

SECTION 330523 – TRENCHLESS UTILITY INSTALLATION

Scope:

The work covered by this Section includes furnishing all labor, materials and equipment required to bore and jack casings, install casings by horizontal directional boring or horizontal directional drilling and to properly complete pipeline construction as shown on the Drawings and described herein.

Submittals:

- A. Material submittals shall include shop drawings for casing pipe showing sizes and connection details and details on any casing spacers that will be used.
- B. Experience submittals shall be required as boring and jacking casings is considered specialty work. If the Contractor elects to perform the work, the Contractor shall provide evidence of a minimum of five continuous years of experience in steel casing construction.
- C. Contractor shall submit allowable tensile loads (ATLs) for various pipe sizes and lengths and a proposed “weak-link” or breakaway device in accordance with those ATLs for approval by the Owner prior to any pull-in installation including directional drilling. ATLs shall be determined using manufacturer’s recommendations and be in accordance with ASTM F 1804 Standard Practice for Determining Allowable Tensile Load for Polyethylene (PE) Gas Pipe During Pull-In Installation.

Safety:

Perform all excavation and backfilling activities in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596), as amended. The Contractor shall pay particular attention to the Safety and Health Regulations Part 1926, Subpart P “Excavation, Trenching & Shoring” as described in OSHA publication 2226.

Products:

- A. **Steel Pipe Casing:** Steel pipe casing shall be manufactured from steel conforming to ASTM Grade 2 as amended to date, with a minimum yield strength of 35,000 psi before cold forming.
 - (1) Pipe may be straight seam or spiral welded. A protective coat will not be required. Spacers for installation of the carrier pipe shall be installed by the Contractor.
 - (2) The diameter and wall thickness of the steel piping shall be as listed in the following table.

Pipe Size (inches)	Outside Diameter of Bell (inches)	Casing Size (inches)	Casing Thickness (inches)
4	6.71	8	0.250
6	8.90	10	0.250
8	11.16	16	0.281
10	13.25	18	0.344
12	15.37	20	0.344
24	28.50	36	0.532
30	34.95	42	0.625

- (3) The thicknesses of casing shown in the table above are minimum thicknesses. Actual thicknesses shall be determined by the casing installer based on an evaluation of the required jacking forces. Any buckling of the casing due to jacking forces shall be repaired at no additional cost to the Owner.
- B. Casing Spacers:** Casing spacers for ductile iron pipe shall be flanged, bolt-on style with a two-section stainless steel shell lined with a PVC liner, minimum 0.09-inch thick, also having a hardness of 85-90 durometer. Runners shall be attached to stainless steel risers which shall be properly welded to the shell. The height of the runners and risers shall be manufactured such that the pipe does not float in the casing. Casing spacers shall be Cascade Waterworks Manufacturing Company or Advanced Products and Systems, Inc., or equal.
- C. HDPE Casing:** The casing pipe shall be either iron pipe size or ductile iron pipe size with an SDR of 17 or less. Casing pipe shall be supplied by the same supplier approved for water or sewer mains. The pipe shall be produced by Rinker, J-M PE Corporation Pipe, or equal.

Implementation:

- A. Installation of Steel Pipe Casing by Boring:** Installation of steel pipe casing shall be by the dry bore method at locations requested by the Owner. Installation of steel pipe casing shall be in accordance with the applicable regulations of the Georgia Department of Transportation (DOT), the Railroad, the Drawings, these specifications, and any permits acquired with respect to the particular boring. All excavation for the pit and bore shall be unclassified. Steel casing pipe shall be required when the carrier pipe is ductile iron and for all railroad crossings and where shown on the Drawings.
- (1) Boring pit: The boring pit shall be solid sheeted, braced, and shored as necessary to provide a safe operation. The Contractor shall take all precautions, and comply with all requirements as may be necessary to protect private or public property.
 - (2) Line and Grade: The Contractor shall set the boring rig so that after the casing is complete, and the water or sewer pipe is installed, the invert of the pipe shall conform to grade and alignment as shown on the Drawings. As the casing is installed, Contractor shall check the horizontal and vertical alignment frequently. Contractor shall install the boring at a 90-degree angle to the crossing unless Owner approves a different crossing angle.
 - (3) Boring: Boring and jacking of the casing pipe shall be accomplished by the dry auger boring method without jetting, sluicing, or wet boring. The hole shall be bored and cased through the soil by a cutting head on a continuous auger mounted inside the casing pipe. The boring of the hole and installation of the casing pipe shall be simultaneous. Lengths of the casing pipe shall be fully welded to the preceding section in accordance with American Welding Society (AWS) recommended procedure.
 - (4) Diameter of Hole: Bored installations shall have a bored hole diameter essentially the same as the outside diameter of the casing pipe to be installed.
 - (5) Casing Pipe Length: Lengths of casing pipe shall be as long as practical for site conditions. Joints between sections shall be completely welded in accordance with AWS recommended procedures. Prior to welding joints, the Contractor shall ensure that both ends of the casing sections being welded are square.
 - (6) The Contractor shall plan to use a casing lubricant, such as bentonite, in the event excessive frictional forces jeopardize the successful completion of the casing installation.

- (7) Once the jacking procedure has begun, it should be continued without stopping until completed.
- (8) Installation of the Carrier Pipe: The carrier pipe for the water or sewer line shall be as shown on the Detail Sheet. Spacers for installation of the carrier pipe shall be furnished and installed by the Contractor. Casing spacers shall be installed at the interval recommended by the carrier pipe manufacturer, but in no case shall the spacing of the spacers exceed 8 linear feet unless approved by the design engineer.
- (9) Payment: The price bid for the steel casing shall include all necessary excavation and sheeting for the pit, protective service, and all other miscellaneous materials and work required for complete installation. Payment for steel casing shall be for total number of feet installed. Payment for the carrier pipe shall be by the unit price bid for the water or sewer line. The spacers shall be furnished and installed by the Contractor. If there is a failure to complete a bore and the contractor is forced to abandon a bore, the casing must be filled with grout and no payment will be made for this work.

B. HDPE Casing by the Boring Method: HDPE casing pipe shall be installed by the Directional Bore Method in accordance with manufacturer's recommendations and where requested by the Owner. HDPE casing shall be installed where requested by the Owner and where the carrier pipe is also HDPE. Directional bores will be used for crossing creeks, rivers, and County Roads where approved by the Owner.

- (1) Boring Machine Set-up: The Contractor shall take all precautions, and comply with all requirements as may be necessary to protect private or public property. Contractor must also make arrangements for the escape of drilling mud and provide for containment and clean-up equipment.
- (2) Line and Grade: The Contractor shall set the boring rig so that after the casing is complete, and the water or sewer carrier pipe is installed, the invert of the pipe shall conform to grade and alignment as shown on the Contract Drawings. As the casing is installed, Contractor shall check the horizontal and vertical alignment frequently. Contractor shall install the boring at a 90 degree angle to the crossing unless Owner approves a different crossing angle.
- (3) Centering spacers shall not be used for HDPE pipe installed in HDPE casing.
- (4) The annulus between the casing and the pipe shall not be grouted.
- (5) Contractor will join leading end of carrier pipe using a restrained mechanical joint or a flange adapter with a split backup ring.
- (6) Diameter of Hole: Bored installations shall have a bored hole diameter essentially the same as the outside diameter of the casing pipe to be installed.
- (7) Casing Pipe Length: Lengths of casing pipe shall be as long as practical for site conditions. Joints between sections shall be completely fused in accordance with the manufacturer's recommendations.
- (8) Casing pipes shall be sized as listed on the following page unless they are detailed differently on the drawings.

HDPE Nominal Pipe Size (inches)	HDPE Nominal Casing Size (inches)
4	8
6	10
8	12
10	14
12	16

C. HDPE Casing by Horizontal Directional Drilling: HDPE casing pipe shall be installed by the Directional Drilling Method in accordance with manufacturer's recommendations, ASTM F 1962 Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit under Obstacle, Including River Crossings, Plastic Pipe Institute Polyethylene Pipe for Horizontal Directional Drilling. Directional drilling will be used only where requested by the Owner. When HDPE casing is installed the carrier pipe shall also be HDPE. Directional drilling techniques may be used for crossing creeks, rivers, and County Roads where approved by the Owner.

- (1) The movement of the pipe string and the pulling load on the polyethylene pipe shall be monitored and a weak link device shall be used to ensure that the pipe is not damaged during installation.
- (2) The pulling load on the polyethylene pipe shall be continuously recorded at all times and an electronic copy of the data provided to the Owner's inspector at the end of each work day. At no time during the installation shall the pipe manufacturer's allowable pull load on the pipe be exceeded.
- (3) Contractor shall allow a 24-hour relaxation period for pipe installed by directional drilling before fusing additional pipe to the pulled in pipe.

D. Free Bores: Free bores shall be installed by the dry bore method at locations requested by the owner. A section of steel casing pipe of the appropriate size shall be used to guide the auger and keep the bore on line and grade. Once the bore is completed the section of casing shall be removed without damaging the hole. After the casing is removed the pipe shall be installed through the bore hole immediately to prevent collapse of the opening. Free bores shall be sized as listed below.

E.

For HDPE Mains	
Pipe Size (inches)	Bore Size (inches)
4	6
6	8
8	10
12	14

For D.I.P. Mains	
Pipe Size (inches)	Bore Size (inches)
4	8
6	10
8	12
12	16

END OF SECTION