SECTION 33 12 00 – WATER SERVICE CONNECTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:

1. Connection to new water main.
2. Connection to existing water main.
3. Water service connections from water main to backflow.

B. Related Sections:

1. Section 31 23 16.13 – Excavation, Trenching, and Backfilling for Utilities
2. Section 33 11 00 – Water Utility Distribution Piping

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Water Service Connections:

1. Basis of Measurement: Individual price for each service connection.
2. Basis of Payment: Includes excavation, bedding. backfill, pipe, fittings, tap, and restoration, to indicated depth and connection to new or existing water main.

1.3 REFERENCE STANDARDS

A. All products, installation and testing of water services and water mains shall meet the requirements of State Primary Drinking Water Regulations (R61-58).

B. All materials and products that contact potable water must be third party certified as meeting the specifications of ANSI/NSF 61.

C. All chemicals and products added to the public water supply must be third party certified as meeting the specifications of ANSI/NSF 60.

D. Any reference to SCDOT standard specifications was obtained from "Standard Specifications for Highway Construction" published by the South Carolina Department of Transportation. Unless otherwise noted, the most current date published applies.

E. Any local and national plumbing codes.

F. American Water Works Association

1. AWWA C800 – Underground Service Line Valves and Fittings
2. AWWA C901 – Polyethylene (PE) Pressure Pipe and Tubing, 3/4 in. through 3 in., for water service
3. AWWA C213 - Fusion-bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings.

G. American Society for Testing and Materials

1. ASTM A536 – Standard Specification for Ductile Iron Castings
2. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications
3. ASTM D1248 – Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

1.4 SUBMITTALS

A. Product Data: Submit manufacturer catalog cuts and other information indicating proposed materials, accessories, details, and construction information.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Manufacturer Instructions or special procedures required to install specified products.

1.5 COORDINATION

A. Coordinate Work of this Section with utility owners and local authorities.

B. Notify all appropriate parties at least 72-hours prior to construction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

B. Stored Materials:

1. Store materials according to manufacturer instructions.
2. Store materials to the best of ability to prevent damage, theft, or vandalism.

C. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Block individual and stockpiled pipe lengths to prevent moving.
3. Provide additional protection according to manufacturer instructions.

1.7 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing products specified in this Section with a minimum five years of experience.

B. Installer: Company specializing in performing Work of this Section shall have appropriate licensure through South Carolina LLR.

1.8 CLOSEOUT DOCUMENTS

A. RECORD DRAWINGS – Provide two (2) pulled tape dimensions for all meter boxes.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.9 WARRANTY

A. Provide a two-year materials and workmanship warranty. The contractor shall be responsible for correcting defects in the Work during the warranty period, including defective material and workmanship.

1.10 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

B. Protection of other utilities:

1. Approximate location of certain known underground lines is shown.
2. Existing small lines not shown.
3. Locate small and other possible utility lines using electronic pipe finder, or other approved method.
4. Excavate and expose existing underground utilities ahead of trenching operations.
5. Repair or replace any damaged utility line or structure at no additional cost to Owner.

PART 2 - PRODUCTS

2.1 WATER SERVICE CONNECTIONS

A. General

1. Provide products with no trace amounts of lead or copper for items listed within this section. Products shall comply with the latest edition of the EPA National Primary

Drinking Water Regulations: Lead and Copper and SC DES guidelines for Lead and Drinking Water.

2. Brass components must conform to ASTM B584, UNS C89833 (latest revision) and be identifiable as being lead free.

B. Pipe:

1. 3/4" and 1" Services
   a. Material: Polyethylene (PEP4710)
   b. Comply with AWWA C901 and ASTM D2239
   c. Pipe Sizing: IPS
   d. Pressure Class: 250 psi
   e. Wall Thickness Ratio: S.I. DR 7 (Standard inside dimension ratio)
   f. No Joints. Continuous lengths between corporation stop and meter box.

2. 2" Services
   a. Material: HDPE
   b. Comply with AWWA C901 and ASTM D3035
   c. Pipe Sizing: IPS (O.D. Controlled)
   d. Pressure Class: 250 psi
   e. Wall Thickness Ratio: DR 9 (O.D.)
   f. No Joints. Continuous lengths between corporation stop and meter box.

3. Services larger than 2"
   a. Shall refer to specification Section: 33 11 00 - Water Utility Distribution Piping

C. Service Saddles:

a. Saddle Body: Ductile Iron with a fusion-bonded epoxy finish for strong corrosion finish
b. Strap:
   1) Connection to Ductile Iron: Electro Galvanized Steel double strap and electro galvanized bolts, nuts, and washers. Bolt sizing conforming to manufactures recommendations for required pipe connection size.
   2) Connection to PVC and HDPE: Type 304 stainless steel double strap and type 304 stainless steel bolts, nuts, and washers. Bolt sizing conforming to manufactures recommendations for required pipe connection size.
   3) Gasket: Nitrile Butadiene Rubber conforming to NSF 61 standards and permanently connected to saddle body.
   4) Coat nuts with anti-seize to prevent friction and galling.
   5) Tap for 3/4" and 1": Outlet tapped with AWWA taper (C.C.)
   6) Tap for 2": Outlet tapped with AWWA I.P. thread (F.I.P.T.)

c. Manufacturers
   1) Series shall be selected upon water main pipe material
      a) Romac Industries series 202NS, 202
      b) JCM series 406, 408
      c) Mueller series DR2S, DR2A
      d) Smith-Blair series 313, 317
      e) Or approved equal.

D. Corporation Valve:
   1. For ¾" and 1" Service Taps:
      a. Provide a domestic manufactured AWWA standard brass corporation valve with a 300 psi rating, with ground key and threads on inlet side and connection suitable for use with the type of service pipe being used on the outlet side.
      b. Provide Mueller B-25005N Ball Valve, AY McDonald 74701B-3H or approved equal.

E. Gate Valve for 2" Taps
   1. Valves shall be resilient-seated wedge, ductile iron body, conforming to AWWA C515, NSF 61, and rated for a maximum working pressure of 350 psi.
   2. Gate shall not be wedged into a pocket nor slide across the seating surface to obtain tight closures.
   3. Sealing mechanism shall provide zero leakage at the water working pressure against the line flow from either direction and be designed such that no metal seams, edges, screws, etc. are within the waterway in the closed position.
   4. Iron wedge must be symmetrical and fully encapsulated with molded rubber and no exposed iron.
   5. All interior and exterior ferrous surfaces of the valve, including the interior of the gate, shall be coated with a protective coating conforming to AWWA C550. Coating shall be applied to castings prior to assembly to ensure all exposed areas will be fully covered.
   6. Stem shall be designed to have an external failure should stem ever fail under excessive torque. Design should allow for operation of valve by wrench or other readily available tool during time of failure without disassembly the valve.
   7. Provide 316 stainless steel bolts and nuts.
   8. Valve shall have a non-rising stem.
   9. Valve shall have threaded end connections complying with ANSI B2.1
   10. Provide Mueller NRS A2362-8 Resilient Wedge Gate Valve or approved equal.

F. Valve Boxes for 2" Service Tap Gate Valves
   1. Valve boxes shall be provided for all buried valves 2 inches and larger.
   2. Provide a cast iron adjustable screw type, two (2) piece valve box suitable for depths shown on construction drawings. Provide extensions as required to meet depths.
   3. The valve box cover shall have the word "WATER" cast within.
   4. Provide cast iron valve boxes with a minimum inside diameter of 5" at the top on all valves located below grade.
   5. All castings shall have a minimum thickness of 1.5 mil of bitumastic paint.
   6. For valve boxes located within pavement, provide heavy duty valve box and cover rated for use in traffic areas and conforming to AASHTO standards.
   7. Valve shall be fitted with an extension stem for use with the buried service non-rising stem valves. The stem shall be of corrosion resistant metal and be designed to bring the valve nut within 6" of the grade.
   8. Stem shall be fitted with a self-centering disk below the operating nut to keep the extension stem aligned and limit foreign debris inside of the box.
   9. Provide 24" (O.D.) concrete collar with wire reinforcement at all valve boxes. Collar shall have a minimum height of 4" at valve box opening.
   10. Provide Tyler Series 461-S (or 562-S as depth requires), Star Pipe Products 461S, or approved equal.

G. Curb Stop
   1. Provide a full port brass ball meter valve F.I.P. x F.I.P with a quarter turn check – lock wing.
   2. Furnish valve with gaskets and O-rings of EPDM D2000 material.
   3. Curb stop size shall correspond to the service line size to be installed.
   4. Provide Mueller Company model B20200N (300) or approved equal.

H. Coupling Adapters
   1. For 3/4" and 1" services
      a. Provide a full brass body consisting of a one way grip ring and a resilient O-ring.
      b. Adapter shall be designed to prevent pipe pullout and a positive leak tight seal.
      c. Adapter shall contain sizing information cast within.
      d. Provide Insta-Tite H15426N by Mueller Company or approved equal.
   2. For 2" services
      a. Provide a full brass body designed for compression use of IPS PE O.D. Controlled (PEP) on one end and MNPT on the opposite end.
      b. Provide with a nitrile ASTM D2000 gasket, polypropylene washer, cast brass ASTM b62 coupling nut, and 304 stainless steel cap screw.
      c. Adapter shall contain sizing information cast within.
      d. Pack Joint V-15440N by Mueller Company, AY McDonalds 74753-44 or approved equal.

I. 2" Service Tap Appurtenances
   1. Provide a 2" ductile iron knuckle restraint with Type 304 stainless steel bolt and nut, as manufactured by Harco Corporation Model # 60-100-02 or approved equal.
   2. Provide a 2" MNPT x MNPT threaded ductile iron nipple.
   3. Utilize stainless steel O.D. Controlled IPS inserts for proper installation as manufactured by AY McDonald Model # 6137 or approved equal.
   4. Provide 2" bell x MNPT ductile iron adapter as manufactured by Harco Model # 80170 or approved equal

J. Tracer Wire
   1. Where PVC or polyethylene pipe is used, provide a continuous 12 gauge insulated copper tracer wire.
   2. Insulation to be blue in color and must be approved for direct bury by manufacturer.
   3. Tracer wire should be located at a maximum of 6" above the top of the service line or wrapped around the pipe.
   4. Tracer wire to terminate at each valve and allow for connection of equipment for tracing. Wire should be located at valve in a manner which prevents interference with the operation of the valve.

K. Meter Boxes
   1. Meter boxes and covers shall be injection molded of a polypropylene material with added ultraviolet (UV) protection.
   2. Provide meter boxes with a tapered body consisting of a minimum wall thickness of 0.25 inches and a 1-inch bottom flange.

3. The body of the box shall have a double wall at the top cover seat area with a minimum thickness of 0.187 inches. The seat area shall consist of structural support ribs on undersides with a minimum thickness of 3/16 inches.
4. Furnish box with a minimum 0.25 inch thick cover consisting of a cast iron reader. Cover and cast iron reader shall have the words “WATER METER” cast within.
5. For 3/4” and 1” meters, provide 14”x19”x12” meter box as manufactured by NDS model D1200 and cover or approved equal.
6. For 2-inch meters, provide 17”x30”x18” super jumbo meter box as manufactured by NDS or approved equal.

L. Backflow
1. Refer to SCDES (formerly SC DHEC) Approved Backflow Prevention Assemblies for South Carolina.

2.2 MISCELLANEOUS MATERIALS

A. As required, provide all other materials for a complete and proper installation for products and installation as described here within. All products shall comply with

PART 3 - EXECUTION

3.1 GENERAL

A. Determine depth and location of all water mains prior to installation of new water service connections.

B. Coordinate each location with property owners and utility owner’s representative.

C. Locate services to avoid conflicts with other utilities and structures.

D. Services shall be located 2 feet to 5 feet from common property line.

3.2 INSTALLATION

A. Commission shall be given a minimum of 48-hour notice prior to making any connections to a live water main.

B. Expose existing or new water main.

C. Remove large stones or other hard materials that could damage pipe or impede consistent backfilling or compaction.

D. Bedding:

1. Excavate pipe trench as specified in Section 31 23 16.13 – Excavation, Trenching, and Backfilling for Utilities.

E. Clean pipe thoroughly and surface prep pipe according to saddle manufacturer recommendations to ensure a proper watertight seal.

F. Install service saddle corresponding to required water main pipe material in accordance with manufacturer's recommendations.

G. Install corporation stop and complete required tap accordingly.

H. Connect service tubing from corporation stop and route in a continuous length to the location of the proposed service meter box location. To the best extent possible, service lines shall be straight, free of curves/bends and be perpendicular to the watermain and property line.

I. Install tracer wire as from valve to valve along the service line.

J. Service meter box shall be located on the customers side of the property line (outside of the SCDOT or Lexington County ROW).

K. Install all required adapters and curb stop within the water meter box.

L. Install meter box level in all directions and top flush with finished grades.

M. Box shall not rest on service line.

N. Meter shall be located within the box in a manner that can be removed at any time without disturbing the box setting.

O. Backfilling:

1. Comply with Section 31 23 16.13 – Excavation, Trenching, and Backfilling for Utilities.

P. Flush all service lines to remove any foreign debris upon installation of curb stop prior to installing meter.

3.3 FIELD QUALITY CONTROL

A. Request inspection prior to backfilling.

3.4 PROTECTION

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

B. Contractor shall be responsible for keeping the pipelines clean from dirt and debris. Should any foreign materials enter the pipe, remove and clean pipe. Cap open ends of piping during periods of Work stoppage.

3.5 TRACER WIRE TESTING

1. Tracer wire will be tested with a magnetic locating device to test all locations where tracer wire is installed.
2. Where there is a break in the tracer wire, repair wire by splicing and using gel nuts or an approved equal repair at no additional cost to the Owner.

END OF SECTION 33 12 00