

## Section 659 Lighting

### 659.1 Description

- (1) This section describes providing highway, walkway, and other outdoor lighting.

### 659.2 Materials

- (1) Furnish lighting components from the department's approved products list.

### 659.3 Construction

#### 659.3.1 General

- (1) Keep the luminaire lamps in their shipping cartons and protect against contamination until use. Wear clean gloves when installing luminaire lamps. Provide circuit identification plaques and luminaire sequence decals suitable for outdoor construction on the support poles as the plans show.

#### 659.3.2 Wiring and Fusing

- (1) Use 12 AWG, stranded copper, XLP insulated, single conductor, USE rated, 600 volt AC wire from pole hand holes to luminaires, unless sized otherwise on the plans.
- (2) For fusing in transformer bases, hand-holes, or junction boxes, install fuse holder assemblies from a department-approved manufacturer. Use in-line 600 volt AC breakaway fuse holder assemblies with waterproof insulating boots and midget 13/32-inch by 1 1/2-inch fast acting fuses. Fuse as follows:
  - Use 600 or 500 volt AC rated fuses for 480/240 volt systems.
  - Use 250 volt AC rated fuses for 240/120 volt systems.
  - If luminaires are double-fused in 240 volt AC 2-wire systems, or 480 volt AC 3-phase delta systems, use two-pole fuse holders.
- (3) Individually fuse the luminaires at 5 amp unless the plans show otherwise. Locate fusing at the pole hand-hole. Fuse walkway lighting units at 5 amp, in the hand-hole of the pole. Fuse underdeck lighting at 5 amp per luminaire, located as the plans show.
- (4) For underdeck lighting, provide a separate equipment grounding conductor, equal in size to the ungrounded conductors, in all runs.
- (5) For hand-hole or junction box splices and fuse assemblies, provide a neatly trained loop of each conductor to facilitate removing each splice and each fuse assembly from the hand-hole or the junction box for servicing. Ground each hand-hole or junction box as the plans show.
- (6) If the plans show grounded neutral lighting systems, ground the neutral only as far as the hand-hole or the junction box. From the hand-hole or junction box to the luminaires, isolate the neutral, and separately bond metal parts to ground.
- (7) Connect the equipment grounding conductor to the grounding lug in each metal lighting pole. If transformer bases are required, make the grounding connection to the transformer base.
- (8) Make lighting conductor splices in breakaway bases or hand holes electrically secure using UL or NRTL approved insulated multi-tap terminal block type connectors.

#### 659.3.3 Luminaires

- (1) Provide luminaires together with the hardware and fittings the plans show.
- (2) Install utility luminaires on luminaire arms with an initial rake of plus 3 degrees, this measurement includes the rake of the arm. Install luminaires on luminaire arms level in the longitudinal direction of the highway. Except on segments where the profile is sloped greater than 3 degrees, then the engineer will determine the longitudinal level of the luminaires.

#### 659.3.4 Underdeck and Walkway Lighting

- (1) Under the Underdeck Lighting bid item, provide lighting systems under highway bridges together with the hardware and fittings as plans show.
- (2) Under the Lighting Units Walkway bid item, provide standards and post-top luminaires, together with the hardware and fittings the plans show.
- (3) Make wires continuous without splices from the fuses to the first luminaire and from luminaire to luminaire.
- (4) For underdeck lighting, use one-inch reinforced thermosetting resin conduit conforming to [652](#). For condulets and covers, conform to the requirements for loop detector conduit in [652.2.4](#).
- (5) Install junction boxes for underdeck lighting as the plans show and as specified in [653](#). For underdeck luminaire mounting boxes, if necessary to mount the luminaire, use boxes made of highly corrosion resistant metal and listed for outdoor use.

### 659.3.5 Lighting Control Cabinet

- (1) Provide lighting control cabinets together with the circuit wiring connections, hardware, and fittings the plans show.

### 659.4 Measurement

- (1) The department will measure the EACH bid items under this section as each individual unit acceptably completed.
- (2) The department will measure the Underdeck Lighting bid items as a single lump sum unit for each structure acceptably completed.

### 659.5 Payment

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
659.0100 - 0199	Luminaires Utility (material) (watts)	EACH
659.0200 - 0299	Luminaires Underdeck (watts)	EACH
659.0400	Luminaires High Mast Lighting	EACH
659.0600	Underdeck Lighting (location)	LS
659.0700	Lighting Units Walkway	EACH
659.1100-1199	Luminaires Utility LED (Category)	EACH
659.1200 - 1299	Luminaires Underdeck LED (Category)	EACH
659.2000 – 2999	Lighting Control Cabinets (voltage)(width)	EACH

- (2) Payment for the Luminaires bid items is full compensation for providing materials including luminaires, ballasts, lamps, fittings, brackets, hardware and attachments; and for luminaire fusing.
- (3) Payment for the Underdeck Lighting bid items is full compensation for grounding; for junction boxes; for luminaire mounting boxes as required; for conduit, condulets, and junction box fusing; and for hardware and fittings.
- (4) Payment for Lighting Units Walkway is full compensation for providing materials, including pedestal base standards, luminaires, lamps, fuses, fuse holders, and all hardware and fittings needed to integrate the components into units connected to lighting branch circuit. The department will pay for the concrete base under a separate bid item.
- (5) The department will pay for wiring from the lighting underground feeder systems to any luminaires under the separate contract bid item.
- (6) Payment for the Lighting Control Cabinets bid items is full compensation for providing cabinets including circuit wiring connections, hardware, and fittings the plans show.