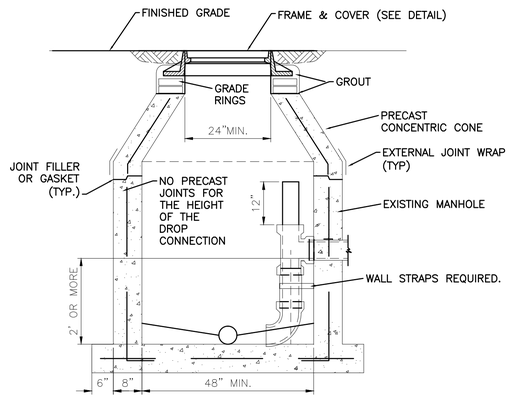
INVERT FLOW CHANNELS (202)



NOTES:

1. INSIDE DROP TO BE USED WHEN DROP IS GREATER THAN 6 INCHES AND LESS THAN 24 INCHES AND/OR FOR LATERAL CONNECTIONS.
2. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO FLOW STREAM.
3. CONSTRUCTION OF DROP SHALL PROVIDE AN OVERSIZED SLAB TO EXTEND UNDER THE DROP CONNECTION.
4. MINIMUM PIPE SIZE FOR DROP IS 8".
5. SEE "STANDARD MANHOLE" DETAIL FOR ADDITIONAL REQUIREMENTS.

DROP CONNECTION PRECAST MANHOLE TYPE A (205)



NOTES:

1. ALL DETAILS AND SPECIFICATIONS FOR STANDARD MANHOLES ARE APPLICABLE EXCEPT FOR REFERENCES TO DROP ASSEMBLY.
2. INSIDE DROP CONNECTION TO BE USED ONLY FOR A SINGLE DROP CONNECTION TO AN EXISTING MANHOLE.
3. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT INVERT IS LOCATED 2.0 FEET OR MORE ABOVE THE MAIN INVERT CHANNEL. DROP CONNECTIONS SHOULD NOT BE DESIGNED FOR LESS THAN A 2.4 FOOT DROP.
4. SOLVENT TYPE JOINT PVC FITTINGS TO BE UTILIZED IN THE DROP ASSEMBLY ONLY.

INSIDE DROP CONNECTION EXISTING MANHOLE TYPE C (207)

PERMIT SET

Robert M. Connors
Florida P.E. No. 41863

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CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER DETAILS
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO.	OF
C12	14

TOTAL: 32

CAD FILE: 12133-C12-DETL

DRAWING FILE NO.: 4-139-49

APPROVED
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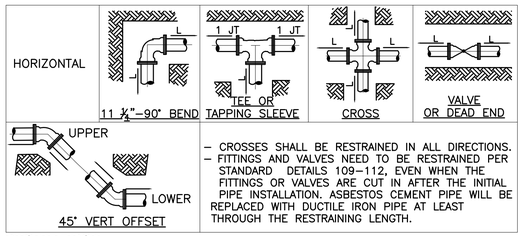


– CROSSES SHALL BE RESTRAINED IN ALL DIRECTIONS.
– FITTINGS AND VALVES NEED TO BE RESTRAINED PER STANDARD DETAILS 109–112, EVEN WHEN THE FITTINGS OR VALVES ARE CUT IN AFTER THE INITIAL PIPE INSTALLATION. ASBESTOS CEMENT PIPE WILL BE REPLACED WITH DUCTILE IRON PIPE AT LEAST THROUGH THE RESTRAINING LENGTH.

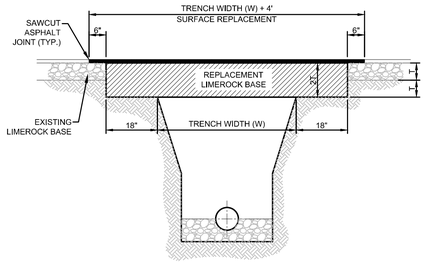
DUCTILE IRON PIPE

	HORIZONTAL, L (FEET)						45° VERTICAL OFFSET (FEET)	
Diameter	11 ¼°	22 ½°	45°	90°	Tee or Cross	Valves and Dead End	UPPER	LOWER
4	1	2	4	10	3	20	9	3
6	2	3	6	14	11	28	12	4
8	2	4	8	17	20	37	16	5
10	2	5	19	21	27	44	19	6
12	3	5	10	24	34	52	22	6

PVC PIPE

	HORIZONTAL, L (FEET)						45° VERTICAL OFFSET (FEET)	
Diameter	11 ¼°	22 ½°	45°	90°	Tee or Cross	Valves and Dead End	UPPER	LOWER
4	2	3	5	12	5	32	14	3
6	2	4	7	16	18	45	19	5
8	3	5	9	21	31	59	25	6
10	3	5	11	25	43	71	30	7
12	3	6	12	29	55	83	35	7

THE NOTED REQUIREMENTS WERE CALCULATED IN ACCORDANCE WITH THRUST RESTRAINT CALCULATOR V6.1 BY EBAA IRON WITH THE FOLLOWING ASSUMPTIONS:
SOIL CONDITIONS: SAND (SW, SP, GW)
LAYING CONDITION: 4, SAND BEDDING, BACKFILL COMPACTED > 80%
MINIMUM COVER: 3.0 FT SAFETY FACTOR: 1.5 BARE PIPE
IF FIELD CONDITIONS DIFFER FROM THE ABOVE, CONTRACTOR SHALL NOTIFY WWS.
FOR PIPE LARGER THAN INCLUDED IN THE ABOVE TABLES, ENGINEER OF RECORD SHALL SUBMIT CALCULATIONS FOR EACH JOINT REQUIRING RESTRAINT.



NOTES:

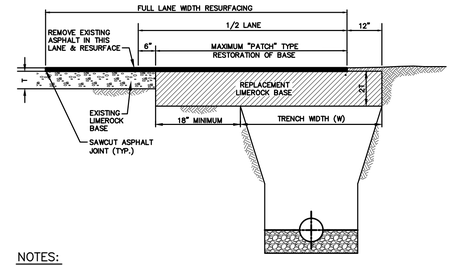
1. REPLACED BASE MATERIAL OVER TRENCH SHALL BE TWICE THE THICKNESS OF THE ORIGINAL BASE, MINIMUM 8", MAXIMUM 18".
2. BASE MATERIAL SHALL BE PLACED IN 6" MAXIMUM (LOOSE MEASUREMENT) LAYERS AND EACH LAYER THOROUGHLY ROLLED OR TAMPED TO 98% OF MAXIMUM DENSITY, PER AASHTO T-180.
3. SUBGRADE MATERIAL SHALL BE GRANULAR AND ANGULAR AND SHALL HAVE A MINIMUM LBR OF 40.
4. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED PARALLEL TO OR PERPENDICULAR TO THE ROADWAY
5. SURFACE TREATED PAVEMENT JOINTS SHALL BE LAPPED.
6. SURFACE MATERIAL SHALL BE CONSISTENT WITH THE SURROUNDING SURFACE (MINIMUM 1" THICKNESS)
7. BASE MATERIAL SHALL HAVE A MINIMUM LBR OF 100 AND A MINIMUM CARBONATE CONTENT OF 70% (60% FOR LOCAL STREETS)
8. IF THE TRENCH IS FILLED TEMPORARILY, IT SHALL BE COVERED WITH A 2" ASPHALTIC CONCRETE PATCH TO KEEP THE FILL MATERIAL FROM RAVELING UNTIL REPLACED WITH A PERMANENT PATCH.

PAVEMENT RESTORATION DETAIL

SCALE: N.T.S.

GENERAL NOTES:

1. THESE PAVEMENT RESTORATION DETAILS ONLY APPLY FOR WORK WITHIN THE BR.O.W.ARD COUNTY RIGHTS–OF–WAY AND MAY NOT BE APPLICABLE FOR OTHER JURISDICTIONAL RIGHTS–OF–WAY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND COMPLY WITH ALL GOVERNING MINIMUM CONSTRUCTION STANDARDS AND CODES PERTAINING TO THIS PROJECT.



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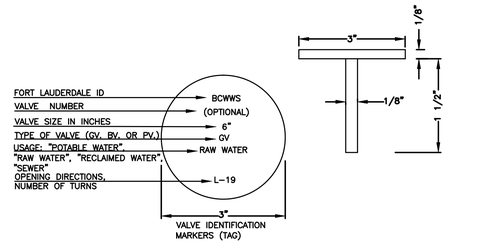
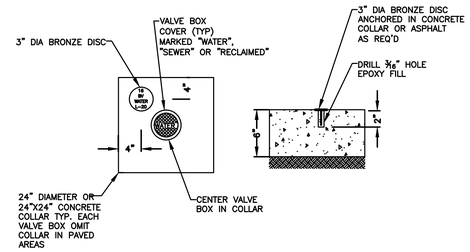
3. SUBGRADE MATERIAL SHALL BE GRANULAR AND ANGULAR AND SHALL HAVE A MINIMUM LBR OF 40.
4. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED PARALLEL TO OR PERPENDICULAR TO THE ROADWAY
5. SURFACE TREATED PAVEMENT JOINTS SHALL BE LAPPED.
6. SURFACE MATERIAL SHALL BE CONSISTENT WITH THE SURROUNDING SURFACE (MINIMUM 1" THICKNESS)
7. BASE MATERIAL SHALL HAVE A MINIMUM LBR OF 100 AND A MINIMUM CARBONATE CONTENT OF 70% (60% FOR LOCAL STREETS)
8. IF THE TRENCH IS FILLED TEMPORARILY, IT SHALL BE COVERED WITH A 2" ASPHALTIC CONCRETE PATCH TO KEEP THE FILL MATERIAL FROM RAVELING UNTIL REPLACED WITH A PERMANENT PATCH.

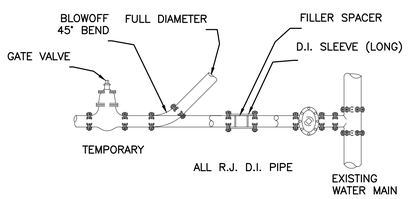
TYPICAL RESTORATION OF LESS THAN 1/2 LANE OF ROCK BASE REPLACEMENT OF FLEXIBLE PAVEMENT CUT FOR PARALLEL UTILITY INSTALLATION

STANDARD DETAIL





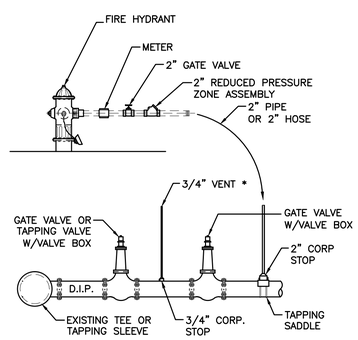
VALVE COLLAR AND IDENTIFICATION MARKER DETAIL



NOTES:

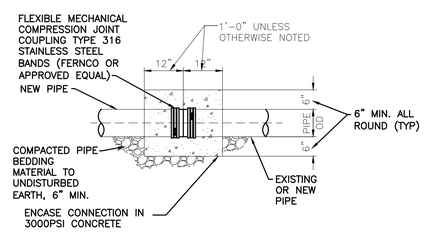
1. UPON COMPLETION OF THE PIPE INSTALLATION FOR ANY SECTION, THE MAINS SHALL BE SWABBED AND FLUSHED TO REMOVE DIRT AND ANY OTHER FOREIGN MATTER BY ACHIEVING A MINIMUM VELOCITY OF 2.5 FEET PER SECOND IN THE PIPE. TEMPORARY FITTINGS, PIPE, ETC. MAY BE NEEDED TO FACILITATE FLUSHING.
2. INSTALL A 45° BEND AND ASSOCIATED PIPING AS SHOWN TO DIRECT THE FLUSHING WATER AWAY FROM THE IMMEDIATE WORK AREA AND EXERCISE DUE CARE SO AS TO ENSURE THAT THE WATER USED IN FLUSHING DOES NOT CAUSE A NUISANCE OR INFLICT PROPERTY DAMAGE.
3. BENDS AND PIPING SHALL BE THE SAME SIZE AS THE LINE TO BE FLUSHED.
4. PRIOR TO THE ACTUAL LINE FLUSHING OPERATION, THE CONTRACTOR SHALL PROPERLY NOTIFY THE CITY INSPECTOR OF SUCH INTENDED WATER USE.
5. NO EXISTING VALVES SHALL BE TURNED ON OR OFF, EXCEPT BY AUTHORIZED CITY PERSONNEL.
6. FLUSHING SHALL NOT BE ACCOMPLISHED WITHOUT THE ACTUAL PRESENCE OF THE CITY INSPECTOR.
7. AFTER THE LINE UNDER CONSTRUCTION HAS BEEN SUCCESSFULLY FLUSHED THE CONTRACTOR SHALL REMOVE THE TEMPORARY PIPING ARRANGEMENT AND PROCEED WITH THE REMAINING CONSTRUCTION AS SPECIFIED.
8. THERE MAY BE SPECIAL REQUIREMENTS FOR FLUSHING PIPE LARGER THAN 12" DIAMETER.

FLUSHING CONNECTION AND BLOW OFF DETAIL (303)



* NOTE: AFTER TESTS REMOVE 3/4" TUBING AND 2" GALVANIZED PIPE AND INSTALL PLUGS ON CORPORATION STOPS.

FILLING CONNECTION (305)



JOINT FOR DISSIMILAR GRAVITY SEWER PIPE (211)

CRAVEN • THOMPSON AND ASSOCIATES, INC.
ENGINEERS • PLANNERS • SURVEYORS
3563 N.W. 53RD STREET, FORT LAUDERDALE, FLORIDA 33309
FAX: (954) 739–6409 TEL.: (954) 739–6400
FLORIDA LICENSED ENGINEERING, SURVEYING & MAPPING BUSINESS No. 271
FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000114

PERMIT SET

Robert M. Connors
Florida P.E. No. 41863

DRAWN BY: | DATE: MM/DD/YY
DESIGNED BY: | SCALE:
CHECKED BY:
FIELD BOOK:

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

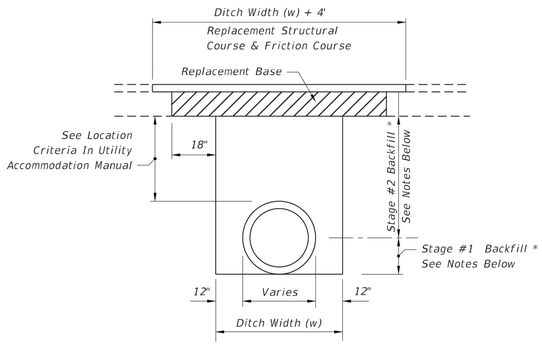
NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER DETAILS
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO. C13 OF 14
TOTAL: 32
CAD FILE: 12133-C13.DWG
DRAWING FILE NO.: 4-139-49

APPROVED
CAM 17-1229
Exhibit 1
Page 94
Joseph

N:\DWGS\ENG\PROJECTS\2015\15-0051-001-01 A-13 NEW PUMP STATION (FT. LAUDERDALE)\DRAWINGS\12133-C13-DETL.DWG



FLEXIBLE PAVEMENT NOTES

PAVEMENT REMOVAL AND REPLACEMENT

Pavement shall be mechanically sawed.

The replacement asphalt shall match the existing structural and friction courses for type and thickness in accordance with current FDOT asphalt mix specifications.

The new base materials shall be either of the same type and composition as the materials removed or of equal or greater structural adequacy (See Index No. 514).

BACKFILL

COMPACTED AND STABILIZED FILL OPTION

Backfill material shall be placed in accordance with Section 125 of the Standard Specifications.

In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.

In Stage #2, construct compacted fill along the sides of the pipe and up to the bottom of the base,with the upper 12" receiving Type B Stabilization. In lieu of Type B Stabilization, the Contractor may construct using Optional Base Group 3.

* FLOWABLE FILL OPTION

If compaction can not be achieved through normal mechanical methods then flowable fill may be used.

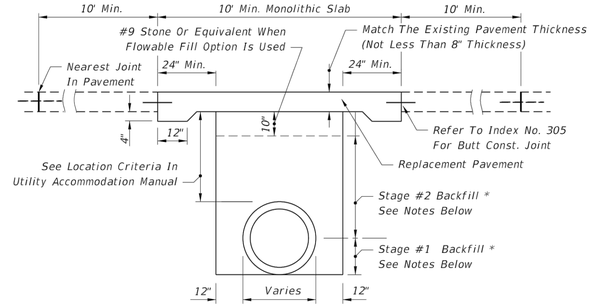
Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.

Do not allow the utility being installed to float. If a method is provided to prevent flotation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.

In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.

In Stage #2, place flowable fill to the bottom of the existing base course.

FLEXIBLE PAVEMENT CUT



RIGID PAVEMENT NOTES

PAVEMENT REMOVAL AND REPLACEMENT

High early strength cement concrete (3000 psi) meeting the requirements of Standard Specification 346 shall be used for rigid pavement replacement.

Pavement shall be mechanically sawed and restored to conform with existing pavement joints within 12 hours. (See Index No. 305)

GRANULAR BACKFILL

Any edgedrain system that is removed shall be replaced with the same type materials. Any edgedrain system that is damaged shall be repaired with methods approved by the Engineer.

Fill material shall be placed in accordance with the Standard Specifications. Fill material shall be special select soil in accordance with Index No. 505.

In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.

In Stage #2, construct fill along the sides of the pipe and up to the bottom of replacement pavement.

* FLOWABLE FILL OPTION

If mechanical compaction can not be achieved through normal mechanical methods then flowable fill may be used.

Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.

Do not allow the utility being installed to float. If a method is provided to prevent flotation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.

In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.

In Stage #2, place flowable fill to the bottom of the stone layer.

RIGID PAVEMENT CUT

GENERAL NOTES

1. The details provided in this standard index apply to cases in which jack and bore or directional boring methods are not required by the Engineer.
2. Flowable fill shall not be placed directly over loose, or high plastic, or muck material (see Index 505) which will cause settlement due to fill weight. Where highly compressible material exists, the amount, shape and depth of flowable fill must be engineered to prevent pavement settlement.
3. These details do not apply to utility cuts longitudinal to the centerline of the roadway which may require the additional use of geotextiles, special bedding and backfill, or other special requirements.
4. Method of construction must be approved by the Engineer.
5. Some pipe may require special granular backfill up to 6" above top of pipe. Geotextiles may be required to encapsulate the special granular material.
6. Where asphalt concrete overlays exist over full slab concrete pavement, the replacement pavement shall have an overlay constructed over the replacement slab. The overlay shall match the existing asphalt pavement thickness. The replacement friction course shall match the existing friction course, except structural course may be used in lieu of dense graded friction course.
7. All shoulder pavement, curb, curb and gutter, and their substructure disturbed by utility trench cut construction shall be restored in kind.
8. The use of flowable fill to reduce the time traffic is taken off a facility is acceptable but must have prior approval by the Engineer. Flowable fill use is allowed only when properly engineered for pavement crossings, whether straight or diagonal, and shall not be installed for significant depths or lengths. The maximum length shall be fifty (50) feet and a maximum depth of six (6) feet unless supported by an engineering document prepared by a registered professional engineer that specializes in soils engineering. The engineering document shall address the evaluation of local groundwater flow interruption and settlement potential.
9. Excavatable flowable fill is to be used when the flowable fill option is selected.

TRENCH CUTS AND RESTORATIONS ACROSS ROADWAYS

FDOT INDEX 307 PAVEMENT RESTORATION DETAIL

CRAVEN • THOMPSON AND ASSOCIATES, INC.
ENGINEERS • PLANNERS • SURVEYORS
3563 N.W. 53RD STREET, FORT LAUDERDALE, FLORIDA 33309
FAX: (954) 739-6409 TEL.: (954) 739-6400
FLORIDA LICENSED ENGINEERING, SURVEYING & MAPPING BUSINESS No. 271
FLORIDA LICENSED LANDSCAPE ARCHITECTURE BUSINESS No. C000114

PERMIT SET

N:\DWGS\ENG\PROJECTS\2015\15-0051-001-01 A-13 NEW PUMP STATION (FT. LAUDERDALE)\DRAWINGS\12133-C14-DETL.DWG

Robert M. Connors
Florida P.E. No. 41863

DRAWN BY: | DATE: MM/DD/YY
DESIGNED BY: | SCALE:
CHECKED BY:
FIELD BOOK:

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION

PROJECT # 12133
A-13 NEW PUMP STATION
SEWER REDIRECTION
SANITARY SEWER DETAILS
CITY OF FORT LAUDERDALE, FLORIDA

SHEET NO. C14 OF 14
TOTAL: 32
CAD FILE: 12133-C14-DETL.DWG
DRAWING FILE NO. 4-139-49

APPROVED
Digitally signed by Robert M. Connors
DN: cn=Robert M. Connors, c=US, o=Craven Thompson & Associates, ou=Engineering, email=rconnors@ctaengineers.com
Date: 2017.06.15 12:06:42 -04'00'

FDOT PRE-CONSTRUCTION MEETING CHECKLIST

	Item Permit # _____	Yes	No
1	Sign-in sheet		
2	MOT -Lane closure request form (submitted prior to construction) -Note: The Contractor needs to provide access to all businesses in the construction area. -Drop-off criteria (Index # 600 page 10/13) -Provide access to all businesses in the construction area -Ensure pedestrian safety and meet ADA standards		
3	Construction Phases (schedule).		
4	FDOT Standard Specification #8-6.4 Suspension of Contractor's Operations-Holidays.		
5	Local News Media (refer to attached) and Barbara Kelleher, FDOT Public Information Director shall be contacted a week prior to any lane closures on the state road system if it will occur during peak hours or over the span of more than one day.		
6	***FDOT shall be notified a minimum of forty eight (48) hours in advance prior to starting work.***		
7	***FDOT shall be notified immediately upon completion of work.***		
8	Dewatering permit – when pumping or well point within FDOT ROW.		
9	All FDOT property shall be restored to its original condition.		
10	Discuss any typical roadway asphalt section -restoration Note: temporary striping MUST have to be put in place along with RPM's as required for fourteen (14) days and then Thermoplastic Striping must be put down.		
11	Asphalt: subject to a three year warranty period (FDOT Section 338).		
12	All asphalt paving within FDOT's ROW must pass the rolling straightedge test (FDOT Section 330 -any paving greater than 250').		
13	If excavatable flowable fill is used, it must pass the penetrometer test; standard backfill, according to Index # 307.		
14	Piezo loops: coordinate with FDOT – kara.schwartz@dot.state.fl.us, (954) 777-4364		
15	Always call 811 before you dig		
16	Lighting locates (see attached): Permittee to coordinate with the maintaining agency prior to commencement of construction. Prior to final acceptance, FDOT and the maintaining agency of the light pole will need to sign off on the final inspection.		
17	The Contractor shall have a set of the approved permit package on site at all times		
18	Certificate of Liability insurance with endorsement (N/A for utility applications)		
19	Permit is valid until _____		
20	A Permittee may request an extension of the Permit expiration date by sending a written request for a permit time extension 15 working days prior to the expiration date. (work may not continue with expired permit, including final inspections)		
21	Coordination with Broward County Transit (Ms. Arethia Douglas, P.E. at 954-357-8375, AcDouglas@broward.org)		
22	DOT ROW cannot be utilized for staging, storage or mobilization of equipment, supplies/vehicles.		
23	Contain all erosion and sedimentation on-site and prevent its entry into the state road storm sewer system.		
24	Coordination with Railroads.		
25	Mast Arm and Traffic Signals -CTQP Certified Inspector (drilled shafts) - Structures Foundations (FDOT Section 455)		
26	ITS Property/ATMS Infrastructure Preservation: Permittee is responsible for contacting FDOT/ITS Device & Infrastructure (Ms. Melissa Ackert P.E. 954-777-4156 or Beth Coe at 954-777-4373) for locates prior to starting proposed work on state roads with ATMS infrastructure. See attached "**ATMS Infrastructure Preservation**" map for locations of state roads with ITS Property /ATMS infrastructure.		
27	Additional Notes/Comments		

FDOT CLOSE OUT DOCUMENTS

		Yes	No	N/A
1	Directional bore logs and red lines (include depth and offsets)			
2	As-built drawings			
3	Copy of the concrete tickets			
4	Copy of the density reports			
5	Copy of the tack tickets			
6	Copy of the asphalt tickets			
7	Copy of the passing penetrometer test (when flowable fill is being used)			
8	Drainage: original sign and seal sheet No. 8/8 from E.O.R.			
9	Utility permits: original sign sheet No. 2/2 of utility permit form 710-010-85			
10	Roadway access permits: Request for Bond Release and Statement of Certification of Complete Permit Work, signed and sealed by E.O.R.			
11	Copy of the passing rolling straightedge test			
12	Relocated light poles: FDOT and maintaining agency of the local light pole need to sign off on the final inspection.			
13	FOR FDOT USE ONLY: Roadway Characteristics Inventory (RCI) report to Lloyd McPerson: new driveways, median modifications, signs, structures, etc.			

ROADWAY / LANE CLOSURE REQUEST

(Submittal required 14 Days Prior to Date of Closure)

STATE PROJECT NUMBER _____ PERMIT NUMBER _____

STATE ROAD NUMBER _____

TYPE OF CLOSURE _____ MAINLINE _____ RAMP _____ CROSS STREET

LOCATIONOF CLOSURE _____

DESCRIPTION OF ANTICIPATED CLOSURE _____ PARTIAL _____ FULL

Mainline Roadway Closure

Direction NB SB EB WB

Total Number of Lanes _____ Number Closed _____ Number Open _____

Day/ Date/Hours of Closure From: _____ _____ AM

To/ Thru: _____ _____ PM

Ramp Closure ON Ramp NB ramp SB ramp EB ramp WB ramp

Ramp Closure OFF Ramp NB ramp SB ramp EB ramp WB ramp

Day/ Date/Hours of Closure From: _____ AM/PM

To/ Thru: _____ AM/PM

DESCRIPTION OF WORK TO BE PERFORMED

ATTACHMENTS MOT PLAN DETOUR PLAN STANDARD INDEX

CLOSURE REQUESTED BY (SIGNATURE REQUIRED)

_____ _____

Contractor (Name of Company) Resident/ Project Engineer

Permitee(Name of Company) Contractor/Permitee Representative

Maint. Yard (N. / S./ Dist.) Area Maintenance Engineer

APPROVED BY: (SIGNATURE REQUIRED)

Date / / Date / /

Unit Permit Engineer Dist. Construction/Dist. Mainteneace Engineer

D4 Policy: There will be no "Daytime" Interstate lane closures (including ramps) allowed unless approved by the District Secretary. (See Approval process below.) In addition, District 4 policy prohibits Interstate lane closures on Friday and Saturday Night. "Daytime" is identified as 6:00 am to 10:00 pm.

In order to obtain approval, the request should be routed through the District Design Engineer. The request shall include: 1) Written justification; 2) A lane closure analysis (Signed and sealed): 3) Specific recommendations for advanced notifications to the public; 4) Should incentives be used to shorten the lane closure? (Talk with construction and work program.) & 5) Length of time for the lane closure.

8-6.4 Suspension of Contractor's Operations-Holidays: Unless the Contractor submits a written request to work on a holiday at least ten days in advance of the requested date and receives written approval from the Engineer, the Contractor shall not work on the following days: Martin Luther King, Jr. Day; Memorial Day; the Saturday and Sunday immediately preceding Memorial Day; Independence Day; Labor Day; the Friday, Saturday, and Sunday immediately preceding Labor Day; Veterans Day; Thanksgiving Day; the Friday, Saturday and Sunday immediately following Thanksgiving Day; and December 24 through January 2, inclusive. Contract Time will be charged during these holiday periods regardless of whether or not the Contractor's operations have been suspended. Contract time will be adjusted in accordance with 8-7.3.2. The Contractor is not entitled to any additional compensation beyond any allowed contract time adjustment for suspension of operations during such holiday periods.

During such suspensions, remove all equipment and materials from the clear zone, except those required for the safety of the traveling public and retain sufficient personnel at the job site to properly meet the requirements of Sections 102 and 104. The Contractor is not entitled to any additional compensation for removal of equipment from clear zones or for compliance with Section 102 and Section 104 during such holiday periods.

Subject: Walgreens @ Powerline Road

To whom it may be concerned:

The following information is regarding the above referenced project for you to inform the residents of the area as requested by the FDOT.

Project: Walgreens Powerline Road and Hillsboro Blvd.

Location and Scope: Re-build the existing entrance on one of the North bound lanes of Powerline Road just South of Hillsboro Blvd. and re-building the existing entrance on the East bound lane of Hillsboro Blvd.

Duration of Lane Closures: September 6, 2012 until September 12, 2012. The MOT will be in place from 9:00 am until 4:00 pm. on week days only.

We also will be closing one East bound lane of Hillsboro Blvd. from September 13, 2012 until September 18, 2012. The MOT will be in place from 9:00am until 4:00 pm on week days only.

Please let us know if you need any further information. Thank you for your cooperation.

ITS Property

Restoration for Intelligent Transportation System is subject to Table 1. Component failures and disruption of normal operation include, but are not limited to Telecommunications, Camera System, Vehicle Detection System, Dynamic Message System, and Power Systems.

Table 1 - Allowable Down Time

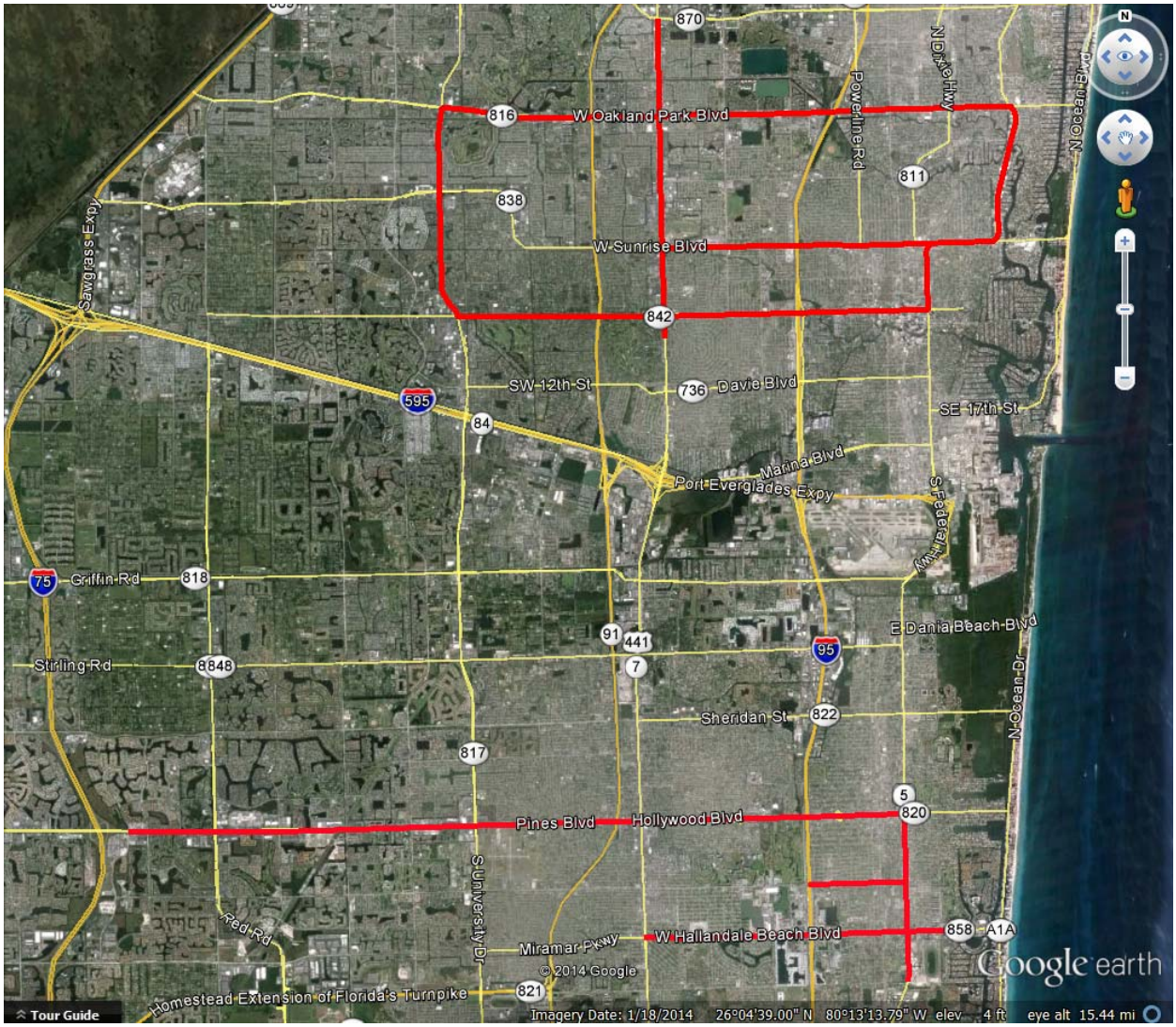
Item	Allowable Time
Telecommunications	4 hours
Camera System	48 hours
Vehicle Detection System	48 hours
Dynamic Message System	48 hours
Power Systems	4 hours

Damaged fiber optic cable may be temporarily fusion spliced within the allowable time in Table 1 to restore the communications; however, the Contractor shall replace any damaged fiber optic cable from termination point to termination point.

Contact Information

OWNER	CONTACT NAME	PHONE NUMBER
FDOT / ITS Devices and Infrastructure	Melissa Ackert P.E. Beth Coe	954-777-4156 954-777-4373
Locates	Chris Beaudry	954-847-2784
48 hour advanced notice of field work	Shayla Khalilahmadi	954-296-3691

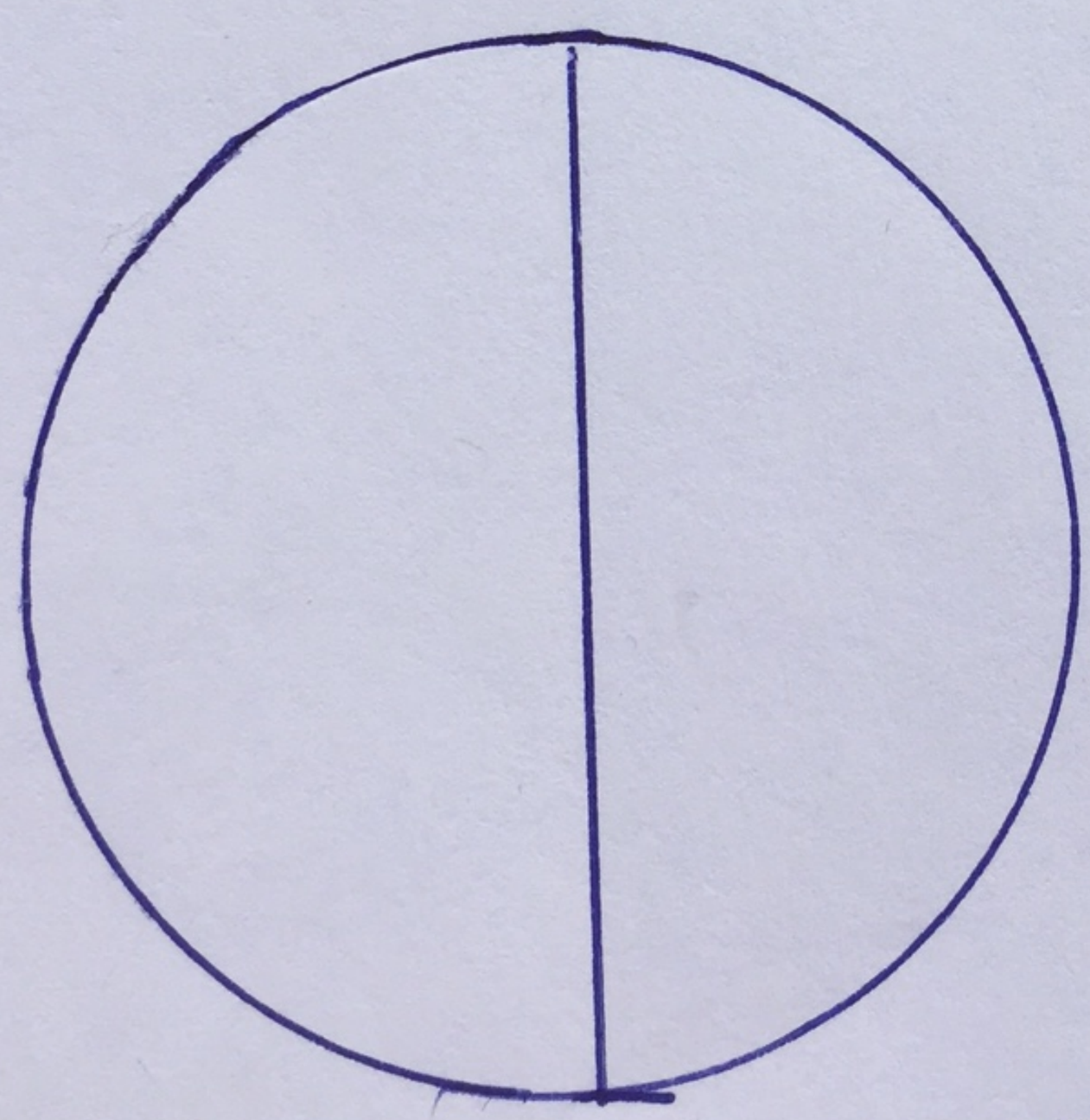
ATMS Infrastructure Preservation



APPENDIX E

INFORMATION FOR EXISTING WET WELL SECTION(S) SUPPLIED BY THE CITY

WW #1

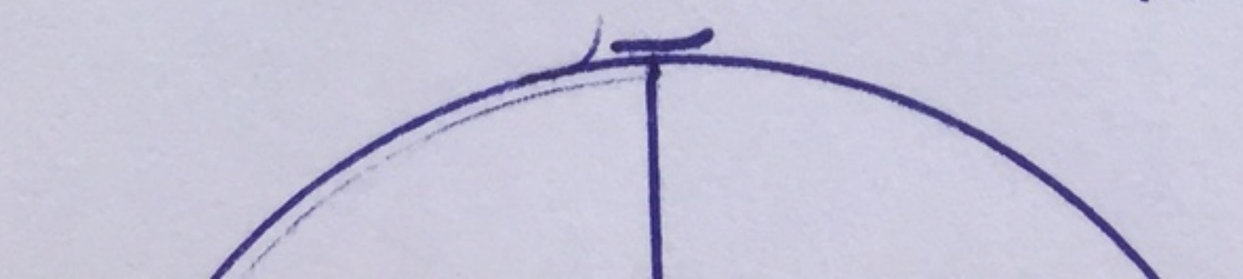


DIA. = Φ 12"

HEIGHT = 4'

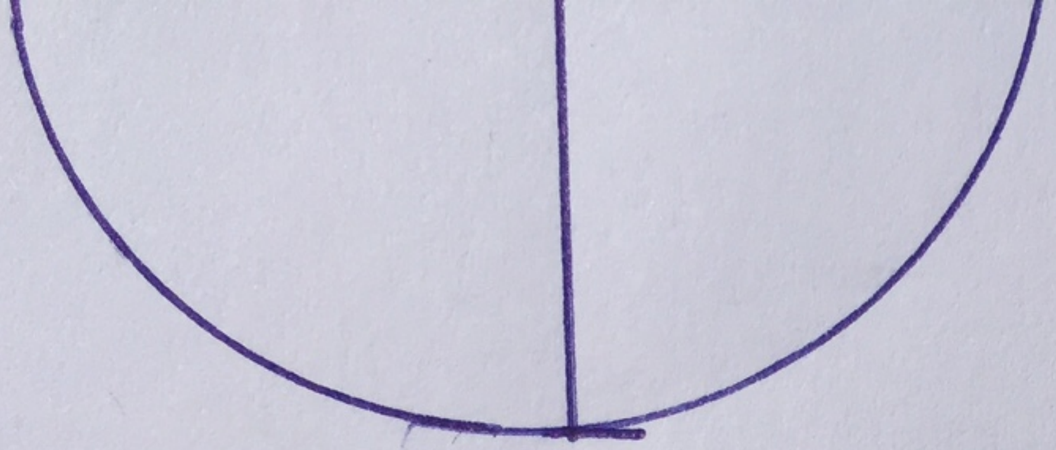
THICKNESS =

WW #2

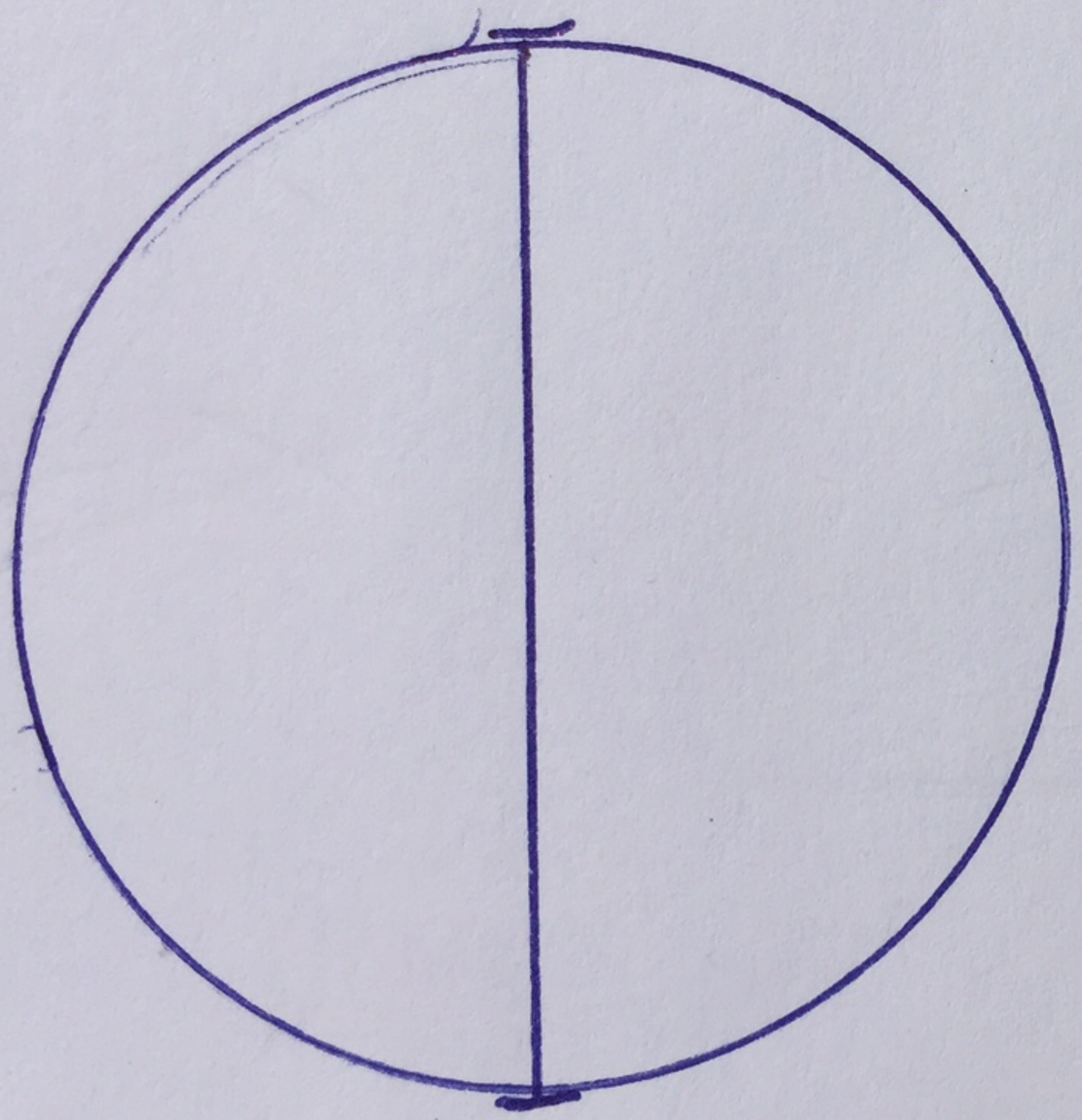


DIA = 8'


A-1C



WW # 2

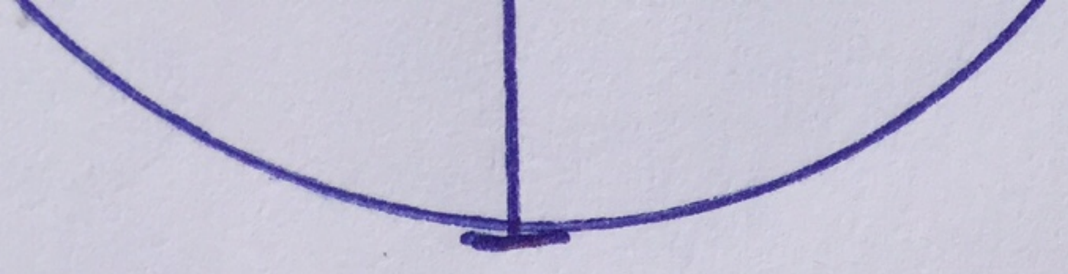


DIA = 12'

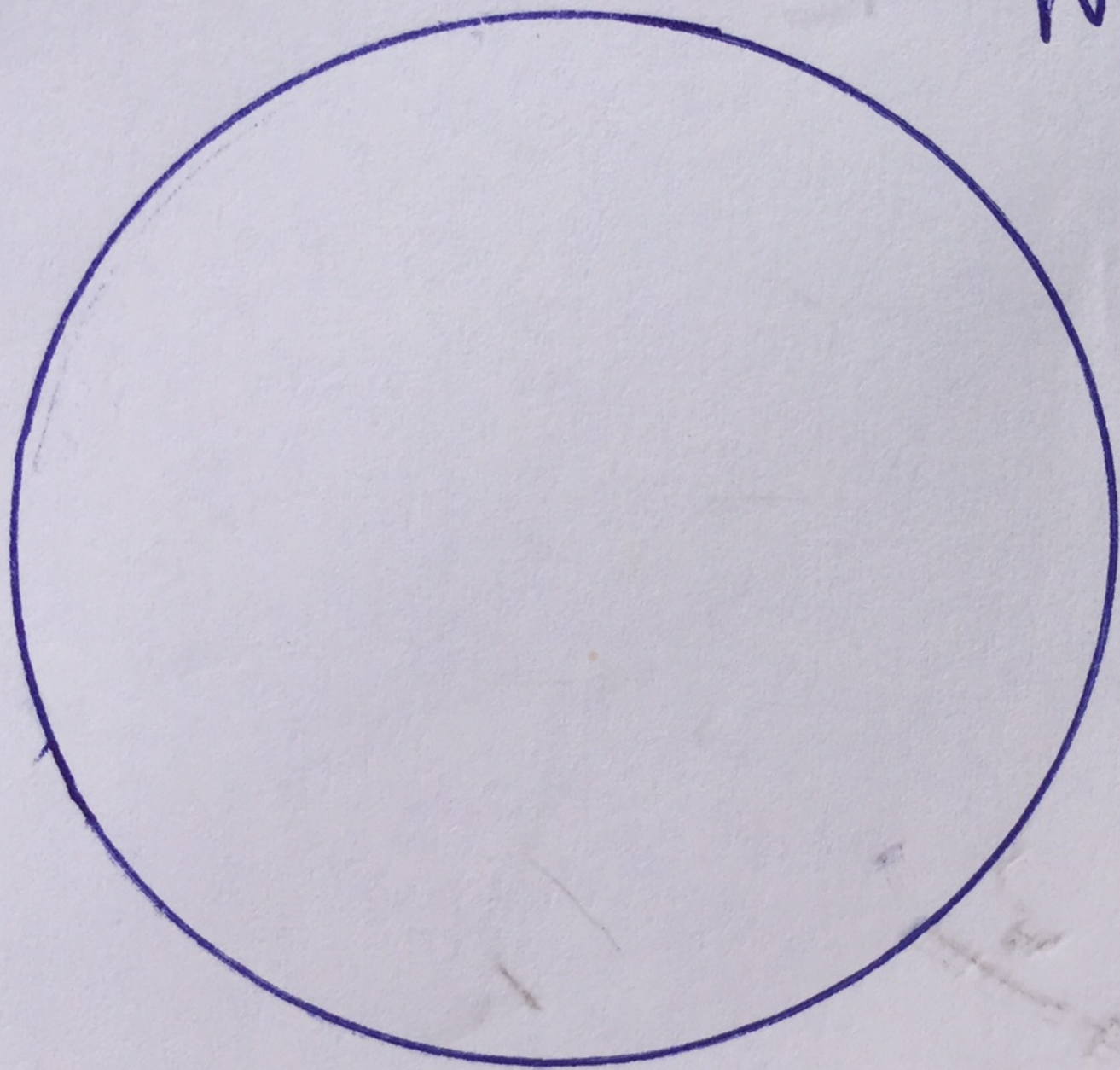
HEIGHT = 8'

THICKNESS =

WW # 3



WW# 3



DIA = 8 12'

HEIGHT = 8'

THICKNESS =

WW#4

THICKNESS =

WW #4

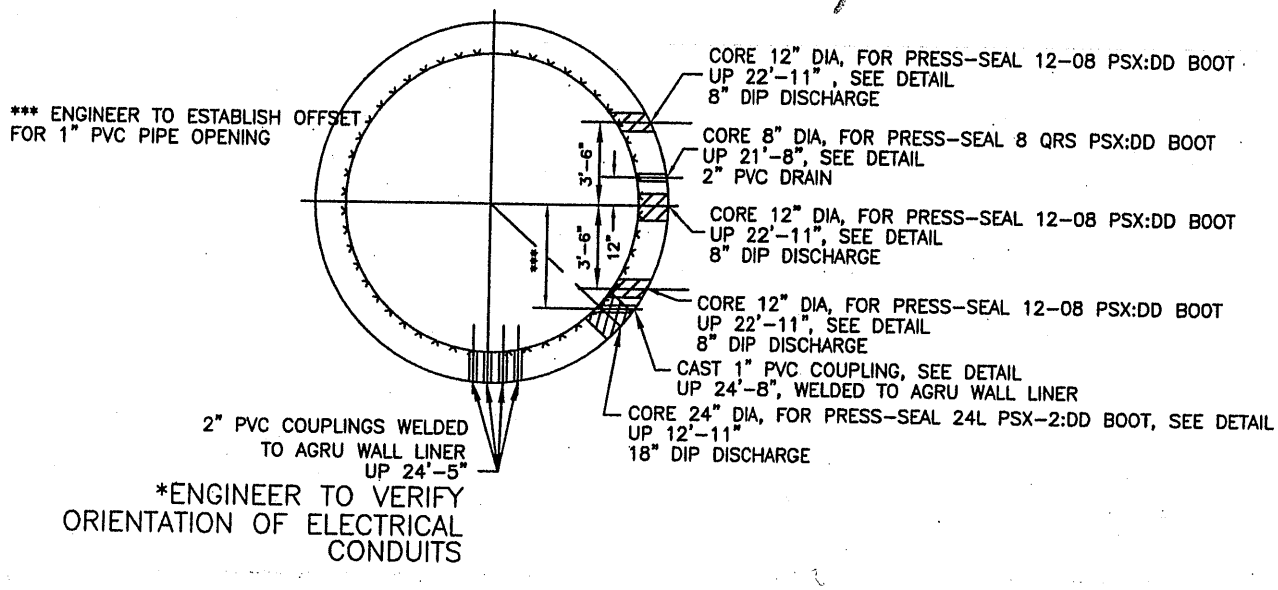
DIA = 12'

HEIGHT = 6'

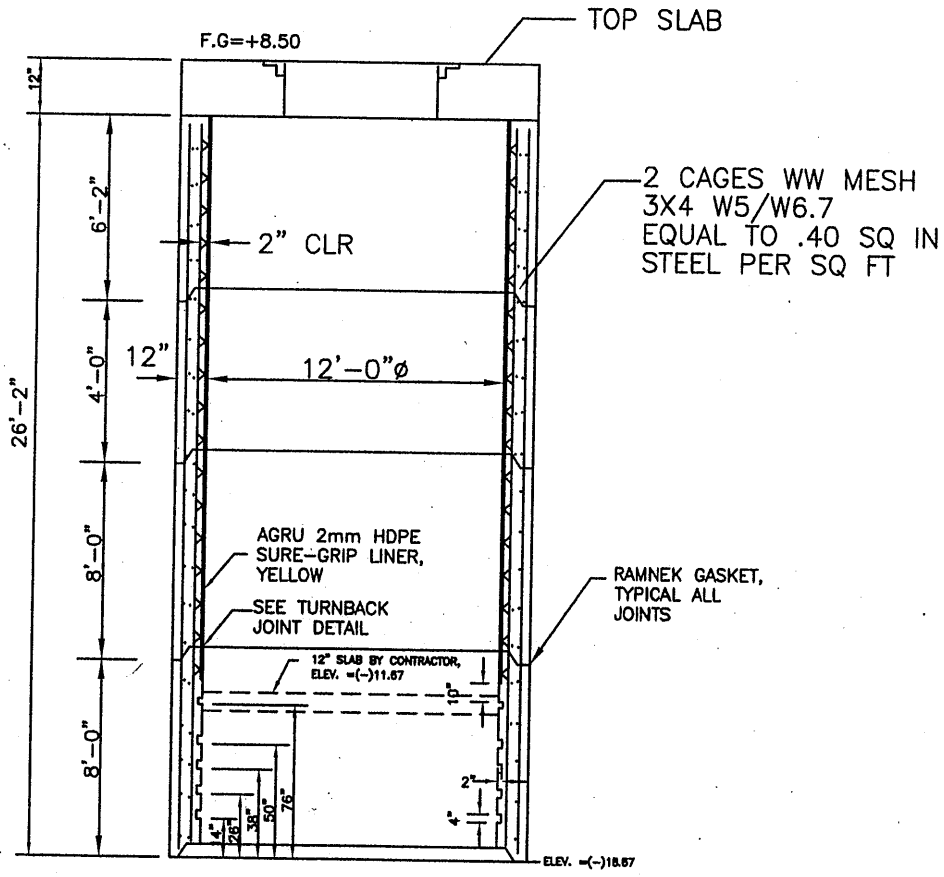
THICKNESS =

REBAR	W.W. MESH	CONCRETE	CUT:	H.A./SUMP:	COMPONENT	C.Y.	WEIGHT
GRADE 60	GRADE 65	5,000 PSI @ 28 DAYS					

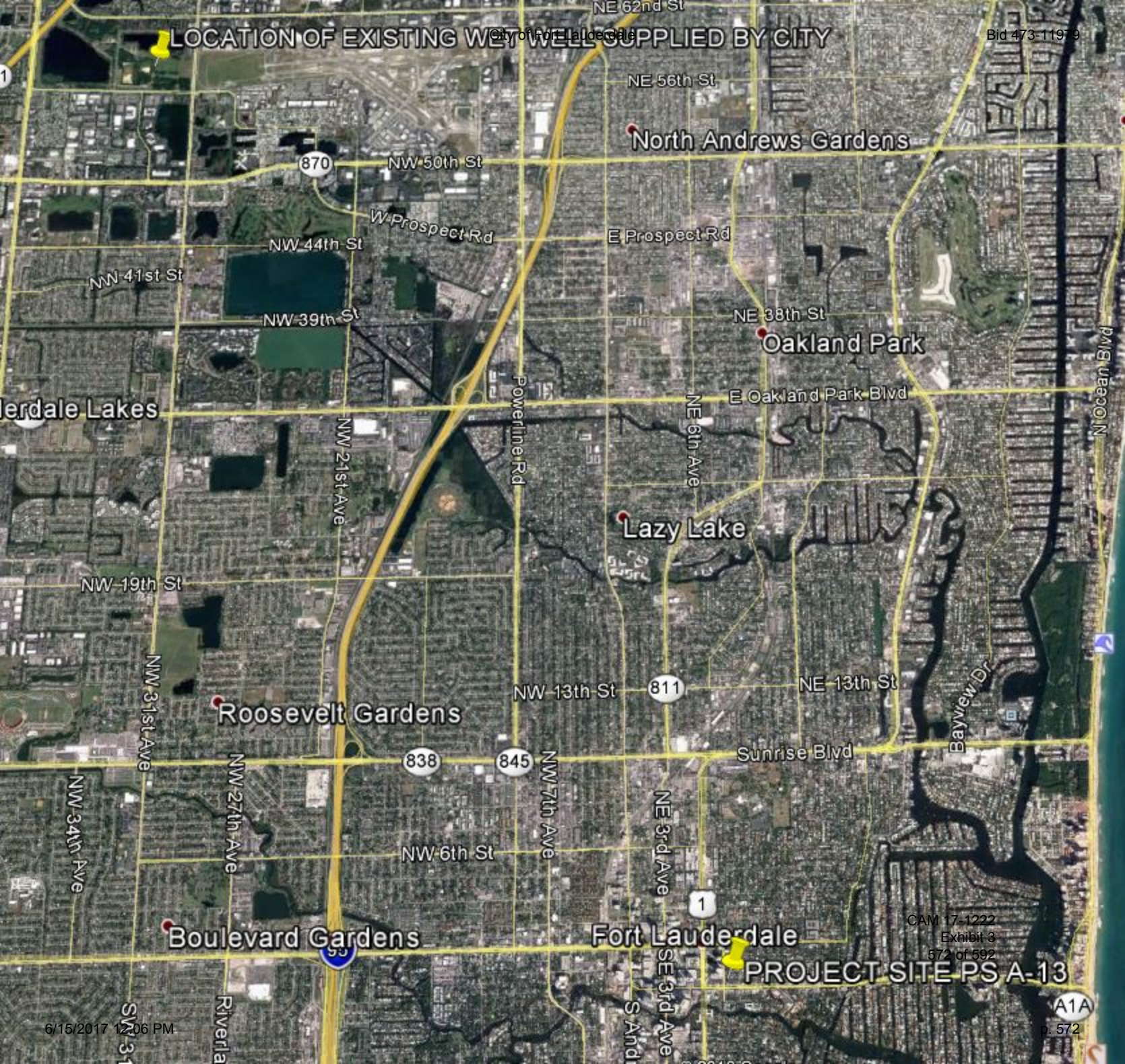
APPROVED
Metro Equipment Service Inc.
By: _____
Date: 5/1/2007



*ENGINEER TO VERIFY ORIENTATION OF ELECTRICAL CONDUITS



U.S. PRECAST CORPORATION, MEDLEY-FLORIDA, (305)885-8471, (305)887-6027(FAX)	DWG.: EA	144"ø WET WELL W/ TOP SLAB	
	DATE: 4/23/07	JOB NAME: PUMP STATION UPGRADES PHS I	STR.No.: 1
	CHK.:	CUSTOMER: METRO EQUIPMENT SERVICES	PS-A10
	DATE:	REVISION: FILE No.:	SHEET 1 OF 2
	NOTES: * INDEPENDENT LAB TESTING REQ.* BY:		JOB No.: 547406


LOCATION OF EXISTING WET WELL SUPPLIED BY CITY
NE 62nd St
NE 56th St
North Andrews Gardens
870
NW 50th St
W Prospect Rd
E Prospect Rd
NW 44th St
NW 41st St
NW 39th St
NE 38th St
Oakland Park
E Oakland Park Blvd
Lauderdale Lakes
NW 21st Ave
Powerline Rd
NE 6th Ave
Lazy Lake
NW 19th St
NW 31st Ave
NW 13th St
811
NE 13th St
Roosevelt Gardens
Bayview Dr
838
845
Sunrise Blvd
NW 7th Ave
NW 27th Ave
NW 34th Ave
NE 3rd Ave
NW 6th St
1
Boulevard Gardens
Fort Lauderdale
PROJECT SITE PS A-13
A1A
Riverla
S And
SE 3rd Ave

CITY OF FORT LAUDERDALE
GENERAL CONDITIONS

These instructions are standard for all contracts for commodities or services issued through the City of Fort Lauderdale Procurement Services Division. The City may delete, supersede, or modify any of these standard instructions for a particular contract by indicating such change in the Invitation to Bid (ITB) Special Conditions, Technical Specifications, Instructions, Proposal Pages, Addenda, and Legal Advertisement. In this general conditions document, Invitation to Bid (ITB), Request for Qualifications (RFQ), and Request for Proposal (RFP) are interchangeable.

PART I BIDDER PROPOSAL PAGE(S) CONDITIONS:

1.01 BIDDER ADDRESS: The City maintains automated vendor address lists that have been generated for each specific Commodity Class item through our bid issuing service, BidSync. Notices of Invitations to Bid (ITB'S) are sent by e-mail to the selection of bidders who have fully registered with BidSync or faxed (if applicable) to every vendor on those lists, who may then view the bid documents online. Bidders who have been informed of a bid's availability in any other manner are responsible for registering with BidSync in order to view the bid documents. There is no fee for doing so. If you wish bid notifications be provided to another e-mail address or fax, please contact BidSync. If you wish purchase orders sent to a different address, please so indicate in your bid response. If you wish payments sent to a different address, please so indicate on your invoice.

1.02 DELIVERY: Time will be of the essence for any orders placed as a result of this ITB. The City reserves the right to cancel any orders, or part thereof, without obligation if delivery is not made in accordance with the schedule specified by the Bidder and accepted by the City.

1.03 PACKING SLIPS: It will be the responsibility **of** the awarded Contractor, to attach all packing slips to the OUTSIDE of each shipment. Packing slips must provide a detailed description of what is to be received and reference the City of Fort Lauderdale purchase order number that is associated with the shipment. Failure to provide a detailed packing slip attached to the outside of shipment may result in refusal of shipment at Contractor's expense.

1.04 PAYMENT TERMS AND CASH DISCOUNTS: Payment terms, unless otherwise stated in this ITB, will be considered to be net 45 days after the date of satisfactory delivery at the place of acceptance and receipt of correct invoice at the office specified, whichever occurs last. Bidder may offer cash discounts for prompt payment but they will not be considered in determination of award. If a Bidder offers a discount, it is understood that the discount time will be computed from the date of satisfactory delivery, at the place of acceptance, and receipt of correct invoice, at the office specified, whichever occurs last.

1.05 TOTAL BID DISCOUNT: If Bidder offers a discount for award of all items listed in the bid, such discount shall be deducted from the total of the firm net unit prices bid and shall be considered in tabulation and award of bid.

1.06 BIDS FIRM FOR ACCEPTANCE: Bidder warrants, by virtue of bidding, that the bid and the prices quoted in the bid will be firm for acceptance by the City for a period of one hundred twenty (120) days from the date of bid opening unless otherwise stated in the ITB.

1.07 VARIANCES: For purposes of bid evaluation, Bidder's must indicate any variances, no matter how slight, from ITB General Conditions, Special Conditions, Specifications or Addenda in the space provided in the ITB. No variations or exceptions by a Bidder will be considered or deemed a part of the bid submitted unless such variances or exceptions are listed in the bid and referenced in the space provided on the bidder proposal pages. If variances are not stated, or referenced as required, it will be assumed that the product or service fully complies with the City's terms, conditions, and specifications.

By receiving a bid, City does not necessarily accept any variances contained in the bid. All variances submitted are subject to review and approval by the City. If any bid contains material variances that, in the City's sole opinion, make that bid conditional in nature, the City reserves the right to reject the bid or part of the bid that is declared, by the City as conditional.

1.08 NO BIDS: If you do not intend to bid please indicate the reason, such as insufficient time to respond, do not offer product or service, unable to meet specifications, schedule would not permit, or any other reason, in the space provided in this ITB. Failure to bid or return no bid comments prior to the bid due and opening date and time, indicated in this ITB, may result in your firm being deleted from our Bidder's registration list for the Commodity Class Item requested in this ITB.

1.09 MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION AND BUSINESS DEFINITIONS: The City of Fort Lauderdale wants to increase the participation of Minority Business Enterprises (MBE), Women Business Enterprises (WBE), and Small Business Enterprises (SBE) in its procurement activities. If your firm qualifies in accordance with the below definitions please indicate in the space provided in this ITB.

Minority Business Enterprise (MBE) "A Minority Business" is a business enterprise that is owned or controlled by one or more socially or economically disadvantaged persons. Such disadvantage may arise from cultural, racial, chronic economic

circumstances or background or other similar cause. Such persons include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

The term "Minority Business Enterprise" means a business at least 51 percent of which is owned by minority group members or, in the case of a publicly owned business, at least 51 percent of the stock of which is owned by minority group members. For the purpose of the preceding sentence, minority group members are citizens of the United States who include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

Women Business Enterprise (WBE) a "Women Owned or Controlled Business" is a business enterprise at least 51 percent of which is owned by females or, in the case of a publicly owned business, at least 51 percent of the stock of which is owned by females.

Small Business Enterprise (SBE) "Small Business" means a corporation, partnership, sole proprietorship, or other legal entity formed for the purpose of making a profit, which is independently owned and operated, has either fewer than 100 employees or less than $1,000,000 in annual gross receipts.

BLACK, which includes persons having origins in any of the Black racial groups of Africa.
WHITE, which includes persons whose origins are Anglo-Saxon and Europeans and persons of Indo-European decent including Pakistani and East Indian.
HISPANIC, which includes persons of Mexican, Puerto Rican, Cuban, Central and South American, or other Spanish culture or origin, regardless of race.
NATIVE AMERICAN, which includes persons whose origins are American Indians, Eskimos, Aleuts, or Native Hawaiians.
ASIAN AMERICAN, which includes persons having origin in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.

1.10 MINORITY-WOMEN BUSINESS ENTERPRISE PARTICIPATION

It is the desire of the City of Fort Lauderdale to increase the participation of minority (MBE) and women-owned (WBE) businesses in its contracting and procurement programs. While the City does not have any preference or set aside programs in place, it is committed to a policy of equitable participation for these firms. Proposers are requested to include in their proposals a narrative describing their past accomplishments and intended actions in this area. If proposers are considering minority or women owned enterprise participation in their proposal, those firms, and their specific duties have to be identified in the proposal. If a proposer is considered for award, he or she will be asked to meet with City staff so that the intended MBE/WBE participation can be formalized and included in the subsequent contract.

1.11 SCRUTINIZED COMPANIES

Subject to *Odebrecht Construction, Inc., v. Prasad*, 876 F.Supp.2d 1305 (S.D. Fla. 2012), *affirmed*, *Odebrecht Construction, Inc., v. Secretary, Florida Department of Transportation*, 715 F.3d 1268 (11th Cir. 2013), with regard to the "Cuba Amendment," the Contractor certifies that it is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section 215.4725, Florida Statutes (2016), that it is not engaged in a boycott of Israel, and that it does not have business operations in Cuba or Syria, as provided in section 287.135, Florida Statutes (2016), as may be amended or revised. The City may terminate this Agreement at the City's option if the Contractor is found to have submitted a false certification as provided under subsection (5) of section 287.135, Florida Statutes (2016), as may be amended or revised, or been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section 215.4725, Florida Statutes (2016), or is engaged in a boycott of Israel or has been engaged in business operations in Cuba or Syria, as defined in Section 287.135, Florida Statutes (2016), as may be amended or revised.

1.12 DEBARRED OR SUSPENDED BIDDERS OR PROPOSERS

The bidder or proposer certifies, by submission of a response to this solicitation, that neither it nor its principals and subcontractors are presently debarred or suspended by any Federal department or agency.

Part II DEFINITIONS/ORDER OF PRECEDENCE:

2.01 BIDDING DEFINITIONS The City will use the following definitions in its general conditions, special conditions, technical specifications, instructions to bidders, addenda and any other document used in the bidding process:
INVITATION TO BID (ITB) when the City is requesting bids from qualified Bidders.

REQUEST FOR PROPOSALS (RFP) when the City is requesting proposals from qualified Proposers.
REQUEST FOR QUALIFICATIONS (RFQ) when the City is requesting qualifications from qualified Proposers.
BID – a price and terms quote received in response to an ITB.
PROPOSAL – a proposal received in response to an RFP.
BIDDER – Person or firm submitting a Bid.
PROPOSER – Person or firm submitting a Proposal.
RESPONSIVE BIDDER – A person whose bid conforms in all material respects to the terms and conditions included in the ITB.
RESPONSIBLE BIDDER – A person who has the capability in all respects to perform in full the contract requirements, as stated in the ITB, and the integrity and reliability that will assure good faith performance.
FIRST RANKED PROPOSER – That Proposer, responding to a City RFP, whose Proposal is deemed by the City, the most advantageous to the City after applying the evaluation criteria contained in the RFP.
SELLER – Successful Bidder or Proposer who is awarded a Purchase Order or Contract to provide goods or services to the City.
CONTRACTOR – Successful Bidder or Proposer who is awarded a Purchase Order, award Contract, Blanket Purchase Order agreement, or Term Contract to provide goods or services to the City.
CONTRACT – A deliberate verbal or written agreement between two or more competent parties to perform or not to perform a certain act or acts, including all types of agreements, regardless of what they may be called, for the procurement or disposal of equipment, materials, supplies, services or construction.
CONSULTANT – Successful Bidder or Proposer who is awarded a contract to provide professional services to the City.
The following terms may be used interchangeably by the City: ITB and/or RFP; Bid or Proposal; Bidder, Proposer, or Seller; Contractor or Consultant; Contract, Award, Agreement or Purchase Order.

2.02 SPECIAL CONDITIONS: Any and all Special Conditions contained in this ITB that may be in variance or conflict with these General Conditions shall have precedence over these General Conditions. If no changes or deletions to General Conditions are made in the Special Conditions, then the General Conditions shall prevail in their entirety,

PART III BIDDING AND AWARD PROCEDURES:

3.01 SUBMISSION AND RECEIPT OF BIDS: To receive consideration, bids must be received prior to the bid opening date and time. Unless otherwise specified, Bidders should use the proposal forms provided by the City. These forms may be duplicated, but failure to use the forms may cause the bid to be rejected. Any erasures or corrections on the bid must be made in ink and initialed by Bidder in ink. All information submitted by the Bidder shall be printed, typewritten or filled in with pen and ink. Bids shall be signed in ink. Separate bids must be submitted for each ITB issued by the City in separate sealed envelopes properly marked. When a particular ITB or RFP requires multiple copies of bids or proposals they may be included in a single envelope or package properly sealed and identified. Only send bids via facsimile transmission (FAX) if the ITB specifically states that bids sent via FAX will be considered. If such a statement is not included in the ITB, bids sent via FAX will be rejected. Bids will be publicly opened in the Procurement Office, or other designated area, in the presence of Bidders, the public, and City staff. Bidders and the public are invited and encouraged to attend bid openings. Bids will be tabulated and made available for review by Bidder's and the public in accordance with applicable regulations.

3.02 MODEL NUMBER CORRECTIONS: If the model number for the make specified in this ITB is incorrect, or no longer available and replaced with an updated model with new specifications, the Bidder shall enter the correct model number on the bidder proposal page. In the case of an updated model with new specifications, Bidder shall provide adequate information to allow the City to determine if the model bid meets the City's requirements.

3.03 PRICES QUOTED: Deduct trade discounts, and quote firm net prices. Give both unit price and extended total. In the case of a discrepancy in computing the amount of the bid, the unit price quoted will govern. All prices quoted shall be F.O.B. destination, freight prepaid (Bidder pays and bears freight charges, Bidder owns goods in transit and files any claims), unless otherwise stated in Special Conditions. Each item must be bid separately. No attempt shall be made to tie any item or items contained in the ITB with any other business with the City.

3.04 TAXES: The City of Fort Lauderdale is exempt from Federal Excise and Florida Sales taxes on direct purchase of tangible property. Exemption **number for EIN is 59-6000319, and State Sales tax exemption number is 85-8013875578C-1.**

3.05 WARRANTIES OF USAGE: Any quantities listed in this ITB as estimated or projected are provided for tabulation and information purposes only. No warranty or guarantee of quantities is given or implied. It is understood that the Contractor will furnish the City's needs as they arise.

3.06 APPROVED EQUAL: When the technical specifications call for a brand name, manufacturer, make, model, or vendor catalog number with acceptance of APPROVED EQUAL, it shall be for the purpose of establishing a level of quality and features desired and acceptable to the City. In such cases, the City will be receptive to any unit that would be considered by qualified City personnel as an approved equal. In that the specified make and model represent a level of quality and features desired by the City, the Bidder must state clearly in the bid any variance from those specifications. It is the Bidder's responsibility to provide adequate information, in the bid, to enable the City to ensure that the bid meets the required criteria. If adequate information is not submitted with the bid, it may be rejected. The City will be the sole judge in determining if the item bid qualifies as an approved equal.

3.07 MINIMUM AND MANDATORY TECHNICAL SPECIFICATIONS: The technical specifications may include items that are considered minimum, mandatory, or required. If any Bidder is unable to meet or exceed these items, and feels that the technical specifications are overly restrictive, the bidder must notify the Procurement Services Division immediately. Such notification must be received by the Procurement Services Division prior to the deadline contained in the ITB, for questions of a material nature, or prior to five (5) days before bid due and open date, whichever occurs first. If no such notification is received prior to that deadline, the City will consider the technical specifications to be acceptable to all bidders.

3.08 MISTAKES: Bidders are cautioned to examine all terms, conditions, specifications, drawings, exhibits, addenda, delivery instructions and special conditions pertaining to the ITB. Failure of the Bidder to examine all pertinent documents shall not entitle the bidder to any relief from the conditions imposed in the contract.

3.09 SAMPLES AND DEMONSTRATIONS: Samples or inspection of product may be requested to determine suitability. Unless otherwise specified in Special Conditions, samples shall be requested after the date of bid opening, and if requested should be received by the City within seven (7) working days of request. Samples, when requested, must be furnished free of expense to the City and if not used in testing or destroyed, will upon request of the Bidder, be returned within thirty (30) days of bid award at Bidder's expense. When required, the City may request full demonstrations of units prior to award. When such demonstrations are requested, the Bidder shall respond promptly and arrange a demonstration at a convenient location. Failure to provide samples or demonstrations as specified by the City may result in rejection of a bid.

3.10 LIFE CYCLE COSTING: If so specified in the ITB, the City may elect to evaluate equipment proposed on the basis of total cost of ownership. In using Life Cycle Costing, factors such as the following may be considered: estimated useful life, maintenance costs, cost of supplies, labor intensity, energy usage, environmental impact, and residual value. The City reserves the right to use those or other applicable criteria, in its sole opinion that will most accurately estimate total cost of use and ownership.

3.11 BIDDING ITEMS WITH RECYCLED CONTENT: In addressing environmental concerns, the City of Fort Lauderdale encourages Bidders to submit bids or alternate bids containing items with recycled content. When submitting bids containing items with recycled content, Bidder shall provide documentation adequate for the City to verify the recycled content. The City prefers packaging consisting of materials that are degradable or able to be recycled. When specifically stated in the ITB, the City may give preference to bids containing items manufactured with recycled material or packaging that is able to be recycled.

3.12 USE OF OTHER GOVERNMENTAL CONTRACTS: The City reserves the right to reject any part or all of any bids received and utilize other available governmental contracts, if such action is in its best interest.

3.13 QUALIFICATIONS/INSPECTION: Bids will only be considered from firms normally engaged in providing the types of commodities/services specified herein. The City reserves the right to inspect the Bidder's facilities, equipment, personnel, and organization at any time, or to take any other action necessary to determine Bidder's ability to perform. The Procurement Director reserves the right to reject bids where evidence or evaluation is determined to indicate inability to perform.

3.14 BID SURETY: If Special Conditions require a bid security, it shall be submitted in the amount stated. A bid security can be in the form of a bid bond or cashier's check. Bid security will be returned to the unsuccessful bidders as soon as practicable after opening of bids. Bid security will be returned to the successful bidder after acceptance of the performance bond, if required; acceptance of insurance coverage, if required; and full execution of contract documents, if required; or conditions as stated in Special Conditions.

3.15 **PUBLIC RECORDS/TRADE SECRETS/COPYRIGHT:** The Proposer's response to the RFP is a public record pursuant to Florida law, which is subject to disclosure by the City under the State of Florida Public Records Law, Florida Statutes Chapter 119.07 ("Public Records Law"). The City shall permit public access to all documents, papers, letters or other material submitted in connection with this RFP and the Contract to be executed for this RFP, subject to the provisions of Chapter 119.07 of the Florida Statutes.

Any language contained in the Proposer's response to the RFP purporting to require confidentiality of any portion of the Proposer's response to the RFP, except to the extent that certain information is in the City's opinion a Trade Secret pursuant to Florida law, shall be void. If a Proposer submits any documents or other information to the City which the Proposer claims is Trade Secret information and exempt from Florida Statutes Chapter 119.07 ("Public Records Laws"), the Proposer shall clearly designate that it is a Trade Secret and that it is asserting that the document or information is exempt. The Proposer must specifically identify the exemption being claimed under Florida Statutes 119.07. The City shall be the final arbiter of whether any information contained in the Proposer's response to the RFP constitutes a Trade Secret. The city's determination of whether an exemption applies shall be final, and the proposer agrees to defend, indemnify, and hold harmless the city and the city's officers, employees, and agent, against any loss or damages incurred by any person or entity as a result of the city's treatment of records as public records. Proposals purporting to be subject to copyright protection in full or in part will be rejected.

EXCEPT FOR CLEARLY MARKED PORTIONS THAT ARE BONA FIDE TRADE SECRETS PURSUANT TO FLORIDA LAW, DO NOT MARK YOUR RESPONSE TO THE RFP AS PROPRIETARY OR CONFIDENTIAL. DO NOT MARK YOUR RESPONSE TO THE RFP OR ANY PART THEREOF AS COPYRIGHTED.

3.16 PROHIBITION OF INTEREST: No contract will be awarded to a bidding firm who has City elected officials, officers or

employees affiliated with it, unless the bidding firm has fully complied with current Florida State Statutes and City Ordinances relating to this issue. Bidders must disclose any such affiliation. Failure to disclose any such affiliation will result in disqualification of the Bidder and removal of the Bidder from the City's bidder lists and prohibition from engaging in any business with the City.

3.17 RESERVATIONS FOR AWARD AND REJECTION OF BIDS: The City reserves the right to accept or reject any or all bids, part of bids, and to waive minor irregularities or variations to specifications contained in bids, and minor irregularities in the bidding process. The City also reserves the right to award the contract on a split order basis, lump sum basis, individual item basis, or such combination as shall best serve the interest of the City. The City reserves the right to make an award to the responsive and responsible bidder whose product or service meets the terms, conditions, and specifications of the ITB and whose bid is considered to best serve the City's interest. In determining the responsiveness of the offer and the responsibility of the Bidder, the following shall be considered when applicable: the ability, capacity and skill of the Bidder to perform as required; whether the Bidder can perform promptly, or within the time specified, without delay or interference; the character, integrity, reputation, judgment, experience and efficiency of the Bidder; the quality of past performance by the Bidder; the previous and existing compliance by the Bidder with related laws and ordinances; the sufficiency of the Bidder's financial resources; the availability, quality and adaptability of the Bidder's supplies or services to the required use; the ability of the Bidder to provide future maintenance, service or parts; the number and scope of conditions attached to the bid.

If the ITB provides for a contract trial period, the City reserves the right, in the event the selected bidder does not perform satisfactorily, to award a trial period to the next ranked bidder or to award a contract to the next ranked bidder, if that bidder has successfully provided services to the City in the past. This procedure to continue until a bidder is selected or the contract is re-bid, at the sole option of the City.

3.18 LEGAL REQUIREMENTS: Applicable provisions of all federal, state, county laws, and local ordinances, rules and regulations, shall govern development, submittal and evaluation of all bids received in response hereto and shall govern any and all claims and disputes which may arise between person(s) submitting a bid response hereto and the City by and through its officers, employees and authorized representatives, or any other person, natural or otherwise; and lack of knowledge by any bidder shall not constitute a cognizable defense against the legal effect thereof.

3.19 BID PROTEST PROCEDURE: ANY PROPOSER OR BIDDER WHO IS NOT RECOMMENDED FOR AWARD OF A CONTRACT AND WHO ALLEGES A FAILURE BY THE CITY TO FOLLOW THE CITY'S PROCUREMENT ORDINANCE OR ANY APPLICABLE LAW MAY PROTEST TO THE DIRECTOR OF PROCUREMENT SERVICES DIVISION (DIRECTOR), BY DELIVERING A LETTER OF PROTEST TO THE DIRECTOR WITHIN FIVE (5) DAYS AFTER A NOTICE OF INTENT TO AWARD IS POSTED ON THE CITY'S WEB SITE AT THE FOLLOWING LINK: http://www.fortlauderdale.gov/purchasing/notices_of_intent.htm

THE COMPLETE PROTEST ORDINANCE MAY BE FOUND ON THE CITY'S WEB SITE AT THE FOLLOWING LINK: http://www.fortlauderdale.gov/purchasing/protestordinance.pdf

PART IV BONDS AND INSURANCE

4.01 PERFORMANCE BOND: If a performance bond is required in Special Conditions, the Contractor shall within fifteen (15) working days after notification of award, furnish to the City a Performance Bond, payable to the City of Fort Lauderdale, Florida, in the face amount specified in Special Conditions as surety for faithful performance under the terms and conditions of the contract. If the bond is on an annual coverage basis, renewal for each succeeding year shall be submitted to the City thirty (30) days prior to the termination date of the existing Performance Bond. The Performance Bond must be executed by a surety company of recognized standing, authorized to do business in the State of Florida and having a resident agent.

Acknowledgement and agreement is given by both parties that the amount herein set for the Performance Bond is not intended to be nor shall be deemed to be in the nature of liquidated damages nor is it intended to limit the liability of the Contractor to the City in the event of a material breach of this Agreement by the Contractor.

4.02 INSURANCE: If the Contractor is required to go on to City property to perform work or services as a result of ITB award, the Contractor shall assume full responsibility and expense to obtain all necessary insurance as required by City or specified in Special Conditions.

The Contractor shall provide to the Procurement Services Division original certificates of coverage and receive notification of approval of those certificates by the City's Risk Manager prior to engaging in any activities under this contract. The Contractors insurance is subject to the approval of the City's Risk Manager. The certificates must list the City as an ADDITIONAL INSURED for General Liability Insurance, and shall have no less than thirty (30) days written notice of cancellation or material change. Further modification of the insurance requirements may be made at the sole discretion of the City's Risk Manager if circumstances change or adequate protection of the City is not presented. Bidder, by submitting the bid, agrees to abide by such modifications.

PART V PURCHASE ORDER AND CONTRACT TERMS:

5.01 COMPLIANCE TO SPECIFICATIONS, LATE DELIVERIES/PENALTIES: Items offered may be tested for compliance to bid

specifications. Items delivered which do not conform to bid specifications may be rejected and returned at Contractor's expense. Any violation resulting in contract termination for cause or delivery of items not conforming to specifications, or late delivery may also result in:

- Bidders name being removed from the City's bidder's mailing list for a specified period and Bidder will not be recommended for any award during that period.
- All City Departments being advised to refrain from doing business with the Bidder.
- All other remedies in law or equity.

5.02 ACCEPTANCE, CONDITION, AND PACKAGING: The material delivered in response to ITB award shall remain the property of the Seller until a physical inspection is made and the material accepted to the satisfaction of the City. The material must comply fully with the terms of the ITB, be of the required quality, new, and the latest model. All containers shall be suitable for storage and shipment by common carrier, and all prices shall include standard commercial packaging. The City will not accept substitutes of any kind. Any substitutes or material not meeting specifications will be returned at the Bidder's expense. Payment will be made only after City receipt and acceptance of materials or services.

5.03 SAFETY STANDARDS: All manufactured items and fabricated assemblies shall comply with applicable requirements of the Occupation Safety and Health Act of 1970 as amended, and be in compliance with Chapter 442, Florida Statutes. Any toxic substance listed in Section 38F-41.03 of the Florida Administrative Code delivered as a result of this order must be accompanied by a completed Safety Data Sheet (SDS).

5.04 ASBESTOS STATEMENT: All material supplied must be 100% asbestos free. Bidder, by virtue of bidding, certifies that if awarded any portion of the ITB the bidder will supply only material or equipment that is 100% asbestos free.

5.05 OTHER GOVERNMENTAL ENTITIES: If the Bidder is awarded a contract as a result of this ITB, the bidder may, if the bidder has sufficient capacity or quantities available, provide to other governmental agencies, so requesting, the products or services awarded in accordance with the terms and conditions of the ITB and resulting contract. Prices shall be F.O.B. delivered to the requesting agency.

5.06 VERBAL INSTRUCTIONS PROCEDURE: No negotiations, decisions, or actions shall be initiated or executed by the Contractor as a result of any discussions with any City employee. Only those communications which are in writing from an authorized City representative may be considered. Only written communications from Contractors, which are assigned by a person designated as authorized to bind the Contractor, will be recognized by the City as duly authorized expressions on behalf of Contractors.

5.07 INDEPENDENT CONTRACTOR: The Contractor is an independent contractor under this Agreement. Personal services provided by the Proposer shall be by employees of the Contractor and subject to supervision by the Contractor, and not as officers, employees, or agents of the City. Personnel policies, tax responsibilities, social security, health insurance, employee benefits, procurement policies unless otherwise stated in this ITB, and other similar administrative procedures applicable to services rendered under this contract shall be those of the Contractor.

5.08 INDEMNITY/HOLD HARMLESS AGREEMENT: The Contractor agrees to protect, defend, indemnify, and hold harmless the City of Fort Lauderdale and its officers, employees and agents from and against any and all losses, penalties, damages, settlements, claims, costs, charges for other expenses, or liabilities of every and any kind including attorney's fees, in connection with or arising directly or indirectly out of the work agreed to or performed by Contractor under the terms of any agreement that may arise due to the bidding process. Without limiting the foregoing, any and all such claims, suits, or other actions relating to personal injury, death, damage to property, defects in materials or workmanship, actual or alleged violations of any applicable Statute, ordinance, administrative order, rule or regulation, or decree of any court shall be included in the indemnity hereunder.

5.09 TERMINATION FOR CAUSE: If, through any cause, the Contractor shall fail to fulfill in a timely and proper manner its obligations under this Agreement, or if the Contractor shall violate any of the provisions of this Agreement, the City may upon written notice to the Contractor terminate the right of the Contractor to proceed under this Agreement, or with such part or parts of the Agreement as to which there has been default, and may hold the Contractor liable for any damages caused to the City by reason of such default and termination. In the event of such termination, any completed services performed by the Contractor under this Agreement shall, at the option of the City, become the City's property and the Contractor shall be entitled to receive equitable compensation for any work completed to the satisfaction of the City. The Contractor, however, shall not be relieved of liability to the City for damages sustained by the City by reason of any breach of the Agreement by the Contractor, and the City may withhold any payments to the Contractor for the purpose of setoff until such time as the amount of damages due to the City from the Contractor can be determined.

5.10 TERMINATION FOR CONVENIENCE: The City reserves the right, in its best interest as determined by the City, to cancel contract by giving written notice to the Contractor thirty (30) days prior to the effective date of such cancellation.

5.11 CANCELLATION FOR UNAPPROPRIATED FUNDS: The obligation of the City for payment to a Contractor is limited to the availability of funds appropriated in a current fiscal period, and continuation of the contract into a subsequent fiscal period is subject to appropriation of funds, unless otherwise authorized by law.

5.12 RECORDS/AUDIT: The Contractor shall maintain during the term of the contract all books of account, reports and records in

accordance with generally accepted accounting practices and standards for records directly related to this contract. The Contractor agrees to make available to the City Auditor or designee, during normal business hours and in Broward, Miami-Dade or Palm Beach Counties, all books of account, reports and records relating to this contract should be retained for the duration of the contract and for three years after the final payment under this Agreement, or until all pending audits, investigations or litigation matters relating to the contract are closed, whichever is later.

5.13 PERMITS, TAXES, LICENSES: The successful Contractor shall, at their own expense, obtain all necessary permits, pay all licenses, fees and taxes, required to comply with all local ordinances, state and federal laws, rules and regulations applicable to business to be carried out under this contract.

5.14 LAWS/ORDINANCES: The Contractor shall observe and comply with all Federal, state, local and municipal laws, ordinances rules and regulations that would apply to this contract.

5.15 NON-DISCRIMINATION: There shall be no discrimination as to race, sex, color, creed, age or national origin in the operations conducted under this contract.

5.16 UNUSUAL CIRCUMSTANCES: If during a contract term where costs to the City are to remain firm or adjustments are restricted by a percentage or CPI cap, unusual circumstances that could not have been foreseen by either party of the contract occur, and those circumstances significantly affect the Contractor's cost in providing the required prior items or services, then the Contractor may request adjustments to the costs to the City to reflect the changed circumstances. The circumstances must be beyond the control of the Contractor, and the requested adjustments must be fully documented. The City may, after examination, refuse to accept the adjusted costs if they are not properly documented, increases are considered to be excessive, or decreases are considered to be insufficient. In the event the City does not wish to accept the adjusted costs and the matter cannot be resolved to the satisfaction of the City, the City will reserve the following options:

1. The contract can be canceled by the City upon giving thirty (30) days written notice to the Contractor with no penalty to the City or Contractor. The Contractor shall fill all City requirements submitted to the Contractor until the termination date contained in the notice.

2. The City requires the Contractor to continue to provide the items and services at the firm fixed (non-adjusted) cost until the termination of the contract term then in effect.

3. If the City, in its interest and in its sole opinion, determines that the Contractor in a capricious manner attempted to use this section of the contract to relieve them of a legitimate obligation under the contract, and no unusual circumstances had occurred, the City reserves the right to take any and all action under law or equity. Such action shall include, but not be limited to, declaring the Contractor in default and disqualifying him for receiving any business from the City for a stated period of time.

If the City does agree to adjusted costs, these adjusted costs shall not be invoiced to the City until the Contractor receives notice in writing signed by a person authorized to bind the City in such matters.

5.17 ELIGIBILITY: If applicable, the Contractor must first register with the Department of State of the State of Florida, in accordance with Florida State Statutes, prior to entering into a contract with the City.

5.18 PATENTS AND ROYALTIES: The Contractor, without exception, shall indemnify and save harmless the City and its employees from liability of any nature and kind, including cost and expenses for or on account of any copyrighted, patented or un-patented invention, process, or article manufactured or used in the performance of the contract, including its use by the City. If the Contractor uses any design, device, or materials covered by letters, patent or copyright, it is mutually agreed and understood without exception that the bid prices shall include all royalties or costs arising from the use of such design, device, or materials in any way involved in the work.

5.19 ASSIGNMENT: Contractor shall not transfer or assign the performance required by this ITB without the prior written consent of the City. Any award issued pursuant to this ITB, and the monies, which may become due hereunder, are not assignable except with the prior written approval of the City Commission or the City Manager or City Manager's designee, depending on original award approval.

5.20 LITIGATION VENUE: The parties waive the privilege of venue and agree that all litigation between them in the state courts shall take place in Broward County, Florida and that all litigation between them in the federal courts shall take place in the Southern District in and for the State of Florida.

5.21 LOCATION OF UNDERGROUND FACILITIES: If the Contractor, for the purpose of responding to this solicitation, requests the location of underground facilities through the Sunshine State One-Call of Florida, Inc. notification system or through any person or entity providing a facility locating service, and underground facilities are marked with paint, stakes or other markings within the City pursuant to such a request, then the Contractor, shall be deemed non-responsive to this solicitation in accordance with Section 2-184(5) of the City of Fort Lauderdale Code of Ordinances.

5.22 PUBLIC RECORDS

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT. CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT: (954-828-5002, PRRCONTRACT@FORTLAUDERDALE.GOV, CITY CLERK'S OFFICE, 100 NORTH ANDREWS AVENUE, FORT LAUDERDALE, FLORIDA 33301)

Contractor shall:

1. Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service.

2. Upon request from the City's custodian of public records, provide the City with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes (2016), as may be amended or revised, or as otherwise provided by law.

3. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of this contract if the Contractor does not transfer the records to the City.

4. Upon completion of the Contract, transfer, at no cost, to the City all public records in possession of the Contractor or keep and maintain public records required by the City to perform the service. If the Contractor transfers all public records to the City upon completion of this Contract, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the Contractor keeps and maintains public records upon completion of this Contract, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the City, upon request from the City's custodian of public records, in a format that is compatible with the information technology systems of the City.

NON-COLLUSION STATEMENT:

By signing this offer, the vendor/contractor certifies that this offer is made independently and free from collusion. Vendor shall disclose below any City of Fort Lauderdale, FL officer or employee, or any relative of any such officer or employee who is an officer or director of, or has a material interest in, the vendor's business, who is in a position to influence this procurement.

Any City of Fort Lauderdale, FL officer or employee who has any input into the writing of specifications or requirements, solicitation of offers, decision to award, evaluation of offers, or any other activity pertinent to this procurement is presumed, for purposes hereof, to be in a position to influence this procurement.

For purposes hereof, a person has a material interest if they directly or indirectly own more than 5 percent of the total assets or capital stock of any business entity, or if they otherwise stand to personally gain if the contract is awarded to this vendor.

In accordance with City of Fort Lauderdale, FL Policy and Standards Manual, 6.10.8.3,

3.3. City employees may not contract with the City through any corporation or business entity in which they or their immediate family members hold a controlling financial interest (e.g. ownership of five (5) percent or more).

3.4. Immediate family members (spouse, parents and children) are also prohibited from contracting with the City subject to the same general rules.

Failure of a vendor to disclose any relationship described herein shall be reason for debarment in accordance with the provisions of the City Procurement Code.

NAME	RELATIONSHIPS

In the event the vendor does not indicate any names, the City shall interpret this to mean that the vendor has indicated that no such relationships exist.

CONTRACT PAYMENT METHOD BY P-CARD

THIS FORM MUST BY SUBMITTED WITH YOUR RESPONSE

The City of Fort Lauderdale has implemented a Procurement Card (P-Card) program which changes how payments are remitted to its vendors. The City has transitioned from traditional paper checks to payment by credit card via MasterCard or Visa. This allows you as a vendor of the City of Fort Lauderdale to receive your payment fast and safely. No more waiting for checks to be printed and mailed.

Payments will be made utilizing the City's P-Card (MasterCard or Visa). Accordingly, firms must presently have the ability to accept credit card payment or take whatever steps necessary to implement acceptance of a credit card before the commencement of a contract.

Please indicate which credit card payment you prefer:

☐ Master Card

☐ Visa Card

Company Name: _____

Name (Printed)	Signature
Date:	Title

TRENCH SAFETY

Bidder acknowledges that included in the appropriate bid items of his bid and in the Total Bid Price are costs for complying with the Florida Trench Safety Act, Florida Statutes 553.60 – 553.64. The bidder further identifies the costs of such compliance to be summarized below:

Trench Safety Measure (Description)	Units of Measure (LF/SF)	Unit (Quantity)	Unit Cost	Extended Cost
A.			$	$
B.			$	$
C.			$	$
D.			$	$

Total: $

The bidder certifies that all trench excavation done within his control in excess of five feet (5') in depth shall be in accordance with the Occupational Safety and Health Administration's excavation safety standards, C.F.R. s. 1926.650 Subpart P., and the Florida Trench Safety Act, Florida Statutes 553.60-553.64.

Failure to complete the above may result in the bid being declared non-responsive.

DATE: _____ _____
(SIGNATURE)

STATE OF: _____ COUNTY OF: _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____
(Name of Individual Signing)

_____ who, after first being duly sworn by me,
_____ affixed his/her signature in the space provided above on this
_____ day of _____, 20____.

_____
NOTARY PUBLIC

My Commission Expires: _____

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Exhibit 3
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QUESTIONNAIRE SHEET

PLEASE PRINT OR TYPE:

Firm Name:

President

Business Address:

Telephone:

Fax:

E-Mail Address:

What was the last project of this nature which you completed?

The following are named as three corporations and representatives of those corporations for which you have performed work similar to that required by this contract, and which the City may contact as your references (include addresses and telephone numbers):

How many years has your organization been in business?

Have you ever failed to complete work awarded to you; if so, where and why?

CAM 17-1222
Exhibit 3
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The name of the qualifying agent for the firm and his position is:

Certificate of Competency Number of Qualifying Agent:

Effective Date: Expiration Date:

Licensed in: Contractor's License #(s)

(County/State)

Expiration Date:

NOTE: To be considered for award of this contract, the bidder must submit a financial statement upon request.

Contractor must have proper licensing prior to submitting bid and must submit evidence of same with bid.

QUESTIONNAIRE SHEET

1. Have you personally inspected the proposed work and have you a complete plan for its performance?

2. Will you sublet any part of this work? If so, list the portions or specialties of the work that you will.

a)
b)
c)
d)
e)
f)
g)

3. What equipment do you own that is available for the work?

4. What equipment will you purchase for the proposed work?

5. What equipment will you rent for the proposed work?

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT

MINORITY BUSINESS ENTERPRISE (MBE) - WOMEN BUSINESS ENTERPRISE (WBE)

PRIME CONTRACTOR IDENTIFICATION FORM

In order to assist us in identifying the status of those companies doing business with the City of Fort Lauderdale, this form must be completed and returned with your bid package.

Name of Firm:

Address of Firm:

Telephone Number:

Name of Person Completing Form:

Title:

Signature:

Date:

City Project Number:

City Project Description:

Please check the item(s) which properly identify the status of your firm:

☐ Our firm is not a MBE or WBE.

☐ Our firm is a MBE, as at least 51 percent is owned and operated by one or more socially and economically disadvantaged individuals.

☐ American Indian ☐ Asian ☐ Black ☐ Hispanic

☐ Our firm is a WBE, as at least 51 percent is owned and operated by one or more women.

☐ American Indian ☐ Asian ☐ Black ☐ Hispanic

MBE/WBE CONTRACTOR INFORMATION

The City, in a continuing effort, is encouraging the increased participation of minority and women-owned businesses in Public Works Department related contracts. Along those lines, we are requiring that each firm provide documentation detailing their own programs for utilizing minority and women-owned businesses.

Submit this information as a part of this bid package and refer to the checklist, to ensure that all areas of concern are covered. The low responsive bidder may be contacted to schedule a meeting to discuss these objectives. It is our intention to proceed as quickly as possible with this project, so your cooperation in this matter is appreciated.

CONTRACTOR CHECKLIST

☐ List Previous City of Fort Lauderdale Contracts

☐ Number of Employees in your firm

--Percent (%) Women

--Percent (%) Minorities

--Job Classifications of Women and Minorities

☐ Use of minority and/or women subcontractors on past projects.

☐ Nature of the work subcontracted to minority and/or women-owned firms.

☐ How are subcontractors notified of available opportunities with your firm?

☐ Anticipated amount to be subcontracted on this project.

☐ Anticipated amount to be subcontracted to minority and/or women-owned businesses on this project.

CONSTRUCTION BID CERTIFICATION

Please Note: All fields below must be completed. If the field does not apply to you, please note N/A in that field. If you are a foreign corporation, you may be required to obtain a certificate of authority from the department of state, in accordance with Florida Statute §607.1501 (visit http://www.dos.state.fl.us/).

Company: (Legal Registration)

Address:

City: State: Zip:

Telephone No. FAX No. Email:

Does your firm qualify for MBE or WBE status: MBE ☐ WBE ☐

If a corporation, state the name of the President, Secretary and Resident Agent. If a partnership, state the names of all partners. If a trade name, state the names of the individuals who do business under the trade name.

Name	**Title**	**Name**	**Title**
Name	**Title**	**Name**	**Name**

ADDENDUM ACKNOWLEDGEMENT - Bidder acknowledges that the following addenda have been received and are included in the bid:

Addendum No.	Date Received	Addendum No.	Date Received	Addendum No.	Date Received	Addendum No.	Date Received

VARIANCES: If you take exception or have variances to any term, condition, specification, or requirement in this bid you must specify such variance in the space provided below or reference in the space provided below all variances contained on other pages within your bid. Additional pages may be attached if necessary. No variances will be deemed to be part of the bid submitted unless such is listed and contained in the space provided below. The City does not, by virtue of submitting a variance, necessarily accept any variances. If no statement is contained in the below space, it is hereby implied that your response is in full compliance with this competitive solicitation. If you do not have variances, simply mark N/A. If submitting your response electronically through BIDSYNC you must also click the "Take Exception" button.

The below signatory affirms that he has or will obtain all required permits and licenses from the appropriate agencies, and that his firm is authorized to do business in the State of Florida. The below signatory agrees to furnish all labor, tools, material, equipment and supplies, and to sustain all the expense incurred in doing the work set forth in strict accordance with the bid plans and contract documents at the unit prices indicated if awarded a contract. The below signatory has not divulged to, discussed, or compared this bid with other bidders, and has not colluded with any other bidder or parties to this bid whatsoever. Furthermore, the undersigned guarantees the truth and accuracy of all statements and answers contained in this bid. The below signatory also hereby agrees, by virtue of submitting or attempting to submit a bid, that in no event shall the City's liability for bodder's direct, indirect, incidental, consequential, special or exemplary damages, expenses, or lost profits arising out of this competitive solicitation process, including but not limited to public advertisement, bid conferences, site visits, evaluations, oral presentations, or award proceedings exceed the amount of Five Hundred Dollars ($500.00). This limitation shall not apply to claims arising under any provision of indemnification or the City protest ordinance contained in this competitive solicitation.

Submitted by:

Name (printed)	Signature
Date:	Date:

Question and Answers for Bid #473-11979 - A-13 Sewer Redirection - 12133

Overall Bid Questions

Question 1

is there a cost estimate or budget? **(Submitted: Jun 15, 2017 8:14:43 AM EDT)**