

**FAUQUIER COUNTY WATER AND SANITATION AUTHORITY**

**DIRECTIONAL DRILLING SERVICES FOR THE  
ROCK SPRINGS SUBDIVISION WATERLINE REPLACEMENT PROJECT**

**Contract No. 18-C-01-0223**

**SCOPE OF WORK – EXHIBIT “D”**

- The project consists of the installation of up to approximately 2,500 LF (in combination) of 4” high density polyethylene (HDPE), D.I.P.S. waterline within the Authority’s Rock Springs Subdivision Water System in Warrenton, Virginia. The work specified in this section consists of furnishing and installing underground utilities using the horizontal directional drilling (HDD) method of installation. This work shall include all services, equipment, materials, and labor for the complete and proper installation, testing, restoration of underground utilities and environmental protection and restoration. See below for aerial maps showing proposed location and length of waterline to be installed by HDD.
- The estimate of quantities of the various items of Work, equipment and materials, as set forth in this Scope of Work, is approximate only and is given solely to be used as a uniform basis for the comparison of proposals. The quantities actually required to complete the Work may be more or less than so estimated.
- Material Specifications and Construction Requirements as detailed in Volume 5 – Construction, Part A - Utility Standards Manual (“USM”) of the Authority’s *Operating Code*, effective 28 November 2017 and as amended – being Exhibit “H” of the Contract Documents.
- SPECIFICATIONS – HDD/HDPE Pipe

**PART 1 GENERAL**

**1.1 DESCRIPTION**

It is the intent of this specification to define the acceptable methods and materials for installing water mains by the HDD method and the requirements for HDPE pipe installed by directional drilling.

**1.2 QUALITY ASSURANCE**

- A. Experience: Actively engaged in horizontal directional drilling for minimum of 3 years.

- B. The Contractor shall perform the work in general conformance with all pipe manufacturer's requirements for handling, storage, maximum longitudinal and bending stresses, etc. for the selected pipe material.

### 1.3 PROJECT CONDITIONS

- A. Complete HDD so as not to interfere with, interrupt, or endanger surface and activity thereon.
- B. Do not use HDD in rock stratum or subsoil consisting of boulders and underground obstructions that impede the process.
- C. The Contractor shall be responsible for the offsite disposal of all surplus bentonite mixture, cuttings, soil, and debris generated by the HDD project. The surplus materials shall be removed, hauled, and disposed of in accordance with all regulatory agencies having jurisdiction.

## **PART 2 MATERIALS**

### 2.1 PIPING & FITTINGS

Piping and fittings shall be extruded from a polyethylene compound and shall conform to the following requirements:

- A. The polyethylene resin shall meet or exceed the requirements of ASTM D3350 for PE 3408 material with a cell classification of 335434C or better.
- B. Pipe and accessories shall be 200 psi at 73.4 degrees F meeting requirements of Standard Dimension Ratio (SDR) 9 as a minimum strength.
- C. The HDPE shall meet NSF 14, AWWA C901 and AWWA C906 certification for potable water applications and comply with ANSI/NSF Standard 61 health effects requirement.
- D. The pipe manufacturer shall be listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements of the resin manufacturer for the resin used to manufacture the pipe in this project.
- E. Joining shall be performed by thermal butt-fusion in accordance with ASTM D-2774 and the manufacturer's recommendations to a strength equal to or greater than the tensile strength of the pipe. Electro-fusion welding may also be used to complete when the location is not accessible to butt-fusion welding equipment. The on-site welder making the joints (butt fusion or electro-fusion) shall have received specific training from the

manufacturer of the fittings and/or pipe being welded and shall have written proof of proper training/certification from the associated manufacturers.

- F. Water pipe exterior shall be blue in color or contain blue striping.

## 2.2 DRILLING FLUID

Bentonite drilling mud shall be compatible with the environment. The bentonite drilling mud must be in a homogenous, flowable state serving as an agent to carry the loose cuttings to the surface through the annulus of the borehole.

## 2.3 DETECTION WIRE

HMWPE solid copper wire, 10 gauge or thicker, with low density polyethylene insulation of minimum thickness of 45 mils.

# **PART 3 EXECUTION**

## 3.1 PREPARTION

- A. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protecting during excavation operations. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Owner immediately. Cooperate with the Owner and public or private utility companies in keeping their respective services and facilities in operation. Repair damaged utilities to the satisfaction of the utility owner.
- B. Contractor shall place slit fence between all drilling operations and any drainage, well-fields, wetland, waterway or other area designated for such protection necessary by documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations. Fuel may not be stored in bulk containers within 200 feet of any water body or wetland.
- C. The handling of the joined pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Cuts or gouges that reduce the wall thickness by more than 10% are not acceptable and must be cut out and discarded.

- D. The pipe must be inspected and cleaned with a wet cloth prior to each joint assembly so they are free of any dirt or sand. The ends of pipe must be free of any chips, scratches, or scrapes before pipe is assembled.
- E. The required piping shall be assembled in a manner that does not obstruct adjacent roadways or public activities. The Contractor shall erect temporary fencing around the entry and exit pipe staging areas.
- F. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter. During the course of the work, all reasonable precautions shall be taken to protect the pipe interiors against contamination.
- G. The Contractor shall be responsible for all permits, fees, temporary meter rental/provisions, temporary back flow preventer rental/provision, and other water utility requirements for supplying water during construction. The Contractor shall use the existing water system only at locations, times and conditions as set forth by the system owner or its representatives.
- H. Protect existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.

### 3.2 OPERATION

- A. Pre-excavate pipe entry and receiving areas to provide a gradual entry of the pipe without stress to the pipe or joints and to allow free movement into the bore hole at an acceptable depth. Carefully guide pipe in such a manner as to avoid deformation of, or damage to, the pipe.
- B. When water is encountered, provide and maintain dewatering system of sufficient capacity to remove water. Keep excavation free of water until backfill operation in progress. Perform dewatering in a manner that removal of soil particles is held to a minimum.
- C. The pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100 feet. In the event that pilot does deviate from bore path more than 5%, the Contractor shall notify the Authority and the Authority may require the Contractor to pull-back and re-drill from the location along bore path before the deviation.
- D. Upon successful completion of pilot hole, the Contractor shall ream bore hole to a minimum of 25% greater than outside diameter of pipe bell for straight pulls and 50% greater for curved or radius pulls using the appropriate tools. Contractor shall have the option to pre-ream or ream and pull back pipe in one operation if conditions allow. The Contractor

shall not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle.

- E. If unexpected subsurface conditions are encountered during the bore, the procedure shall be stopped. The installation shall not continue until approval has been given by the Authority.
- F. Proper alignment and elevation of the bore hole shall be consistently maintained throughout the directional drilling operation. The Contractor shall assemble, support, and hydrostatically test the pipeline prior to installation in the directional drill tunnel.

### 3.3 INSTALLATION

- A. Pipe lengths shall be connected together in one length if space permits. Pipe shall be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe.
- B. Route piping in straight line. Do not exceed maximum pipe deflection as recommended by the pipe manufacturer.
- C. Pipe shall be installed within a depth of 3 to 5 feet.
- D. After successfully reaming bore hole to the required diameter, the Contractor shall pull the pipe through the bore hole. In front of the pipe shall be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations the Contractor shall not apply more than the maximum safe pipe pull force at any time.
- E. The pullback section of the pipeline shall be supported during the pullback operation so that it moves freely and the pipe is not damaged.
- F. In the event that pipe becomes stuck, contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, the Contractor shall notify the Authority. The Authority and Contractor shall discuss options and then work shall proceed accordingly.
- G. Pull detection wire without splices on top and along with HDPE pipe. Extend wire into locator station at each end of HDPE pipe. Allow adequate slack and support to protect wires from damage during backfilling operations. Test each detection wire for continuity after backfill is completed.

- H. When connecting to adjacent pulled or non-pulled section of HDPE pipe, allow pull section of pipe to extend past termination point. After pullback, pipe shall be allowed to relax at least 24 hours or per Manufacturer's recommendations, whichever is greater, prior to any testing or connections.
- I. The annular space between the pipe and the bore hole shall be filled with an approved material (Bentonite or equal) to support and stabilize the pipe.
- J. Terminate all HDPE pipe with fusion welded HDPE mechanical joint adapters and kit.

### 3.4 SITE RESTORATION

Following drilling operations and pipeline installation, the Contractor must demobilize equipment and restore the work-site to its original condition. All excavations must be backfilled and mechanically compacted to 95% of original density. Landscaping must be restored or replaced to its original condition. All drilling mud shall be properly disposed of by the Contractor.

### 3.5 FIELD QUALITY CONTROL

- A. The Contractor shall be fully responsible for all damages arising from his failure to comply with the regulations and the requirements of these Specifications.
- B. Following the successful pullback of the pipe, the Authority shall hydro-test the pipe from end to end. Any material showing seepage or the slightest leakage shall be replaced by the Contractor as directed by the Authority at no additional expense to the Authority. The Authority will be responsible for installation of valves, reconnecting all existing service lines on the new main, and disinfecting the main in accordance with federal and Virginia Drinking Water Standards.



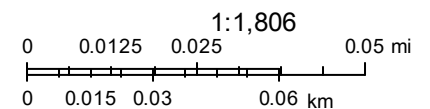
# FAUQUIER COUNTY WATER AND SANITATION AUTHORITY



**PHASE 1: HDD 1,200'**  
of 4" HDPE adjacent to  
existing 2" galvanized  
pipe to be abandoned

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|--|-------------|--|----------------|---------|
|  | Wells       |  | Water Valves   | Parcels |
|  | Meters      |  | Water Lines    |         |
|  | Water Leaks |  | address points |         |



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



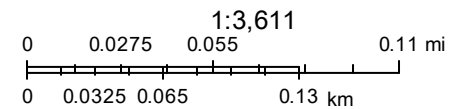
# FAUQUIER COUNTY WATER AND SANITATION AUTHORITY



PHASE 2: HDD 1,300' of 4" HDPE adjacent to existing 2" galvanized pipe to be abandoned

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|--|-------------|--|----------------|--|----------------|
|  | Wells       |  | Water Valves   |  | Water Lines    |
|  | Meters      |  | Hydrant Valves |  | address points |
|  | Water Leaks |  | Hydrants       |  | Parcels        |



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community