

## CHAPTER 5 PIPELINE DRILLING, BORING AND JACKING

### 5.1 **SCOPE:**

Boring and jacking of utility pipelines under highways and railroads shall be as shown on the plans and as specified herein.

### 5.2 **GENERAL REQUIREMENTS:**

Boring and tunneling operations shall be performed in accordance with all requirements of the SCDOT or the railroad, as applicable, including insurance, inspection, temporary work, watchmen, flagmen, protection of personnel and property, work restrictions, and work scheduling. Unless otherwise specified or directed, the CONTRACTOR shall pay for all costs in connection with meeting these requirements. The CONTRACTOR shall be responsible for repair or replacement of all existing structures and facilities, including roadways damaged or disturbed as a result of the work within a period of two years after completion of boring and tunneling operations. Repairs shall be performed at no additional cost to the OWNER, Department of Transportation or railroad. All work shall be completed to the full satisfaction of the OWNER, Department of Transportation or railroad.

- A. **Inspection:** Boring and tunneling operations will be subject to inspection by the ENGINEER and by the SCDOT, County Engineer, or railroad, as applicable. The SCDOT, County or railroad inspector will have full authority to stop work if, in his opinion, it may cause damage to the highway or railroad or endanger traffic. CONTRACTOR shall notify the ENGINEER and BJWSA a minimum of 72 hours prior to performing work.
- B. **Railroad Right-of-Way:** For all work on railroad right-of-way, the CONTRACTOR shall notify the railroad at least 72 hours prior to beginning construction.
- C. **Experience:** Before starting boring and tunneling operations, the CONTRACTOR shall submit to the ENGINEER an experience record of the proposed boring and tunneling sub-CONTRACTOR. Such record shall include a list of equipment and personnel to be used, and a list of at least five previous successful similar installations under highways or railroads within the past five years. Failure to submit an experience record or submittal of a record not meeting these requirements will be cause for rejection of the boring and tunneling subcontractor.

### 5.3 **MATERIALS:**

- A. **Carrier Pipe:** Carrier Pipe shall be as specified in Chapter 6, "Pipeline Materials".
- B. **Encasement Pipe:** Encasement Pipe installed by boring and jacking shall be welded steel pipe conforming to ASTM A139, Grade B, 35,000 PSI minimum yield, and shall be the size shown on the plans. Pipe shall be bituminous coated on the outside. Minimum wall thickness shall be as follows:

Diameter (IN.)	Minimum Thickness (IN.)
6 – 14	0.250
16 – 18	0.3125
20 – 22	0.375
24 – 26	0.4375
Diameter (IN.)	Minimum Thickness (IN.)
28 – 32	0.500
34 – 42	0.5625
44 – 48	0.625
50 – 54	0.750

#### **5.4 INSTALLATION:**

Unless otherwise specified or directed, encasement shall be welded steel pipe installed by boring and jacking. CONTRACTOR shall submit complete drawings, details and other data of the proposed method of construction, materials and equipment to the ENGINEER and department of transportation or railroad for review. No open excavation will be allowed within the limits of the encasement without the ENGINEER's approval. All sheeting, shoring and bracing shall be provided as necessary for the satisfactory and safe performance of the work, and will be subject to the approval of the ENGINEER and in accordance with the requirements of the department of transportation or railroad. All work areas shall be maintained in a suitable dry condition at all times, with methods of dewatering, draining, pumping and disposal of water subject to approval of the ENGINEER and department of transportation or railroad.

- A. Boring and Jacking Encasement: Encasement pipe shall be installed by boring and jacking, with welded joints to the required lines and grades. The CONTRACTOR shall bear the cost of any corrective action required to meet the line and grade requirements shown on the plans. Welding shall conform to the requirements of the American Welding Society and the American Railway Engineering Association for this type of work. The distance to which boring is carried ahead of the pipe shall be not more than is absolutely necessary for installation purposes, and will be subject to approval of the ENGINEER. The work shall be performed so that no voids occur in the earth surrounding the pipe and so that ground settlement adjacent to and within the limits of the pipeline crossing is eliminated. If voids occur or are encountered outside the pipe, grout holes shall be drilled at 10-foot centers in the top of the encasement pipe and the voids filled with 1:3 Portland cement grout applied at sufficient pressure to fill the voids and prevent embankment settlement. If it becomes necessary to abandon an incomplete or unacceptable bore, the abandoned encasement shall be capped and filled completely with 1:3 Portland cement grout. Abandonment procedures shall be completed prior to moving to another boring location. All costs in connection with an abandoned bore, including the construction cost and capping and filling costs, shall be the CONTRACTOR's expense.
- B. Carrier Pipe Installation: Carrier Pipe shall be installed in a manner to provide proper line and grade. Carrier pipe shall be adequately supported in the encasement piping with stainless steel spacers to prevent movement, including floatation. Casing spacers shall be spaced a maximum of 10 FT for DIP carrier piping and a minimum of 5 FT for PVC carrier piping. All carrier piping shall be restrained at each joint within the casing pipe. CONTRACTOR shall submit his proposed method of installation and details of restraint to the ENGINEER prior to installation. After the carrier pipe is installed, each end of the encasement shall be sealed with rubber casing boots with stainless steel straps. Refer to Chapter 13 for approved manufacturers of casing spacers and plugs.

- C. Directional Drilling: Where directionally drilled (without casing) pipe under highways or railroads is indicated and permitted, the bore diameter shall be essentially the same as the outside diameter of the pipe to prevent settlement or caving. All borings under public roads shall comply with SCDDOT regulations. If voids develop or if the bore diameter is greater than the outside diameter of the pipe by more than 1 inch, the voids shall be pressure grouted or other remedial measures as approved by the ENGINEER shall be taken at the CONTRACTOR's expense. Tracer wire per Section 6 shall be installed within the casing pipe and connected to the tracer wire for the non cased pipeline sections. Tracer wire shall be taped securely to the carrier piping prior to insertion in the casing.
- D. Appurtenances: Vents and drains, where required, shall be provided where indicated on the plans. Vents shall consist of pipe as noted, and shall be located so as not to interfere with highway maintenance or be concealed by vegetation. Drains shall be provided at the lower end and shall consist of stone as noted on the plans.
- E. Warranty Period: The CONTRACTOR shall be responsible for repair or replacement of all existing structures and facilities, including roadways damaged or disturbed as a result of the work within a period of two (2) years after completion of boring and tunneling operations. Repairs shall be performed at no additional cost to the OWNER, Department of Transportation or railroad. All work shall be completed to the full satisfaction of the OWNER, Department of Transportation or railroad.

*END OF SECTION*