



Attachment "B"

Technical Specifications

CITY OF NORTH MIAMI



16-inch DIP WATER MAIN
ALONG NE 143 STREET FROM NE 16 AVENUE AND NE 18 AVENUE,
AND NE 18 AVENUE FROM NE 143 STREET TO NE 149 STREET

Specifications Package

Issued Date: July, 2017



R.J.Behar & Company, Inc.
Engineers • Planners

6861 S.W. 196 Avenue
Pembroke Pines, FL 33332
Tel: (954) 680-7771
Fax: (954) 680-7781

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**SECTION 01010
SUMMARY OF WORK**

PART 1 - GENERAL

1.01 SUMMARY:

This section summarizes the Work of the Project as covered in detail in the complete Contract Documents. This is a general summary and is not intended to be complete and all inclusive of the required Work items.

1.02 PROJECT DESCRIPTION:

The project is located along NE 143rd Street from NE 16th Avenue to NE 18th Avenue and along NE 18th Avenue from NE 143rd Street to NE 149th Street in the City of North Miami (the City). The scope includes installing a new 16-inch Ductile Iron Pipe (D.I.P.) Water Main and abandoning the existing 12-inch water main to establish the required fire flow for the area. New service lines are to be installed at the new main along with meter boxes as noted in the plans. Work includes connection of the new main to the existing main at each end, valves and bends as noted in the plans. Work also includes; pavement restoration, sod restoration, pavement marking restoration, milling and resurfacing of the entire lane width and coordination with existing utilities.

1.03 WORK PERFORMED BY OTHERS: (Not Used)

1.04 CONTRACTOR'S USE OF PREMISES:

A. During construction activities, the CONTRACTOR shall be responsible for maintaining all access roads in good condition, including grading and drainage.

1.05 WORK SEQUENCE, COORDINATION ACTIVITIES AND SCHEDULED DATES:

A. General: The CONTRACTOR shall coordinate its work with other adjacent CONTRACTORS, landowners and City activities, with specific attention to access and staging areas. Construction sequence shall be determined by CONTRACTOR subject to the following needs for continuous access and operation by others.

B. Traffic shall be maintained at all times. Continuous access shall be provided to the City.

C. Approved MOT shall be maintained at all times.

1.06 LIST OF DRAWINGS:

A. Contract Drawings:

- | | | |
|-----|---------|--------------------------------------|
| 1. | 1 | Key Sheet |
| 2. | 2 | Tabulation of Quantities |
| 3. | 3 | General Notes |
| 4. | 4 | Stormwater Pollution Prevention Plan |
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SUMMARY OF WORK

14. G-1 Borings Location Plan

1.07 REFERENCE MATERIALS:

- A. Reference Materials - The following reference Materials are available for inspection at the offices of the City: Geotechnical Engineering Study, By Tierra South Florida dated October 15, 2104.

1.08 COORDINATION:

- A. The PROJECT MANAGER for this contract is Chuks Okereke, PE with the City of North Miami Public Works Department. The Engineer of Record (ENGINEER) is Juan Vazquez, PE with R.J. Behar and Company, Inc. The City will appoint a designee to conduct inspections and coordinate during construction. All technical requests for information will be transmitted to the City's Designee. However no changes to the scope of work shall be accomplished without the prior written approval from the City's PROJECT MANAGER.

END OF SECTION

**SECTION 01291
MEASUREMENT AND PAYMENT**

PART 1 - GENERAL

1.1 SCOPE

- A. Payment for various items of the Bid Schedule, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor operations and incidentals appurtenant to the items of WORK being described, as necessary to complete the various items of the WORK all in accordance with requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). No separate payment will be made for any item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in the Bid Schedule for the various appurtenance items of WORK.

- B. Payment for the various items of the Bid Schedule, where applicable, shall constitute full compensation for CONTRACTOR's superintendent at the job site full-time during construction, for furnishing and installing all pipe and structures complete in place including but not limited to bends, valves, ARVs, tees, outlets, fittings, blind flanges and specials, including connections to existing pipelines shown on the DRAWINGS; including surveying both horizontal and vertical control for construction of the roadways, structures, pipeline and appurtenances; including all earthwork, excavation as shown on the DRAWINGS, removal and disposal of waste, unsuitable and excess material, furnishing and installing pipe bedding material, all backfill and compaction of native material, and dewatering (including contaminated sites) as required; including potholing to verify locations of existing utilities in advance of construction; the restoration of interfering portions of existing service and utility lines that are not included in other bid items and shown on the DRAWINGS, including pressure testing and disinfection; restraint of pipe shown on the DRAWINGS and grouting of pipe joints; including providing the water for pressure testing, cleaning the pipe and disinfection, and disposal of the water as required when completed; furnishing, installation, and removal of test heads, cleanup; and restoration of all improvements incidental to construction for which there are no other bid items; including but not limited to, sprinkler systems, drainage systems, guardrails, landscaping, fences, curbs and gutters, and all other WORK not included in other bid items.

- C. Payment shall also include providing the necessary equipment and labor to pothole and verify depths and locations of existing utilities sufficiently ahead of construction to avoid conflicts with the design alignment and grade of the transmission pipeline. Conflicts with utilities shown on the DRAWINGS which result from the CONTRACTOR's negligence to pothole sufficiently ahead of construction (a minimum of two days ahead of construction of the pipeline or as approved by the ENGINEER) shall be resolved by the CONTRACTOR at no additional cost to the City. Unmarked utilities damaged during construction will be paid under unit prices in the Bid Package for similar WORK, if and as approved by the ENGINEER.

- D. Payment for all bid items shall constitute full compensation for the complete installation of each bid item including but not limited to excavation, dewatering, backfill and compaction. The WORK shall include for all bid items to be completed, tested and ready for acceptance by the appropriate government agency.

1.1 MOBILIZATION

- A. Cost for all work and operation necessary for Mobilization and Demobilization of Equipment, Materials and Personnel, Field Engineering, Construction Layout and Surveying, Dust Control, Final Certified As-builts, Pre-construction video and Documentation, Field Testing and Laboratory Work with Certified Reports, and

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all Work, Labor and Materials necessary to comply with Storm Water Pollution Prevention measures shall be included in the unit price for mobilization and no separate payment shall be made.

- B. Payment for Mobilization will be made in equal monthly amounts during the duration of the contract time.

1.2 MAINTENANCE OF TRAFFIC

- A. Section 01010 "Summary of Work", and all other references to traffic control in this document and any regulatory requirements.
- 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.

1.3 FURNISH & INSTALL UTILITY WATER PIPE

- A. Measurement for payment for furnishing and installing water 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, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and installing water pipe will be made at the unit price per linear foot of pipe of the size named in the Bid Schedule. Payment for water pipe fittings will be made at the unit price each, named in the Bid Schedule.
- C. Payment shall include providing all necessary pipe, trench excavation, dewatering, bedding, backfilling, compaction and plug as required.

1.4 CONNECT TO EXISTING WATER MAIN

- A. Measurement for payment to cut-in fittings and/or connect to existing water main will be based upon the actual number, per each, of such connections completed, all in accordance with the Contract Documents.
- B. Payment for connecting to existing water main will be made at the unit price per each type of connection named in Section 1.5 (Cut-in & tapping sleeve with valves) and 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. Price shall include but not be limited to excavation, testing, backfill, dewatering, connections, and all other appurtenances, restoration work and all else necessary for a complete and functional installation.

1.5 FURNISH & INSTALL CUT-IN & TAPPING SLEEVE WITH VALVES

- A. Measurement for payment to furnish and install cut-in and tapping sleeve with valve will be based upon actual quantity, each, of such named sleeves and valves furnished and installed, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and installing cut-in and 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 cut-in or tapping sleeve, valve, valve extension and valve box.

1.6 FURNISH & INSTALL FIRE HYDRANT WITH CHECK VALVE ASSEMBLY

- A. Measurement for payment to furnish and install fire hydrant with check valve assembly shall be at the

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unit bid price per each fire hydrant assemblies furnished in accordance with the Contract Documents.

- B. Payment for furnishing and installing fire hydrant with check valve assembly shall be at the unit bid price per each and shall include furnishing, storing, and transporting. Fire hydrant assemblies shall include the complete fire hydrant, fire hydrant extensions, 2' x 2' concrete pad, bollards as required and check valve assemblies. Pipe, gate valves and other fittings shall not be included in this pay item.

1.7 FURNISH & INSTALL VALVE WITH BOX

- A. Measurement for payment to furnish and install valves will be based upon actual quantity, each, of such valves (gate, butterfly, or plug) 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 vales shall be constructed with a riser to ground level, and be marked, tagged, and photographed.

1.8 PLUG AND PLACE OUT OF SERVICE FOR EXISTING PIPE

- A. Measurement for payment to plug existing pipe and put out of service will be based upon actual quantity, each, of such connections made in accordance with the contract document.
- B. Payment to plug existing pipe and put out of service 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 capping the existing water main, including excavation, bedding, backfill, compaction, dewatering, shutting down existing main cutting main, by-pass pumping, restrained caps and installation of the connection fittings.

1.9 FURNISH & INSTALL BACTERIOLOGICAL SAMPLE POINTS

- 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.

1.10 ABANDON, CAP AND GROUT EXISTING MAIN

- A. Measurement for payment to abandon, cap and grout pipe will be based upon the actual number of linear feet of such pipe actually abandoned, all in accordance with the Contract Documents.
- B. Payment for abandoning, capping and grouting of existing 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 abandoning, grouting and plugging of such pipe, including investigation, potholing, excavation, cutting existing pipe, capping existing pipe, backfilling trench, compaction, removal of existing valves, and all restoration work. Limits of payment for abandonment shall be based on as-built locations of caps installed for grouting.
- C. Contractor shall verify that all existing house connections have been disconnected prior to grouting of existing pipelines. Any damages incurred to private property due to house connections not

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disconnected prior to grouting the pipe, the CONTRACTOR shall repair and/or replace damage at no expense to CITY.

- D. Existing pressure mains to be abandoned and grouted shall be cut and capped/plugged within one (1') foot of the main pressure line to remain in service. The CONTRACTOR shall determine the actual location of the existing connection to the main line by excavation, potholing, etc.

1.11 FURNISH & INSTALL WATER SERVICE WITH METER BOX AND REMOVAL/DISPOSAL OF EXISTING METER BOX AND METER

- A. Measurement for payment for furnishing and installing water service and new meter box for installation of new meter by the City as necessary will be based upon the actual number, each, of water services and new meter boxes installed, all in accordance with the Contract Documents.
- B. Payment for furnishing and installing water service and new meter box as necessary will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for its complete installation of the water service from the water main to the new meter box, casing pipe, connections to existing service, fittings, backflow preventer, and check valve for a complete and functional installation. This bid item includes the removal and delivery to the City of the existing water meter and meter box. The City will install the new meter in the new meter box. Contractor will be required to pay meter installation fees to the City.
- C. This bid item shall include copper or High Density Polyethylene (HDPE) pipe, as detailed in the plans, removal of existing services as needed, all yokes, compression couplings and adapters as needed. This item shall also include reading and recording of water readings prior to and upon completion of installation of new meters. Meter box and bedding shall be included.
- D. Payment for furnishing and installing water service on private property from meter to connection point will be included, which price shall constitute full compensation for its complete installation of the water service from the water meter to where the existing water service can be connected to the new water service, including all fittings, backflow preventer, check valve, piping on private property to match existing size, clearing as required and complete restoration of private property and all else necessary for a complete and functional installation. Contractor is required to coordinate with the City to provide the property owner with notification prior to performing the work on private property. Payment for this item shall be made upon completion of all items stated above.

1.12 FURNISH & INSTALL WATER SERVICE TO EXISTING METER BOX AND METER

- A. Measurement for payment for furnishing and installing water service to existing meter box and meter as necessary will be based upon the actual number, each, of water services installed, all in accordance with the Contract Documents.
- B. Payment for furnishing and installing water service as necessary will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for its complete installation of the water service from the water main to the existing meter box, casing pipe, connections to existing service, fittings, backflow preventer, and check valve for a complete and functional installation.
- C. This bid item shall include copper or High Density Polyethylene (HDPE) pipe, as detailed in the plans, removal of existing services as needed, all yokes, compression couplings and adapters as needed. This item shall also include reading and recording of water readings prior to and upon completion of installation of new service line. Payment for this item shall be made upon completion of all items stated above.

1.13 FURNISH & INSTALL AUTOMATIC AIR RELEASE VALVE

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- A. Measurement for payment to furnish and install an air vacuum/air release valve will be based upon the actual number, each, of such air/vacuum air release valve installed all in accordance with the Contract Documents.
- B. Payment for furnishing and installing an air vacuum/air release valve will be made at the unit price named in the Bid Schedule which price shall constitute full compensation for the supply of stainless steel valve, construction of air vacuum/air release valve maintenance access structure, ring and cover, excavation, backfill, stone, valves and all else necessary for a complete and functional installation.

1.14 FURNISH & PLACE ASPHALT CONCRETE PAVEMENT

- A. Measurement for payment of asphalt concrete pavement will be based upon the number of square yards of such asphalt concrete pavement actually constructed, as detailed in the Drawings, all in accordance with the requirements of the Contract Documents.
- B. Payment for placement of asphalt concrete pavement and 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 the asphalt surface, complete in place to the cross section and thicknesses shown on the Drawings; including restoration of traffic loop detectors, adjustment of finished grades of valve boxes for mains which are proposed to remain in service, milling and saw cutting of all pavement and all cleanup of the area disturbed by this construction.
- C. Payment for maintenance and protection of traffic, including but not limited to temporary striping between lifts of asphalt, as required, shall be made under the maintenance and protection of traffic item named in the Bid Schedule.

1.15 FURNISH & PLACE LIMEROCK BASE MATERIAL

- A. Measurement for payment for furnishing and placing limerock base material will be based upon the number of square yards of such materials actually compacted in place at the depth indicated, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and placing of limerock 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 and disposal of waste or unsuitable material.

1.16 COMPACTION/STABILIZATION OF SUBGRADE

- 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 Load-Bearing Ratio (LBR) of 40, importing fill material and disposal of excess waste or unsuitable material.

1.17 RESTORATION OF ASPHALT / CONCRETE DRIVEWAYS / RESTORATION OF DRIVEWAYS INCLUDING TEXTURED CONCRETE OR PAVERS

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- A. Measurement for payment for restoration of driveways will be based upon the actual number of square yards of such Asphalt / Concrete / Textured Concrete or Paver driveways restored as shown in the DRAWINGS, all in accordance with the requirements of the Contract Documents.
- B. Payment for restoration of driveways 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, base compaction, construction of the driveway to the same depth and material as the existing one, base material, sand, furnishing and setting for expansion joint material, edge restraint 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 driveways outside the limits shown on the DRAWINGS or not approved by the ENGINEER. Driveway restoration on private property shall be done as approved by the ENGINEER, to accommodate grade changes.
- D. Minimum Asphalt Restoration shall be 1" thick Superpave SP-9.5 and 6" Limerock Base (LBR-100), Minimum Concrete Driveway Restoration shall be 6" thick of 3,000 psi concrete and Minimum Paver Driveway Restoration shall be paver to match existing to remain on 6" Limerock Base (LBR-100).

1.18 MILL & RESURFACE PAVEMENT

- A. Measurement for payment for milling and resurfacing of asphalt pavement within the Rights of Way 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" 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", applying a tack coat and furnishing, placing and compacting a minimum 1" thick Superpave SP-9.5, complete in place to the cross section of existing roadway, including temporary pavement markings and messages, milling and saw cutting of all pavement and all cleanup of the area disturbed by this construction.
- C. Milling and resurfacing shall comply with the specifications as shown in the plans. Asphalt shall be placed to assure an approximate 2% cross slope is maintained throughout the resurfacing area of the roadway.

1.19 RESTORE CONCRETE SIDEWALKS INCLUDING CAST IN PLACE TRUNCATED DOMES

- A. Measurement for payment for furnishing and installing sidewalks including cast in place truncated dome detectable warnings, if required, will be based upon the actual number of square yards of such sidewalks constructed as shown in the DRAWINGS, all in accordance with the requirements of the Contract Documents.
- B. Payment for furnishing and installing sidewalks including cast in place truncated domes detectable warnings, if required, 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, clearing, grading, compaction of subgrade, backfilling of sidewalk, construction of the sidewalk including ADA ramps as required, detectable warning cutting and 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.
- C. Furnishing and installing cast in place Truncated Dome Detectable Warning are included in the price of sidewalk installation. Size of cast in place detectable warnings shall be per the applicable code.

1.20 FURNISH & INSTALL IRRIGATION SYSTEM RESTORATION

- A. Measurement for payment for furnish and install irrigation system restoration will be based upon the actual number, each lot, of such irrigation systems restored in swales and to replace systems on private property, all in accordance with requirements of the Contract Documents.
- B. Payment for irrigation system restoration will be made at the unit price, each lot, 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. Corner lots will be paid as one lot. Irrigation systems shall provide full coverage of the swale and/or match 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.

1.21 FURNISH & PLACE PAVEMENT THERMOPLASTIC MARKING

- A. Measurement for payment for furnishing and placing pavement markings will be based upon the number of linear feet of such markings actually constructed as determined by measurement along the centerline of the pavement markings in place, including temporary striping, temporary layout, final thermoplastic striping, etc. all in accordance with the requirements of the Contract Documents. Contractor shall restore all existing pavement markings damaged during the construction.
- B. Payment for furnishing and placing pavement markings will be made at the unit price per linear foot or each of pavement markings named in the Bid Schedule.

1.22 FURNISH & INSTALL REFLECTIVE PAVEMENT MARKERS

- A. Measurement for payment for furnishing and installing reflective pavement markers (RPM) will be based upon the actual number, each, of such RPM's installed, all in accordance with requirements of the Contract Documents.
- B. Payment for furnishing and installing RPMs will be made at the unit price, each, named in the Bid Schedule which price shall constitute full compensation for the complete installation.

1.23 RELOCATE OR ADJUST EXISTING SIGN

- A. Measurement for payment to relocate or adjust existing sign posts will be based on the actual quantity, per each, of sign posts relocated or adjusted all in accordance with the requirements of the Contract Documents.
- B. Payment for relocating or adjusting existing sign posts will be made at the unit price per each, named in the Bid Schedule, which price shall constitute full compensation for the work of relocating or adjusting existing sign posts, adjusting signs and all else necessary for a complete and functional installation.

1.24 FURNISH & PLACE SOD AND GRADE SWALE

- A. Measurement for payment for furnishing and installing sod and grading swale will be based upon the number of square yards of sod actually installed, and area cleared and graded including private

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property, as approved by the ENGINEER, all in accordance with the requirements of the Contract Documents.

- B. Payment for sod and grading will be made at the unit price per square yard of performance turf, sod and swale graded as named in the Bid Schedule which price shall constitute full compensation for furnishing and installing the sod and clearing and grading swale.

1.25 PERMIT FEES

- A. Any applicable permit fees shall be covered under a Contingency in the payment application.

END OF SECTION

**SECTION 01300
SUBMITTAL PROCEDURES**

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes definitions, descriptions, transmittal, and review of "Compliance" and "Miscellaneous" Submittals.
- B. Related Work Specified Elsewhere:
 - 1. Contract Closeout: SECTION 01700.

1.02 GENERAL INFORMATION:

- A. Definitions:
 - 1. Compliance Submittals include shop drawings, product data, and samples which are prepared by the Contractor, Subcontractor, manufacturer, or Supplier and submitted by the Contractor to the ENGINEER as a basis for approval of the use of Equipment and Materials proposed for incorporation in the Work or needed to describe installation, operation, maintenance, or technical properties.
 - a. Shop drawings include custom-prepared data of all types including drawings, diagrams, performance curves, material schedules, templates, instructions, and similar information not in standard printed form applicable to other projects.
 - b. Product data includes standard printed information on materials, products and systems; not custom-prepared for this Project, other than the designation of selections from available choices.
 - c. Samples include both fabricated and unfabricated physical examples of materials, products, and Work; both as complete units and as smaller portions of units of Work; either for limited visual inspection or (where indicated) for more detailed testing and analysis. Mock-ups are a special form of samples which are too large to be handled in the specified manner for transmittal of sample Submittals.
 - 2. Miscellaneous Submittals are those technical reports, administrative Submittals, certificates, and guarantees not defined as shop drawings, product data, or samples.
 - a. Technical reports include laboratory reports, tests, technical procedures, technical records, Contractor's design analysis and Contractor's survey field notes for construction staking, before cross-sections and after cross-sections.
 - b. Administrative Submittals are those nontechnical Submittals required by the Contract Documents or deemed necessary for administrative records. These Submittals include maintenance agreements, workmanship Bonds, Project photographs, physical work records, statements of applicability, copies of industry standards, as-constructed data, security/protection/safety data, and similar type Submittals.
 - c. Certificates and guarantees are those Submittals on Equipment and Materials where a written certificate or guarantee from the manufacturer or Supplier is called for in the Specifications.
 - d. Reports as required by Contract describing Contractor's means and methods for items such as dewatering, earth and water retaining, erosion/turbidity control, and safety plans.
 - 3. Refer to ARTICLE 1.03 of this Part for detailed lists of documents and specific requirements.
- B. Quality Requirements:
 - 1. Submittals such as shop drawings and product data shall be of the quality for legibility and reproduction purposes. Every line, character, and letter shall be clearly legible. Drawings such as reproducibles shall be useable for further reproduction to yield legible hard copy.
 - 2. Documents submitted to the ENGINEER that do not conform to these requirements shall be subject to rejection by the ENGINEER, and upon request by ENGINEER, Contractor shall

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resubmit conforming documents. If conforming Submittals cannot be obtained, such documents shall be retraced, redrawn, or photographically restored as may be necessary to meet such requirements. Contractor's (or his Subcontractor's) failure to initially satisfy the legibility quality requirements will not relieve Contractor (or his Subcontractors) from meeting the required schedule for Submittal of shop drawings and product data.

C. Language and Dimensions:

1. All words and dimensional units shall be in the English language.
2. Metric dimensional unit equivalents may be stated in addition to the English units.

D. Submittal Completeness:

1. Submittals shall be complete with respect to dimensions, design criteria, materials of construction, and other information specified to enable ENGINEER to review the information effectively.
2. Where standard drawings are furnished which cover a number of variations of the general class of equipment, each such drawing shall be individually annotated to describe exactly which parts of the drawing apply to the equipment being furnished. Use hatch marks to indicate variations that do not apply to the Submittal. The use of "highlighting markers" is not an acceptable means of annotating Submittals. Such annotation shall also include proper identification of the Submittal permanently attached to the drawing.
3. Reproduction or copies of Contract Drawings or portions thereof will not be accepted as complete fabrication or erection drawings. The Contractor may use a reproduction of the ENGINEER prepared Contract Drawings for erection drawings such as to indicate information on erection or to identify detail drawing references. Where the drawings are revised to show this additional Contractor information, the ENGINEER's title block shall be replaced with a Contractor's title block and the ENGINEER's professional seal shall be removed from the drawing. The Contractor shall revise these erection drawings for subsequent ENGINEER revisions to the Contract Drawings.

1.03 COMPLIANCE SUBMITTALS:

A. Items shall include, but not be limited to, the following:

1. Manufacturer's specifications.
2. Catalogs, or parts thereof, of manufactured equipment.
3. Shop fabrication and erection drawings.
4. General outline drawings of equipment showing overall dimensions, location of major components, weights, and location of required building openings and floor plates.
5. Detailed equipment installation drawings, showing foundation details, anchor bolt sizes and locations, baseplate sizes, location of City's connections; and all clearances required for erection, operation, and disassembly for maintenance.
6. Schematic diagrams for electrical items, showing external connections, terminal block numbers, internal wiring diagrams, and one-line diagrams.
7. Bills of material and spare parts list.
8. Instruction books and operating manuals.
9. Material lists or schedules.
10. Performance tests on equipment by manufacturers.
11. Concrete mix design information.
12. Samples and color charts.
13. All drawings, catalogs or parts thereof, manufacturer's specifications and data, samples, instructions, and other information specified or necessary:
 - a. For ENGINEER to determine that the Equipment and Materials conform with the design concept and comply with the intent of the Contract Documents.
 - b. For the proper erection, installation, operation and maintenance of the Equipment and Materials which ENGINEER will review for general content but not for substance.
 - c. For ENGINEER to determine what supports, anchorages, structural details, connections, and services are required for the Equipment and Materials, and the effects on contiguous or related structures and Equipment and Materials.
14. As-built drawings.

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- B. Schedule and Log of Compliance Submittals:
1. Prepare for ENGINEER, a schedule and log for submission of all Compliance Submittals specified or necessary for ENGINEER's review of the use of Equipment and Materials proposed for incorporation in the Work or needed for proper installation, operation or maintenance. Submit the schedule and log with the procurement schedule and Work progress schedule. Schedule submission of all Compliance Submittals to permit review, fabrication and delivery in time so as to not cause a delay in the Work of Contractor or his Subcontractors or any other contractors as described herein.
 2. In establishing schedule for Compliance Submittals allow 15 days in ENGINEER's office for reviewing original Submittals and 10 days for reviewing resubmittals.
 3. The schedule shall indicate the anticipated dates of original submission, and shall be based upon at least one resubmission of each item.
 4. Schedule all Compliance Submittals required prior to fabrication or manufacture for submission within 90 days of the Notice to Proceed. Schedule Compliance Submittals pertaining to storage, installation and operation at the site for ENGINEER's acceptance prior to delivery of the Equipment and Materials.
 5. Resubmit Compliance Submittals the number of times required for ENGINEER's "Submittal Accepted." However, any need for resubmittals in excess of the number set forth in the accepted schedule, or any other delay in obtaining acceptance of Submittals, will not be grounds for extension of the Contract Time, provided ENGINEER completes his reviews within the times stated above.
- C. Transmittal of Compliance Submittals:
1. All Compliance Submittals of Equipment and Materials furnished by Subcontractors, manufacturers, and Suppliers shall be submitted to the City by Contractor.
 2. After checking and verifying all field measurements, transmit all Compliance Submittals to the ENGINEER and City for acceptance.
 3. Quantity Requirements:
 - a. Except as otherwise specified, transmit all manufacturer's or fabricator's Shop Drawings in the quantity as follows:
 - (1) Initial Submittal: Seven copies including one reproducible to City. Two copies will be returned to Contractor.
 - (2) Resubmittals: Seven copies including one reproducible to City. Two copies will be returned to Contractor.
 - (3) Submittal for Final Distribution: Four copies to City.
 - (4) As-built Prints: Provide three copies, including one reproducible, and one (1) set of drawings on Compact Disk electronic format to the City.
 - b. Transmit Submittals of product data as follows:
 - (1) Initial Submittal: Seven copies to City. Two copies will be returned to Contractor.
 - (2) Resubmittals: Seven copies to City. Two copies will be returned to Contractor.
 - (3) Submittal for Final Distribution: Four copies to City.
 - c. Transmit Submittals of material Samples, color charts, and similar items as follows:
 - (1) Initial Submittal: Six to City.
 - (2) Resubmittal: Six to City.
 - (3) Upon approval, one Sample will be returned to Contractor.
 - d. Transmit Submittals of equipment instruction books as follows:
 - (1) Initial Submittal: Three copies to City. One copy will be returned to Contractor.
 - (2) Resubmittals: Three copies to City. One copy will be returned to Contractor.
 - (3) Submittal for Final Distribution: Three copies to City.
 - (4) Transmit Submittals for Reference Only - Three copies to City.
 4. Copies of the equipment contractor's erection drawings and other Compliance Submittals required for the installation of equipment furnished by others under separate contract for installation under

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this Contract will be transmitted to Contractor by City Engineer in the final distribution of such Submittals.

D. ENGINEER's Review:

1. ENGINEER will review and return Compliance Submittals to Contractor with appropriate notations via City. Instruction books and similar Submittals will be reviewed by ENGINEER for general content but not for substance.
2. City Engineer's and ENGINEER's acceptance of Compliance Submittals will not relieve Contractor from his responsibility as stated in the GENERAL CONDITIONS.

E. Compliance Submittal Action Stamp:

1. ENGINEER's review action stamp, appropriately completed, will appear on all Compliance Submittals of Contractor when returned by ENGINEER. Review status designations listed on ENGINEER's action stamp are defined as follows:
 - a. "ACCEPTED AS SUBMITTED": Signifies Equipment or Material represented by the Submittal conforms with the design concept and complies with the intent of the Contract Documents and is acceptable for incorporation in the Work. Contractor is to proceed with fabrication or procurement of the items and with related Work. Copies of the Submittal are to be transmitted to City Engineer and ENGINEER for final distribution.
 - b. - "ACCEPTED AS NOTED": Signifies Equipment and Material represented by the Submittal conforms with the design concept and complies with the intent of the Contract Documents and is acceptable for incorporation in the Work subject to the condition that as constructed it shall be in accordance with all notations and/or corrections indicated. Contractor is to proceed with fabrication or procurement of the items and with related Work in accordance with ENGINEER's notations and is to submit a revised Submittal responsive to notations marked on the returned Submittal or written in the letter of transmittal.
 - c. -"RETURNED FOR REVISION": Means that deviations from the requirements of the Contract Documents exist in the submittal. Contractor is to resubmit revised information responsive to ENGINEER's annotations on the returned Submittal or written in the letter of transmittal. Fabrication or procurement of items represented by the Submittal and related Work is not to proceed until the Submittal is approved.
 - d. "NOT ACCEPTABLE (SUBMIT ANEW)": Signifies Equipment and Material represented by the Submittal does not conform with the design concept or comply with the intent of the Contract Documents and is disapproved for use in the Work. Contractor is to submit Compliance Submittals responsive to the Contract Documents.
 - e. "PRELIMINARY SUBMITTAL": Signifies Submittals of such preliminary nature that a determination of conformance with the design concept or compliance with the intent of the Contract Documents must be deferred until additional information is furnished. Contractor is to submit such additional information to permit layout and related activities to proceed.
 - f. - "FOR REFERENCE ONLY": Signifies Submittals which are for supplementary information only; pamphlets, general information sheets, catalog cuts, standard sheets, bulletins and similar data, all of which are useful to ENGINEER or City in design, operation, or maintenance, but which by their nature do not constitute a basis for determining that items represented thereby conform with the design concept or comply with the intent of the Contract Documents. ENGINEER reviews such Submittals for general content but not for substance.
 - g. - "DISTRIBUTION COPY (PREVIOUSLY ACCEPTED)": Signifies Submittals which have been previously accepted and are being distributed to Contractor, City, Resident Project Representative, and others for coordination and construction purposes.

F. Instruction Books / Operation & Maintenance Manuals:

1. Equipment instruction books and manuals shall be prepared by the manufacturer and shall include the following:
 - a. Index and tabs.

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- b. Instructions for installation, start-up, operation, inspection, maintenance, parts lists and recommended spare parts, and data sheets showing model numbers.
 - c. Applicable drawings.
 - d. Name of contact person, phone number, and address of the nearest authorized service facility.
 - e. Attached to the above shall be a notice of the exact warranty effective dates, beginning and ending.
 - f. All additional data specified.
2. Information listed above shall be bound into hard-back binders of three-ring type. Sheet size shall be 8-1/2 x 11. Binder color shall be yellow for Electrical and Electronics and brown for Miscellaneous Equipment. Capacity shall be a minimum of 1-1/2-inch, but sufficient to contain and utilize sheets with ease.
- a. The following information shall be imprinted, inserted or affixed by label on the binder front cover:
 - (1) Equipment name.
 - (2) Manufacturer's name.
 - (3) Project name:
 - (4) Contract number:
 - (5) Reference to applicable Drawing No. & Technical Specifications Section.
 - b. The following information shall be imprinted, inserted, or affixed by label on the binder spine:
 - (1) Equipment name.
 - (2) Manufacturer's name.
 - (3) Project Name:
 - (4) Contract number:
 - (5) Reference to applicable Drawing No. & Technical Specifications Section.
 - c. Format: The overall manual should be constructed around certain types of structures or equipment in the project, and not merely assembled by technical specification section, so that all pertinent data needed by personnel to operate or maintain the equipment or structure is in one binder (as far as is practical). The Contractor shall coordinate with the Resident Project Representative and the City as to how the manuals are to be assembled.
3. Quantity Requirements. Three (3) copies of reviewed, corrected and accepted documents covered in this section shall be provided.

G. Samples:

1. Office samples shall be of sufficient size and quantity to clearly illustrate the following:
 - a. Functional characteristics of the product, with integrally related parts and attachment devices.
 - b. Full range of color, texture, and pattern.

1.04 MISCELLANEOUS SUBMITTALS:

- A. Miscellaneous Submittals are comprised of technical reports, administrative Submittals, and guarantees which relate to the Work, but do not require ENGINEER's approval prior to proceeding with the Work. Miscellaneous Submittals may include but are not limited to (At City's discretion):
 1. Welder qualification tests.
 2. Welding procedure qualification tests.
 3. X-ray and radiographic reports.
 4. Field test reports.
 5. Concrete cylinder test reports.
 6. Certification on Materials:
 - a) Steel mill tests.
 - b) Paint lab tests.
 - c) Cement tests.
 7. Soil test reports.

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8. Temperature records.
9. Shipping or packing lists.
10. Job progress schedules.
11. Equipment and Material delivery schedules.
12. Progress photographs.
13. Warranties and guarantees.
14. Fire protection and hydraulic calculations.
15. Surveying field notes.
16. Pump tests.
17. Traffic control plan.

B. Transmittal of Miscellaneous Submittals:

1. All Miscellaneous Submittals furnished by Subcontractors, manufacturers, and Suppliers shall be submitted to City by Contractor unless otherwise specified.
 - a. Identify each miscellaneous Submittal by Project name and number, Contract title and number, and the specification section and article number marked thereon or in the letter of transmittal. Unidentifiable Submittals will be returned for proper identification.
 - b. At the time of each submission, call to the attention of the City and ENGINEER in the letter of transmittal any deviations from the requirements of the Contract Documents.
2. Quantity Requirements:
 - a. Technical reports and administrative Submittals except as otherwise specified: Four copies to City.
 - b. Written Certificates and Guarantees: Two copies to City.
3. Test Reports:
 - a. Responsibilities of Contractor, City and ENGINEER regarding tests and inspections of Equipment and Materials and completed Work are set forth elsewhere in these Contract Documents.
 - b. The party specified responsible for testing or inspection shall in each case, unless otherwise specified, arrange for the testing laboratory or reporting agency to distribute test reports as follows:
 - (1) City: Two copies.
 - (2) ENGINEER: One copy.
 - (3) Resident Project Representative: One copy.
 - (4) Contractor: Two copies.
 - (5) Manufacturer or supplier: One copy.

C. ENGINEER's Review:

1. ENGINEER will review Miscellaneous Submittals for indications of Work or material deficiencies.
2. ENGINEER will respond to Contractor on those Miscellaneous Submittals which indicate Work or material deficiency.

PART 2 - PRODUCTS - Not applicable.

PART 3 - EXECUTION

3.01 SUBMITTAL LOG:

Contractor shall maintain an accurate Submittal Log and a Distribution List for the duration of the Work, showing current status of all Submittals and Distributees at all times in a form acceptable to the City. Contractor shall make the Submittal Log available to the City for its review on request, and shall bring a copy of the Submittal Log to all Progress Meetings.

END OF SECTION

**SECTION 01451
TESTING LABORATORY SERVICES**

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. The CONTRACTOR will employ and pay for the services of an Independent Testing laboratory acceptable to the City to perform certain specified testing under City supervision (All other required testing services under the Contract Documents shall also be provided by the CONTRACTOR).
 - 1. CONTRACTOR shall cooperate with the laboratory to facilitate the execution of its required services.
 - 2. The cost of any retesting necessitated by failure of materials or methods shall be paid by the CONTRACTOR.
 - 3. The following tests will be provided by the CONTRACTOR:
 - a. Density
 - b. Proctor
 - c. LBR
 - d. Carbonate Content
 - e. Gradation
 - f. Plastic Index and Liquid Limit
 - g. Organic Content
 - h. Concrete Compressive Strength and Slump
 - i. Asphalt Extraction
- B. CONTRACTOR shall pay for all other testing including bacteriological testing.

1.2 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.

1.3 QUALIFICATION OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E-329.
- C. Authorized to operate in the state in which the project is located.
- D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of Natural Bureau of Standards during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- E. Testing Equipment.
 - 1. Calibrated at reasonable intervals by devices of accuracy traceable to either:

- a. National Bureau of Standards.
- b. Accepted values of natural physical constants.

1.4 LABORATORY DUTIES

- A. Cooperate with ENGINEER and CONTRACTOR; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specified standards.
 - 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify ENGINEER and CONTRACTOR of observed irregularities or deficiencies of WORK or products.
- D. Promptly submit written report of each test and inspection; one copy each to ENGINEER, the City, CONTRACTOR, and one copy to Record Document File. Each report shall include:
 - 1. Date issued.
 - 2. Project title, number and Parcel number.
 - 3. Testing laboratory name, address and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling or inspection.
 - 6. Record of temperature and weather conditions.
 - 7. Date of test.
 - 8. Identification of fill product and specification section.
 - 9. Location of sample or test in the project.
 - 10. Type of inspection or test.
 - 11. Results of tests and compliance with Contract Documents.
 - 12. Interpretation of test results, when requested by ENGINEER.
- E. Perform additional tests as required by the ENGINEER.

1.5 LIMITATION OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract documents.
 - 2. Approve or accept any portion of the WORK.
 - 3. Perform any duties of the CONTRACTOR.

1.6 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to WORK.
- B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes which require control by the Testing Laboratory.
- D. Furnish copies of Products test reports as required.

**SECTION 01451
TESTING LABORATORY SERVICES**

- E. Furnish incidental labor and facilities:
1. To provide access to WORK to be tested.
 2. To obtain and handle samples at the project site or at the source of the product to be tested.
 3. To facilitate inspections and tests.
 4. For storage of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

**SECTION 01700
CONTRACT CLOSEOUT**

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Submittal of warranties.
 - 4. Final cleaning.
 - 5. CONTRACTOR's Certification.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections in DIVISIONS 2 through 16.
- C. Related Work Specified Elsewhere:
 - 1. Prerequisites to Substantial Completion and Final Acceptance: N/A

1.02 SUBSTANTIAL COMPLETION:

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following as applicable:
 - 1. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 2. Obtain and submit releases enabling the City unrestricted use of the Work and access to services and utilities. Include operating certificates, and similar releases.
 - 3. Submit record drawings, maintenance manuals, Project photographs, damage or settlement surveys, property surveys, and similar record information.
 - 4. Complete start-up testing of systems and instruction of the City's operation and maintenance personnel.
 - 5. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 - 6. Complete final cleanup requirements, including touch up painting.
 - 7. Touch up and otherwise repair and restore marred, exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the City or its designee will either proceed with inspection or advise the CONTRACTOR of unfilled requirements. The City will prepare the Certificate of Substantial Completion following inspection or advise the CONTRACTOR of work that must be completed or corrected before the certificate will be issued.
 - 1. The City will reschedule the inspection when in its opinion, the Work is substantially complete.

1.03 FINAL ACCEPTANCE:

- A. Preliminary Procedures: Submit certification by CONTRACTOR that Work has been completed in accordance with the Contract Documents to the knowledge of the CONTRACTOR. Before requesting final payment, complete the following as applicable:

**SECTION 01700
CONTRACT CLOSEOUT**

1. Submit the request for final inspection and provide with any required releases and supporting documentation. Include insurance certificates for products and completed operations where required.
 2. Submit a certified copy of the City 's final inspection list of items to be completed or corrected. The certified copy of the list shall state that each item has been completed.
 3. Submit consent of surety to final payment.
 4. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 5. Release of Liens (from the Prime, and all CONTRACTORS, Vendors and Suppliers).
- B. Reinspection Procedure: The City will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed.
1. Upon completion of reinspection, the City will advise the CONTRACTOR of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, reinspection will be repeated.

1.04 RECORD DOCUMENT SUBMITTALS:

- A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the City's reference during normal working hours.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Call attention to each entry by drawing a "cloud" around the areas affected.
- C. The Engineer will make electronic copies of whatever electronic versions of the bid plans exist, available to the CONTRACTOR for Record Drawing purposes. CONTRACTOR must obtain the concurrence of the Engineer as to form and content of record information provided in electronic format prior to proceeding, but in general, information similar to that shown below needs to be similarly provided.
 1. Record information concurrently with construction progress.
 2. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work. Mark each document "PROJECT RECORD" in neat, large, printed letters.
 3. Mark new information that is important to the City but was not shown on Contract Drawings or Shop Drawings.
 4. Note related change-order numbers where applicable.
 5. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
 6. Include the following as applicable:
 - a. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements (vertical and horizontal location of buried or encased piping, raceways, cables, etc.).
 - b. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of construction.
 - c. Where Submittals (like shop drawings) are used for mark-up, record a cross-reference at corresponding location on Drawings.

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CONTRACT CLOSEOUT**

- d. Field changes of dimension and detail.
 - e. Changes made by approved Change Order or other Modifications.
 - f. Details not on original Contract Drawings.
 - g. Record drawings shall include a plot of the actual excavation cross-sections plotted at the same station as and on top of the design cross-sections.
 - h. Record drawings shall include a plot of the actual levee and embankment cross-sections plotted at the same station as and on top of the design cross-sections.
 - i. Give particular attention to concealed elements that would be difficult or expensive to locate at a later date.
- B. Record Specifications: Maintain one complete copy of the Contract Documents including addenda. Include with the Contract Documents one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.
1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
 3. Note related record drawing information and Product Data.
 4. Upon completion of the Work, and before final payment submit record Specifications for the City's records.
 5. Include the following:
 - a. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually installed, particularly optional and substitute items.
 - b. Changes made by Addendum, Change Order, or other Modifications.
 - c. Related Submittal.
- C. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.
1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
 2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
 3. Upon completion of markup, submit complete set of record Product Data to the City for the City's records.
- D. Warranties and Bonds: N/A

PART 2 - EXECUTION

2.01 FINAL CLEANING:

- A. General: The GENERAL CONDITIONS require general cleaning during construction.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each road surface to the condition expected in a normal program. All residual aggregate, sand or other road and drainage materials shall be removed to the satisfaction of the City before final payment is approved.
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
 - a. Remove debris and surface dust from limited-access spaces including trenches, equipment vaults, manholes, and similar spaces.

SECTION 01700
CONTRACT CLOSEOUT

- b. Clean the site of rubbish, litter, and other foreign substances. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.
 - c. Remove temporary structures, tools, equipment, supplies, and surplus materials.
 - d. Remove temporary protection devices and facilities which were installed to protect previously completed Work.
 - e. Special Cleaning: cleaning for specific units of Work is specified in applicable Sections of Specifications.
- C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.
- E. Repairs:
- 1. Repair damaged protective coated surfaces.
 - 2. Repair roads and other items damaged or deteriorated because of construction operations, including those which have been damaged, but are not located within the project limits.
 - 3. Restore all ground areas affected by construction operations.

END OF SECTION

**SECTION 02050
DEMOLITION**

PART 1 - GENERAL

1.01 SCOPE:

- A. Summary of Work: The CONTRACTOR shall include the removal of existing construction to limits indicated on drawings where earthwork or other construction operations are to be performed as specified herein. The City shall not be responsible for the condition of any items to be removed or salvaged.

The specification sections listed below may be related to the project work.

1.02 APPLICABLE PUBLICATIONS: (Not Used)

1.03 DEFINITIONS: (Not Used)

1.04 SUBMITTALS:

- A. Schedule of Demolition:
 - 1. Submit proposed methods and operations of demolition for review prior to the start of work.
- B. Permits:
 - 1. The CONTRACTOR shall be responsible for acquiring appropriate necessary permits for the work. Copies of the permits shall be submitted to the City.

1.05 QUALIFICATIONS: N/A

1.06 RESPONSIBILITIES:

- A. The CONTRACTOR shall not commence demolition of structure(s) prior to written permission of the City.
- B. Condition of structures to be demolished:
 - 1. The City assumes no responsibility for actual condition of structures to be demolished.
 - 2. Conditions existing at time of inspection for bidding purposes will be maintained by the City insofar as practicable.
- C. The CONTRACTOR shall remove all such foundations to one foot below the proposed sub-grades.
- D. Explosives: The use of explosives will not be permitted. The CONTRACTOR may use a non-explosive, expanding agent in drilled holes for the demolition of concrete, and shall conform to all manufacturers' recommendations, including safety precautions for mixing and placing the agent.
- E. The CONTRACTOR shall ensure the safe passage of persons around the area of demolition and clearing. The CONTRACTOR shall conduct operations to prevent injury to adjacent structures, other facilities, and persons.
 - 1. The CONTRACTOR shall protect existing finish work that is to remain in place from damage due to demolition operations.
- F. Traffic:
 - 1. The CONTRACTOR shall conduct operations and the removal of debris to ensure minimum interference with existing access roads and other adjacent, occupied or used facilities.
 - 2. Do not close, block or otherwise obstruct access roads or other occupied or used facilities without permission from the City.
- G. The CONTRACTOR shall promptly repair damages caused to adjacent facilities by demolition operations at no cost to the City.

1.07 CERTIFICATIONS AND TESTING: (Not Used)

1.08 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the City as requested for inspection. The CONTRACTOR shall provide 48 hours notice of its intention to begin new WORK activities.

1.09 WARRANTY: (Not Used)

PART 2 - PRODUCTS

2.01 SALVAGE MATERIALS:

1. The CONTRACTOR will not be required to salvage or store any existing material designated for demolition or clearing of site.

PART 3 - EXECUTION

3.01 DEMOLITION:

- A. The CONTRACTOR shall provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
- B. If hazardous materials are found, the CONTRACTOR shall notify the City immediately.
- C. The CONTRACTOR shall completely backfill below-grade areas and voids resulting from demolition work. The CONTRACTOR shall provide fill consisting of approved soil, gravel or sand (free of trash and debris) and compact fill to approximate density of surrounding native soil.

3.02 DISPOSAL OF DEMOLISHED MATERIALS:

- A. The CONTRACTOR shall remove debris, rubbish, and other materials resulting from demolition operations.
- B. If hazardous materials are encountered during demolition operations, the CONTRACTOR shall comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
- C. The CONTRACTOR shall transport materials removed from demolished structures and properly dispose of them at an approved site according to the State, Federal, and local regulations.

3.03 CONNECTIONS TO EXISTING CONSTRUCTION:

- A. The CONTRACTOR shall cut and remove portions of existing construction as required to allow proper installation of new construction.
- B. The CONTRACTOR shall shore, brace and maintain existing structure(s) in a safe condition until permanent supports are completed.
- C. The CONTRACTOR shall repair all damage as a result of installation of shoring and bracing.

3.04 CLEANUP AND REPAIR:

- A. Upon completion of demolition work, the CONTRACTOR shall remove tools, equipment and demolished materials from site; see SECTION 1.0 and 3.02 A and B of this specification.
- B. The CONTRACTOR shall repair demolition performed in excess of that required and return structures and surfaces to conditions existing prior to commencement of demolition work. The CONTRACTOR shall repair adjacent construction or surfaces soiled or damaged by demolition work.
- C. On site burning of the demolition operation is prohibited.
- D. The CONTRACTOR shall remove or modify as indicated all existing construction within the construction limits to the extent necessary to permit construction of the work. The CONTRACTOR

**SECTION 02050
DEMOLITION**

shall properly dispose of the material at an approved site according to the State, Federal, and local regulations.

END OF SECTION

**SECTION 02140
DEWATERING**

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section specifies designing, furnishing, installing, maintaining, operating and removing temporary dewatering systems as required to lower and control water levels and hydrostatic pressures during construction; disposing of pumped water; constructing, maintaining, observing and, except where indicated or required to remain in place, removing of equipment and instrumentation for control of the system.

1.02 RELATED WORK:

- A. Section 02220, EXCAVATION AND BACKFILL FOR PIPE SYSTEMS
- B. Section 02221, TRENCHING, BACKFILLING AND COMPACTING

1.03 SYSTEM DESCRIPTION:

- A. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from the slopes or bottom of the excavation; increasing the stability of excavated slopes; preventing loss of material from beneath the slopes or bottom of the excavation; reducing lateral loads on sheeting and bracing; improving the excavation and hauling characteristics of sandy soil; preventing rupture or heaving of the bottom of any excavation; and disposing of pumped water.
- B. Normal dewatering is defined as using conventional pumps installed in open excavations, ditches, or sumps.

1.04 QUALITY ASSURANCE:

- A. The Contractor is responsible for the adequacy of the dewatering systems.
- B. The dewatering systems shall be capable of effectively reducing the hydrostatic pressure and lowering the groundwater levels to a minimum of 2 feet below excavation bottom, unless otherwise directed by the Engineer, so that all excavation bottoms are firm and dry.
- C. The dewatering system shall be capable of maintaining a dry and stable subgrade until the structures, pipes and appurtenances to be built therein have been completed to the extent that they will not be floated or otherwise damaged.
- D. The dewatering system and excavation support shall be designed so that lowering of the groundwater level outside the excavation does not adversely affect adjacent structures, utilities or wells.

1.05 SUBMITTALS

- A. Contractor shall submit six copies a plan indicating how they intend to control the discharge from any dewatering operations on the project, whether it is discharge of groundwater from excavations or Stormwater runoff during the life of the project.

PART 2 - PRODUCTS: NOT APPLICABLE

PART 3 – EXECUTION

3.01 DEWATERING OPERATIONS:

- A. All water pumped or drained from the work shall be disposed of in a manner which will not result in undue interference with other work or damage to adjacent properties, pavements and other surfaces, buildings, structures and utilities. Suitable temporary pipes, flumes or channels shall be provided for water that may flow along or across the site of the work. All disposal of pumped water shall conform to the provisions of the City and the County.
- B. Dewatering facilities shall be located where they will not interfere with utilities and construction work to be done by others.
- C. Dewatering procedures to be used shall be as described below:
 - 1) Crushed stone shall encapsulate the suction end of the pump to aid in minimizing the amount of silt discharged.
 - 2) For dewatering operations with relatively minor flows, pump discharges shall be directed into haybale sedimentation traps lined with filter fabric. Water is to be filtered through the haybales and filter fabric prior to being allowed to seep out into its natural water course.
 - 3) For dewatering operations with larger flows, pump discharges shall be into a steel dewatering basin. Steel baffle plates shall in used to slow water velocities to increase the contact time and allow adequate settlement of sediment prior to discharge into waterways.
 - 4) Where indicated on the contract drawings or in conditions of excess silt suspended in the discharge water, silt control bags are to be utilized in catchbasins. D. The Contractor shall be responsible for repair of any damage caused by his dewatering operations, at no cost to the Owner.

END OF SECTION

**SECTION 02200
SITE PREPARATION**

PART 1 GENERAL

1.01 DEFINITIONS

- A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.
- B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.
- C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2 inches caliper to a depth of 12 inches below subgrade.
- D. Scalping: Removal of sod without removing more than upper 3 inches of topsoil.
- E. Stripping: Removal of topsoil remaining after applicable scalping is completed.
- F. Project Limits: Areas, as specified, within which Work is to be performed.

1.02 QUALITY ASSURANCE

- A. The CONTRACTOR shall obtain CONTRACTOR's approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

1.03 SCHEDULING AND SEQUENCING

- A. Prepare site only after adequate erosion and sediment controls are in place. Limit areas exposed uncontrolled to erosion during installation of temporary erosion and sediment controls.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Clear, grub, and strip areas actually needed for waste disposal, borrow, or site improvements within limits specified.
- B. Property obstructions which are to remain in-place, such as buildings, sewers, drains, water or gas pipes, bridges, etc., are to be carefully protected from damage.
- C. Do not injure or deface vegetation that is not designated for removal. All branches potentially interfering with construction operations shall be pruned prior to starting work and following approval of the ENGINEER and the CITY.

3.02 LIMITS

- A. As Follows, but not to Extend beyond Project Limits.
 - 1. Excavation Including Trenches: 5 feet beyond top of cut slopes or shored wall.
 - 2. Fill:

**SECTION 02200
SITE PREPARATION**

- a. Clearing and Grubbing: 5 feet beyond toe of permanent fill.
 - b. Stripping and Scalping: 2 feet beyond toe of permanent fill.
 3. Waste Disposal:
 - a. Clearing: 5 feet beyond perimeter.
 - b. Scalping and Stripping: Not required.
 - c. Grubbing: Around perimeter as necessary for neat finished appearance.
 4. Overhead Utilities:
 - a. Clearing, Grubbing Scalping, and Stripping: Wherever grading is required, including borrow pits, ditches, etc.
 5. Other Areas: As shown.
- B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 TEMPORARY REMOVAL OF INTERFERING PLANTINGS

- A. Remove and store shrubs and trees that are not designated for removal but do interfere with construction or could be damaged by construction activities.
- B. Photograph and document location, orientation, and condition of each plant prior to its removal. Record sufficient information to uniquely identify each plant removed and to assure accurate replacement.

3.04 CLEARING

- A. Clear areas within limits specified.
- B. Fell trees so that they fall away from facilities and vegetation not designated for removal.
- C. Cut stumps not designated for grubbing 12 inches below the ground surface.
- D. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

3.05 GRUBBING

- A. Grub areas within limits specified.

3.06 SCALPING

- A. Do not remove sod until after clearing and grubbing is completed and resulting debris is removed.
- B. Scalp areas within limits specified.

3.07 STRIPPING

- A. Do not remove topsoil until after scalping is completed.
- B. Strip areas within limits to minimum depths specified. Do not remove subsoil with topsoil.
- C. Stockpile strippings, meeting requirements of Section 02911, Soil Preparation, for topsoil, separately from other excavated material.

3.08 TREE REMOVAL OUTSIDE CLEARING LIMITS

- A. Remove Within Project Limits:
 - 1. Dead, dying, leaning, or otherwise unsound trees that may strike and damage Project facilities in falling.
 - 2. Trees designated by ENGINEER.
- B. Cut stumps off flush with ground, remove debris, and if disturbed, restore surrounding area to its original condition.

3.09 TREE TOPPING

- A. Top trees designated by ENGINEER so remaining portion will not strike facilities in falling. Where topping will remove more than 1/2 of a tree's crown, remove entire tree.
- B. Treat wounds resulting from topping in accordance with standard horticultural practice to preserve the natural character of the tree.

3.10 PRUNING

- A. Remove branches below the following heights:
 - 1. Sixteen feet above roadways and shoulders.
 - 2. Nine feet above sidewalks.
 - 3. Six feet above roofs.
- B. Prune only after planting and in accordance with standard horticultural practice to preserve the natural character of the plant. Perform in presence of the City's Representative. Remove all dead wood, suckers, and broken or badly bruised branches. Use only clean, sharp tools. Do not cut lead shoot.

3.11 DISPOSAL

- A. Clearing and Grubbing Debris:
 - 1. Woody debris may be chipped. Chips may be sold to City's benefit or used for landscaping onsite as mulch or uniformly mixed with topsoil, provided that resulting mix will be fertile and not support combustion. Maximum dimensions of chipped material used onsite shall be 1/4-inch by 2 inch. Dispose of chips that are unsaleable or unsuitable for landscaping or other uses with unchipped debris.
 - 2. Limit offsite disposal of clearing and grubbing debris to locations that are approved by federal, state, and local authorities, and that will not be visible from Project.
- B. Scalpings: As specified for clearing and grubbing debris.
- C. Strippings:
 - 1. Dispose of strippings that are unsuitable for topsoil or that exceed quantity required for topsoil offsite or in waste disposal areas approved by the CITY.
 - 2. Stockpile topsoil in sufficient quantity to meet Project needs. Dispose of excess strippings as specified for clearing and grubbing.

END OF SECTION

SECTION 02220
EXCAVATION AND BACKFILL FOR PIPE SYSTEMS

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

- A. Clearing, excavating, grading and backfilling as required for the construction of pipe and other underground utility systems and appurtenances.

1.2 QUALITY ASSURANCE

- A. Comply with Chapter 90-96 of the Laws of Florida (The Trench Safety Act) and OSHA Standard 29 CFR, Section 1926.650 Subpart P.
- B. References:
1. American Society for Testing and Materials (ASTM):
 - a) ASTM D1556-90; Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - b) ASTM D1557-91; Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 - c) ASTM D2487-90; Classification of Soils for engineering Purposes.
 - d) Florida Department of Transportation (FDOT), "Standard Specifications for Road and Bridge Construction," latest edition, (FDOT)

PART 2 - PRODUCTS

1.1 PRODUCTS AND MATERIALS

- A. Bedding Material:
1. For use below the water table or in wet trenches: pea rock, 3/4 inch washed rock, or similar material.
 2. Pipe bedding material for use in dry trenches: lime rock screenings, sand or other fine inorganic material.
- B. Additional Backfill Material:
1. "Satisfactory Fill Materials" include materials classified in ASTM D2487 as GW, GP, SW, and SP properly worked by Contractor to obtain optimum moisture and compaction. Maximum size of rock limited to 3 inches. Use 2-inch maximum size for the top 2 feet below the finish indicated grade.
 2. Stones or rocks:
 - a) Not larger than three inches in diameter.
 - b) When placed within one foot of piping and appurtenances: Not larger than two inches in diameter.
 - c) When placed within one foot of PVC piping: Not larger than one inch in diameter.
- C. Fill Brought from Off-site: Provide test results and source certification that fill materials do not contain any hazardous materials such as heavy metals, organics, or petroleum products.

PART 3 - EXECUTION

1.2 PREPARATION

SECTION 02220
EXCAVATION AND BACKFILL FOR PIPE SYSTEMS

- A. Perform all clearing necessary for the proper installation of all piping and appurtenances.
- B. Transplant, relocate, protect and preserve plantings, shrubbery, trees, or other landscape materials subject to damage resulting from excavation and other site operations. Replace damaged landscape materials and plant materials.
- C. Relocate, brace, protect and preserve utility poles, structures, and other site improvements subject to damage resulting from excavation and other site operations. Repair damaged site improvements.

1.3 PROJECT CONDITIONS

- A. Existing Utilities:
 - 1. Protect existing utilities from movement, settlement, or other damages according to General Conditions.
- B. Trench Safety Act: Provide trench safety systems at all trench excavations where workers may be exposed to moving ground or cave-ins regardless of depth of trench. Ensure all trenches comply with OSHA "Trench Safety Act".

1.4 FIELD QUALITY CONTROL

- A. Excavations:
 - 1. Perform all excavations of every description and of whatever substances encountered, including rock excavations, to the dimensions and depth necessary for installation of utility systems as specified or to remove deleterious materials.
 - 2. All excavations: Made by open cut.
 - 3. Trench walls:
 - a) Kept vertical.
 - b) Sheeted and braced as necessary to protect the safety of workmen, the general public, this or other work or structures, or to maintain specified trench widths.
 - c) Wood sheeting or certain designs of steel sheeting: cut off sheeting at a level 2 feet above the top of the installed pipe and leave in place that portion below that level.
 - d) Interlocking steel sheeting: remove sheeting after use providing removal can be accomplished without disturbing the bedding, pipe or pipe alignment.
 - e) Damage to the pipe bedding, pipe or alignment of the constructed utility caused by removal of sheeting: Replace affected portion of the Work at no additional cost to County.
 - f) Open trench ahead of pipe laying operations: Not more than 100 linear feet.
 - g) Slope trench sides to a stable angle of repose of the excavated material in areas where trench widths are not limited by Right-of-Way and easement widths, property line restrictions, existing adjacent improvements, including pavements, structures and other utilities, or maintenance of traffic.
 - h) Safely constructed movable shield, "box" or "mole": use in place of sheeting when the trench is opened immediately ahead of the shield and closed immediately behind the shield as pipe laying proceeds inside the shield.
 - 4. Trench Access: Provide ladders or steps.
 - 5. Pipe trenches for utility lines:
 - a) Excavate to a width within the limits of the top of the pipe and the trench bottom to provide a clearance on each side of the pipe barrel, measured to the face of the excavation or sheeting, if used, of 8 inches to 12 inches.
 - b) Manhole excavations: Of sufficient depth to permit their construction on the undisturbed bottom of the excavation.
 - 6. Materials removed from the trenches:

SECTION 02220
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- a) Store and dispose of excavated materials in a manner that will not interfere with traffic on public streets and sidewalks.
 - b) Do not store or place excavated materials on public or private property outside the County's property line.
 - c) Properly dispose of unsuitable materials such as muck and organically contaminated fill off site.
 - d) Materials suitable for use as backfill: Hauled to and use in areas where not enough suitable material is available from the excavation.
- B. Excess suitable material: Dispose of within the limits of the project as directed by the Project Consultant. Finish grade the disposal area.
- 1. Excavation of Unclassified Material:
 - a) Materials encountered during the excavating to the depth and extent specified and indicated on drawings may include rock, concrete, masonry, or other similar materials.
 - b) No adjustment will be made in the Contract Price because of the presence (or absence) of rock, concrete, masonry, or other similar materials.
- C. Removal of Water:
- 1. All excavations:
 - a) Free from water before pipe or structures are installed.
 - b) Extreme Water Conditions: Contractor may elect to utilize extreme water conditions methods specified elsewhere in this document.
 - 2. Control water flow on site:
 - a) Meet State and Federal "SWPPP" flow containment programs and approvals. Restrict flow from one site area to another by installing temporary dams or plugs within the pipe provided they are suitably removed and do not damage the lining of the pipe.
 - b) All work shall be conducted in strict accordance with the "SWPPP" plan.
 - c) Installed lines, except for water distribution lines: May be used to convey trench water, provided the pipe lining is not damaged and the line is cleaned out prior to acceptance of the work.
 - 3. Dewatering:
 - a) Provide all necessary pumps, under drains, well-point systems, and other means for removing water from trenches and other parts of the Work.
 - b) Continue dewatering operations until the backfill has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe in the trench and so that it is above the natural water table.
 - 4. Water Disposal:
 - a) Do not cause injury to public health, to public or private property, to the work completed or in progress, to the surface of the streets, or cause any interference with the use of the same by the public.
 - b) All disposal of surface water shall be based on "SWPPP" approved plan.
 - c) Do not start excavation until receiving approval of proposed water disposal method.
- D. Pipe Bedding:
- 1. Excavate pipe trenches to a level of 8 inches below the outside bottom of the proposed pipe barrel.
 - 2. Backfill resulting excavation with pipe bedding material, up to the level of the lower one-half of the proposed pipe barrel.
 - 3. Tamped and compact backfill to provide proper bedding for the pipe and then shape bed to receive the pipe.
 - 4. Provide bedding under the branch of all fittings to furnish adequate support and bearing under the fitting.

SECTION 02220
EXCAVATION AND BACKFILL FOR PIPE SYSTEMS

5. Excavations below the levels required for installation of the pipe bedding, except for "Additional Excavation": Backfill with bedding material, tamp, compact and shape to provide proper support for the proposed pipe, at no additional cost to the County.
- E. Backfill under Maintenance Access Structures, Inlets and Meter Vaults:
1. Fill excavations below the levels required for the proper construction of Maintenance Access Structures or meter vaults with 3/4 inch washed rock.
- F. Trench Stabilization:
1. No claim for extras or additional payment will be considered for cost incurred in the stabilization of trench bottoms, which are rendered soft or unstable as a result of construction methods, such as improper or inadequate sheeting, dewatering or other causes.
 2. Do not install pipe when such conditions exist.
 3. Contractor: correct such conditions so as to provide proper bedding or foundations for the proposed installation at no additional cost to the County.
- G. Backfill:
1. Backfilling of utility trenches: not allowed until the work has been approved by the County, and other jurisdictional inspectors as applicable.
 2. Provide pressure tests as required by codes and jurisdictional authorities.
 3. Uncover any work, which is covered or concealed without approved inspections at no cost to the County.
 4. Partial backfill: May be made to restrain the pipe during pressure testing.
 5. Provide additional or supplemental backfill materials as necessary from on-site or off-site sources.
 6. Placing Backfill:
 - a) Place selected backfill material containing no stone or rocks larger than 2 inches in 12-inch layers and thoroughly tamp to a depth of 12 inches over the top of the pipe.
 - b) Provide thorough support for the branch of all service connection fittings.
 - c) Preserve the alignment and gradient of the installed pipe.
 - d) Waterlines or Force Main Pipes: Place remainder of the backfill in layers, not to exceed 12 inches, and compact with mechanical tampers or other suitable equipment to obtain a density of not less than 95 percent of its maximum density.
 - e) Sewer Pipes:
 - i. Backfill to a depth of 30 inches over the pipe by placing backfill material in 12 inch layers and thoroughly compact with mechanical tampers to obtain a density of not less than 95 percent of maximum density.
 - ii. Place remainder of backfill in layers not to exceed 12 inches, and compact with mechanical tampers or other suitable equipment to obtain a density of not less than 95 percent of maximum density.
 - f) Within paved areas of trench excavation: construct base and surfacing constructed as based upon ASTM D1557-91 and compacted to 98 percent maximum density.
 - g) Partially backfill no more than 100 feet of trench with pipe in place at any time.
- H. Compaction and Densities:
1. Methods of control and testing of backfill construction are:
 - a) Maximum density of the material in trenches: Conform to AASHTO Designation T 180-74.
 - b) Field density of the backfill material in place: Conform to AASHTO Designation T 238-79.
 2. Laboratory and field density tests necessary to establish compliance with the compaction requirements of these specifications will be conducted at the County's expense at intervals to be determined by the County. Tests will be made at depths and locations selected by the County.

SECTION 02220
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3. Rework and recompact trench backfill, which does not comply with the specified densities until the required compaction is secured, at no additional cost to the County. Costs for retesting such work: Paid for by the Contractor.
- I. Additional Excavation and Backfill:
1. Remove and dispose of organic material, such as roots, muck, or other vegetative matter, or other material encountered below the level of proposed pipe bedding material.
 2. Install sheeting as necessary to maintain pipe trenches within the specified limits.
 3. Backfill resulting excavation with suitable backfill material, placed in 12-inch layers tamped and compacted up to the level of the bottom of the proposed pipe bedding material.
 4. Sufficiently compact this material to protect the pipe against settlement.
 5. Provide pipe bedding as specified above.
- J. Trenching in Extreme Water Conditions:
1. General:
 - a) A combination of conditions in the substrata, water table, or method of disposal may be encountered during the course of the work, which make dewatering impossible, or only possible through the use of unusual methods.
 - b) When such conditions are encountered, but only after all reasonable means to dewater the excavation have been employed without success, the Contractor, with the concurrence of the County, may use Section 125-8.3.4 of the FDOT Standard Specifications for Road and Bridge Construction.
 2. Removal of Water: The installation of pipe, Maintenance Access Structures and appurtenances underwater will be permitted.
 3. Excavation:
 - a) Perform excavation of pipe trenches to the level of the bottom of the proposed pipe bedding as specified above:
 - i. If rock, such as lime rock or other similar hard, cemented material providing firm, unyielding trench bottoms is encountered at the level of the bottom of the proposed pipe bedding: no additional excavation required.
 - ii. If material such as sand, marl, or other material which cannot be classified as rock, is encountered at the level of the bottom of the proposed pipe bedding: Excavate pipe trench to an additional depth of 10 inches minimum, below that level.
 - iii. Provide additional excavation, and related additional backfilling made necessary by deleterious materials encountered.
 - b) Excavate for Maintenance Access Structures to be installed under water to a depth, below the outside bottom of the proposed structure to provide a minimum space of 12 inches in rock, or 24 inches in sand for the placement of drain field lime rock.
 - c) Provide longitudinally sloping plane bottom surface for the placement of pipe bedding material from the bottom of the manhole excavation, at its extremity, to a line of intersection with the bottom of the typical excavation of 10 feet measured horizontally, from the vertical plane of the manhole excavation.
 4. Pipe and Manhole Bedding:
 - a) Backfill pipe trench or manhole excavation to receive the pipe or manhole with drain field lime rock up to the level of the lower one-third (1/3) of the proposed pipe barrel, or to the outside bottom of the proposed manhole as applicable.
 - b) Tamp and compact backfill to provide proper bedding for the pipe or manhole.
 - c) Do not utilize material other than drain field lime rock as bedding material for underwater

SECTION 02220
EXCAVATION AND BACKFILL FOR PIPE SYSTEMS

construction.

5. Backfill:
 - a) Backfill after the pipe is installed with drain field lime rock around the pipe and to a level even with the top of the pipe bell.
 - b) Carefully lift all backfill material, including drain field lime rock, into trench and release to fall freely when the bucket or container is at or just above water level:
 - c) Do not dump or push backfill material into trenches containing water.
 - d) Carefully ram backfill material into place in uniform layers below the existing water level.
 - e) Place and compact backfill material above the water level to densities specified above.
- K. Restoration of Existing Surfaces: Restore paved and grassed areas disturbed by the operations required under this Section as indicated on the Drawings and specified herein.
- L. Testing:
 1. See Section 01410 Testing and Quality Control, 1.04.
 2. Tests of Materials as follows;
 - a) Laboratory Tests for Moisture Content and Density: Under provisions of ASTM D1557-91, one test for each material encountered or proposed to be used.
 - b) Field Tests for Moisture Content and Density: Under provisions of ASTM D1556- 90, one test per layer per 100 linear feet of ditch.

END OF SECTION

SECTION 02221
TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 SCOPE:

- A. Summary of Work: The CONTRACTOR shall furnish all labor, materials and equipment necessary for complete and proper trenching, backfilling and compacting as specified herein.

The specification sections listed below may be related to the project work.

1. 02220 Excavation and Backfill for Pipe Systems

1.02 APPLICABLE PUBLICATIONS:

- A. American Society of Testing Materials (ASTM):
1. D698-00a – Standard Test Methods for Laboratory compaction Characteristics of Soil Using the Standard Effort (12,400 ft-lbf/ ft³ (600 kN-m/m³)).
 2. D1557-00- Standard Test Methods for Laboratory compaction Characteristics of Soil Using the Modified Effort (56,000 ft-lbf/ ft³ (2,700 kN-m/m³)).
 3. D4253-00 – Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 4. D4254-00 – Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- B. Florida Department of Transportation (FDOT):
1. Standard Specifications for Road and Bridge Construction, latest edition, (FDOT).
- C. Miscellaneous Project Data:
1. Subsurface soil data logs are provided for the CONTRACTOR's reference: See contract drawings

1.03 DEFINITIONS: (Not Used)

1.04 SUBMITTALS: (Not Used)

1.05 QUALIFICATIONS: (Not Used)

1.06 RESPONSIBILITIES:

- A. The CONTRACTOR shall make all excavations for piping and appurtenant structures in any material encountered to the depth and grades required, shall backfill such excavations and dispose of excess or unsuitable materials from excavation, and shall provide and place necessary borrow material to properly backfill excavations, all as indicated on the drawings, specified herein, or as directed by the ENGINEER.
- B. Excavation, dewatering, sheeting and bracing required shall be carried out so as to prevent any possibility of undermining or disturbing the foundations of any existing structure or work, and so that all work may be accomplished and inspected in the dry, except as directed by the ENGINEER. Aqueous construction may be performed only with prior approval of the ENGINEER.

**SECTION 02221
TRENCHING, BACKFILLING AND COMPACTING**

- 1.07 CERTIFICATIONS AND TESTINGS: (Not Used)
- 1.08 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the ENGINEER as requested for inspection. The CONTRACTOR shall provide 48 hours notice of its intention to begin new WORK activities.
- 1.09 WARRANTY: (Not Used)

PART 2 - PRODUCTS

- 2.01 MATERIALS: The CONTRACTOR shall furnish materials as required to complete the Work under this Section.

PART 3 - EXECUTION

- 3.01 EXTENT OF OPEN EXCAVATION: The CONTRACTOR shall perform the excavation such that at any time the amount of excavation open will be held to a minimum consistent with normal and orderly prosecution of the work, or as restricted by permit conditions.
- 3.02 CUTTING PAVEMENT: When excavations are required in paved areas the CONTRACTOR shall conform to the following.
- A. When excavations are to be made in paved surfaces, the pavement shall be cut ahead of the excavation by means of suitable sharp tools to provide a uniform sharp edge with minimum disturbance of remaining materials.
 - B. Asphalt paving and other improvements in the right-of-way and on other private property affected by this construction shall be duly protected and, where disturbed, shall be restored or replaced to meet original conditions.
- 3.03 TRENCH EXCAVATION: The CONTRACTOR shall perform trench excavation in accordance with the following.
- A. All excavation for piping shall be open cut. Trench sides shall be approximately vertical between an elevation of one foot above the top of the pipe and the centerline of the pipe; otherwise, trench sides shall be as vertical as possible or as required. Trenches may be excavated by machinery to a depth that will not disturb the finish grade.
 - B. Trench width shall be as narrow as practical and shall not be widened by scraping or loosening material from the sides.
- 3.04 EXCAVATION BELOW NORMAL GRADE:
- A. In the event the CONTRACTOR through error or carelessness excavates below the elevation required, the CONTRACTOR shall at his own expense backfill with selected gravel and compact to obtain a suitable pipe bedding all as directed and to the satisfaction of the ENGINEER.
 - B. In the event unstable or unsuitable bedding material is encountered at or below the pipe bedding level the CONTRACTOR shall removed such material and replaced with it suitable compacted material.
- 3.05 BACKFILLING TRENCHES:
- A. The CONTRACTOR shall be responsible for obtaining the necessary inspections before, during and after backfilling and shall re-excavate, refill and perform all such related work to obtain satisfactory test results.

**SECTION 02221
TRENCHING, BACKFILLING AND COMPACTING**

- B. The CONTRACTOR shall use excavated materials classified as embankment fill for backfilling and such grading on the site as is required. The CONTRACTOR shall dispose of any excess of fill or unstable material in areas approved by the ENGINEER. Pipe trenches shall be backfilled with fine, loose embankment fill (see SECTION 02220, paragraph 2.1.B), free from large stones, carefully deposited on both sides of pipe and thoroughly and carefully rammed until enough fill has been placed to provide a cover of at least one foot above the pipe. The remainder of the backfill material may then be thrown in and tamped. Water settling may be permitted. The CONTRACTOR shall submit written request detailing the need to perform water settling and reasons why work in the dry is not possible. The CONTRACTOR shall also submit detailed procedures for the review and approval of the ENGINEER. Whenever trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off and finally, made to conform to the surface of the ground. Backfilling shall be carefully performed and the surface restored to the elevation shown on the plans. In unpaved areas the surface of trenches shall conform and be equal to quality, character and material to the surface immediately prior to making the excavation.
- C. Place earth embedment as follows:
1. With level bottom layer at proper grade to receive and uniformly support pipe barrel throughout its length.
 2. Form shallow depression under each joint to facilitate jointing.
 3. Add second layer simultaneously to both sides of the pipe with care to avoid displacement of the pipe.
 4. Place material in maximum lifts per standard detail GS 1.9.

- 3.06 BACKFILLING OF TRENCH UNDER ROADWAY AND AREAS TO BE PAVED: The CONTRACTOR shall place material in layers after filling one foot above pipe as previously described. Each layer shall be compacted to maximum dry density as specified in GS 1.9 so that pavement can be placed promptly. Any pavement cut or area disturbed by this work shall be replaced to match existing.
- 3.07 BACKFILLING OF TRENCH OPEN AREAS: The CONTRACTOR shall place material in lifts after filling one foot above pipe as previously described. The top one-foot layer shall be compacted to maximum dry density as specified in GS 1.9. Restore the surface to original grade and place sod or seed as required by the contract documents.

END OF SECTION

**SECTION 02240
SOIL STABILIZATION**

PART 1 - GENERAL

1.01 SCOPE:

Summary of Work: The CONTRACTOR shall furnish all labor, equipment, and materials for stabilization of the soil to provide a firm and unyielding subgrade for the Work as described in this section.

1.02 APPLICABLE PUBLICATIONS: The following standard specifications shall apply to the work of this Section as indicated:

A. Florida Department of Transportation

Standard Specifications for Road and Bridge Construction, latest edition, (FDOT)

B. American Society of Testing Materials, (ASTM)

1. ASTM D1557-00, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using the Modified Effort (56,000 ft-lb/ft³ (2,700 kN-m/m³))
2. ASTM D 2922-01, Standard Test Methods for Density of Soil and Soil-Aggregate in Place by the Nuclear Methods (Shallow Depth)

C. Soils Report/Boring log, See Appendix

1.03 DEFINITIONS: (Not Used)

1.04 SUBMITTALS: (Not Used)

1.05 QUALIFICATIONS: (Not Used)

1.06 RESPONSIBILITIES: (Not Used)

1.07 CERTIFICATIONS AND TESTING: The CONTRACTOR shall provide to CONTRACTOR three copies of certified test results for the tests required to be performed by the CONTRACTOR.

1.08 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the work for CONTRACTOR as requested for inspection. The CONTRACTOR shall provide 48 hours notice of its intention to begin new WORK activities. CONTRACTOR may perform field density tests in accordance with ASTM Standards, for each type of material used in backfilling. Failure to meet the specified density will require the CONTRACTOR to recompact and retest, at its own expense, those areas directed by CONTRACTOR.

1.09 WARRANTY: (Not Used)

PART 2 - PRODUCTS

2.01 PRODUCT REQUIREMENTS:

General Requirements: The CONTRACTOR shall provide the required stabilization material which shall be either commercial limerock or crushed shellrock in conformance with FDOT Standard Specifications for Road and Bridge Construction Sections 911 and 914.

PART 3 - EXECUTION

- 3.01 **PREPARATION:** The CONTRACTOR, prior to beginning the stabilizing operations, shall grade the area to be stabilized to an elevation such that upon completion of the stabilizing operations the stabilized subgrade will conform to the lines, grades and cross sections shown on the Drawings.
- 3.02 **APPLICATION OF STABILIZING MATERIAL:** The CONTRACTOR shall spread the stabilizing material uniformly over the area to be stabilized. The CONTRACTOR shall then mix the material with rotary tillers, or other equipment meeting the approval of CONTRACTOR. The area to be stabilized shall be thoroughly mixed throughout the entire depth and width of the stabilizing area.
- 3.03 **COMPACTION:** After mixing operations are completed, the CONTRACTOR shall compact the area to the minimum density as required by FDOT Section 160-3.4.2. The subgrade shall be firm and unyielding; to the extent that it will support construction equipment. The CONTRACTOR shall remove all soft and yielding material, and any other portions of the subgrade, which will not compact readily, and replace with suitable material and the whole subgrade brought to line and grade.
- 3.04 **FINISH GRADING:** The CONTRACTOR shall shape the completed stabilized subgrade to conform to the finished lines, grades, and cross-sections indicated on the Drawings.
- 3.05 **MAINTENANCE:** After the subgrade has been completed as specified, the CONTRACTOR shall maintain it free from, ruts, depressions and any damage resulting from the hauling or handling of materials, equipment, etc. It shall be the CONTRACTOR's responsibility to maintain the required density until the subsequent base is in place.

END OF SECTION

SECTION 02515
WATER SERVICE CONNECTIONS AND TRANSFERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All applicable provisions of the Bidding and Contract Requirements, and Division 1 - General Requirements shall govern the WORK under this Section.

1.2 WORK INCLUDED

- A. This section covers the WORK necessary for service connections, laying service pipe, casing pipe, making connections to the new water main and to the existing service pipe, testing and flushing, and all incidental WORK necessary to accomplish the construction.
- B. The WORK includes excavation, backfill and compaction, furnishing and installing service clamps, corporation stops or valves, meter yokes or connections, service connection piping, fittings, and appurtenances within the designated limits, testing, flushing, and other incidental WORK as required for a complete installation. Included are the installation and transfers of 5/8-inch, one (1) inch, 1½ inch, and two (2)-inch meter connections within the limits shown on the plans.
- C. The approximate location of service connections to be installed or transferred will be determined by the CONTRACTOR, upon review and approval by the ENGINEER and CITY.

1.3 RELATED WORK

- A. Division 2 as applicable.
- B. Section 02220 - Excavation and Backfilling for Pipe Systems.
- C. Section 02221 – Trenching, Backfilling and Compacting.
- D. Section 02510 - Water Distribution System.

PART 2 - PRODUCTS

2.1 EXCAVATION

- A. Excavation shall conform to the requirements of Section 02220, Excavation and Backfilling for Pipe Systems.

2.2 BACKFILL

- A. Acceptable material excavated from the trench shall be used for trench backfill. Select backfill material for use in the pipe zone, when required by the ENGINEER, shall contain no material larger than one (1) inch in diameter.

2.3 SERVICE CONNECTION SIZE

- A. The location and size of service connection to be transferred or installed will be as determined in the field by CONTRACTOR. The meter and meter box will be installed by CONTRACTOR if required. Minimum tap size shall be two (2) inch.

SECTION 02515
WATER SERVICE CONNECTIONS AND TRANSFERS

2.4 SERVICE SADDLES

- A. Service saddles shall be malleable or ductile iron double-strap saddles with iron pipe tap, or equal. Saddle shall be of the size required by the pipe and shall be provided with a neoprene O-ring seal and appropriately sized IP tap. Straps shall be corrosion resistant with Type 304 stainless steel bands and hardware.

2.5 TAPPING MATERIALS

- A. The CONTRACTOR shall provide the necessary tapping machines for making the connections, and shall furnish the miscellaneous materials required for making the taps, such as cutting oil and similar materials.

2.6 CORPORATION STOPS

- A. Corporation stops for one (1) inch services shall have AWWA thread inlet and a compressive connection outlet suitable for service pipe. Corporation stops for two (2) inch services shall be ball valves and have outside iron thread inlet and a compression connection outlet suitable for service pipe. Corporation stops shall meet ANSI/NSF 61 and AWWA C800, latest revisions.

2.7 COUPLINGS

- A. Couplings shall be hose clamp type coupling, outside IP thread to plastic for connecting polyethylene pipe to corporation stop and meter yoke. Clamp pipe with two stainless steel clamps at each connection.

2.8 FLEXIBLE COUPLINGS

- A. Flexible couplings shall be straight cast couplings and shall be Rockwell International No. 431, or equal.

2.9 UNION

- A. Copper-to-copper union.

2.10 MISCELLANEOUS FITTINGS

- A. Miscellaneous fittings, includes reducers and adapters.

2.11 CURB STOPS

- A. Curb stops shall meet AWWA C800, latest revision and shall be Mueller or equal.

2.12 CURB BOXES

- A. Curb boxes shall be two (2) feet long, extension type, arch pattern base, Mueller or equal, and furnished with lids and plugs.

2.13 METER STOP

- A. Meter stops shall be Mueller, Ford, Hays Manufacturing Company, or equal.

2.14 METERS, BOXES, AND COVERS

- A. Meters are provided by the CITY. Boxes and Covers are to be furnished by the CONTRACTOR.

SECTION 02515
WATER SERVICE CONNECTIONS AND TRANSFERS

CONTRACTOR will install Meters, Boxes and Covers.

2.15 METER YOKES

- A. The meter yokes shall be Ford Meter Box (Iron Yoke Bars, Y500 Series), Mueller (Iron Meter Yokes, H-5020) or equal.

2.16 ANGLE VALVES

- A. Angle valves for the one (1) inch and two (2) inch meter installations shall be Ford, Crane, or equal.

2.17 COPPER TUBING

- A. Copper tubing used for one and two inch service connections shall be Type K, soft, seamless, conforming to ASTM B88, with commercially pure wrought copper solder joint fittings. Make joints with 95-5 coreless wire solder, ASTM B32, Grade 95 TA.

2.18 POLYETHYLENE PLASTIC TUBING

- A. Polyethylene plastic tubing shall be manufactured from ultra-high molecular weight, high-density polyethylene in accordance with AWWA C901, latest revision, ASTM D3350, PE 355434C. The tubing shall have a working pressure of 200 psi and a standard dimension ratio of nine (9).

2.19 CASING PIPE

- A. Casing pipe shall be galvanized or black iron, or equal, as determined by ENGINEER.

2.20 PRODUCT SPECIFICATION SHEETS

- A. All products used in water system shall comply with the requirements of the City of North Miami Utility Department and Miami-Dade County.

PART 3 - EXECUTION

3.1 TRENCH EXCAVATION AND BACKFILL

- A. Conform to the requirements of Section 02220, Excavation and Backfilling for Pipe Systems. Place only select backfill material in the trench within 6 inches of the service connection pipe or line. Cover around pipe shall be 8 inches or as indicated on the plans. Backfill and compact remainder of trench with excavated material as specified in the referenced section.

3.2 CONNECTION TO MAIN

- A. Clean exterior of main of dirt or other foreign matter that may impair the quality of the completed connection. Then place service clamp at the desired location and clamp tight by tightening alternate nuts progressively. Do not place service clamp within 1 foot of pipe joint or other clamp.
- B. Taps shall be made in the pipe by experienced workers using tools in good repair with the proper adapters for the size main being tapped.

3.3 PREPARATION OF TRENCH

- A. Grade the bottom of the trench by hand to the line and grade to which the pipe is to be laid, with proper allowance for special bedding. All other conditions and operations as specified in Section 02220, Excavation and Backfilling for Pipe Systems must be adhered to. The trench bottom shall form a

SECTION 02515
WATER SERVICE CONNECTIONS AND TRANSFERS

continuous and uniform bearing support for the pipe. A 6 inch layer of imported earth or other specified material will be required over and under pipe in areas where suitable trench side material is not available.

3.4 UNDERCROSSING OF ASPHALT-SURFACED ROADS

- A. Service connection piping under asphalt-surfaced roads shall be by open cut trenching. The service connection pipe shall be installed so that it has a minimum cover of 2.5 feet with a slight grade sloping away from the water main.

3.5 COPPER TUBING

- A. The copper tubing shall be cut with square ends, reamed, and flared with the proper size flaring tool, cleaned, and made up tightly. Care shall be taken to prevent the tubing from kinking or buckling on short-radius bends. Kinked or buckled sections of copper tubing shall be cut out and the tubing spliced with the proper brass fitting at the CONTRACTOR's sole expense.

3.6 POLYETHYLENE PLASTIC TUBING

- A. Install polyethylene plastic tubing in accordance with the manufacturer's recommendations.

3.7 INSTALLATION OF METER BOXES AND METERS

- A. Meters and meter boxes or vaults shall be installed by the CONTRACTOR as shown on the plans. Finish grade of completed meter enclosure shall be flush with existing ground or as shown otherwise. Meter boxes or vaults shall be set or constructed plumb with the top set to conform to the slope of the finish grade. Lightly compacted earth backfill shall be placed inside of the meter boxes to depth indicated. Grade adjustment of the meter boxes or vaults shall be by using standard extension sections for the box or vault specified. Install meter in a horizontal position with the meter dial or dials at a depth below the cover as shown on the plans. Backfill around meter vaults as specified for adjoining pipe.
- B. Water meters shall be reinstalled by the CONTRACTOR. Corporation stops shall be in the open position and angle stops shall be closed, prior to reinstallation of the meter.
- C. Withhold reinstalling meters until the new water system is ready for operation. The remainder of the service connection, excluding the meter, may be installed at any time during or after construction of the main.
- D. Where existing meters are designated for relocation, contractor shall read, record, and submit existing meter readings on the form supplied by the CITY prior to removal of meters, and after completion of relocation WORK. CONTRACTOR shall furnish ENGINEER and CITY with copies of all meter readings on a monthly basis or as requested by the ENGINEER.

3.8 HYDROSTATIC TEST AND LEAKAGE

- A. Test service connections and service connection tubing by either testing in conjunction with the main at the test pressure required for the main, or by testing at the normal hydrostatic main pressure after the main has been completely installed and tested. Inspect visually for leaks and repair any leaks before backfilling. Duration of the test shall be at least fifteen (15) minutes.

3.9 DISINFECTION

- A. Service connection transfers shall be disinfected as follows:
 - 1. Make connection to the main pipeline which shall have been previously hydrostatically tested and disinfected.

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WATER SERVICE CONNECTIONS AND TRANSFERS

2. Prior to connecting new copper or plastic tubing to existing copper tubing or meter stop, flush new copper or plastic tubing by fully opening corporation stop and allowing water to run for 2 minutes.
 3. Close corporation stop and meter stop, connect new copper or plastic tubing to existing copper tubing or to meter stop, as applicable. Open corporation stop and allow to stand for a minimum of 30 minutes retention period. Open meter stop.
- B. The CITY may put extra chlorine in the water system during the time of service connection transfers to provide sufficient chlorine residual to adequately disinfect service connections when the above procedure is followed.

END OF SECTION

SECTION 02519

DISINFECTION OF WATER SYSTEMS

PART 1 - GENERAL

1.01 GENERAL CITY PRESENCE

- A. All work under this Section to be done in the presence of the ENGINEER and CITY Representatives
- B. Existing valves and connections to the water system are to be operated by the CITY staff only.

PART 2 – PRODUCTS

1.02 WATER FOR DISINFECTION AND TESTING

- A. Clean, uncontaminated, and potable.
- B. The CITY will supply potable quality water. CONTRACTOR shall convey in disinfected pipelines or containers.

1.03 SUBCONTRACTOR'S EQUIPMENT

- A. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.
- B. Provide protection as required by AWWA Standards C651, C652, C653, and/or C654 against cross-connections.

PART 3 - EXECUTION

2.01 GENERAL

- A. Disinfection procedures shall conform to AWWA Standards C651, and this Specification.
- B. Disinfect the following items installed or modified under this Project, intended to hold, transport, or otherwise contact potable water:
 - 1. Pipelines: Disinfect new pipelines that connect to existing pipelines up to point of connection.
 - 2. Disinfect surfaces of materials that will contact finished water, both during and following construction, using one of the methods described in AWWA C652 and C653. Disinfect prior to contact with finished water. Take care to avoid recontamination following disinfection.
- C. Prior to application of disinfectants, clean pipelines of loose and suspended material. Flush pipelines until clear of suspended solids and color. Use water suitable for flushing and disinfecting.
- D. Conform to AWWA C651 for pipes and pipelines, except as modified in these Specifications. AWWA Specification requirements will be made available to the CONTRACTOR upon request.
- E. Allow freshwater and disinfectant solution to flow into pipe or vessel at a measured rate so that chlorine-water solution is at specified strength. Do not place concentrated commercial disinfectant in pipeline or other facilities to be disinfected before it is filled with water.

**SECTION 02519
DISINFECTION OF WATER SYSTEMS**

2.02 SEQUENCING AND SCHEDULING

- A. Commence Initial Disinfection After Completion of Following:
 - 1. Installation of water services, valves, and hydrant leads.
 - 2. Completion and acceptance of internal painting of system(s).
 - 3. Hydrostatic and pneumatic testing, pressure testing, functional and performance testing and acceptance of pipelines, pumping systems, structures, and equipment.
 - 4. Disinfection of:
 - a. Pumps and associated system piping.
 - b. Treatment plant basins and processes used to supply water to system.
- B. Provide 48 hour's notice to ENGINEER and CITY Representative for scheduling of valve operation, sampling, or laboratory testing.

2.03 PIPING AND PIPELINES

- A. Flushing:
 - 1. Before disinfecting, flush and/or pig as required all foreign matter from pipe in accordance with AWWA C651. Provide hoses, temporary pipes, ditches, and other conduits as needed to dispose of flushing water without damage to adjacent properties.
 - 2. Flush service connections and hydrants. Flush distribution lines prior to flushing hydrants and service connections.
 - 3. Flush pipe through flushing branches and remove branches after flushing is completed.
 - 4. Operate new valves during flushing process at least twice during each flush.
- B. Disinfecting Procedure: In accordance with AWWA C651. The piping and appurtenances shall be sterilized by introducing the sterilizing agent into the water which is being pumped into the system in such a manner that the entire system involved will be filled with water containing a minimum chlorine concentration of 50 ppm at any point. The water shall be allowed to remain in the system for a minimum contact period of 24 hours before the system is flushed out.
- C. Pipelines larger than 36 inches in diameter may be disinfected by spraying in accordance with the method described in AWWA C652.
- D. Sampling Points: Provide sampling points on all water mains at the end of each water main and at a maximum spacing of 1,500 feet.
- E. Water mains can be put into service when the chlorine concentration is less than 0.1 ppm free chlorine and 3.0 ppm total chlorine.

2.04 DAMAGED WATER MAINS

- A. All pipe and fittings used to repair a damaged water main or service shall be swabbed or sprayed with hypochlorite as specified above.
 - 1. Hypochlorite concentration shall range from 4 to 12 percent.
 - 2. Hypochlorite solution must remain in contact with all pipe and fittings for a minimum of 10 minutes.

2.05 DISPOSAL OF HEAVILY CHLORINATED WATER

- A. Do not allow flow into a waterway without neutralizing disinfectant residual.

**SECTION 02519
DISINFECTION OF WATER SYSTEMS**

- B. See the appendix of AWWA C651, C652, C653, and/or C654 for acceptable neutralization methods.

2.06 **TESTING**

- A. After pipelines have been cleaned, disinfected, and refilled with potable water, COUNTY Representatives will take water samples and have them analyzed for conformance to bacterial limitations for public drinking water supplies.
- B. Sampling and testing shall be in accordance with AWWA C-651 and FAC 62-555.340. Any main installed, tested and put into service shall pass all required testing as a single unit. If any single sampling point on the main fails, all testing shall be repeated (at no additional cost) until all sampling points pass.
- C. Bacteriological samples must be collected on two consecutive days. The CONTRACTOR will coordinate and provide a means of sampling for COUNTY Representatives to collect the samples. Failure to provide adequate notice and any subsequent delay in sampling will not be considered grounds for project delay.
- D. If minimum samples required above are bacterially positive, disinfecting procedures and bacteriological testing shall be repeated until bacterial limits are met at no additional cost.

END OF SECTION

**SECTION 02660
WATER DISTRIBUTION**

PART 1 - GENERAL

1.01 SCOPE:

This section of the specifications covers the material and installation requirements for piping, valves, fittings, specials, crossings, connections, flushing, and testing. Excavation, trenching, and backfill for the installation of underground piping systems shall be specified in Section 02221.

Construction of reclaimed water mains shall proceed in a continuous operation through flushing and pressure testing, unless otherwise permitted by the City Engineer.

1.02 RELATED SECTIONS:

- A. Section 02200 – Site Preparation.
- B. Section 02220 – Excavation and Backfill for Pipe Systems.

1.03 SUBMITTALS:

- A. Submit product data under provisions of Section 01300, “Submittal Procedures”.

Three copies of all required test reports shall be submitted to the City Engineer. These shall include:

- A. Certified records of tests on ductile iron pipe made by the manufacturer or a commercial testing laboratory for each shipment of pipe. Tests shall be in accord with the procedure outlined in ANSI Standard A21.51 (AWWA C-151).
- B. Certificate by polyvinyl chloride pipe manufacturer that all pipe furnished meets the requirements of A.W.W.A. C-900; PVC pipe shall be blue in color.
- C. Certificate by Polyethylene plastic tubing manufacturer that meets A.W.W.A. C091.
- D. Reports on pressure and leakage tests. Shop drawings shall be submitted for all valves, valve boxes, and pipeline restraints.

1.04 PROJECT RECORD DOCUMENTS:

- A. Submit documents under provisions of Section 01700, “Contract Closeout”.
- B. Accurately record location of pipe runs, connections and elevations.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Pipe:
 - 1. General: All materials will be inspected by the City Engineering inspector prior to installation. All materials shall be new, manufactured either in the year that construction begins or the previous year. AWWA or ASTM Specifications shall be latest issue.
- Ductile Iron Pipe:

**SECTION 02660
WATER DISTRIBUTION**

- a. Ductile iron pipe for water main installed underground shall be manufactured in accordance with AWWA C-151 (ANSI Std. A 21.51). Pipe shall be designed for thickness in accordance with AWWA C-150 (ANSI Std. A 21.50), subject to the following design criteria: 150 psi water pressure plus 100 psi surge pressure, Type 2 laying condition, 2 to 1 safety factor, trench width diameter plus 2 feet, and depth of cover as shown on the drawings. The depth of cover for reclaimed water mains not shown in profile shall be a minimum of 3 feet 6 inches, unless otherwise shown on the drawings. Where ductile iron pipe is threaded for flanges, the thickness shall be increased to provide for pressures cited above. The depth of cover for the pipe listed in the preceding paragraph is specified as a minimum required depth. The pipe manufacturer shall determine additional wall thickness required where amount of cover exceeds the minimum requirements.
 - b. Pipe shall have cement lining and bituminous seal coat in accordance with AWWA C-104 (ANSI Std. A 21.4). Pipe shall also be bituminous coated on the outside. Lining shall be standard thickness. Joints for ductile iron pipe shall be mechanical or push-on type designed in accordance with AWWA C-111. Gasket lubricant shall be labeled with the trade name, pipe manufacturer's name. Fittings for ductile iron pipe shall be manufactured of ductile iron and shall conform to the requirements of AWWA C-110 or AWWA C-153. Fittings shall be designed so as to be compatible with the pipe and so as to provide at least equal resistance to internal and external loads on the pipe. The lining and coating of the fittings shall be as specified for the pipe. Joints for fittings shall be mechanical type for underground service. The joint and bolts and nuts shall conform to AWWA C-111. All fittings shall be rated for not less than 150 psi working pressure plus 100 psi surge pressure.
- B. Polyvinyl Chloride (PVC) Pipe:
- a. Polyvinyl chloride pipe for risers shall meet the requirements of AWWA C-900.
- C. Restraining:
- a. Restrained Joints: Restrained joints shall be provided for all buried piping systems at the location required to resist system thrust. Pipe joints and fittings shall be restrained as specified below.
 - b. Restrained joints for field-cut ductile iron pipe: When prior approval is obtained from the Engineer, fittings and push-on ductile iron pipe may be restrained using a follower gland which includes a restraining mechanism. When actuated during installation, the restraining device shall impart multiple wedging action against the pipe wall which increases resistance as internal pressure in the pipeline increases.
 - c. The joint shall maintain flexibility after installation. Glands shall be manufactured of ductile iron conforming to ASTM A536 and restraining devices shall be of heat treated ductile iron with a minimum hardness of 370 BHN. The gland shall have standard dimension and bolting patterns for mechanical joints conforming to ANSI/AWWA C111 and C153, latest revisions.
- D. Gate Valves:
- a. Gate valves shall be designed for a working pressure of not less than 150 psi, of a resilient seat wedge type, and when fully open, have a clean waterway equal to the nominal diameter of the pipe. The valve shall open by turning to the left or counterclockwise when viewed from the stem. The operating nut shall have an arrow cast in the metal indicating the direction of opening. Each valve shall have the manufacturer's distinctive marking, pressure rating, and year of manufacture cast on the body. Prior to shipment from the factory, each valve shall be tested by applying to it a hydraulic pressure equal to twice the specified working pressure.
 - b. Valves 3" and larger shall be iron body, fully bronze mounted, resilient seat valves and shall conform to the specifications for Gate Valves for Ordinary Water Works Service, AWWA C-500 and C-509 and shall be fitted with an O-ring seal of standard manufacture. Valves to be located underground shall be non-rising stem type designed for buried service with a two-inch square operating nut. The valves shall have mechanical joint connections. Valves to be used above

**SECTION 02660
WATER DISTRIBUTION**

ground shall have outside screw and yoke operation, handwheels and standard flanged ends in accordance with AWWA C-110.

- c. Valves two inches (2") and smaller shall be all brass, ball valve curb stop type and shall conform to AWWA standards and ASTM B62 Index - 115-85-5-5-5.

PART 3 - INSTALLATION

3.01 GENERAL:

- A. Pipe and fittings for the reclaimed water main shall be strung out along the route of construction with the bells pointing in the direction of construction. Pipe shall be placed where it will cause least interference with traffic. Pipe shall be handled by mechanical equipment. Before the pipe is lowered into the trench, it shall be swabbed or brushed out to insure that no dirt or foreign material gets into the finished line. Trench waters shall be kept out of the pipe and the pipe kept closed by means of a test plug whenever work is not in progress. The Contractor shall provide the means for dewatering the trench, and the cost thereof shall be included in the price for installing the pipe.
- B. Deflections from a straight line or grade made necessary by vertical curves or horizontal curves or offsets shall not exceed the manufacturer's recommendations. If the specified or required alignment requires deflections in excess of those recommended, the Contractor shall either provide special bends as approved by the City Engineer or a sufficient number of shorter lengths of pipe to provide angular deflections within the required limit.

3.02 SURFACE RESTORATION:

- A. Restore the top surfaces of the backfill to the original or planned conditions. Carefully examine trenches upon the completion of backfilling and remove surface irregularities that are dangerous or obstructive to traffic. Where existing pavement, curbing, curb and gutter, sidewalk or valley gutter is removed for the purpose of construction water mains, etc. Replace and restore such pavement, etc. to as good condition, as determined by the Engineer, as before removal, at no additional cost to the City. The replacement pavement is to be of the same or similar type as that removed.

END OF SECTION

**SECTION 02695
PROTECTION OF EXISTING FACILITIES**

PART 1 -GENERAL

1.1 GENERAL

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

1.2 RIGHTS-OF-WAY

- A. The CONTRACTOR shall not do any WORK that would affect any oil, gas, sewer, or water pipeline; any telephone, telegraph, or electric transmission line; any fence; or any other structure, nor shall the CONTRACTOR enter upon the Right-of-way involved until notified by the ENGINEER that the OWNER has secured authority therefore from the proper party. After authority has been obtained, the CONTRACTOR shall give said party due notice of its intention to begin WORK, if required by said party, and shall remove, shore, support or otherwise protect such pipeline, transmission line, ditch, fence, or structure or replace the same. When two or more contracts are being executed at one time on the same or adjacent land in such manner that WORK on one contract may interfere with that on another, the OWNER shall determine the sequence and order of the WORK. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the OWNER to the CONTRACTOR so desiring, to the extent, amount, in the manner, and at the times permitted. No such decision as to the method or time of conducting the WORK or the use of territory shall be made the basis of any claim for delay or damage, except as provided for temporary suspension of the WORK in the General Conditions of the Contract.

1.3 PROTECTION OF STREET OR ROADWAY MARKERS

- A. The CONTRACTOR shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced. All survey markers or points disturbed by the CONTRACTOR shall be accurately restored after all street or roadway resurfacing has been completed.

1.4 RESTORATION OF PAVEMENT/SIDEWALKS

- A. General: All paved areas cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the affected pavement owner. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.

SECTION 02695
PROTECTION OF EXISTING FACILITIES

- B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.
- C. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.
- D. Restoration of Sidewalks or Private Driveways: Wherever sidewalks or private roads have been removed for purposes of construction, the CONTRACTOR shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the CONTRACTOR shall maintain said temporary sidewalks or roadways until the final restoration thereof has been made. The CONTRACTOR shall replace any damage to existing sidewalks that are to remain at no cost to the CITY.

1.5 EXISTING UTILITIES AND IMPROVEMENTS

- A. General: The CONTRACTOR shall protect all Underground Utilities and other improvements which may be impaired during construction operations. It shall be the CONTRACTOR's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.
- B. Utilities to be Moved: In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the CONTRACTOR, be notified by the CONTRACTOR to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the CONTRACTOR shall notify the ENGINEER a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.
- C. Temporary Removal or Relocation: Where the proper completion of the WORK requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is indicated, the CONTRACTOR shall, at the CONTRACTOR's expense, remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the ENGINEER and the OWNER of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the CONTRACTOR in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.
- D. OWNER's Right of Access: The right is reserved to the OWNER and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the WORK of this Contract.
- E. Underground Utilities Indicated: Existing utility lines that are indicated or the locations of which are made known to the CONTRACTOR prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the CONTRACTOR.
- F. Underground Utilities Not Indicated: In the event that the CONTRACTOR damages any existing utility lines that are not indicated or the locations of which are not made known to the CONTRACTOR by

SECTION 02695
PROTECTION OF EXISTING FACILITIES

Sunshine State One Call Center prior to excavation, a written report thereof shall be made immediately to the ENGINEER. If directed by the ENGINEER, repairs shall be made by the CONTRACTOR under the provisions for changes and extra WORK contained in the General Conditions of the Contract. The CONTRACTOR shall be responsible for all repair or relocation costs for any failure by the CONTRACTOR to contact appropriate utilities for locations prior to digging.

- G. Approval of Repairs: All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement owner and the ENGINEER before being concealed by backfill or other WORK.
- H. Maintaining in Service: All oil and gasoline pipelines, power, and telephone or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the WORK shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the ENGINEER are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The CONTRACTOR shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.
- I. Existing Water Services: CONTRACTOR shall protect and provide temporary support for existing water services. Any water service damaged by the CONTRACTOR shall be replaced at the CONTRACTOR's expense, with a new water service complete with new water main tap.

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

- A. General: The CONTRACTOR shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street Right-of-way and project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or OWNER. All existing trees and shrubs which are damaged during construction shall be trimmed or replaced by the CONTRACTOR or a certified tree company under permit from the jurisdictional agency and/or the OWNER. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs. All trees to remain in right-of-way shall be protected and fenced with orange barricade fencing.
- B. Trimming: Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be made close to the trunk or large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.
- C. Replacement: The CONTRACTOR shall immediately notify the jurisdictional agency and/or the OWNER if any tree is damaged by the CONTRACTOR's operations. If, in the opinion of said agency or the OWNER, the damage is such that replacement is necessary, the CONTRACTOR shall replace the tree at its own expense. The tree shall be of a like size and variety as the tree damaged, or, if of a smaller size, the CONTRACTOR shall pay to the owner of said tree a compensatory payment acceptable to the tree owner, subject to the approval of the jurisdictional agency or owner. The size of the trees shall be not less than 1-inch diameter nor less than 6 feet in height.

1.7 NOTIFICATION BY THE CONTRACTOR

- A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway Right-of-way the CONTRACTOR shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than 3 days nor more than 7 days prior to excavation so that a representative of said owners or agencies can be present during such WORK if they so desire. The CONTRACTOR shall also notify the Sunshine State One Call Center 1-800-432-4770 at least 2 days, but no more than 14 days, prior to such excavation.

PART 2 -PRODUCTS

2.1 MATERIALS, GENERAL

- A. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards

2.2 TEMPORARY FENCING

- A. Materials to CONTRACTOR's option, minimum fence height is 6 feet.

2.3 BARRIERS

- A. Materials to CONTRACTOR's option, as appropriate to serve required purpose.

PART 3 -EXECUTION

3.1 GENERAL

- A. Install facilities of a neat and reasonable uniform appearance, structurally adequate for required purposes. Haul roads affected by construction traffic will be restored to original or better condition by CONTRACTOR at CONTRACTOR's expense.
- B. Maintain barriers during entire construction period.
- C. Relocate barriers as required by progress of construction.

3.2 TREE AND PLANT PROTECTION

- A. Preserve and protect existing trees and plants adjacent to WORK areas.
- B. Consult with ENGINEER and remove agreed-on roots and branches which interfere with WORK:
 - 1) Employ qualified tree surgeon to remove branches, and to treat cuts.
- C. Protect root zones of trees and plants:
 - 1) Do not allow vehicular traffic and parking.
 - 2) Do not store materials or products.
 - 3) Prevent dumping of refuse or chemically injurious materials or liquids.
 - 4) Prevent puddling or continuous running water.
- D. Carefully supervise all WORK to prevent damage.
- E. Replace trees and plants which are damaged or destroyed due to WORK operations under this contract.

3.3 REMOVAL

- A. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed, and when approved by OWNER or ENGINEER.
- B. Clean and repair damage caused by installation, fill and grade areas of the site to required elevations and slopes, and clean the area.

END OF SECTION

**SECTION 02705
MILLING OF EXISTING ASPHALT PAVEMENT**

PART 1 - GENERAL

1.01 SCOPE:

- A. Summary of Work: The CONTRACTOR shall furnish all labor and equipment to remove the existing asphalt pavement surface by milling to improve the rideability and cross slope of the finished pavement, to lower the finished grade adjacent to the existing curb before resurfacing, or to completely remove the existing pavement. Plans will specify an average depth of cut for milling and resurfacing. CONTRACTOR shall take ownership of the milled material.

1.02 APPLICABLE PUBLICATION:

- A. Florida Department of Transportation (FDOT)
 - 1. Standard Specifications for Road and Bridge Construction, latest edition

1.03 RELATED SECTIONS:

- A. Section 02710 Base Course
- B. Section 02741 Asphaltic Concrete Paving
- C. Section 02761 Pavement Marking

1.04 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the City as requested for inspection. The CONTRACTOR shall provide at least 48 hours advance notice of its intention to begin new WORK activities.

PART 2 - PRODUCTS

2.01 EQUIPMENT: The CONTRACTOR shall furnish equipment conforming to FDOT Specification Section 327-2.

PART 3 - EXECUTION

3.01 CONSTRUCTION AND QUALITY CONTROL: The CONTRACTOR shall conform to FDOT Specification Section 327-3 and 4 for the construction and quality control requirements of the milling operation.

END OF SECTION

**SECTION 02710
BASE COURSE**

PART 1 GENERAL

1.01 SCOPE

The CONTRACTOR shall furnish all labor, equipment, and materials for construction of the base course for the asphaltic concrete pavement.

1.02 APPLICABLE PUBLICATIONS

- A. Florida Department of Transportation
Standard Specifications for Road and Bridge Construction, latest edition, (FDOT)
- B. American Society of Testing Materials, (ASTM)
 - 1. ASTM D1557-00, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using the Modified Effort (56,000 ft-lb/ft³ (2,700 kN-m/m³))
 - 2. ASTM D 2922-01, Standard Test Methods for Density of Soil and Soil-Aggregate in Place by the Nuclear Methods (Shallow Depth)

1.03 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 CONTRACTOR shall provide the required base material which shall be either commercial limerock or crushed shellrock in conformance with FDOT Standard Specifications for Road and Bridge Construction Sections 230 and 911.
- 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. 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 02240, Soil Stabilization.
- 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.

**SECTION 02710
BASE COURSE**

- 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

**SECTION 02741
ASPHALTIC CONCRETE PAVING**

PART 1 - GENERAL

1.01 SCOPE:

- A. Summary of Work: The CONTRACTOR shall furnish all labor, materials, and equipment for construction of an asphaltic concrete surface course of the thickness and to the lines and grades shown on the Drawings or as specified herein.

1.02 APPLICABLE PUBLICATION:

- A. Florida Department of Transportation (FDOT)
 - 1. Standard Specifications for Road and Bridge Construction, latest edition

1.03 RELATED SECTIONS:

- A. Section 02705 Milling of Existing Asphalt Pavement
- B. Section 02710 Base Course
- C. Section 02761 Pavement Marking

1.04 CERTIFICATIONS AND TESTING: Material testing shall be performed as described in the FDOT Standard Specifications for Road and Bridge Construction, latest edition.

1.05 INSPECTION COORDINATION: The CONTRACTOR shall provide access to the WORK for the City as requested for inspection. The CONTRACTOR shall provide at least 48 hours advance notice of its intention to begin new WORK activities.

1.06 WARRANTY:

- A. The CONTRACTOR shall warrant the WORK against defects for one year from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PRIME COAT: The CONTRACTOR shall furnish prime coat conforming to FDOT Specification Section 300-2.1, 916-3, and 916-4.

2.02 TACK COAT: The CONTRACTOR shall furnish tack coat conforming to FDOT Specification Section 300-2.3 and 916-2.

2.03 ASPHALTIC CONCRETE: The CONTRACTOR shall furnish asphaltic concrete conforming to the applicable FDOT Specification Section 334 for the type asphalt specified on the Drawings.

PART 3 - EXECUTION

3.01 APPLICATION OF PRIME AND TACK COATS: The CONTRACTOR shall apply the prime and tack coats in accordance with the following:

- A. Weather Limitations: Application shall be made when the air temperature in the shade is above 40 degrees F.

**SECTION 02741
ASPHALTIC CONCRETE PAVING**

- B. Prime Coat: Application of the prime coat shall conform to FDOT Specification Section 300-7. The surface to be primed shall be clean, and moisture content of the base shall not exceed 90% of the optimum. The temperature of the prime material shall be between 100 degrees and 150 degrees F. The material shall be applied by means of a pressure distributor. The rate of application shall be not less than 0.10 gal/sy unless directed otherwise by the City.

- C. Tack Coat: Application of the tack coat shall conform to FDOT Specification Section 30-8. The tack coat shall be applied with a pressure distributor. The material shall be heated to a suitable temperature for proper application. The rate of application shall be between 0.02 and 0.10 gal/sy. The time of application shall be sufficiently in advance of laying of the bituminous surface course to permit drying, but shall not be applied so far in advance, so as to lose adhesiveness. The surface shall be kept free from traffic until the subsequent layer of bituminous hot mix has been laid.

3.02 LAYING OF ASPHALTIC CONCRETE: The CONTRACTOR shall place the asphaltic concrete pavement in conformance with the following:

- A. Limitations of Operations: The laying operations shall not begin unless the weather is suitable for all activities as specified in FDOT Specification Section 330-3.

- B. Preparation: The preparation of the asphalt cement, aggregates and mixture shall conform to FDOT Specification Section 330-4.

- C. Transportation: The mixture shall be transported as specified in FDOT Specification Section 330-3.

- D. Placing Mixture: Placing the mixture shall conform to FDOT Specification Section 330-5 and 6.

- E. Compacting Mixture: Compaction of the asphaltic concrete shall be in accordance with FDOT Specification Section 330-7.

- F. Surface Requirements: The surface shall conform to FDOT Specification Section 330-9, except that the criteria for the maximum allowable deficiency in the final surface layer shall be 3/16 inch for all locations and types of paved areas.

3.03 PROTECTION OF FINISHED SURFACES: The CONTRACTOR shall protect the finished asphaltic concrete pavement surface upon completion. No dumping of any material directly on the pavement shall be permitted. Vehicular traffic shall not be permitted on any pavement that has not set sufficiently to prevent rutting or other distortion.

END OF SECTION

**SECTION 2761
PAVEMENT MARKINGS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All applicable provisions of the bidding and Contract Requirements, and Division 1 - General Requirements shall govern the WORK under this section.

1.2 WORK INCLUDED

- A. The WORK covered by this section shall include the furnishing of all labor, equipment and materials necessary to construct and install all pavement marking and striping in accordance with the plans and these specifications.

1.3 RELATED WORK

- A. Section 02741 - Asphaltic Concrete Paving
- B. FDOT Standard Specification Sections 710 and 711

1.4 PROJECT CONDITIONS

- A. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 degrees F for oil base materials, 50 degrees F for water-based materials, and not exceeding 90 degrees F.
- B. Surface Preparation: The surface shall be clean and free of dirt, grease, oil, or other contaminants which could interfere with adhesion.

1.5 QUALITY ASSURANCE

- A. Perform all WORK in accordance with the requirements of local agencies.

PART 2 - PRODUCTS

2.1 Chlorinated rubber-alkyd type, as per Fed Spec. No. TT-P-115, Type III, or shall be Code T-1, conforming to Section 971-12.2 of the Florida Department of Transportation Standard Specifications.

- A. Paint shall be factory mixed, quick drying and non-bleeding type.
- B. Color shall be as per D.O.T. requirements.
- C. Striping, arrows, lane markers and stop bars shall be provided with paint containing reflective additive.

2.2 Thermoplastic paint shall conform to the applicable Technical Specifications (Section 711) of the Florida Department of Transportation and Miami-Dade County Standards.

2.3 Traffic paint shall conform to the applicable Technical Specifications (Section 710) of the Florida Department of Transportation and Miami-Dade County Standards.

- 2.4 Reflectors shall be in accordance with Miami-Dade County Minimum Standards.

PART 3 - EXECUTION

3.1 TRAFFIC AND LANE MARKINGS

- A. Sweep dust and loose material from the sealed surface.
- B. Apply thermoplastic paint striping as indicated on the DRAWINGS in accordance with FDOT Standard Specification Section 711.
- C. Protect pavement markings until completely dry in accordance with manufacturer's recommendations.

3.2 TEMPORARY PAVEMENT MARKINGS

- A. Temporary paint shall be applied in accordance with permanent pavement marking specifications. However, only 1 coat of paint shall be required to a clean, dry surface using template or a striping machine. The CONTRACTOR may also propose to utilize temporary/removable pavement marking tape, as approved by the CITY.
- B. Markings shall be applied using butyl adhesive pads or paint to clean dry pavement surfaces which are free of cracking, checking, spalling, or failure of underlying base material.
- C. When required, removable marking tape or pavement marking paint shall be applied on clean dry surfaces at designated locations. Tape that has become damaged and is no longer serviceable shall be replaced without additional compensation.
- D. All temporary markings and striping shall be removed when no longer required. Any pavement area that has been determined to be damaged as a result of the removal operation shall be repaired at no cost to the City.

3.3 PAVEMENT MARKING REMOVAL

- A. Existing pavement marking lines and symbols shall be removed as to not materially or structurally damage the surface or texture of the pavement. A motorized abrasive device shall be utilized to remove existing markings. The CONTRACTOR shall repair any damage to the pavement at no expense to the City. The pavement surface shall be left in a condition that will not mislead or misdirect customers or motorists. Pavement marking removal within public Right of way shall be completed in accordance with the regulatory authority having jurisdiction and the specifications.

END OF SECTION

**SECTION 02920
SODDING**

PART 1 GENERAL

1.01 DEFINITIONS

- A. Maintenance Period: Begin maintenance immediately after each area is planted (sod) and continue for a period of 8 weeks after all planting under this Section is completed.

1.02 DELIVERY, STORAGE, AND PROTECTION

- A. Sod:
1. Do not harvest if sod is excessively dry or wet to the extent survival may be adversely affected.
 2. Harvest and deliver sod only after laying bed is prepared for sodding.
 3. Roll or stack to prevent yellowing.
 4. Deliver and lay within 24 hours of harvesting.
 5. Keep moist and covered to protect from drying from time of harvesting until laid.

1.03 WEATHER RESTRICTIONS

- A. Perform Work under favorable weather and soil moisture conditions as determined by accepted local practice.

1.04 SEQUENCING AND SCHEDULING

- A. Complete Work under this Section within 10 days following completion of soil preparation.
- B. Notify Engineer at Least 3 Days in Advance of:
1. Each material delivery.
 2. Start of planting activity.
- C. Planting Season: Those times of year that are normal for such Work as determined by accepted local practice.

1.05 MAINTENANCE SERVICE

- A. Contractor: Perform maintenance operations during maintenance period to include:
1. Watering: Keep surface moist.
 2. Washouts: Repair by filling with topsoil, and replace sodded areas.
 3. Mowing: Mow to 2 inches after grass height reaches 3 inches, and mow to maintain grass height from exceeding 3 1/2 inches.
 4. Resod unsatisfactory areas or portions thereof immediately at the end of the maintenance period if a satisfactory stand has not been produced, at which time maintenance period shall recommence.
 5. Resod during next planting season if scheduled end of maintenance period falls after September 15.

PART 2 PRODUCTS

2.01 FERTILIZER

- A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose. Minimum percentage of plant food by weight.
- B. Mix:
 - 1. Nitrogen: Sixteen.
 - 2. Phosphoric Acid: Four.
 - 3. Potash: Eight.

2.02 SOD

- A. Unless a particular type of sod is called for, sod shall match existing. In general, the CONTRACTOR should use the following types of sod:
 - 1. Use Bahia grass where no irrigation system exists.
 - 2. Use St. Augustine Floritam where an irrigation system is in use.
- B. Strongly rooted pads, capable of supporting own weight and retaining size and shape when suspended vertically from a firm grasp on upper 10 percent of pad.
 - 1. Grass Height: Normal.
 - 2. Strip Size: Supplier's standard, commercial size rectangles.
 - 3. Soil Thickness: Uniform; 1-inch plus or minus 1/4-inch at time of cutting.
 - 4. Age: Not less than 10 months or more than 30 months.
 - 5. Condition: Healthy, green, moist; free of diseases, nematodes and insects, and of undesirable grassy and broadleaf weeds. Yellow sod, or broken pads, or torn or uneven ends will not be accepted
 - 6. Any netting contained within the sod shall be certified by the manufacturer to be biodegradable within a period of 3 months from installation.

PART 3 EXECUTION

3.01 PREPARATION

- A. Grade Areas to Smooth, Even Surface with Loose, Uniformly Fine Texture:
 - 1. Roll and rake, remove ridges, fill depressions to meet finish grades.
 - 2. Limit such Work to areas to be planted within immediate future.
 - 3. Remove debris, and stones larger than 1 1/2 inches diameter, and other objects that may interfere with planting and maintenance operations.
- B. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry off before seeding. Do not create muddy soil.
- C. Restore prepared areas to specified condition if eroded or otherwise disturbed after preparation and before planting.
- D. Limit preparation to those areas that can be sodded within 72 hours after preparation.

**SECTION 02920
SODDING**

3.02 FERTILIZER

- A. Apply evenly over area in accordance with manufacturer's instructions. Mix into top 2 inches of top soil.
- B. Application Rate: 20 pounds per 1,000 square feet (1,000 pounds per acre).

3.03 SODDING

- A. Do not plant dormant sod, or when soil conditions are unsuitable for proper results.
- B. Prewet the area prior to placing sod. Lay sod to form solid mass with tightly fitted joints; butt ends and sides, do not overlap:
 - 1. Stagger strips to offset joints in adjacent courses.
 - 2. Work from boards to avoid damage to subgrade or sod.
 - 3. Tamp or roll lightly to ensure contact with subgrade; work sifted soil into minor cracks between pieces of sod, remove excess to avoid smothering adjacent grass.
 - 4. Complete sod surface true to finished grade, even, and firm.
- C. Fasten sod on slopes to prevent slippage with wooden pins 6 inches long driven through sod into subgrade, until flush with top of sod. Install at sufficiently close intervals to securely hold sod.
- D. Water sod with fine spray immediately after planting. During first month, water daily or as required to maintain moist soil to depth of 4 inches.

3.04 FIELD QUALITY CONTROL

- A. Six weeks after sodding is complete and on written notice from the CONTRACTOR, the City will, within 5 days of receipt, determine if the sod has been satisfactorily established.
- B. If the sod is not satisfactorily established, CONTRACTOR shall replace the sod and repeat the requirements of this Section.

END OF SECTION