ORIGINATION FORM

Date: November 29, 2011
Originator: Chester A. Henson
Contact Information: 414-4117

Specification Title: Section 715
Specification Section, Article, or Subarticle Number: Highway Lighting System

Why does the existing language need to be changed? Method of Payment for conduit was revised to be consistent with payment in other sections. Miscellaneous changes were made to cleanup the specification.

Summary of the changes: See revisions

Are these changes applicable to all Department jobs? If not, what are the restrictions? Yes

Will these changes result in an increase or decrease in project costs? If yes, what is the estimated change in costs? No

With who have you discussed these changes? Specifications, construction and maintenance

What other offices will be impacted by these changes? None

Are changes needed to the PPM, Design Standards, SDG, CPAM or other manual? No

Is a Design Bulletin, Construction Memo, or Estimates Bulletin needed? Yes a design and estimates bulletin will be issued for the change in measurement.

Contact the State Specifications Office for assistance in completing this form.
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ANANTH PRASAD, P.E.
SECRETARY

M E M O R A N D U M

DATE: December 14, 2011

TO: Specification Review Distribution List

FROM: Rudy Powell, State Specifications Engineer

SUBJECT: Proposed Specification: **7150000 Highway Lighting System**.

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

This change was proposed by Chester Henson to revise the method of payment for conduit to be consistent with payment in other sections. Miscellaneous changes were also made to clean up the specification.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at SP965RP or rudy.powell@dot.state.fl.us. Comments received after **January 11, 2011,** may not be considered. Your input is encouraged.

RP/cah
Attachment

HIGHWAY LIGHTENG SYSTEM.
(REV 12-5-11)

SECTION 715 (Pages 808 to 813) is deleted and the following substituted:

SECTION 715
HIGHWAY LIGHTING SYSTEM

715-1 Description.

Install a highway lighting system in accordance with the details shown in the plans. Use pole assemblies as shown in the Design Standards when standard aluminum pole assemblies or standard high mast light assemblies are required by the Contract Documents. Include in the system the light poles, bases, luminaires, ballasts, ~~pull boxes,~~ cable, conduit, ~~substations, expansion joints,~~ protective devices, ~~transformers~~ and control devices; all as specified or required for the complete facility.

Obtain ~~aluminum~~*conventional light* pole and high mast light pole assemblies from a fabrication facility that is listed on the Department's list of metal producers with an accepted quality control program, meeting the requirements of 105-3. Provide metal lighting poles, excluding high mast lighting, with internal vibration damping devices in accordance with Design Standard 17515 in all installations on bridges, walls and concrete median barriers.

715-2 Shop Drawings and Working Drawings.

Submit shop drawings and working drawings with descriptive specifications and engineering data for *the service main, control panel enclosure, control panel main disconnect, lighting contactor, electrical* panel ~~board~~, transformer, ~~primary oil switch,~~*in-line* fused *holders, surge protective devices,*~~cutouts,~~ non-standard light poles (including brackets), luminaires, ballast, photo-electric cell, ~~screw type foundations,~~ *conduit* and cable or any other item requested by the Engineer as specified in Section 5.

715-3 Materials and Equipment to be Installed.

715-3.1 General: Meet the materials and equipment requirements of Section 992. Provide products of established, reputable manufacturers of electrical equipment, meeting NEC requirements~~, the regulations of the National Board of Fire Underwriters,~~ and the approval of the Engineer.

715-3.2 Criterion Designation of Materials and Equipment: Where a criterion specification is designated for any material or equipment to be installed, by the name or catalog number of a specific manufacturer, understand that such designation is intended only for the purpose of establishing the style, quality, performance characteristics, etc., and is not intended to limit the acceptability of competitive products. The Engineer will consider products of other manufacturers which are approved as similar and equal as equally acceptable.

715-4 Furnishing of Electrical Service.

Start the system with a weatherhead on a riser on a service pole and extend through the required metering equipment of the power company, and through the lighting system as shown.

The power company will provide service to the areas in the vicinities indicated. Consult and cooperate with the power company in locating its distribution transformer and service pole

so that the lines will be as short and direct as possible. Bear any line-extension costs up to the first 2,000 feet. Furnish or install only those parts of the metering equipment or connections that are customary and required by the power company in the locality involved.

715-5 Excavation and Backfilling.

715-5.1 General: For excavation and backfilling, meet the requirements of Section 125, except that when rock is encountered, carry the excavation 3 inches below the required level and re-fill with sand or with selected earth material, 100% of which passes the 1 inch sieve.

715-5.2 Trenches for Cable: Construct trenches for cable or conduit no less than 6 inches in width and deep enough to provide a minimum cover in accordance with the Design Standards.

715-5.3 Placing Backfill for Cable: For installation of the cable, place an initial layer of 6 inches thick, loose measurement, sand or selected earth material, 100% of which passes a 1 inch sieve. Place and compact the remaining material in accordance with 125-8.

715-6 Foundations for Light Poles.

715-6.1 Concrete Foundations: Provide foundations for light poles of the sizes and shapes shown in the plans. Construct precast or cast-in-place concrete foundations in accordance with the Design Standards. Obtain precast foundations from a plant that is currently on the Department's list of Producers with Accepted Quality Control Programs. Producers seeking inclusion on the list shall meet the requirements of 105-3.

715-6.2 Setting Anchor Bolts: Set anchor bolts according to manufacturer's templates and adjust to a plumb line, check for elevation and location, and hold rigidly in position to prevent displacement while pouring concrete.

715-6.3 Installation: Do not erect roadway light poles or high mast light poles until the concrete strength in the cast-in-place foundation is at least 2,500 psi. Determine concrete strength from tests on a minimum of two test cylinders sampled and tested in accordance with ASTM C 31 and ASTM C 39 and verifying test results have been provided to the Engineer.

Fill the voids around precast concrete foundations under roadway light poles with flowable fill meeting the requirements of Section 121 or clean sands placed using hydraulic methods to a level 6 inches below grade.

715-7 *Pulling Conductors*~~Laying Cables~~.

~~Place the direct-burial cables by moving the cable reel along the trench so that the cables are placed directly in their final position in the trench, with a minimum of handling and dragging. Space the cables at least 3 inches apart, both vertically and horizontally, and separate them with clean sand. Place the bottom cables on a 3 inches bed of sand and cover the top cables with 3 inches of sand prior to backfilling.~~ Leave at least 3 feet of ~~slack cable~~*conductor* where the cable enters and leaves *conduit.*~~ducts, and after looping into light poles. Leave adequate slack in light poles and bracket cables and other conductors.~~ Protect *conductors*~~cables~~ pulled into conduit or ducts against abrasion, kinking, and twisting. Locate pull boxes so that the ~~cable~~*conductors are* ~~is~~ not subjected to excessive pulling stresses.

715-8 Splicing.

Make all conductor splices in the bases of the light poles, or in pull boxes designed for the purpose. Do not make underground splices unless specifically authorized by the Engineer, and then only as directed by him.

Unless otherwise shown in the Design Standards or authorized by the Engineer, splices shall be made with split bolt connectors. The connector shall be sealed in silicone gel that easily peels away leaving a clean connection. The gel will be contained in a closure that when snapped around the split bolt will provide a waterproof connection without the use of tools or taping. This closure will be UV resistant, impact resistant and abrasion resistant.~~Make all necessary splices or connections with solderless connectors or compression sleeves. Do not use twist-on connectors if any of the conductors involved are larger than No. 10.~~

715-9 Conduit and Ducts.

715-9.1 General: Install conduit and ducts at the locations shown in the plans, or as required for a satisfactory installation.~~ Provide conduit or ducts for all crossings under roads and streets.~~

715-9.2 Conduit in Structures: Use conduit of either rigid steel or PVC for embedding in structural concrete. Install an expansion fitting at every structural expansion joint through which the conduit passes. Provide exposed runs of conduit with adequate expansion joints as shown in the plans or approved by the Engineer. Obtain the Engineer's approval of the design of the expansion joints.

715-9.3 Pre-wired Direct-burial Duct: Where specified in the plans or directed by the Engineer, install a pre-wired, flexible polyethylene plastic pipe containing the conductors for the lighting circuits. Provide conductors and polyethylene pipe as described in the plans.

715-10 Erecting Light Poles.

715-10.1 General: Install the light poles at the locations and in accordance with the details shown in the plans. Unless otherwise specifically approved by the Engineer, fasten bracket (truss) arms to the pole prior to erection. Do not field weld on any part of the pole assembly. Plumb the poles after erection and use metal shims or leveling nuts if necessary to obtain precise alignment. Use a thin cement grout where necessary to eliminate unevenness or irregularities in the top of the base.

715-10.2 Adjusting Anchor Bolts and Installing Nuts on Anchor Bolts: Where poles are to be placed on existing foundations or bases with anchor bolts in place, furnish poles with a base which fits the anchor bolt spacing. Include the cost of any necessary extension of existing anchor bolts in the price bid for the lighting system. For high mast light pole bases, install nuts on anchor bolts in accordance with 649-5.

715-10.3 Installation of Luminaire: Install the luminaire on the truss arm in accordance with the manufacturer's instructions, and place it so that the light pattern is evenly distributed along the roadway.

715-10.4 Electrical Connections: Make primary ballast connections in accordance with manufacturer's instructions. Install sufficient cable to allow all connections to be made outside the light pole base. Connect the ground conductor to the ground stud provided.

715-10.5 Identification Plates: If required by the Contract Documents, stamp the identification plate on the pole with an identifying number or legend. Number the poles consecutively, beginning with number 1. Stamp each light pole number with 3/4 inch figures and stamp each circuit number with 1/2 inch figures.

715-10.6 Screen Installation for High Mast Light Pole Bases: Install a screen in accordance with 649-6.

715-11 Grounding.

Ground in accordance with the National Electrical Code and local codes which exceed these Specifications.

Ground each metal light pole not on a bridge structure with an approved rod, 20 feet in length and at least 5/8 inch in diameter.

For poles on bridge structures, bring the grounding conductors out to a pull box at each end of the structure and connect them to driven ground rods, 20 feet in length and at least 5/8 inch in diameter.

The 20 feet length of rod may be either two rods 10 feet in length connected by a threaded coupling and driven as a single rod or two rods 10 feet in length separated by at least 6 feet.

Make all bonds between ground wires and grounding electrode assemblies or arrays with an exothermic bond with the following exception: do not exothermically bond grounding electrode to grounding electrode connections.

The work specified in this Section will not be paid for directly, but will be considered as incidental work.

Ground all high mast poles in accordance with the details for grounding in the Design Standards, Index No. 17502.

715-12 Labeling.

Stencil labels on the cases of ~~oil switch,~~ transformer~~,~~ *and* panel board~~, and photo-electric cell~~ with white oil paint, as designated by the Engineer. Also, mark the correct circuit designations in accordance with the wiring diagram on the terminal marking strips of each terminal block and on the card holder in the panel board.

715-13 Markers.

Construct duct, cable, and splice markers as shown in the plans, and place them over the ends of underground ducts and at each change in direction of cable or conduit run. Place markers flat on the ground with 1 inch projecting above finished grade.

715-14 Tests of Installation.

Upon completion of the work, test the installation to ensure that the installation is entirely free of ground faults, short circuits, and open circuits and that it is in satisfactory working condition. Furnish all labor, materials, and apparatus necessary for making the required tests. Remove and replace any defective material or workmanship discovered as a result of these tests at no expense to the Department, and make subsequent re-tests to the satisfaction of the Engineer.

Make all arrangements with the power supplier for power. Pay all costs, excluding energy charges, required for the test period.

Not less than 48 hours prior to the beginning of the test period, give the power supplier the schedule for such test.

Test the installation under normal operating conditions during the seven day test period specified in 715-15, rather than as a continuous burn test period.

If the work is not open to traffic at the end of the seven day test period, de-energize the lighting system until the work is opened.

715-15 Acceptance of Highway Lighting.

The Engineer may make partial acceptance of the highway lighting based on satisfactory performance of all highway lighting for seven consecutive days. The seven day evaluation period may commence upon written authorization by the Engineer that highway lighting is considered ready for acceptance evaluation. Contract Time will be charged during the entire highway lighting evaluation period. Correct any defects in materials or workmanship which might appear during the evaluation period at no expense to the Department. Transfer to the Department any guarantees on equipment or materials furnished by the manufacturer and ensure that the manufacturer includes with such guarantees the provision that they are subject to such transfer, and proper validation of such fact. The Department's written acceptance of highway lighting and the transfer to the Department of all manufacturer guarantees will be conditions precedent to final acceptance of all work under the Contract in accordance with 5-11.

715-16 Method of Measurement.

The quantities to be paid for will be as follows, completed and accepted:

(a) Conduit: ~~The length, in feet, including elbows, sweeps,~~*The Contract unit price per foot of conduit, furnished and installed, will include furnishing all* connecting hardware, trenching and backfill as indicated in the plans and the Design Standards, and the cost of restoring cut pavement, sidewalks, sod, and etc., to its original condition. *The length will be based on the horizontal path of the installed conduit as measured in a straight line between the centers of pull boxes, cabinets, poles, etc. No allowance will be made for sweeps or vertical distances above or below the ground or the bridge deck.*

(b) Luminaire and Truss Arm: The Contract unit price will include the truss arm, luminaire with lamp, and all necessary mounting hardware as indicated in the plans and the Design Standards.

(c) Load Center: The Contract unit price will include the service pole, insulators, weatherheads, transformers, enclosures, panel boards, breakers, safety switches, H.O.A. switches, lighting protectors, fuses, photo electric assembly, meter base, and all external and internal conduit and conductors for the service as indicated in the plans and the Design Standards.

(d) Light Pole Foundation: The Contract unit price will include the foundation and anchor bolts with lock nuts and washers as indicated in the plans and the Design Standards.

(e) Luminaire: The Contract unit price will include the luminaire with lamp and necessary mounting hardware as indicated in the plans and the Design Standards.

(f) Pull Box: The Contract unit price will include the pull box and cover as indicated in the plans and the Design Standards.

(g) High Mast Parts: The Contract unit price will include the part specified with all mounting hardware as indicated in the Contract Documents and the Design Standards.

(h) Frangible Base for Light Pole: The Contract unit price will include the frangible base, attachments, bolts, and washers as indicated in the plans and the Design Standards.

(i) Photo Electric Control Assembly: The Contract unit price will include the photo electric control, transformers, conduit, and conductors as indicated in the plans and the Design Standards.

(j) Pre-Fab Pilaster: The Contract unit price will include the pilaster and all mounting hardware as indicated in the plans.

(k) High Mast Lighting Pole Complete: The Contract unit price will include the pole, luminaires with lamps, lowering system, breakers and anchor bolts with lock nuts and washers, and foundation as indicated in the plans and the Design Standards.

(l) Conductor: The length, in feet, as indicated in the plans and the Design Standards.

(m) Lighting Pole Complete: The Contract unit price will include the pole, internal vibration damping device, truss arm, luminaire with lamp, anchor bolts with lock nuts and washers, frangible base and foundation.

(n) Pole Cable Distribution System: The Contract Unit price will include the surge protector, fuse holders with fuses, waterproof connectors and the waterproof wiring connection to the luminaries.

715-17 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including all materials, equipment and tests.