ADDENDUM NO. 1
MARCH 23, 2018

Solicitation Title: NE 143rd Street Water Main Improvements Project

Solicitation No.: IFB 23-17-18 Opening Date: MONDAY, APRIL 2, 2018
BY NO LATER THAN 3:30 PM

Attention all potential bidders:

☒ MUST Addendum: Read carefully and follow all instructions. Information included in this Addendum will have a material impact on the submittal for this solicitation. All “MUST” addenda are considered a matter of responsiveness. “MUST” addenda must be acknowledged on Form “A-5. Failure of a Submitter to acknowledge the addenda may be cause for rejection of the bid.

To all prospective bidders, please note the following changes and clarifications:

1. The Bid Form (pages 30-33) is replaced with the bid form included as Attachment “C” of this addendum. Bidders must use the revised bid form as part of their proposal in order to be considered responsive.

2. Revisions to sheets 2, 5, 7, 8, 9, 10 and 11 of the Engineering Plans (Attachment “A” of the original IFB) are included with this addendum as Attachment “D”.

3. The following revisions to the Technical Specifications (Attachment “B” of the original IFB) are included with this addendum:
   - Attachment “E” – Revised Section 01291 – Measurement and Payment
   - Attachment “F” – Revised Section 02220 – Excavation & Backfill for Pipe Systems
   - Attachment “G” – Revised Section 02660 – Water Distribution

Request for Information Questions/Clarification:

Q.1 Do the pipe and fittings have to be zinc coated for salt water intrusion area?
A.1 Yes, including the polyethylene encasement per Standard 1.9

Q.2 Does the contractor have the option to directional drill the long water services in lieu of open cut?
A.2 Yes, Directional drilling will be allowed.

Q.3 Item 18: Furnish and Install 2” HDPE quantity (1) Ea., does not match the drawings request of (2) proposed 2” Water Mains at +/-Sta. 32+81.68 and +/-Sta. 33+34.92 installed east and west along NE 144th Street. Please clarify quantity and unit of
measurement; should be in LF not Ea.

**A.3** See **Attachment “D”** included with this addendum for plans revision.

**Q.4** Please clarify final connection point of proposed 2” Water Mains at +/-Sta. 32+81.68 and +/-Sta. 33+34.92 installed east and west along NE 144th Street.

**A.4** See **Attachment “D”** included with this addendum for plans revision.

**Q.5** What’s the pay item for the 8”X16” Tee at +/-Sta. 36+28.84 on plan page 9.

**A.5** See **Attachment “D”** included with this addendum for plans revision.

**Q.6** According to the Connection Detail 3 on plan page 9, the 6”X16” Tee at +/-Sta. 36+64.45 should be an 8”X16” Tee. Please clarify and also what will be the pay item for the proposed 8”X16” Tee?

**A.6** See **Attachment “D”** included with this addendum for plans revision.

**Q.7** What’s the pay item for the Back Flow Preventer at +/-Sta. 36+74.71 on plan page 9?

**A.7** The Back Flow Preventer is existing to remain.

**Q.8** Item 1: What’s the required depth for the stabilization of subgrade?

**A.8** Refer to Note No 2 on sheet 16.

**Q.9** Item 2: What’s the required depth for the Lime Rock Base?

**A.9** Refer to Note No 2 on sheet 16.

**Q.10** Provide a pay item, quantity, and thickness for Measurement and Payment 1.14 Furnish and Place Asphalt Concrete Pavement, for trench restoration.

**A.10** Quantities are included in pay items 1 - 4.

**Q.11** Provide the required Pavement Restoration Detail. i.e. (Type I, Type M, etc.)

**A.11** Refer to sheet 16.

**Q.12** After reviewing and providing the required Pavement Restoration Detail, please adjust quantities in bid Items 1 and 2 if necessary.

**A.12** Quantities are included in pay items 1 through 4.

**Q.13** I would like to confirm that the City of North Miami is requiring BOTH a State Certified General Contractor License AND a State Certified Underground Utility and Excavation Contractor License as noted on page 15 of 44 under Section 2.0, Special Conditions.

**A.13** Yes, both licenses are required for this project. Licenses for sub-contractors shall be accepted.

For any other questions, clarification can be found in the specifications. All other terms, conditions and specifications remain unchanged for this solicitation.
Attachment “C”

Revised Bid Form
REVISED BID FORM
NE 143RD STREET WATER MAIN IMPROVEMENTS PROJECT
IFB 23-17-18
ESTIMATED COST: $900,000

The proposed price shall include the total cost for materials, labor, supervision, equipment, permits, overhead and profit, bonds and insurance, and all other related expenses needed to successfully execute the Project described under this Solicitation and referenced documents.

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<th>TOTAL</th>
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**SUBTOTAL (ITEMS 1-40)**

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**TOTAL BID AMOUNT**

[See Next Page for Notes and Acknowledgement]
NOTES:

- Please note that the City has added a Permit Allowance to cover the cost of permits issued for each project performed under this Contract; therefore, Respondents should not include the cost of permitting as a separate part of their proposed price.

- The Respondent acknowledges that the Project must be completed within two hundred and ten (210) calendar days from the City's issuance of a Notice-to-Proceed.

- Respondent(s), individual, partnership, corporation or association responding to this Solicitation certifies that all statements made in this document are true and correct to the best of their knowledge. Moreover, the Respondent(s) agrees to hold this offer open for a period of ninety (90) days from Bid Opening.

- Respondent(s) understand and agree to be bound by the conditions included in this Solicitation and shall comply with all requirements contained therein.

______________________________
Company Name

______________________________
Authorized Company Representative (Print Name)  Title:

______________________________
Signature  Date:
Attachment “D”

Engineering Plan Revisions
(Sheets 2, 5, 7, 8, 9, 10 and 11)
### TABULATION OF QUANTITIES

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**GENERAL NOTE:**

DO NOT TAKE ADVANTAGE OF ANY APPARENT ERROR OR OMISSION DISCOVERED IN THE CONTRACT DOCUMENTS, BUT IMMEDIATELY NOTIFY THE ENGINEER OF SUCH DISCOVERY. THE ENGINEER WILL THEN MAKE SUCH CORRECTIONS AND INTERPRETATIONS AS NECESSARY TO REFLECT THE ACTUAL SPIRIT AND INTENT OF THE CONTRACT DOCUMENTS.

**PAY ITEM NOTES:**

ITEM No. 19 INCLUDES RECONNECTION TO EXISTING FIRE HYDRANT.

MISCELLANEOUS PIECES THAT WILL BE NEEDED FOR FULL FUNCTIONING OF ITEMS No. 16,17,18,19,20 SHALL BE INCLUDED AS PART OF THE PAY ITEMS.

2" WATER MAIN IN ITEM No. 20 INCLUDES COST OF RECONNECTION TO EXISTING LINE INCLUDES SLEEVES AND CORP STOPS, AS REQUIRED.

ITEM No. 21 INCLUDES REMOVAL AND DISPOSAL OF EXISTING METER BOXES.

ITEM No. 34 INCLUDES THE COST OF PLUGGING AND GROUTING EXISTING MAIN.
Attachment “E”

Revised 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, Final Certified As-builts, and Pre-construction video and Documentation 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, etc.) 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 or tapping sleeve and valves 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 or 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 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 valves 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 PIPES

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 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 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 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 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.

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

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.
SECTION 01291
MEASUREMENT AND PAYMENT

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

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 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 EROSION AND DUST CONTROL

A. Cost for all work and operation necessary including all Work, Labor and Materials necessary to comply with
Storm Water Pollution Prevention measures, and Dust Control as required by the contract documents and the regulating agencies.

B. Payment for Erosion and Dust Control will be made in equal monthly amounts during the duration of the contract time.

1.26 FIELD TESTING AND LABORATORY WORK WITH CERTIFIED REPORTS
A. Cost for all work and operation necessary including all Work, Labor and Materials necessary to comply with testing requirements by the contract documents. Contractor to submit a Quality Control Plan and testing schedule for approval by the City.

B. Payment for Field Testing and Laboratory Testing with Certified Reports will be made in equal monthly amounts during the duration of the contract time.

1.27 PERMIT FEES
A. Any applicable permit fees shall be covered under the Permit Fee Allowance in the payment application.

END OF SECTION
Attachment “F”

Revised Section 02220

Excavation & Backfill for Pipe Systems
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:
      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
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 City.
      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:
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 City’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.
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 City.

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 City.

G. Backfill:
   1. Backfilling of utility trenches: not allowed until the work has been approved by the City, 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 City.
   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 Contractor's expense at intervals to be approved by the City. Tests will be made at depths and locations approved by the City.
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 City. 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 City, 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
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
Attachment “G”

Revised 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 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:
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 water mains not shown in profile shall be a minimum of 3 feet, 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.

Saltwater Intrusion and Corrosive Soils Requirements

In saltwater intrusion areas where the installation is subject to groundwater variation, the City shall require the use of V-Bio Enhanced Polyethylene Encasement and ductile iron pipe with a zinc basecoat under the asphaltic topcoat. All ductile iron pipe and fittings shall be wrapped with the V-Bio Polyethylene Enhanced Encasement and have the zinc protective coating factory applied.

For corrosive soils encountered outside of saltwater intrusion areas during construction V-Bio Polyethylene Encasement shall be installed to protect the ductile iron main, fittings and valves.

Zinc Basecoat: The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 g/m2 of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a local minimum not less than 2 mils. The coating system shall conform in every respect to ISO 8179-1 “Ductile iron pipes - External zinc-based coating - Part 1: Metallic zinc with finishing layer. Ductile iron fittings shall also have a zinc protective coating sprayed on at the factory at a minimum of 3 mils.

The V-Bio Polyethylene Enhanced Encasement shall be accordance with AWWA C600 and ANSI/AWWA C105/A21.5, “Polyethylene Encasement of Ductile-Iron Pipe Systems”. Color shall be blue for potable water, purple for recycled water, and green for sanitary sewage service. Polyethylene encasement for use with ductile iron pipe systems shall consist of three layers of co-extruded linear low-density polyethylene (LLDPE), fused into a single thickness of not less than 8 mils. The inside layer of the polyethylene wrap to be in contact with the pipe exterior shall be infused with a corrosion inhibitor and antimicrobial biocide to control galvanic corrosion. Product: V-Bio or approved equal.

Polyethylene encasement for ductile-iron pipe shall be supplied as a flat tube meeting the dimensions of Table 1 in AWWA C105 and shall be supplied by the ductile-iron pipe manufacturer.

Plastic adhesive tape shall consist of polyolefin backing and adhesive which bonds to common pipeline coatings including polyethylene. Products: Canusa Wrapid Tape; Tapecoat H35; Polyken 934; AA Thread Seal Tape, Inc.; or approved equal.
Install the polyethylene to completely encase the pipe and fittings to provide a watertight corrosion barrier. Continuously secure overlaps and ends of sheet and tube with polyethylene tape. Make circumferential seams with two or more complete wraps, with no exposed edges. Tape longitudinal seams and longitudinal overlaps, extending tape beyond and beneath circumferential seams. Wrap bell-spigot interfaces, restrained joint components, and other irregular surfaces with wax tape or moldable sealant prior to placing polyethylene encasement. Minimize voids beneath polyethylene.

Place circumferential or spiral wraps of polyethylene tape at 2-foot intervals along the barrel of the pipe to minimize the space between the pipe and the polyethylene. Overlap adjoining polyethylene tube coatings a minimum of 1 foot and wrap prior to placing concrete anchors, collars, supports, or thrust blocks. Hand-wrap the polyethylene sheet, apply two complete wraps with no exposed edges to provide a watertight corrosion barrier, and secure in place with 2-inch-wide plastic adhesive tape. Repair polyethylene material that is damaged during installation. Use polyethylene sheet, place over damaged or torn area, and secure in place with 2-inch-wide plastic adhesive tape. Repair polyethylene encasement at all service connections in accordance with AWWA C600-10, Section 4.8.

**Asphaltic Coating**

All pipe and fittings shall be outside-coated with an asphaltic material applied by means of the airless spray method. The exterior coating shall meet ANSI/AWWA C151/A21.51-09 for this type of coating, shall be smooth without pinholes, thin, bare or overly thick areas. Smoothness shall be such that when hand rubbed, no "sand paper" feeling will be experienced and such that the spigot area will readily slide through the gasket without pulling, tearing, rolling or otherwise disturbing the sealing capabilities of the gasket. Spigot ends shall be beveled prior to painting and to an extent that will permit ready insertion of the spigot through the gasket area.

**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 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