KANSAS DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION TO THE
STANDARD SPECIFICATIONS, 1990 EDITION

Section 801. Delete this Section and replace with:

SECTION 801

ELECTRIC LIGHTING SYSTEMS AND TRAFFIC SIGNALS

801.1 DESCRIPTION

Install electric lighting systems and traffic signal items as shown in the Contract Documents.

BID ITEMS	UNITS
Electric Lighting System	Lump Sum
Electric Conduit (*) (**)	Linear Foot (meter)
Electric Service Box	Each
Traffic Signal	Lump Sum
Traffic Signal Interconnect	Lump Sum
Emergency Vehicle System	Lump Sum

*Size
**Type: Metallic or Non-metallic, no entry denotes either is allowed.

801.2 MATERIALS

a. General. Provide equipment and materials for electric lighting system and traffic signal items that comply with **DIVISION 1700**. Provide all parts necessary to complete the electric lighting system or traffic signal or modify existing systems. Before starting any construction activities, submit for the Engineer's approval, a schedule of all equipment and materials for the highway lighting system or traffic signal. Submit 7 copies of catalog cuts, diagrams and drawings to the Bureau of Traffic Engineering. The Engineer will accept or reject the equipment or materials within 2 weeks.

For concrete foundations, use Grade 3.5 (24) concrete that complies with **DIVISION 400,** and steel reinforcement that complies with **DIVISION 1600,** unless shown otherwise in the Contract Documents.

b. Standard Fabrication. Fabricate the standards as shown in the Contract Documents. Provide straight standards with a maximum variation of 1 inch (25 mm) at the mid-point of 30 to 45 foot 9.1 to 13.7 m) standards and ¾ inch (19 mm) at the mid-point of 20 to 30 foot (6.1 to 9.1 m) standards. A maximum static deflection (without wind load) of 4 inches (102 mm) is

permitted for poles less than 30 feet (9.1 m) in height and 4½ inches (115 mm) for poles 30 feet (9.1 m) or greater in height. Measure static deflections with mast arms and luminaries in place.

The design of the standard, mast arm and method of attaching the mast arm to the standard must be approved by the Engineer.

801.3 CONSTRUCTION REQUIREMENTS

a. Codes and Regulations. Perform all electrical work according to:

- National Electric Code.
- National Electric Safety Code.
- Regulations of the National Board of Fire Underwriters.
- Local ordinances.
- Details in the Contract Documents.

Before starting any work on existing street lighting and circuits, obtain daily safety circuit clearance from the serving company. Before beginning work, pull cut-out plugs and warning signs posted at cut-out boxes.

b. General.

(1) Provide and install all incidental parts not shown in the Contract Documents which are necessary to complete the electrical system or traffic signal or modify existing systems as shown in the Contract Documents. All utility hookups are subsidiary unless shown otherwise in the Contract Documents.

(2) Provide continuous welds that develop the full strength of the member.

(3) Perform welds by the submerged arc process.

(4) Grind exposed welds flush with the base material.

(5) Smoothly finish all exposed edges of plates which make up the base assembly. Round all exposed corners of such plates to ⅛ inch (3 mm) radius.

c. Removals and Excavations. Perform removals of existing structures and excavations to minimize damage to existing structures and right-of-way.

Remove the existing concrete foundations (including anchor bolts) to the elevation shown in the Contract Documents.

Limit the excavation for the conduits, foundations and other appliances to that necessary for the installation of the equipment and materials. Do not excavate until immediately before installing the equipment and materials.

Place plastic warning tape (12 inches (305 mm) below the surface) directly over conduit.

Place excavated material where the least damage and obstruction to vehicles and pedestrian traffic will occur. Do not impede surface drainage.

At the end of each day's work and at all times when construction operations are suspended, remove all equipment and other obstructions from the portion of the roadway open for use by public traffic.

d. Backfill. Place the backfill material in uniform layers (maximum 6 inches (152 mm) compacted) evenly on all sides of the structure. Compact the backfill using pneumatic tampers,

vibratory compactors or other equipment approved by the Engineer. Compact the backfill to comply with the Contract Documents. If backfill requirements are not specified, compact each layer until no further consolidation is observed.

Remove surplus excavated material from the project and dispose on sites approved by the Engineer. Reseed the areas disturbed by the excavations. Hand seeding methods may be used.

e. Replacing Damaged Improvements. Replace all sidewalks, curbs, gutters, pavements and other improvements removed or damaged during installations of the lighting systems or traffic signals. Replace or reconstruct the removed or damaged improvements with the same type and quality of materials originally used. If part of an existing slab of concrete pavement or square of sidewalk is removed or damaged, replace the entire slab or square.

f. Foundations.

(1) Concrete Foundations. Form the foundations and place the concrete according to **DIVISION 700**. Hold conduit ends and anchor bolts securely in the proper position when the concrete is placed.

Cure the concrete foundations with wet burlap or polyethylene for a period of 72 hours. Prevent concrete temperatures from falling below 32ºF (0ºC).

Do not attach poles until the concrete has cured for 14 days.

If a foundation can not be constructed as shown in the Contract Documents because of an obstruction, the Engineer will determine how to construct the foundation.

(2) Screw-In Foundation Anchors. Pre-drilling holes for screw-in foundation anchors is prohibited. As the foundation anchors are screwed into the ground, make sure they are plumb. The pole base of the screw-in foundation anchor must be level when the installation is complete.

Use the connectors to make minor leveling adjustments on poles with breakaway connectors. Use galvanized or cadmium plated shims or washers (maximum thickness ¼ inch (6 mm)) to make minor leveling adjustments on other types of poles. Only 1 shim or washer is allowed on any 1 anchor bolt, with a maximum of 2 shims or washers on any pole.

(3) Removal of Existing Foundations. Remove the designated existing foundations to the depth shown in the Contract Documents. Backfill the resulting holes according to **DIVISION 200**. Dispose of the removed foundations and anchor bolts.

g. Conduit.

(1) Run all conductors between standard locations, either in duct or conduit. Use conduit of the size and type shown in the Contract Documents. If desired, use larger size conduit at no additional cost to KDOT. Use the large size conduit for the entire length of the run from outlet to outlet. Do not reduce couplings.

When PVC or HDPE is specified, install according to the manufacturer's instructions.

When steel conduit is used, ream the ends of all conduits to remove burrs and rough edges. Make field cuts square and true so the ends will match for the full diameter. Do not use slip joints or running threads for coupling conduit. Use an approved threaded union conduit, if a standard coupling can not be used. Before couplings are made up, paint threads on all conduits with a lead or rust preventative paint. Fit and tighten all couplings until the end of the conduits are brought together. Paint any damaged coating on conduit with rust preventative paint.

Thread and cap all steel conduit ends with standard pipe caps, until wiring is started. When caps are removed, provide threaded ends with approved conduit bushings.

Except factory bends, use conduit bends with a radius of greater than or equal 6 times the inside diameter of the conduit. Where factory bends are not used, make conduit bends without crimping or flattening, using the longest radius practicable.

Mark the location ends of all conduit for future electrical circuits in structures with a "Y" at least 3 inches (76 mm) high cut in the face of curb, gutter or wall directly above the conduit.

(2) Conduit Entrenched. On electric lighting projects where possible, and on surfacing projects as shown in Contract Documents, install the electrical conduit on straight lines and cover with compacted earth.

Place conduit as shown in the Contract Documents

(3) Conduit Jacked. Use **TABLE 801-1** to determine the conduit depth. Place conduit under existing pavement by approved jacking or drilling methods. Do not disturb pavement without written permission of the Engineer. Keep jacking or drilling pits 2 feet (0.6 m) clear of the edge of any type of pavement.

TABLE 801-1: JACKED CONDUIT DEPTH

Location Condition	Minimum Depth
Pavement	24 inches (0.6 m) below top of pavement.
Trenches on shoulder and in park areas	24 inches (0.6 m) below natural ground level.
Finished surface in street areas	24 inches (0.6 m) below the street surface.*
Railroad tracks	42 inches (1.1 m) below top of tie.

*Conduit may be laid on top of and secured to the existing pavement in curbed dividing strips.

(4) Vertically extend conduit set in standard bases approximately 3 inches (76 mm) above the foundation, or slope towards the base opening where transformer bases are used. Locate conduit entering through the bottom of a pull box near the ends to leave the major portion of the box clear. Terminate conduit entering concrete pull boxes 2 inches (51 mm) inside the box wall and 2 inches (51 mm) or greater above the bottom and slope to facilitate pulling of cable. At all outlets, enter the conduit from the direction of the run.

For conduit carried through existing culverts or bridge structures, pick up the trenched cable for 3 feet (0.9 m) in the ground and run up the face of the culvert headwall to the nearest upper corner or top, through the culvert, down the opposite headwall and into the ground for 3 feet (0.9 m). Fasten conduit to concrete surfaces by means of approved clamps and fasteners.

Clean existing underground conduit to be incorporated into a new system with a mandrel, and blow out with compressed air.

Conduit runs shown in the Contract Documents may be changed with approval of the Engineer to avoid underground obstructions.

h. Electric Service Boxes. Install electric service boxes as shown in the Contract Documents.

i. Pull Boxes. Install pull boxes as shown in the Contract Documents. To facilitate work, additional pull boxes may be used at the Contractor's expense.

j. Expansion Fittings. Install expansion fittings as shown in the Contract Documents, where conduit crosses an expansion joint in the structure. Provide each expansion fitting with a bonding jumper of No. 6 A.W.G. copper wire or equal.

k. Wiring. Neatly arrange and lace up wiring within junction boxes, transformer bases and on standards, etc.

Do not splice cable in conduit or outside of pull boxes, splice boxes or standards, unless shown in the Contract Documents. When not fastened to existing structure or carried through conduit, lay conductor cable to the depth shown in the Contract Documents.

Use powdered soapstone, talc or other approved lubricant when inserting conductors in conduit.

Pencil, trim to conical shape and roughen conductor insulation before applying splice insulation.

When conductors and cables are pulled into the conduit, tape all ends to exclude moisture until the splices are made or terminal appliances are attached.

l. Bonding and Grounding. When a closed system enclosed in conduit is used, bond metallic cable sheaths, conduit and metal standards to form a continuous system, and effectively ground. When an open system such as an overhead wiring or direct burial underground is used, effectively ground only standards and service points, except where conduit runs used under pavement cross a water system.

Install ground electrodes as shown in the Contract Documents.

m. Traffic Signal Interconnect. Install traffic signal interconnects as shown in the Contract Documents.

n. Emergency Vehicle System. Install emergency vehicle systems as shown in the Contract Documents.

o. Operating Instructions. Provide all operating instructions to the Engineer.

801.4 MEASUREMENT AND PAYMENT

If shown as a bid item in the contract, the Engineer will measure electrical conduit by the linear foot (meter) from the outside edge to outside edge of service boxes, junction boxes or traffic light footings. Excavation, backfilling and Grade 3.5 (24) concrete is subsidiary to the item of electrical conduit.

The Engineer will measure electric lighting systems, traffic signal installations, emergency vehicle systems and traffic signal interconnects by the lump sum.

The Engineer will measure each electric service box.

Payment for "Electric Conduit", "Electric Lighting System", "Electric Service Box", "Emergency Vehicle System", "Traffic Signal" and "Traffic Signal Interconnect" at the contract unit prices is full compensation for specified work.