## SECTION 402 -- ELECTRICAL WIRE AND CABLE IN CONDUIT

### 402.01 -- Description

The Contractor shall furnish and install electrical wire and cable of the size and type shown in the plans. This work includes the wire and cable, splices, connections, terminations, identification tags, and all labor, equipment, tools, materials, and incidentals required to complete the work.

### 402.02 -- Material Requirements

Traffic signal and roadway lighting conductors in conduit shall conform to the requirements of Section 1073. Conductors used as a neutral must be designated white or gray. Insulated equipment ground shall be green. Line conductors shall be designated red and black. Cable in Duct (CID) may be used in place of wire and cable only on roadway lighting and sign lighting systems and shall conform to the requirements of Section 1073.

### 402.03 -- Construction Methods

1. Unless indicated otherwise, all lighting systems shall be installed as conductors in conduit.

2. a. Conductors shall be installed in conduit only after the conduit system is completed and in place.

b. The conduit must be continuous, reasonably dry, completely free of debris, and without any sharp projections, edges, or short bends.

c. The Engineer may require the Contractor to demonstrate that the conduit is reasonably dry and free of debris by pulling a swab and/or mandrel through the conduit.

d. The wire and cable manufacturer's recommended maximum pulling tensions shall not be exceeded. If necessary, the cables shall be adequately lubricated to reduce friction and minimize possible damage. Lubricants shall be one of several commercially available wire pulling compounds that are suitable for the cables. They shall consist of soap, talc, mica, or similar materials and shall be designed to have no deleterious effects on the cables.

3. All cables shall be neatly trained to their destinations in cabinets, pole bases, transformer bases, pull boxes, junction boxes, or other enclosures. The destination of all cable runs shall be clearly identified by the use of permanent, non-ferrous or plastic tags stamped or embossed with the direction of the cable run and attached to the conduit in which the cable is housed. Conductor runs shall be tagged at all intermediate points along the run such as in pull boxes, junction boxes, pole bases, and transformer bases. In instances where the conduit housing the conductor is inaccessible, such as in anchor base pole installations, the identification tag shall be attached to the conductor itself.

4. The Contractor shall adhere to the ICEA recommended minimum values for wire and cable bending radii. These limits do not apply to conduit bends, sheaves, or other curved

surfaces around which these cables may be pulled under tension while being installed. Larger radius bends are required for such conditions.

5. Where the cable enters or leaves the conduit, conduit bushings or bell ends shall be installed.

**402.04 -- Method of Measurement**

Electrical wire and cable shall be measured in linear feet from center to center of the pull boxes, poles, junction boxes, and controllers for each type and size shown in the plans. Cable in Duct (CID) will be measured as 2 separate items, conduit and cable.

**402.05 -- Basis of Payment**

1.

| Pay Item | Pay Unit |
|---|---|
| 2/C ____ Detector Lead-in Cable | Linear Foot (LF) |
| ____ /C ____ Traffic Signal Cable | Linear Foot (LF) |
| Grounding Conductor | Linear Foot (LF) |
| _____ Pair Communication Cable | Linear Foot (LF) |
| Service Cable | Linear Foot (LF) |
| Street Lighting Cable, _____ | Linear Foot (LF) |
| Roadway Lighting Cable, _____ | Linear Foot (LF) |
| Street Lighting Cable, _____ Bare | Linear Foot (LF) |

2. Payment is full compensation for all work prescribed in this Section.