DESCRIPTION:

This work shall consist of furnishing and installing conduit of the number, type and location as indicated on the contract documents and as directed by the Engineer.

All material necessary for complete conduit installation will be furnished by the contractor.

For purposes of this specification, the involved utility will be referred to as the Company regardless of whether or not the company is profit-making, non-profit-making, or governmental.

MATERIALS:

Except as noted, all materials necessary for proper installation will be furnished and delivered to the site by the contractor. Conduit and fittings will be furnished in commercial lengths. Sleeves for expansion joints will be furnished in the required lengths.

Materials which are necessary for proper installation (e.g. welded attachments to structural steel) will be furnished and paid for under their respective items.

Contractor supplied materials:

- Steel sleeves (diameter and thickness as shown on the Plans) ASTM A36M
- Portland Cement 701-01
- Concrete Repair Material 701-04
- Mortar Sand 703-03
- Water 712-01
- Pull Cord as indicated on the plans.
- Conduit as indicated on the plans
- Hangers and hardware as indicated on plans
- Epoxy Adhesive Manufacturer’s recommendation for conduit type

CONSTRUCTION DETAILS:

A. Holes in abutments may be made by coring. Alternately, the contractor shall saw or line drill the perimeter of the opening and remove the remaining concrete using chipping hammers meeting the requirements of subsection 580-3.02. If the plans show block-outs, the contractor shall form the openings to the satisfaction of the Engineer.

Unless otherwise shown on the plans, the steel sleeves shall be grouted in place with the grout extending the full thickness of the abutment. Grout shall consist of Concrete Repair Material (§ 701-04) or a 3 to 1 (by volume) mixture of sand and cement together with sufficient water to make a workable mix.

Conduit bends, where required, shall be made using standard fittings without appreciably reducing the internal diameter. Expansion sleeves shall be installed at the locations indicated on the contract plans or as directed by the Company.
All joints in galvanized steel conduit shall be sealed with a thread sealing material, recommended by the conduit manufacturer, applied to the male threads. Plastic conduit shall be joined by solvent welding belled ends and couplings. Fiberglass conduit shall be jointed in accordance with the manufacturer's recommendation for the type of joint furnished.

When directed by the Engineer, the contractor shall repair damage to galvanized steel surfaces of conduit in accordance with the requirements of subsection 719-01. For the purposes of this specification the repair size limitations of subsection 719-01 shall not apply. The Engineer shall determine size limitations of repair. If the Engineer determines that a damaged galvanized coating is not repairable, for whatever reason, that portion of conduit shall be replaced by the contractor with conduit coated in a manner acceptable to the Engineer. The replacement will be made at the contractor's expense.

When galvanized steel conduit is installed, all metallic connections shall be tight to ensure continuity of ground bondings. Bonded ground straps shall be installed at each expansion joint of each conduit. Each conduit installation will be grounded outside the bridge limits by the contractor.

All conduit shall project a minimum of 12 inches beyond the back of the abutment backwalls, or as shown on the contract plans. Underground conduit greater than 5 feet in length shall be backfilled in accordance with subsection 203-3.15 - FILL AND BACKFILL AT STRUCTURES, CULVERTS, PIPES, CONDUITS AND DIRECT BURIAL CABLES. All underground conduit, regardless of length, shall be covered with the minimum earth cover indicated on the contract plans.

All installed conduit shall be tested by the contractor before the installation will be accepted. The contractor shall test for clear bore, and correct installation by the use of a ball mandrel, brush and snake. The ball shall be of lignum vitae, or other material of equal hardness, as determined by the Engineer. The ball shall be turned to approximately 85% of the internal diameter of the conduit to be tested. Two short wire brushes shall be included in the mandrel assembly.

Snaking of the mandrel through the conduit, shall be done in the presence of the Engineer. Any conduit which rejects the mandrel shall be cleared immediately. All conduit which cannot be cleared shall be repaired, or replaced, as determined by the Engineer. Replacement conduit shall be equal in all respects the conduit originally supplied. Repair and replacement work shall be done at the contractor's expense.

All ducts shall be fitted with a pull cord. The pull cord shall be installed immediately after completing each section of conduit. All conduit shall be capped, or plugged, unless otherwise indicated on the contract plans, or as directed by the Engineer.

The Company may, at no cost to the contractor, furnish an Inspector during the installation of the conduit. The Inspector will advise the Engineer regarding proper methods of work. He will not direct the contractor's operations.

B. **Excavation:**

The requirements as specified in Section 206, Trench, Culvert and Structure Excavation, of the Standard Specifications shall apply. Except that the cost of excavation shall be included in the lump sum price bid for installing conduit.

C. **Backfill:**

The requirements as specified in Section 203-3.15, Fill and Backfill at Structures, Culverts, Pipes, Conduits and Direct Burial Cable, of the Standard Specifications shall apply. Except that the cost of backfill shall be included in the lump sum price bid for installing conduit.
D. Excavation Protection System:

The requirements as specified in Section 552-3.04, of the Standard Specifications and the directions of the Engineer shall apply. Except that the cost of backfill shall be included in the lump sum price bid for installing conduit.

E. Control Backfill Material:

The provisions of the Specification for Controlled Low Strength Material and the directions of the Engineer shall apply.

METHOD OF MEASUREMENT:

This work will be measured at the lump sum price bid for each location shown in the plans or noted in the proposal, and as directed by the Engineer.

BASIS OF PAYMENT:

The lump sum price bid for furnishing and installing conduit shall include all equipment, material, and labor required to complete the work as shown on the plans and/or in the proposal, and as directed by the Engineer.

Monthly payments will be made for this work in proportion to the amount of work completed.

Materials not noted in this specification, which are necessary for proper conduit installation, will be paid for under their respective items.

No payment will be made for work specifically excluded from payment by the terms of this item.

The cost of Trench & Culvert Excavation, Select Granular Fill, Excavation Protection System, and Controlled Low Strength Material shall be included in the price bid for this item.

PAYMENT WILL BE MADE UNDER:

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>ITEM</th>
<th>PAY UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>662.1820nn08</td>
<td>FURNISH AND INSTALL CONDUIT FOR BRIDGE AND APPROACHES</td>
<td>LUMP SUM</td>
</tr>
</tbody>
</table>

Note: "nn" denotes a serialized pay item, see Subsection 101 - 53.