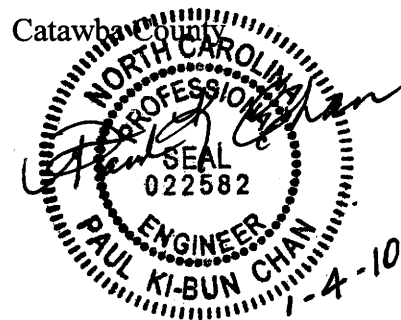


**PROJECT SPECIAL PROVISIONS
Roadway Lighting Renovation**



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. The work involves removing existing lighting equipment and installing new high mast light standards, with control systems and associated circuitry. Coordinate with the Traffic Services Signal Supervisor for delivery of selected salvaged materials. All removed material shall become the property of the Contractor and disposed of in a manner acceptable to the Engineer.

Install guardrail around high mast standards in the median. Clear and grub around existing and proposed high mast standards in wooded areas.

All work shall be performed 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)

Install all bore pits outside clear zone as defined in 2002 AASHTO Roadside Design Guide or as directed by the Engineer.

All work shall be in conformance with Division 8 and Division 14 of the Standard Specifications except as modified or added to by these Special Provisions.

2.00 EXISTING UTILITIES

NC DOT owned underground signal conductors and fiber optic cables may be located on the project. Contact representatives of the Department before construction begins, to identify and locate these facilities. Locate utilities owned by others as required to complete the work and prevent conflict with construction. Refer to Standard Specification section 1400-4(C)

New control systems will be installed in areas accessible for maintenance. Coordinate with NC DOT representatives for location of meters, control systems and electrical services. Contact information is listed below.

Division Traffic Services Signal Supervisor---Sam Nichols (704-480-5423)

3.00 WIRING METHODS

3.00 DESCRIPTION

Amend Section 1400-4(F) to include the following:

Pull conductors by hand, or use motorized cable-pulling equipment designed for pulling multiple cables into conduit. Use sheaves or rollers, as required to prevent damage to conductor insulation. Do not use an automobile to generate cable pulling forces. Use equipment similar to the Greenlee model UT2 cable pulling system, or Engineer approved equal.

4.00 INSPECTIONS

4.10 DESCRIPTION

Amend Section 1400-5 to include the following:

Provide the personnel and equipment necessary for removing and replacing fuseholders and/ or operating circuit breakers, to facilitate the insulation resistance test described elsewhere in the Special Provisions.

A "LIGHTING SYSTEM INSPECTION CHECKLIST" is included at the back of these Special Provisions. Coordinate with the project inspector, to have the checklist items inspected as work progresses and at the end of the project, to prevent delays in preparing the final inspection punch list.

5.00 PERFORMANCE TESTS

5.10 DESCRIPTION

Amend Section 1400-6 to include the following:

Provide a calibrated MegOhmMeter, with certification that calibration was done recently (within one year of use). Provide a meter manufactured by Fluke, Amprobe, Biddle, or Engineer approved equal. Present the meter for inspection, at the pre-lighting-work meeting described elsewhere in these Special Provisions.

Removing water from the conduit of a faulty circuit is not considered a repair. Water in the conduit allows current to flow between skinned places in the conductors insulation. If a circuit fails the insulation resistance test, and removing water allows the circuit to pass, replace the conductors and re-test the new circuit.

6.00 CONSTRUCTION PHASING

6.10 DESCRIPTION

Amend Section 1400-11 to include the following:

Schedule a pre-lighting-work meeting before beginning work on the lighting system. Include staff members from the prime contractor, electrical sub-contractor, Resident

Engineer's office, and the Lighting/ Electrical squad in the Roadway Design Unit in Raleigh.

7.00 LIGHT CONTROL SYSTEM

7.10 DESCRIPTION

Same as Section 1408 -1.

7.20 MATERIALS

Amend Section 1408 -2 of the Standard Specifications as follows:

The completed light control system shall be marked "Suitable for Use as Service Equipment", in a prominent location in the enclosure, in accordance with NEC article 409.110.

8.30 CONSTRUCTION METHODS

Same as Section 1408 -3.

8.40 MEASUREMENT AND PAYMENT

Measurement will be in accordance with Section 1408 -4.

Payment will be made under:

Light Control System Each

8.00 HIGH MOUNT STANDARD

8.10 DESCRIPTION

Same as Section 1401 -1.

8.20 MATERIALS

Amend paragraph five (5) of Section 1401 -2 of the Standard Specifications as follows:

Have the design of the support including base plate and anchorage conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, and the Interim Specifications valid at the time of letting. Fatigue Category II shall be used in design. The welding design and fabrication shall be in accordance with Article 1072-20. The support is to be deigned for the wind velocity shown on the plans.

8.30 CONSTRUCTION METHODS

Amend Section 1401 -3 to include the following 9/4/08 anchor nut tightening procedure.

Anchor Rod Nut Tightening Requirements for Metal PolesPrior to installation

Protect the anchor rod threads from damage prior to installation and during installation.

Prior to installation of the rods in the foundation, turn nuts onto and off the rods, well past the elevation of the bottom of the leveling nuts. Turn by the effort of one worker using an ordinary wrench without a cheater bar. Report to the Engineer thread damage requiring unusually large effort.

During installation

1. Place leveling nuts (bottom nuts) on the anchor rods.
2. Place leveling nut washers on top of the anchor rod leveling nuts.
3. Place a rigid template on top of the leveling nuts to check the level of the nuts. If the anchor nut and washer cannot be brought into firm contact with the template, then beveled washers shall be used.
4. Verify that the distance between the bottom of the leveling nut and the top of the concrete foundation is no more than one anchor rod diameter. If an upright is required to be back-raked, then the distance between the bottom of the leveling nut and the top of the concrete foundation should be no more than one anchor rod diameter, averaged over the anchor rod group.
5. Place the base plate and structural element to which it is attached. However, do not attach to the upright element, during tightening of the anchor nuts, cantilever beams or arms with span in excess of 10 feet. Luminaire arms and fixtures may be attached prior to standing the pole on the foundation.
6. Place top nut washers.
7. Do not use lock washers.
8. Lubricate threads and bearing surfaces of top nuts. Lubricant shall be beeswax, stick paraffin, or other approved lubricant.
9. Place top nuts. If the anchor nut and washer cannot be brought into firm contact with the base plate, then beveled washers shall be used.
10. Tighten top nuts to snug tight. A snug-tight condition is defined as the washer and nut being in full contact with the base plate, and the application of the full effort of a workman on a 12-inch wrench. Turn top nuts in increments following a star pattern (using at least two full tightening cycles).
11. To ensure proper pretensioning, after all top nuts have been brought to snug-tight condition, repeat the procedure on the leveling nuts. Turn leveling nuts in increments following a star pattern (using at least two full tightening cycles).

- 12. At this point, verify if beveled washers are required. Beveled washers are necessary under the leveling nut or top nut if any face of the base plate has a slope greater than 1:20 and / or any nut can not be brought into firm contact with the base plate.
- 13. Before further nut turning, mark the reference position of the nut in the snug-tight condition with a suitable marking (ink or paint that is not water-soluble). Mark on the corner at the intersection of two flats with a corresponding reference mark on the base plate at each nut. After tightening, verify the nut rotation.
- 14. Achieve pretensioning by turn-of-nut method. Turn the top nuts to 1/6 of a turn. Do so in a star pattern using at least two full-tightening cycles.
- 15. After installation, ensure that firm contact exists between the anchor rod nuts, washers, and base plate on any anchor rod installed.
- 16. For overhead sign assemblies: The span type truss or the cantilever truss may be placed on the uprights or attached to the upright at this time. For signal support structures: The span wires or mast arms may be attached to the upright at this time.
- 17. After a period of no less than 4 days, and no more than 2 weeks, and in the presence of the Engineer, use a torque wrench to verify that a torque at least equal to 600 foot-pounds is provided on each top nut. For cantilever structures, verify the torque after erection of the remainder of the structure and any heavy attachments to the structure.
- 18. If any top nut torque reveals less than 600 foot-pounds of effort is required to move the nut, then tighten the nut to no less than 600 foot-pounds.
- 19. Calibrate, at least annually, the torque indicator on the wrench used for tightening the nuts. Provide the Engineer a certification of such calibration.
- 20. Because inspection or re-tightening of the leveling nuts would be prevented, and to reduce moisture retention and associated corrosion, do not place grout under the base plate.

8.40 MEASUREMENT AND PAYMENT

Measurement will be in accordance with Section 1408-4.

Payment will be made under:

120' HIGH MOUNT STANDARD	Each
100' HIGH MOUNT STANDARD	Each
80' HIGH MOUNT STANDARD	Each

9.00 SUPPLEMENTARY CLEARING AND GRUBBING

9.10 DESCRIPTION

Several areas around existing and proposed high mast standards require clearing and grubbing, before standard removal and/ or installation can begin. Refer to Section 200-1 of the Standard Specifications for other details. Seed and mulch the areas as described in Section 1660 of the Standard Specifications.

9.20 MATERIALS

Refer to Sections 200-2 and 1660-2 of the Standard Specifications for materials, and as directed by the Engineer.

9.30 CONSTRUCTION METHODS

Clear and grub the areas surrounding existing and proposed high mast standards, to allow access for heavy equipment and as directed by the Engineer. Refer to Sections 200-3, 200-4 and 200-5 of the Standard Specifications, for other construction requirements. Clear and grub other areas as directed by the Engineer. Seed and mulch affected areas, after standard removal and/ or installation and trenching for circuitry is complete. Provide erosion control as directed by the Engineer.

9.40 MEASUREMENT AND PAYMENT

Refer to Sections 200-7 and 1660-8 of the Standard Specifications for measurement and payment.

Payment will be made under:

Supplementary Clearing and Grubbing.....	Acre
Seeding and Mulching.....	Acre

10.00 REMOVE CONTROL SYSTEM

10.10 DESCRIPTION

The work covered by this section consists of the removal of existing lighting control systems and concrete foundations.

The control systems consist of electrical components mounted inside a steel enclosure, a photocell, feeder circuits in conduit and concrete foundations

10.20 MATERIALS

No materials are required for this.

10.30 CONSTRUCTION METHODS

Leave the existing lighting control system in operation until the new proposed lighting system can be used to maintain the normal nightly operation of the roadway lights.

Coordinate work with NC DOT Traffic Signal Supervisor to assure that circuits can be de-energized where and when necessary.

Conduct work so those portions of the lighting system, which are not in conflict with construction, will be maintained in continuous nighttime operation.

Remove the control system enclosure with all its internal electrical components intact. Remove all conduit and wiring entering the enclosure. The enclosure and its contents shall become the property of the Contractor, removed from the project, and disposed of in a manner acceptable to the Engineer.

Remove the existing foundations, and dispose of the removed concrete and reinforcing steel in a manner acceptable to the Engineer. Backfill the holes with suitable material and compact the material as required.

10.40 MEASUREMENT AND PAYMENT

The quantity of removed control systems to be paid for will be the actual number, which have been removed in a satisfactory manner, and have been accepted by the Engineer.

Removed control systems, measured as provided above, will be paid for at the contract unit bid price per each "Remove Control System". Such price and payment will be considered full compensation for disconnecting circuitry, removing and disposing of control system, disposing of concrete, backfilling, compaction and all incidentals necessary to complete the work.

Payment will be made under:

Remove Control System.....Each

11.00 REMOVE LIGHT STANDARDS

11.10 DESCRIPTION

The work covered by this section consists of the removal of existing metal light standards and concrete foundations at locations shown on the plans. Single-arm standards are 45' mounting height, and high mast standards are 80', 100' and 120' mounting height. Removed light standards will become the property of the Contractor and disposed of in a manner acceptable to the Engineer. Selected salvaged components of the high mast standards are to be delivered to the NC DOT Traffic Signal Supervisor.

11.20 MATERIALS

No materials are required for this work except such miscellaneous items as tape and terminal devices to dead-end circuits serving the light standards.

11.30 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 Signal Supervisor, to assure that circuits can be de-energized where and when necessary.

Remove or abandon existing concrete light standard foundations as defined in Standard Specifications Section 1400-10. Dispose of the removed concrete, reinforcing steel, and anchor bolts in waste areas furnished by the Contractor. Backfill the holes with suitable material and compact the material as required.

Abandon or remove the conductors and the conduit for the removed light standards as shown on the plans. Refer to Standard Specifications Section 1400-10.

11.40 MEASUREMENT AND PAYMENT

The quantity of removed light standards to be paid for will be the actual number which have been dismantled from existing foundations and accepted

The quantity of removed foundations to be paid for will be the actual number, which have been removed or abandoned and accepted.

The removed light standards measured as provided above will be paid for at the contract unit price per each "Remove Light Standard", or "Remove High Mast Light Standard", that have been removed and accepted. Such price and payment will be considered full compensation for removing light standards.

The removed foundations measured as provided above will be paid for at the contract unit price per each "Remove Light Standard Foundation", or "Remove High Mast Light Standard Foundation", that have been removed and accepted. Such price and payment will be considered full compensation for removing or abandoning foundation concrete, reinforcing steel, and anchor bolts. It also includes backfilling the holes with suitable material, and compacting the material as required.

Payment will be made under:

- Remove Light Standard.....Each
- Remove High Mast Light Standard.....Each
- Remove Light Standard Foundation.....Each
- Remove High Mast Light Standard Foundation.....Each

**LIGHTING SYSTEM INSPECTION
CHECKLIST**

Date _____

PROJECT # _____

CONTROL SYSTEM _____

1. Line Voltage: ϕ_A -G _____ ϕ_B -G _____ ϕ_A - ϕ_B _____
2. Control System ID _____
3. Conductors Numbered _____
4. Main CB Rating _____
5. Feeder CB Rating _____
6. Control CB Rating _____
7. Selector Switch Label and Operation _____
8. Damaged Galvanizing _____
9. Grounding Electrode Conductor _____
10. Main Bonding Jumper _____
11. Photocontrol Operation _____
12. Clean Enclosure _____
13. Certificate of Inspection _____
14. Meg Circuits: #1 ϕ_A -G _____ #2 ϕ_A -G _____ #3 ϕ_A -G _____
 ϕ_B -G _____ ϕ_B -G _____ ϕ_B -G _____
 ϕ_A - ϕ_B _____ ϕ_A - ϕ_B _____ ϕ_A - ϕ_B _____

#4 ϕ_A -G _____ #5 ϕ_A -G _____ #6 ϕ_A -G _____
 ϕ_B -G _____ ϕ_B -G _____ ϕ_B -G _____
 ϕ_A - ϕ_B _____ ϕ_A - ϕ_B _____ ϕ_A - ϕ_B _____
15. Amperage: #1 ϕ_A _____ ϕ_B _____ #2 ϕ_A _____ ϕ_B _____ #3 ϕ_A _____ ϕ_B _____
#4 ϕ_A _____ ϕ_B _____ #5 ϕ_A _____ ϕ_B _____ #6 ϕ_A _____ ϕ_B _____
16. Verify Wire Size _____

17. Verify Lights on Correct Circuits _____
18. Print Pocket With As-Built Plans in Panel _____

LIGHT STANDARDS

1. Proper ID's _____
2. Breakaway Fuseholders, Proper Line/Load Connections _____
3. Foundation Elevations _____
4. Breakaway Bases _____
5. Conductor ID's in Base _____

HIGH MOUNT STANDARDS

1. Verify ID's _____
2. Portable Drive and case Turned Over to Traffic Services _____
3. Operation of Lowering Device: HM1 ___ HM2 ___ HM3 ___ HM4 ___ HM5 ___ HM6 ___
4. Connection at Carrier Ring: HM1 ___ HM2 ___ HM3 ___ HM4 ___ HM5 ___ HM6 ___
5. Door Secure and Not Removable _____
6. Wire Mesh at Base _____
7. Lay of Cable on Winch _____
8. Luminaires Level and Secure _____
9. Grounding _____
10. Verify Rating of CB _____
11. Date Code on Lamps _____

JUNCTION BOXES

1. Verify Cleanness _____
2. Verify Conductor ID's _____
3. Verify Location, Elevation and Cover Secure _____

- 4. Ground Rod Connections _____
- 5. Insulation of Joints and Splices _____
- 6. Sealing of Conduits _____

GENERAL: Two-week Test Period _____