

# Item 680

## Highway Traffic Signals



### 1. DESCRIPTION

- **Installation.** Install highway traffic signals.
- **Removal.** Remove, store, and salvage traffic signals.

### 2. MATERIALS

Ensure electrical materials and construction methods conform to the current NEC and additional local utility requirements.

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:

- Item 610, "Roadway Illumination Assemblies"
- Item 625, "Zinc-Coated Steel Wire Strand"
- Item 627, "Treated Timber Poles"
- Item 636, "Signs"
- Item 656, "Foundations for Traffic Control Devices"

\* See Modifications for additional information

Provide controller assemblies that meet the requirements of DMS-11170, "Fully Actuated, Solid-State Traffic Signal Controller Assembly," and the details shown on the plans.

Provide prequalified controller assemblies from the Department's MPL.

Provide flasher assemblies that meet the requirements of DMS-11160, "Flasher Controller Assembly," and the details shown on the plans.

Provide prequalified flasher assemblies from the Department's MPL.

Sampling and testing of traffic signal controller assemblies will be done in accordance with Tex-1170-T.

### 3. CONSTRUCTION

3.1. **Installation.** Install traffic signal controller foundations in accordance with Item 656, "Foundations for Traffic Control Devices."

3.1.1. **Electrical Requirements.**

3.1.1.1. **Electrical Services.** Make arrangements for electrical services and install and supply materials not provided by the utility company as shown on the plans. Install 120-volt, single-phase, 60-Hz AC electrical service unless otherwise shown on the plans.

3.1.1.2. **Conduit.** Install conduit and fittings of the sizes and types shown on the plans. Conduit of larger diameter size than that shown on the plans may be used with no additional compensation, providing the same diameter 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.

- 3.1.1.3. **Wiring.** 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 unless otherwise shown on the plans. Make power entrances to ground-mounted controllers through underground conduit. Wire each signal installation to operate as shown on the plans.
- 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.
- Splices will not be permitted except as shown on the plans, unless each individual splice is approved in writing. Make all allowed splices watertight.
- 3.1.1.4. **Grounding and Bonding.** 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.
- 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.
- Provide copper wire bonding jumpers that are a minimum No. 8 AWG.
- 3.1.2. **Controller Assemblies.** Construct controller foundations in accordance with Item 656, "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.
- Deliver the keys for the controller cabinets to the Engineer when the Contract is complete.
- Place the instruction manual and wiring diagrams for all equipment in the controller cabinet, inside the controller cabinet.
- 3.1.3. **Timber Poles.** Furnish ANSI Class 2 timber poles other than for electrical services in accordance with details shown on the plans.
- 3.1.4. **Preservation of Sod, Shrubbery, and Trees.** Replace sod, shrubbery, and trees damaged during the Contract.
- 3.1.5. **Removal and Replacement of Curbs and Walks.** 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 Engineer.
- 3.1.6. **Intersection Illumination.** Install luminaires on signal poles as shown on the plans.
- 3.1.7. **Signal Timing Plan.** The traffic signal timing plan will be provided by the Department or local entity.
- 3.1.8. **Test Period.** 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.
- Replace materials that are damaged or have failed before acceptance. Replace failed or damaged existing signal system components when caused by the Contractor. The Department will relieve the Contractor of maintenance responsibilities upon passing a 30-day performance test of the signal system and acceptance of the Contract. \* See Modifications for additional information

- 3.2. **Removal.** Remove existing electrical services, pedestal poles, strain poles, mast arm pole assemblies, luminaires, signal heads, vehicle detector equipment, controllers, cables, and other accessories. Remove materials so damage does not occur. Remove and store items designated for reuse or salvage at locations shown on the plans or as directed.

Remove abandoned concrete foundations, including steel, to a point 2 ft. below final grade. Backfill holes with material equal in composition and density to the surrounding area. Replace surfacing material with similar material to an equivalent condition.

Accept ownership and dispose of unsalvageable materials in accordance with federal, state, and local regulations.

\* See Modifications for additional information

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#### 4. MEASUREMENT

This Item will be measured as each traffic signal installed or removed. A traffic signal is a signalized intersection controlled by a single traffic signal controller.

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#### 5. PAYMENT \* See Modifications for additional information

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, or "Removing Traffic Signals."

- 5.1. **Installation.** This price is full compensation for furnishing, installing, and testing the completed installation, controller and associated equipment, controller foundations, luminaires, signs mounted on signal equipment, damping plates, 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 materials, equipment, labor, tools, and incidentals. The Department will pay for electrical energy consumed by the traffic signal.

New drilled shaft foundations for traffic signal poles will be paid for under Item 416, "Drilled Shaft Foundations." New conduit will be paid for under Item 618, "Conduit." New electrical conductors will be paid for under Item 620, "Electrical Conductors." New ground boxes will be paid for under Item 624, "Ground Boxes." New electrical services will be paid for under Item 628, "Electrical Services." New vehicle and pedestrian signal heads will be paid for under Item 682, "Vehicle and Pedestrian Signal Heads." New traffic signal cables will be paid for under Item 684, "Traffic Signal Cables." New traffic signal pole assemblies will be paid for under Item 686, "Traffic Signal Pole Assemblies (Steel)." New traffic signal detectors will be paid for under Item 688, "Pedestrian Detectors and Vehicle Loop Detectors."

- 5.2. **Removal.** This price is full compensation for removing the various traffic signal components; removing the foundations; disposal of unsalvageable materials; hauling; and materials, equipment, labor, tools, and incidentals.