

SECTION 16680

INSTALLATION OF HIGHWAY TRAFFIC SIGNALS

PART 1 DESCRIPTION

- A. Install highway traffic signals.

PART 2 MATERIALS

- A. Ensure electrical materials and construction methods conform to the current NEC and additional local utility requirements.
- B. Furnish new materials. Ensure all materials and construction methods conform to the details shown on the plans, the requirements of this Item, and the pertinent requirements of the following Items:
  - 1. Item 16610, "Roadway Illumination Assemblies"
  - 2. Item 16625, "Zinc-Coated Steel Wire Strand"
  - 3. Item 16627, "Treated Timber Poles"
  - 4. Item 16636, "Aluminum Signs"
  - 5. Item 16656, "Foundations for Traffic Control Devices."

PART 3 CONSTRUCTION

- A. Install traffic signal controller foundations in accordance with Item 16656, "Foundations for Traffic Control Devices."

3.01 ELECTRICAL REQUIREMENTS

- A. Electrical Services
  - 1. Make arrangements for electrical services and install and supply materials not provided by the utility company as shown on the plans. Unless otherwise shown on the plans, install 120 volt, single-phase, 60 Hz AC electrical service.
- B. Conduit
  - 1. Install conduit and fittings of the sizes and types shown on the plans. Conduit of larger size than that shown on the plans may be used with no additional compensation, providing that the same size is used for the entire length of the conduit run. Extend conduit in concrete foundations 2 to 3 in. above the

concrete. Seal the ends of each conduit with silicone caulking or other approved sealant after all cables and conductors are installed.

C. Wiring

1. Unless otherwise shown on the plans, furnish stranded No. 12 AWG XHHW conductors. Install above-ground cables and conductors in rigid metal conduit, except for span wire suspended cables and conductors, drip loops, and electrical wiring inside signal poles. Make power entrances to ground-mounted controllers through underground conduit. Wire each signal installation to operate as shown on the plans.
2. Attach ends of wires to properly sized self-insulated solderless terminals. Attach terminals to the wires with a ratchet-type compression crimping tool properly sized to the wire. Place pre-numbered identification tags of plastic or tape around each wire adjacent to wire ends in the controller and signal pole terminal blocks.
3. Splices will not be permitted except as shown on the plans, unless the Engineer approves each individual splice in writing. Make all allowed splices watertight.

D. Grounding and Bonding

1. Ground and bond conductors in accordance with the NEC. Ensure the resistance from the grounded point of any equipment to the nearest ground rod is less than 1 ohm.
2. Install a continuous bare or green insulated copper wire (equipment ground) throughout the electrical system that is the same size as the neutral conductor, but a minimum No. 8 AWG. Connect the equipment ground to all metal conduit, signal poles, controller housing, electrical service ground, ground rods, and all other metal enclosures and raceways.
3. Provide copper wire bonding jumpers that are a minimum No. 8 AWG.

### 3.02 CONTROLLER ASSEMBLIES

- A. Construct controller foundations in accordance with Item 16656, "Foundations for Traffic Control Devices." Immediately before mounting the controller assembly on the foundation, apply a bead of silicone caulk to seal the cabinet base. Seal any space between conduit entering the controller and the foundation with silicone caulk.
- B. Deliver the keys for the controller cabinets to the Owner's Representative when the contract is complete.

- C. Place the instruction manual and wiring diagrams for all equipment in the controller cabinet, inside the controller cabinet.

3.03 TIMBER POLES

- A. Furnish ANSI Class 2 timber poles other than for electrical services in accordance with details shown on the plans.

3.04 PRESERVATION OF SOD, SHRUBBERY, AND TREES

- A. Replace sod, shrubbery, and trees damaged during the Contract.

3.05 REMOVAL AND REPLACEMENT OF CURBS AND WALKS

- A. Obtain approval before cutting into or removing walks or curbs not shown on the plans to be removed or replaced. Restore any curbs or walks removed equivalent to original condition after work is completed, to the satisfaction of the Owner's Representative

3.06 SIGN LIGHTING

- A. Attach sign lighting to traffic signal equipment as shown on the plans.

3.07 INTERSECTION ILLUMINATION

- A. Construct luminaires on signal poles as shown on the plans.

3.08 TEST PERIOD

- A. Operate completed traffic signal installations continuously for at least 30 days in a satisfactory manner. If any Contractor-furnished equipment fails during the 30 day test period, repair or replace that equipment. This repair or replacement, except lamp replacement, will start a new 30 day test period.
- B. Replace materials that are damaged or have failed prior to acceptance. Replace failed or damaged existing signal system components when caused by the Contractor. The Owner's Representative will relieve the Contractor of maintenance responsibilities upon passing a 30 day performance test of the signal system and acceptance of the contract.

PART 4 MEASUREMENT

- A. This Item will be measured as each signalized intersection controlled by a single traffic signal controller.

PART 5 PAYMENT

- A. The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Installation of Highway Traffic Signals” of the type (isolated, system, or flashing beacon) specified. This price is full compensation for furnishing, installing, and testing the completed installation, controller and associated equipment, controller foundations, luminaires, signs and sign lights mounted on signal equipment, timber poles, mounting hardware and steel wire strand; preservation and replacement of damaged sod, shrubbery and trees; removal and replacement of curbs and walks; and equipment, labor, tools, and incidentals. The City will pay for electrical energy consumed by the traffic signal.
  
- B. New drilled shaft foundations for traffic signal poles will be paid for under Item 16416, “Drilled Shaft Foundations.” New conduit will be paid for under Item 16618, “Conduit.” New electrical conductors will be paid for under Item 16620, “Electrical Conductors.” New ground boxes will be paid for under Item 16624, “Ground Boxes.” New electrical services will be paid for under Item 16628, “Electrical Services.” New vehicle and pedestrian signal heads will be paid for under Item 16682, “Vehicle and Pedestrian Signal Heads.” New traffic signal cables will be paid for under Item 16684, “Traffic Signal Cables.” New traffic signal pole assemblies will be paid for under Item 16686, “Traffic Signal Pole Assemblies (Steel).” New traffic signal detectors will be paid for under Item 16688, “Pedestrian Detectors and Vehicle Loop Detectors.”

END OF SECTION