

**819 - BORED, JACKED OR TUNNELED PIPE**

**SECTION 819**

**BORED, JACKED OR TUNNELED PIPE**

**819.1 DESCRIPTION**

Install the designated pipe by boring, jacking or tunneling as shown in the Contract Documents. If the method of installation is not specified in the Contract Documents, the Contractor has the option to use any of the 3 methods.

**BID ITEMS**

- \* Pipe (Bored, Jacked or Tunneled)
- \*Type and Size of Pipe

**UNITS**

Linear Foot

**819.2 MATERIALS**

Provide materials that comply with the applicable requirements.

Pipe .....	<b>DIVISIONS 1600/1900</b>
Grout .....	<b>SECTION 401</b>

**819.3 CONSTRUCTION REQUIREMENTS**

**a. General.** If the pipe is bored, jacked or tunneled under a highway, railroad, street or other structure, the installation of the pipe shall not interfere with the operation of the highway, railroad, street or other structure. Do not weaken or damage existing roadbeds or structures.

If the grade of the pipe (at the point of boring, jacking or tunneling) is below ground, construct the pits or trenches necessary to install the pipe complying with OSHA requirements. Backfill such pits and trenches upon completion of the pipe installation. Compact the backfill to Type A, MR-5-5, **SECTION 205**.

Submit to the Engineer for approval a detailed plan for the proposed method of installing the pipe.

Install the pipe beginning at the lower elevation (downstream) and progressing to the higher elevation (upstream). Do not vary the final position of the pipe from the specified line or grade more than 1 inch in 10 feet. Variations, if any, shall be regular and in one direction. The flowline shall be in the specified direction.

Repair or replace, as determined by the Engineer, all pipes damaged or misaligned during the boring, jacking or tunneling operations.

**b. Boring.** Use either a pilot hole or the auger method.

(1) Pilot Hole Method. Bore a pilot hole (approximately 2 inches) the length of the crossing. Before boring the larger hole, check the pilot hole for line and grade at the opposite end of the bore from the work pit. The pilot hole serves as the centerline of the larger hole bored later.

(2) Auger Method. Use a steel encasement pipe (of the approximate diameter of the pipe to be installed) equipped with a cutter head to perform the excavation. Use augers of sufficient size to convey the excavated material to the work pit.

In unconsolidated soil formations, the Engineer will permit the use of a gel-forming colloidal drilling fluid (with a minimum of 10% high grade, bentonite) to consolidate the cuttings, seal the walls of the hole, lubricate the removal of the cuttings and lubricate the immediate installation of the pipe.

**c. Jacking.** Use heavy duty jacks suitable for the intended purpose. Use a jacking head and bracing between the jacks and the jacking head, to apply uniform pressure around the ring of pipe. The Engineer will allow the use of joint cushioning material. Use a jacking frame or backstop. Use guides that support and direct the pipe in the proper line and grade.

As the pipe is jacked, excavate the material just ahead of the pipe (a maximum of 2 feet in advance). Remove the excavated material through the pipe. Excavation for the underside of the pipe, for a minimum of 1/3 of the circumference of the pipe, shall follow the contour and grade of the pipe. Over-excavation (maximum of 2 inches) for the upper half of the pipe is allowed. The over-excavation shall taper to nothing at the point the

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excavation conforms to the contour of the pipe. Fill over-excavation in excess of 1 inch with a slurry grout the length of the installation after the pipe is installed.

The Engineer may allow the use of a cutting head of steel plate around the head end of the pipe. The cutting edge may extend a short distance beyond the end of the pipe. Construct (with inside angles or lugs) the cutting edge to prevent it from slipping back into the pipe.

When the pipe jacking operations begin, to the extent possible, continue the operations without interruptions to prevent the pipe from becoming firmly set in the excavation.

**d. Tunneling.** Use a tunnel lining of sufficient strength to support the overburden. Fill the space between the tunnel lining and the limits of the excavation with slurry grout. Provide access holes in the tunnel lining (maximum spacing of 10 feet) for the grouting operations.

### 819.4 MEASUREMENT AND PAYMENT

The Engineer will measure pipe by the foot along the centerline of the pipe. Gain in pipe length due to the fit of the pipe sections at the coupling bands or joints is not measured for payment.

Payment for the specified "Pipe (Bored, Jacked or Tunneled)" at the contract unit price is full compensation for the specified work.