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ENGINEERING INSTRUCTION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

SUBJECT: NEW TRAFFIC SIGNAL INSTALLATIONS

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Deputy Chief Engineer (Facilities Design Subdivision)

This Engineering Instruction promulgates new Specifications and Standard Sheets for new traffic signal installations. The specifications will be contained in Addendum No. 2 to the Standard Specifications. The standard sheets will be transmitted under separate cover.

Specifications

680 - TRAFFIC SIGNALS
724 - MATERIALS DETAILS FOR TRAFFIC SIGNALS

Standard Sheets

680-1 - Span Wire Mounted Traffic Signal Installation Details
680-2 - Mast Arm and Pole Mounted Traffic Signal Installation Details
680-3 - Signal Head Assembly Details
680-4 - Base and Pole Mounted Cabinet Installation Details
680-5 - Single Span Wire Mounting Sign Installation Details
680-6 - Dual Span Wire and Mast Arm Sign Installation Details
680-7 - Magnetic and Ultra-Sonic Vehicle Detector Installation Details
680-8 - Pedestrian Signal and Flashing Beacon Installation Details
680-9 - Inductance Loop Vehicle Detector Installation Details
680-10 - Wood Pole Details
680-11 - Standard Pullboxes, Frames and Covers
680-12 - Pullbox, Conduit and Ground Rod Installation Details
680-13 - Traffic Signal Pole Foundations
680-14 - Standard Traffic Signal Poles (Sheet 1 of 2)
680-15 - Standard Traffic Signal Poles (Sheet 2 of 2)

These Specifications and Standard Sheets become effective and old Sections 680-Traffic Signals and 724-Traffic Signals are superseded with the issuance of Addendum No. 2 anticipated for the Letting of February 28,1980.

The new Specifications and Standard Sheets are intended to standardize new traffic signal installations and ensure that acceptable construction details are used. They shall be used instead of existing Regional Special Specifications and Construction Details now being included in the plans.

Basically the specification changes are revisions to the past specifications to bring them into agreement with the new Standard Sheets. Additionally, some Special Specifications and parts of Section 670-Highway Lighting System have been incorporated. Extensive changes were made in the Traffic Signal Pole Specifications. Provisions for signal modification and removal were deleted from the Specifications. From now on, modification and removal requirements shall be shown on the plans and covered by Regional Special Specifications.

Particular attention should be paid to Subsections 680-4, Method of Measurement and 680-5, Basis of Payment since there are many changes in each. Some of the payment item numbers will be serialized in the same manner presently being used for landscape items. However, this system will not be completely programmed by the time Addendum No. 2 becomes effective. For the interim period we will transmit a partial pay item listing containing the most common item numbers. These item numbers will be entered in the computer. If numbers are missing or numbers are needed for different sizes they should be requested from the Final Plan Review Bureau.

Designers should examine these Specifications and Standard Sheets thoroughly and ensure that designs submitted after the effective date are in compliance. Additional explanation of some of the new provisions is given below:

A. Pole Foundations

1. Foundation details are contained on Standard Sheet 680-13 - Traffic Signal Pole Foundations. Basically this is an adaptation of Standard Sheet 644-1 - Footings for Sign Assemblies with Single Posts and uses the same table.

2. These are standard footings and should be suitable for most installations. If there is a special footing requirement, such as a spread footing or in rock, it should be designed specifically for the application and shown on the plans.

3. Footing size shall be specified on the plans in terms of footing moment in foot kips.

   The contractor shall install the smallest diameter footing that will meet the moment requirement and be at least 16" greater than the bolt circle diameter. If the contractor elects to install a larger diameter footing than that required, no additional payment shall be made and payment shall be based on the smallest diameter footing. If the depth of the smallest diameter footing prohibits it from being installed, the contractor, when directed by the engineer, shall install a larger diameter footing and payment will be based on the larger diameter footing.

In determining quantities the designer shall base his estimate on the smallest size footing for the specified moment.

4. Footings may be either round or square, except that square footings shall be specified for mast arm poles where the arm length is greater than 20 ft. When a square footing is specified, the payment quantity in the table shall be multiplied by 1.3.

B. Poles

1. Four types of poles are covered by the Specifications and Standard Sheets:

   Span Wire Poles

   Mast Arm Poles

   Post Top Mount Poles

   Bracket Mount Poles

2. All poles use anchor bases. Embedded poles are no longer allowed. Each type of pole, except for Post Top Mount, may be equipped with lighting arms.

3. Poles and anchor bolts are to be designed by the pole manufacturer in accordance with the details on the Standard Sheets. Unless you can justify a special requirement, no pole structural or fabrication details should be shown on the plans.

4. Span wire pole design load should be shown on the plans. The load should be calculated in accordance with E.I. 76-43 - Method for Calculating the Loads Applied to Type A Traffic Signal Poles Carrying Suspended Cables.

   The last step where "Min. Load Capacity at Yield" is calculated should be omitted. The load shown on the plans is determined by the largest of the Group I, II or III loads, before the "Min. Load Capacity at Yield" calculation. This load should be raised to at least the next largest 1000 lbs. and labeled on the plans as "Design Load." For example: If the largest Group I, II and III load is 3324 lbs. the "Design Load" shown on the plans should be 4000 lbs. The pole length specified on the plans should be the next even height greater than the calculated span wire mounting height plus 1.5 ft.

5. Mast Arm Pole design requirements should be shown on the plans by specifying:

   a. Mast arm mounting height in even two foot increments.

   b. Mast arm length in even two foot increments.

   c. Weight and projected area of each signal or sign including mounting brackets.

   d. Distance from the mast arm flange end for each signal and sign.

   e. Dual mast arm poles should also be specified in the same manner.

6. Post Top Mount Poles should be specified by length in even two foot increments. The weight and projected area of the signal should be specified if it is greater than that shown on the Standard Sheet. These poles may be either aluminum or galvanized steel.

7. Bracket mount poles should be specified by length in even two foot increments. The load configuration - pedestrian signal, flashing beacon sign assembly, etc., should be specified on the plans by weights and projected areas.

8. Lighting arms when used should be specified on the plans by the mounting height and span of the luminaire. This information is in addition to the basic pole length or mast arm mounting height specified to accommodate the traffic signal installation. The actual total pole length should be left up to the pole manufacturer since it is dependent upon the lighting arm design.

9. Span Wire Pole payment item numbers are based on pole length and load. Mast arm pole item numbers are based on mast arm length and mounting height. If there is more than one mast arm, its characteristics should be specified on the plans. Post Top and Bracket Mount Pole item numbers are based on pole length. Note that item numbers for poles with lighting arms are based on the pole length or mounting height as if the luminaire was not present.

C. Span Wires

Three types of span wire installations are shown on the Standard Sheets:

Single Span Wire

Dual Span Wire with Upper Tether

Dual Span Wire with Lower Tether

The lower tether wire is required when optically programmed signals are installed on span wires. It should also be used with span wire mounted signs, although there are also span wire sign assemblies on the Standard Sheets that do not require tethers.

The upper tether wire assembly can be used where a tether is wanted but without the potential interference of the lower tether wire.

D. Signal Heads

Payment for both pedestrian and traffic signal heads has been changed so that there are separate pay items for the signal sections and the mounting bracket assembly. A signal section is defined in the specification. Each head is assembled from a number of signal sections and the bracket assembly to make a complete signal head, configured as shown on the plans. Disconnect hangers, if required for the installation, will be specified on the plans and paid for under their own item number.

E. Overhead Sign Assemblies

A number of different sign assemblies are shown on the Standard Sheets for both span wire and mast arm installation. Each type has its own item number which covers the entire assembly including sign panel. The designer will have to determine the appropriate type for the particular installation.

F. Cabinets

The ground mounted cabinet footing extends only 4 inches above the surrounding surface. If additional height above the ground is needed, the use of a cabinet base extension section between cabinet and footing should be specified on the plans. A paved work pad is to be provided in front of cabinet doors.

G. Pullboxes

Different sizes of circular pullboxes are shown on the Standard Sheets. The smaller sizes are intended for use at inductance loops or other places where the number of wires in the pullbox is small. The larger circular sizes may be used to replace the rectangular pullbox. Item numbers are provided for each size of pullbox and there are also numbers that allow the option of using either the circular or rectangular pullbox. Note that extension sections are available if a deeper pullbox is needed.

H. Conduit

A standard pavement restoration detail is shown on the Standard Sheets for conduit excavation. If there are different Regional requirements they should be specified on the plans. A payment item is included for conduit jacking or boring and should be used if pavement cuts are not to be permitted.