

402.00 LIGHTING

402.01 GENERAL INFORMATION

SSHC References:

- Section 203 - Removal of Structures and Obstructions*
- Section 401 - Lighting and Traffic Signal Requirements*
- Section 402 - Cable Installation*
- Section 403 - Direct Burial Cable*
- Section 404 - Aerial Cable*
- Section 405 - Conduit*
- Section 406 - Pull Boxes*
- Section 407 - Pole and Tower Foundations*
- Section 408 - Poles and Towers*
- Section 412 - Luminaires*
- Section 413 - Lighting Control Center*
- Section 414 - High Mast Lowering System*
- Section 415 - Lighting System Maintenance*
- Section 416 - Temporary Lighting System*
- Section 1073 - Material Requirements*

Other References:

- NDR Materials Sampling Guide
- National Electric Code
- National Electric Safety Code

General Comment

Because roadway lighting usually makes up only a small portion of a projects total cost, it is many times thought of as insignificant and not requiring much attention. Many benefits in the form of public safety, security, convenience and drivers comfort, however, are derived from a quality lighting job. This makes the lighting inspector's job of checking out and inspecting all aspects of the lighting construction, one of utmost importance.

Special Construction Items

Unusual, difficult or special items of work are usually discussed at the preconstruction conference. The inspector should confer with the Project Manager regarding all items of work he/she does not understand. Further clarification may be had by contacting the Lighting Engineer.

402.02 PRECONSTRUCTON CONFERENCE

In addition to discussing special items of work, the preconstruction conference is also an excellent time to remind the contractor that many problems and delays can be avoided by the early submittal of his/her material list, shop drawings, and samples of all materials that require testing. No materials can be incorporated into the work before first being approved.

If utility support is necessary, confirm the date that any utility work will be started and, if possible, the date completed.

402.03 SHOP DRAWINGS AND MATERIALS LIST

SSHC Subsection 401.02 provides information on shop drawings and a materials list that is required of the contractor before he/she may incorporate any items into the project.

To assure uniform and effective operation of this requirement, the following procedures will be followed:

After receiving the required seven copies of the materials list and shop drawings from the contractor, the Construction Division will send the submittals to the Lighting Section for their review and comments.

All items will be checked for compliance with the plans and specifications. Two copies of the reviewed list and shop drawings, showing approval or disapproval of each item, will be returned to the contractor with a copy to the Project Manager. If the contractor desires additional copies, they must be submitted with the seven required copies.

All equipment and materials to be used on a project must be approved before installation. Once approved, there shall be no substitutions for any of the items without prior written request to, and written approval from, the Lighting Engineer. The inspector must make sure that only materials that have been approved are used on the project.

The contractor shall inform his/her supplier that all items supplied to the project must be suitably stamped, stenciled, tagged or otherwise marked to allow for easy identification with the descriptive markings, brand names and catalog numbers shown on the materials list and shop drawings.

402.04 CONSTRUCTION REQUIREMENTS

Staking of Light Pole and Tower Foundations

SSHC Subsection 407.03 states that the contractor is responsible for field verifying the foundation location and elevation of each lighting unit to determine that no conflicting or hazardous situation will exist when the pole or tower is erected. Any location or elevation that appears unreasonable or out of specifications as to projection above grade, will be brought to the Project Manager's attention. The Project Manager will decide any changes in location and/or elevation.

Wood Poles Used on Lighting Projects

Specifications covering wood poles used on lighting projects will be shown on the project plans.

Testing of Lighting Systems

SSHC Subsection 401.03 requires the contractor to perform operating circuit and resistance test on the lighting system. The Project Manager will send written results of these tests to the Lighting Engineer.

Poles and Towers (*SSHC Section 408*)

Conventional light poles are usually furnished by the Contractor complete with pole shaft, mast arm, luminaire, anchor bolts, foundation, and breakaway device (if required).

High mast towers are usually furnished by the Contractor complete with tower shaft, base plate, anchor bolts, lowering system with motor and foundation.

All poles and towers shall be plumb. Poles will be shimmed to stand plumb. Only regular "U" shaped shim stock is allowed. Towers will be supported solely by anchor bolts and nuts. The nuts will be adjusted to plumb the tower.

All poles and towers will be grounded to a grounding rod(s) as shown in the plans.

All poles must have a handhole with cover attached.

Unless indicated otherwise, all poles required to breakaway on impact will have a frangible transformer base ("T base") as its breakaway device.

Poles and towers shall conform to the requirements of Section 1073.

Poles and Tower Foundations (*SSHC Section 407*)

Pole foundation details will be shown in the plans. Tower foundations will usually be designed by the contractor.

Towers are installed using concrete foundations only. Poles are installed using either concrete or power foundations. Power foundations are allowed only when so indicated in the plans.

All excavations for concrete foundations shall be dry and free of loose dirt before the concrete is placed.

Foundations shall be installed before trenching for conduit and cable.

Backfill around foundations shall be compacted to 95 percent of maximum density as determined by NDR T 99.

Luminaires (*SSHC Section 412*)

All luminaires must be on the NDR Approved Products List or have been specifically approved for use on the project in question by the contractor's submittal of shop drawings or catalog cuts.

Most luminaires are factory set to meet photometric requirements. Occasionally, in order to meet specifications, the position of the lamp socket in each luminaire must be adjusted by following a set of manufacturer's instructions accompanying each luminaire.

Unless indicated otherwise, all luminaires will be installed level in both horizontal axes.

Luminaires shall be installed to proper alignment and orientation with respect to the roadway.

Night inspection by the Project Manager may determine the need for adjustments to the luminaires.

Lighting Control Centers (*SSHC Section 413*)

The location of the lighting control center as shown on the plans is approximate. Actual location will be as determined by the electric utility and the Project Manager.

Components comprising the various types of lighting control centers will be listed on the NDR Approved Products List or will be specifically approved for use on the project in question by the contractor's submittal of shop drawings or catalog cuts.

High Mast Lowering System (*SSHC Section 414*)

Unless indicated otherwise, all new lowering systems will be furnished with an internal power unit (each tower will have its own motor to raise or lower the light ring).

High mast lowering systems will be on the NDR Approved Products List or specifically approved for the project in question by the contractor's submittal of shop drawings or catalog cuts.

A new lowering system will accompany each new tower.

Installation of a new high mast lowering system on an existing tower may require some modification to the tower. Modifications shall be made as detailed in the plans.

Temporary Lighting System (*SSHC Section 416*)

There are a number of different types of temporary lighting systems.

All temporary lighting systems require the contractor to properly operate and maintain the lights daily from dusk to dawn through the construction period.

Materials for a temporary lighting system may be state or contractor furnished as indicated in the plans.

Usually, the contractor will be responsible for providing the electrical energy required to energize the crossover type temporary lighting system.

An equipment grounding conductor is usually not required in a temporary lighting system. In some service areas, however, the utility may require that an equipment ground be used.

When the temporary lighting units are no longer required, the contractor will, in strict conformance with the project requirements, remove, prepare and deliver the units to the designated storage area. Any deviation from the project requirements must be cleared with the Lighting Engineer.

402.05 PAYMENT FOR ELECTRIC POWER USED BY THE LIGHTING SYSTEM

SSHC Subsection 401.05 states that the contractor will not be required to pay for any electrical energy consumed by a permanent lighting system.

The plans should indicate whether the Contractor or the Department arranges and pays for the electrical power for a temporary lighting system.

402.06 COMPLETION AND ACCEPTANCE OF THE PROJECT

Upon completion and acceptance of a lighting project, the Project Manager shall furnish the District Maintenance Superintendent with an accurate set of half-size "as built" plans together with a complete set of shop drawings to facilitate maintenance of the lighting system.