

**DIVISION 33 – UTILITIES  
SECTION 33 05 24 – UTILITY PIPE BORING AND JACKING**

**PART 1 – GENERAL**

1.01 SCOPE

- A. This work shall consist of the underground construction of a pipeline across the state right-of-way, or other facility as indicated on the plans and as specified herein without interruption to the use of the roadway, or other facility as indicated. The work shall be performed in accordance with all permits issued by the owner of any facility being crossed by the pipeline. Also included is the excavation by horizontal drilling or by tunneling casing, and the furnishing of all labor, superintendence, tools, equipment, and materials necessary to completely construct the carrier pipe inside jacked casing pipe. All pits which are constructed to facilitate this work shall be excavated, sheeted, braced, maintained, backfilled, etc. in complete accordance with the provisions of the construction specification for the pipeline of which the pipeline crossing is a part.
- B. The Contractor may use a larger casing pipe than specified, subject to approval of Authority or authorities having jurisdiction.

**PART 2 – PRODUCTS**

2.01 ENCASING CONDUIT

- A. Steel Pipe: ASTM A 139, Grade B or ASTM A 53, Grade B.
- B. The casing pipe shall be welded steel pipe (6" inches larger than carrier pipe O.D.). All joints of the casing shall be full circumference welded.
- C. The casing must be of adequate thickness to withstand all dead and live loads plus the forces exerted during the jacking process.

2.02 SEWER PIPE AND FITTINGS

- A. As specified in Section 33 31 00.

2.03 MISCELLANEOUS MATERIAL

- A. Concrete: As specified in Section 03 30 00: Cast-in-Place Concrete.
  - 1. Type 2: 3,000 psi.
- B. Aggregate Backfill:
  - 1. PennDOT No. 2A Coarse Aggregate conforming to PennDOT Publication 408, Section 703.
- C. Casing End Seals

1. Casing pipe ends shall be sealed by the installation of Rubber Casing Seals with stainless steel tightening bands. The casing end seals shall be manufactured by Cascade Waterworks Manufacturing Co. or Equal.

D. Casing Spacers

1. The Contractor shall utilize pre-manufactured casing spacers to support and center the carrier pipe within the casing pipe.

a. Stainless Steel Casing Spacers:

- (1) Casing spacers shall be bolt on style with a two-piece shell made from 304 stainless steel of a minimum 14-gauge thickness. Each shell section shall have bolt flanges formed with ribs for added strength. Each connecting flange shall have a minimum of three 5/16" T-304 bolts. The shell shall be lined with a ribbed PVC extrusion with a retaining section that overlaps the edge of the shell and prevents slippage. Bearing surfaces (runners) made from UHMW polymer with a static coefficient of friction of 0.01 – 0.13 shall be attached to support structures (risers) at appropriate positions to properly locate the carrier within the casing and to ease installation. The runners shall be attached mechanically by T-304 threaded fasteners that are inserted through the punched riser section and TIG welded for strength. Risers shall be made of T-304 stainless steel of a minimum 14-gauge. Risers shall be MIG welded to the shell. All welds shall be fully passivated. Casing spacers shall be manufactured by Advance Products and Systems, Inc., or equal.

b. Field Adjustable Stainless Steel Casing Spacers:

- (1) Field adjustable casing spacers shall be bolt on style with a two-piece shell made from 304 stainless steel of a minimum 14-gauge thickness. Each shell section shall have bolt flanges formed with ribs for added strength. Each connecting flange shall have a minimum of three 5/16" T-304 bolts. The shell shall be lined with a ribbed PVC extrusion with a retaining section that overlaps the edge of the shell and prevents slippage. Bearing surfaces (runners) shall be manufactured from UHMW polymer with a static coefficient of friction of 0.01 – 0.13 shall be attached to support structures (risers) at appropriate positions to properly locate the carrier within the casing and to ease installation. The runners shall be field adjustable using various runner sizes as required for grade identified on the Contract Drawings. The runners shall be attached by T-304 stainless steel bolts that are able to be removed with common hand tools. Bolts shall be covered with caps to prevent exposure to moisture. Risers shall be made of T-304 stainless steel of a minimum 14-gauge. Risers shall be MIG welded to the shell. All welds shall be fully passivated. Casing spacers shall be field adjustable. Casing spacers shall be manufactured by Advance

Products and Systems, Inc., or equal.

- c. Placement of Spacers on Carrier Pipe:
  - (1) General – One spacer shall be placed not more than two (2) feet from each end of the casing. Subsequent spacers shall be placed at 10' intervals within the casing as indicated on the Contract Drawings.

### **PART 3 – EXECUTION**

#### **3.01 CONSTRUCTION METHODS**

- A. The pipeline crossing shall be constructed by installing the casing pipe and inserting the carrier pipe as specified herein. Installation of the casing pipe shall be by a jacking-tunneling or by a jacking-boring method. No water jetting will be permitted.
- B. If construction is by horizontal boring, it shall be by using an auger inside of the casing and by advancing the casing through the use of jacks of adequate capacity. If by jacking and tunneling, the casing shall be advanced as the earth is excavated and removed by accepted tunneling methods through the use of jacks of adequate capacity.
- C. The casing shall be carefully aligned and jacked to grade as called for the drawings.
- D. If the Contractor elects to install a larger casing pipe, the required minimum cover requirements and/or clearance requirements specified by the owners of the roadway or railroad and/or other facilities adjacent to the pipeline crossing shall be met.
- E. When augers, or similar devices, are used for pipe emplacement, the front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger and cutting head from leading the pipe so that there will be no unsupported excavation ahead of the pipe. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than one-half (1/2) inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or poor material.
- F. Bored or jacked installations shall have a bore hole essentially the same as the outside diameter of the pipe. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than approximately one (1) inch, grouting or other methods approved by the Engineer shall be employed to fill such voids. Cost of such grouting shall be at the Contractor expense.
- G. When water is known or expected to be encountered, pumps of sufficient capacity to handle the flow shall be maintained at the site, and upon approval to operate them, they shall be in constantly attended operation on a twenty-four (24) hour basis until their operation can be safely halted. When dewatering, close observation shall be maintained to detect any settlement or displacement of roadway or railroad embankment, tracks, and facilities.
- H. All operations shall be conducted so as not to interfere with, interrupt, or endanger the operation of traffic, trains, nor damage, destroy or endanger the integrity of roadway or

railroad facilities. All work on or near railroad property shall be conducted in accordance with railroad safety rules and regulations. The Contractor shall secure and comply with the railroad and shall give written acknowledgment to the Railroad that they have been received, read, and understood by the Contractor and his employees. Operations will be subject to Railroad inspection at any and all times.

- I. At all times when the work is being performed, a field supervisor for the work with no less than twelve (12) month experience in the operation of the equipment being used shall be present. If boring, drilling, or similar machines are being used, the machine operator also shall have no less than twelve (12) months experience in the operation of the equipment being used.
- J. Blasting will not be permitted under or near roadway and railroad tracks and facilities.
- K. Whenever equipment or personnel are working closer than fifteen (15) feet to the centerline of an adjacent railroad track, that track shall be considered as being obstructed. Insofar as possible, all operations shall be conducted no less than this distance. Operations closer than fifteen (15) feet to the centerline of a track shall be conducted only with the permission of, and as directed by, a duly qualified railroad employee present at the site of the work.
- L. Crossing of railroad tracks at grade by equipment is prohibited except by prior arrangement with, and as directed by, the Railroad's Chief Engineer.
- M. The Contractor shall provide for the maintenance of flow of existing ditches during the installation of the new bored and jacked pipe. Temporary ditches shall be constructed to assure maintenance of the existing drainage. As required by the previous section, pumps of sufficient capacity shall be available to maintain a dewatered boring site.
- N. The pipe shall be carefully aligned and jacked to grade as called for the drawings. Contractor shall check to insure line and grade are maintained throughout the boring and jacking operation. Line and grade shall be checked at least a minimum of the 1/3 points of the total length of the bore.

### 3.02 SPECIAL CONSTRUCTION CONDITIONS

- A. All permits pertaining to the pipeline crossing which have been issued by any roadway, railroad or utility company, and/or other agency (private or governmental) shall be obtained by the Developer in Authority's name. All labor, materials, equipment, special inspection services, and special construction conditions necessary to this work shall be included as part of this specification.
- B. The excavation of all pits shall not be started more than three (3) working days prior to the commencement of actual casing placement or tunneling operations except in the case of working within state highway right-of-ways, pits shall not be excavated until absolutely necessary.
- C. In any event, no pits shall be left open longer than three (3) working days unless tunneling, casing installation, or carrier pipe installation are actively in progress. All pits shall be protected with steel plating when within state highway right-of-ways. Other areas protected with construction fencing.

- D. The Contractor shall maintain uninterrupted roadway and railroad traffic flow by providing all necessary signs, signals lights and barricades as may be required. Watchmen, flagmen and railroad inspection personnel, as required, shall be paid for the by the Contractor and included in the unit price. Any and all insurance required by the Railroad or Pennsylvania Department of Transportation shall also be provided by the Contractor.
- E. The Contractor shall provide notice of construction to PennDOT and the railroad with seventy-two (72) hours notice for flagmen and inspection personnel. Work shall not commence until such time as said flagmen and inspectors are at the site or that a waiver of this requirement is made in writing by PennDOT or the Railroad.
- F. The Contractor shall engage the services of workmen thoroughly knowledgeable and experienced in such work.

3.03 EXPERIENCE

- A. Horizontal boring, tunneling, and jacking is a specialized type of construction, and the Contractor shall demonstrate that he is fully qualified and has satisfactorily completed at least three (3) such projects.

**END OF SECTION**