

# Special Specification 6070

## Preventative Maintenance of Signal Equipment



### 1. DESCRIPTION

Replace damaged signal parts, signal heads, illumination parts, ground boxes, and down guys. Repair signal assemblies and maintain controller cabinets. Clean camera lenses and inspect signal installations at intersections and interchanges. Inform the Engineer of damage observed.

### 2. MATERIALS

The Department will furnish materials that are part of the final work unless otherwise specified. Submit a list of required materials to the Department at least 24 hours in advance of the requested pickup date between the hours of 8:00 AM and 4:00 PM, Monday - Thursday at the location designated in the General Notes. Designate in writing the person(s) authorized to pick-up materials.

Assume responsibility for materials furnished by the Department. Use material furnished by the Department for this Contract only. Return unused or removed material deemed salvageable upon completion of the work and prior to final payment at the location shown on the plans. Dispose of material deemed unsalvageable in accordance with federal, state, and local regulations.

### 3. EQUIPMENT

Furnish equipment and labor necessary for completion of work described. Required equipment includes, but is not limited to an aerial device capable of reaching overhead work, arrow board, truck mounted attenuator, etc. Use only equipment, tools and machinery in good repair and operating condition. Repair or replace any equipment that, in the opinion of the Engineer may affect the quality of work or safety.

### 4. METHODS

Conform to the most current version of the National Electrical Code (NEC), local utility requirements and the requirements of this Item, and the pertinent requirement of the following Items:

- Item 618, "Conduit"
- Item 620, "Electrical Conductors"
- Item 622, "Duct Cable"
- Item 624, "Ground Boxes"
- Item 625, "Zinc-Coated Steel Wire Strand"
- Item 627, "Treated Timber Poles"
- Item 628, "Electrical Services"
- Item 682, "Vehicle and Pedestrian Signal Heads"
- Item 684, "Traffic Signal Cables"
- Item 685, "Roadside Flashing Beacon Assemblies "
- Item 686, "Traffic Signal Pole Assemblies (Steel)"
- Item 687, "Pedestrian Pole Assemblies"
- Item 688, "Pedestrian Detectors and Vehicle Loop Detectors "

Work orders will be issued to the Contractor detailing work locations and type of work.

Worksheets will be provided to the Contractor to document all devices inspected, cleaned or repaired, and to report other deficiencies that require attention. The Contractor will submit completed worksheets to the Engineer. No payment will be made to the Contractor for any locations where a worksheet is not submitted.

Perform the following work as directed:

- 4.1. **Preventive Maintenance.** Perform the following work for each traffic signal installation:
  - 4.1.1. **Cables.** Inspect cable (tray, heliax, coaxial, signal) for damage or deterioration, proper attachment, excess slack and tangled cables. Re-lash, tighten or straighten span cables as necessary. Document span and signal cables that show signs of damage or deterioration. Submit written notification to the Engineer of necessary repairs.
  - 4.1.2. **Pole and Mast Arms.** Inspect pole bases, foundations, and mast arms. Check welds on pole for fatigue or cracking. Tighten bolts as needed. Remove debris from pole bases. Remove all unnecessary signs and graffiti. Replace missing hand-hole covers.
  - 4.1.3. **Span Wire.** Inspect steel wire (span, tether, messenger), brackets, set screws, clamps, and fittings and service sleeves. Tighten, or align as directed. Check clearance between roadway and signal heads and adjust to 18'-0" or as directed by the Engineer.
  - 4.1.4. **Conduit.** Inspect conduit affixed to poles and reattach as necessary. Ensure conduit ends are sealed with an approved sealant.
  - 4.1.5. **Pedestrian Buttons.** Inspect pedestrian push buttons for proper operation and report damage or malfunctions to the Engineer.
  - 4.1.6. **Ground Boxes.** Inspect ground boxes, clean out debris, and replace or install missing lid bolts. Seal conduit ends as necessary with approved sealant. If necessary, backfill with gravel to insure compliance with Item 624.
  - 4.1.7. **Illumination.** Test illumination circuits. Notify Engineer of test results and recommend repairs as appropriate.
  - 4.1.8. **Signal and Pedestrian Heads.** Inspect signal and pedestrian head lenses, reflectors, visors and back plates for visibility or damage. Clean lenses and appropriate components with soft cloth, soap and water. Relamp each signal section and pedestrian head when existing lamp is observed to be more than 50% inoperable and as directed by the Engineer. Ensure correct alignment of signal heads as directed. Install signal back plates as directed.
  - 4.1.9. **Down Guys.** Inspect steel wire, clamps, service sleeves, guards and anchor rods. Tighten or replace components as necessary and report deterioration of any elements to the Engineer.
  - 4.1.10. **Detector Loops.** Inspect all detector loops in the roadway surface for exposed wires, or deterioration. Seal exposed wires with an approved sealant.
  - 4.1.11. **VIVDS.** When Video Detection cameras are present at the intersection, clean camera lenses with a soft cloth that has been dampened with water. Tighten any loose brackets. Check camera connections and report if loose or corroded.
  - 4.1.12. **Signs.** Remove or replace signs as directed.
    - 4.1.12.1. **Controller cabinet.** Perform the following maintenance services to the controller cabinet or as directed;
      - 4.1.12.1.1. Replace filters.

- 4.1.12.1.2. Lubricate hinges and lock with graphite spray.
- 4.1.12.1.3. Check weatherproof seal (gasket) and report condition.
- 4.1.12.1.4. Check anchor bolts and tighten as necessary.
- 4.1.12.1.5. Check for water accumulation and ensure duct or silicon sealant is adequate to be effective
- 4.1.12.1.6. Check operation of fan and report any malfunctions.
- 4.1.12.1.7. Check ground fault receptacle.
- 4.1.12.1.8. Thoroughly vacuum interior of cabinet.
- 4.1.12.1.9. Remove all graffiti and unauthorized signs or stickers from controller cabinets and signal poles.
- 4.1.12.1.10. Clean all shelves in cabinet with soft, damp cloth. Remove any foreign residue from shelves.
- 4.2. **Pedestrian Buttons.** Push buttons must meet requirements of the Americans with Disability Act (ADA). Replace as directed by the Engineer.
- 4.3. **Signal Section (Signal and Pedestrian Heads).** Replace damaged sections or complete heads, including visors, louvers, brackets, tether assembly, jumper wire and backplates as required. Undamaged LED lamps or other materials deemed salvageable by the Engineer shall remain the property of the State and must be delivered to the location indicated in the plans.
- 4.4. **L.E.D. Lamp Unit (Pedestrian Head).** Mount LED lamps in new pedestrian head housing installed under Article 4.3. Signal Section (Signal Heads and Pedestrian Heads) of this contract.
- 4.5. **Down Guy.** Replace as directed by the Engineer.
- 4.6. **Zinc-Coat Steel Wire Strand (5/16 IN).** Place tether wire at all span wire installations where backplates are attached to signal heads or as directed by the Engineer.

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## 5. MEASUREMENT

This Item will be measured as follows:

- 5.1. **Preventive Maintenance.** This item will be measured by each traffic signal or beacon location regardless of the number of signal heads included at the installation. It should be further understood that any roadside flashers (advance warning) associated with a given signal or beacon location are considered part of the main signal or beacon installation. For the purposes of this item, a diamond intersection will be considered as two (2) installations (locations) if it has two (2) controller cabinets.
- 5.2. **Pedestrian Push Buttons.** By the each replaced.
- 5.3. **Signal Section or Signal Head Assembly (Vehicle or Pedestrian).** By each section that is replaced. When an entire signal head is to be replaced, assembling individual sections to develop the necessary head configuration may be required. Payment for assembling heads is subsidiary to this item.
- 5.4. **L.E.D. Lamp Unit (Pedestrian Head).** By the each installed.
- 5.5. **Down Guy.** By the each replaced.
- 5.6. **Zinc-Coat Steel Wire Strand (5/16 IN).** By the linear foot installed.

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**6. PAYMENT**

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 "Preventive Maintenance," "Pedestrian Push Buttons (Replace)," "Signal Section or Signal Head Assembly (Vehicle or Ped) (Replace)," "LED Lamp Unit (Ped) (Install)," "Down Guy (Replace)" and "Zinc-Coat Stl Wire Strand (5/16 IN)." This price is full compensation for inspections, repairs, and replacement and for furnishing labor, tools, equipment, and incidentals.