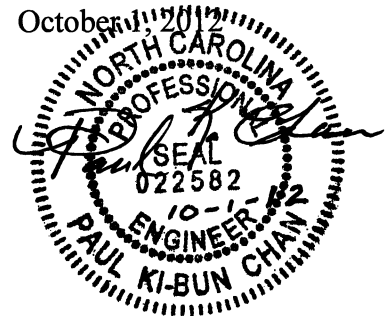


PROJECT SPECIAL PROVISIONS  
LIGHTING



## 1.00 DESCRIPTION

The work covered by this Section consists of furnishing, installing, connecting, and placing into satisfactory operating condition roadway lighting at locations shown on the plans. Perform all work in accordance with these Special Provisions, the Plans, the National Electrical Code, and North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (Standard Specifications).

Perform all work in conformance with Division 14 of the Standard Specifications except as modified or added to by these Special Provisions. Install all bore pits outside the clear zone, as defined in the AASHTO Roadside Design Guide or as directed by the Engineer.

In addition to the requirements of Division 1400, other specific Sections of the Standard Specifications applicable to the work on this project are listed below.

|              |   |
|--------------|---|
| Section 1401 | High Mount Standard and Portable Drive Unit |
| Section 1403 | High Mount Luminaires                       |
| Section 1404 | Light Standards                             |
| Section 1405 | Standard Foundation                         |
| Section 1406 | Light Standard Luminaires                   |
| Section 1407 | Electric Service Pole and Lateral           |
| Section 1408 | Light Control System                        |
| Section 1409 | Electrical Duct                             |
| Section 1410 | Feeder Circuits                             |
| Section 1411 | Electrical Junction Boxes                   |

## 2.00 HIGH MOUNT FOUNDATIONS

### 2.10 DESCRIPTION

High mount foundations for high mount standards consist of drilled piers or footings with pedestals, conduit and anchor rod assemblies. Construct high mount foundations in accordance with the contract and either *Roadway Standard Drawings* No. 1402.01 or the accepted submittals. Define "high mount standard foundation" as a drilled pier including the conduit and anchor rod assembly that meets Standard Drawing No. 1402.01.

### 2.20 MATERIALS

Use high mount foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision found in the Roadway Project Special Provisions.

### 2.30 HIGH MOUNT STANDARD FOUNDATIONS

Construct high mount standard foundations for the wind zone and high mount heights shown in the plans unless the following assumed site conditions are not applicable to high mount locations:

- A. Soil with unit weight ( $\gamma$ )  $\geq$  120 lb/cf and friction angle ( $\phi$ )  $\geq$  30°,
- B. Groundwater at least 7 ft below finished grade and
- C. Slope of finished grade 6:1 (H:V) or flatter.

A subsurface investigation and high mount foundation design are required if the Engineer determines these assumed site conditions do not apply to a high mount location and the high mount cannot be moved. Subsurface conditions requiring a high mount foundation design include but are not limited to weathered or hard rock, boulders, very soft or loose soil, muck or shallow groundwater. No extension of completion date or time will be allowed for subsurface investigations or high mount foundation designs.

#### 2.40 SUBSURFACE INVESTIGATIONS

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each high mount location requiring a subsurface investigation. Rough grade high mount locations to within 2 ft of finished grade before beginning drilling. Drill borings to 2 drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT version 8.0 or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

#### 2.50 HIGH MOUNT FOUNDATION DESIGNS

Design high mount foundations for the wind zone and high mount heights shown in the plans and the slope of finished grade and subsurface conditions at each high mount location. Design drilled piers, footings and pedestals in accordance with the 4<sup>th</sup> Edition of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version 5.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 0.5" at top of piers.

Design footings in accordance with Section 4.4 of the *AASHTO Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than 3,000 lb/sf for footings.

Submit boring logs, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit

and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for high mount foundation design submittals. Have high mount foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

**2.60 CONSTRUCTION METHODS**

Grade a 3 ft diameter level work area around high mount locations with cut and fill slopes as shown on Standard Drawing No. 1402.01. Construct drilled piers, footings and pedestals and install anchor rod assemblies for high mount foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

**2.70 MEASUREMENT AND PAYMENT**

*High Mount Foundations* will be measured and paid in cubic yards. High mount standard foundations will be measured as the cubic yards of concrete shown on Standard Drawing No. 1402.01 for the high mount height and wind zone shown in the plans. All other high mount foundations will be measured as the cubic yards of foundation concrete for drilled piers, footings and pedestals shown on the accepted submittals. The contract unit price for *High Mount Foundations* will be full compensation for providing labor, tools, equipment and foundation materials, stabilizing or shoring excavations and supplying concrete, reinforcing steel, conduit, anchor rod assemblies and any incidentals necessary to construct high mount foundations. Subsurface investigations and high mount foundation designs required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*.

Payment will be made under:

High Mount Foundations.....Cubic Yard

**3.00 RELOCATE SINGLE ARM LIGHT STANDARDS**

**3.10 DESCRIPTION**

The work covered by this section consists of providing all equipment, labor and materials necessary to remove, relocate and reinstall an existing light standard to a new foundation at locations shown on the plans. This section also includes storage of materials to be reused, complete removal of the existing foundation and installation of a PC18 junction box at previous foundation locations for continuity of existing circuitry. Construction of a new foundation is not included in this section.

**3.20 MATERIALS**

Reuse existing materials, including the light standard, breakaway base and arm. Shims and washers may be reused, but new connecting bolts are required. Materials to be reused which are damaged during relocation will be replaced with new materials at no additional cost to the Department.

The Contractor is responsible for the storage and protection of the reused materials against loss or damage.

Provide a PC18 junction box, conduit stubs and set screw type connectors to splice existing conductors after foundation is removed.

### 3.30 CONSTRUCTION METHODS

Maintain operation of the existing lighting system until such time that it becomes in conflict with the actual construction work, or it becomes a hazard to traffic as determined by the Engineer. Coordinate work with the NC DOT Traffic Services Supervisor to assure that circuits can be de-energized where and when necessary.

Dismount the light standard from the existing standard foundation. Reassemble and reinstall light standards on a new foundation and reuse the existing breakaway base. Replace the connecting bolts joining the standard to the breakaway base and attachment hardware for the standard-to-arm connection. Use rope or web slings when hoisting or lifting the light standard to prevent damage or marking. If the light standards are to be stored between dismantling and reinstalling, provide proper transportation and supports to prevent warping. Provide protection against the elements.

Remove luminaire from bracket arms and deliver the luminaire in good condition to the NCDOT Maintenance Yard. Install new luminaire on bracket arm and new conductors inside the relocated standard as detailed and paid for in Section 1406 of the Roadway Standard Specifications.

Completely remove concrete light standard foundations from relocated locations. Dispose of the removed concrete, reinforcing steel and anchor bolts in a manner acceptable to the Engineer. Backfill the holes with suitable material and compact backfill as required.

Provide and install PC18 junction box meeting Section 1411 of the Roadway Standard Specifications after removal of foundation and proper compaction of backfill material. Intercept existing conduit and conductors and turn up into new junction box. Splice conductors using a set screw type connector as detailed in Section 1400-4(F) of the Roadway Standard Specifications.

### 3.40 MEASUREMENT AND PAYMENT

The quantity of relocated light standards to be paid for will be the actual number which have been removed from existing locations, installed at proposed locations in a satisfactory manner and have been accepted by the Engineer.

Relocated light standards measured as provided above will be paid for at the contract unit bid price per each "Relocate Light Standard". Such price and payment will be considered full compensation for disconnecting circuitry, disassembly, transportation, storage, reassembly, installing new connecting bolts, connection of new circuitry, removal of foundation, disposing of

concrete, backfilling, compaction, installation of junction box and tapping of conduit and circuitry at former location and all incidentals necessary to complete the work.

Payment will be made under:

Relocate Light Standard.....Each

**4.00 INSTALL TWIN ARM LIGHT STANDARDS**

**4.10 DESCRIPTION**

Install twin arm light standards provided by the Department. Also install new luminaires, new wiring inside the standard and new breakaway fuseholders. Twin arm standards are located at the NCDOT warehouse at the address below:

County Maintenance Yard  
7703 District Drive  
Charlotte, NC 28213

Coordinate access of twin arm standards with Division 10 Signals Supervisor, Dave Davis (704-982-1998).

**4.20 MATERIALS**

Use twin arm standards and bracket arms provided by the Department. Provide all new connecting hardware to attach standard to new barrier rail foundation. Provide new luminaires, new type SO wiring inside the standard and new breakaway fuseholders (see standard pay item list). Standards that are to be reused which are damaged by the Contractor prior to installation will be replaced with new materials at no cost to the Department.

**4.30 CONSTRUCTION METHODS**

Same as Section 1404-3 of the Roadway Standard Specifications.

Install new luminaires on bracket arms and new conductors inside the standard as detailed and paid for in Section 1406 of the Roadway Standard Specifications.

**4.40 MEASUREMENT AND PAYMENT**

The quantity of twin arm light standards to be paid for will be the actual number which have been transported from the County Maintenance Yard, installed at proposed locations in a satisfactory manner and have been accepted by the Engineer.

Twin arm light standards measured as provided above will be paid for at the contract unit bid price per each "Twin Arm Light Standard". Such price and payment will be considered full compensation for transportation of standard from County Maintenance Yard, storage (if

required), reassembly, installation of twin arm standard on new barrier rail foundation and all incidentals necessary to complete the work.

Payment will be made under:

Install Twin Arm Light Standard ..... Each

**5.00 PORTABLE CONSTRUCTION LIGHTING**

**5.10 DESCRIPTION**

Work covered by this section shall be in accordance with Section 1413 of the Standard Specifications except as modified below.

**5.20 MATERIALS**

Use materials as specified in Section 1413-2.

**5.30 TOWER LIGHT**

Use tower lights as specified in Section 1413-3.

**5.40 MACHINE LIGHTS**

Amend Section 1413-4 to include the following:

Balloon lights are an acceptable alternate luminaire for machine lights.

**5.50 CONSTRUCTION METHODS**

Use construction methods as specified in Section 1413-5.

**5.60 MEASUREMENT AND PAYMENT**

Measurement and payment for Portable Construction Lighting shall be in accordance with Section 1413-6 of the Standard Specifications.