MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**GATEWAY LIGHT SYSTEM**

UTL:BMB 1 of 4 APPR:NJM:DBP:06-13-22

**a. Description.** This work consists of furnishing and installing a complete bridge sign lighting system as shown in the contract. Complete all work in accordance with the standard specifications, the *NEC*, and as specified herein.

**b. Materials**. Submit shop drawings with product information on the overpass structure mounted above the Gateway signage, directionally aimed downward to illuminate the signage from above, based on the following pre-approved luminaire model:

Floodlight. KIM Lighting #INT-2-24L-30-4K9-WF-DL-UNV-A12-CRMB-BLT.

(Quantity. 13)

1. Emitted Light. Furnish wide flood beam spread 77 by 77 degree distribution angle with a diffused lens. Furnish an LED fixture with approximately 3000 lumens and a 4000K color temperature with a 70 or better color rendering index (CRI).

2. Housing. Ensure luminaire housing is fade and abrasion resistant, electrostatically-applied, thermally-cured, triglycidal isocyanurate (TGIC) polyester powdercoat. Furnish lenses that are impact resistant 0.157-inch tempered glass with anti-reflective coating. Ensure housing is ingress protection 66 rated and *ANSI C136.31-2010* vibration tested for 3G compliance (minimum 3000 hours). Furnish luminaires with a minimum 10 kilovolt (kV)/10 kiloampere (kA) replaceable internal surge suppression module meeting *UL 1449/ANSI C62.41.2 Category C* high exposure requirements. Ensure the luminaire power supply, driver/ballast, optical assembly, and surge suppression module are field serviceable and upgradable by means of modular electrical connections and easy access mounting hardware.

3. Operating Temperature. Ensure the luminaire operating temperature is from -40 °C to +55 °C.

4. Electrical. Furnish luminaire with a universal 120-277 volt (V) driver. Driver must operate with power supply that is ±10 percent of nominal and at 60 hertz (Hz) ±3Hz. Power supply must have a power factor of 0.90 or greater at full load and a total harmonic distortion of 20 percent or less at full load. Furnish a luminaire and driver that consumes no more than 30 watts. Furnish luminaire with a minimum 10 kV/10 kA replaceable internal surge suppression module meeting *UL 1449/ANSI C62.41.2 Category C* high-exposure requirements. Ensure luminaire is pre-wired with three-conductor waterproof cable wired through waterproof cable gland. Furnish a re-enterable waterproof electrical box for splicing luminaire cable to field wiring. Furnish sufficient cable slack in cabling below the luminaire mounting plate so that the electrical box can be pulled.

5. Acceptable Agency Listing. Luminaire must contain *UL* (or other acceptable testing agency recognized by *NEC*) stamp for installation in exterior wet locations.

6. Photometric Data. Furnish photometric data that confirms LED’s have long term lumen maintenance documented in accordance with *IESNA TM-21* with an L70 life expectancy of greater than 60,000 hours and reported per *IESNA* LM-80.

7. Mounting. Ship luminaires with 12-inch adjustable arms. The arm must end with the mounting plate. The mounting arm connected to factory-supplied mounting plate must include hook, set screws, and a safety chain. Secure base plate with 316 stainless or hot-dipped galvanized steel anchors set in place with epoxy and 2-inch 316 stainless or hot-dipped galvanized steel hex head bolts. Coordinate with light vendor on material selection to avoid galvanic reaction between anchor system and mounting plate.

8. Luminaire Connection. Furnish factory supplied connecter kits for cable ready luminaires.

9. General Electrical. Ensure all components are field serviceable with modular replacement assemblies. Ensure sign luminaire operates on 120 VAC.

10. Conduit Infrastructure. All material must meet the requirements outlined in section 918 of the Standard Specification for Construction, the *NEC*, and local utility company requirements. Unless noted otherwise on plans or required by utility, provide 2-inch galvanized steel conduit for service entrance and conduit at the equipment rack, 2-inch PVC schedule 80 conduit for direct buried conduit from equipment rack to lower junction box on overpass structure, and 1-inch fiberglass conduit for conduit attached to the structure. Furnish expansion couplings on all conduits entering or leaving the equipment rack. Furnish expansion couplings or 12-inch sections of liquid-tight flexible metal conduit for any horizontal conduit runs crossing an expansion joint on the structure.

11. Warranty. Ensure the luminaire has a minimum 10-year warranty.

12. Grounding. All material must meet the requirements outlined in section 918 of the Standard Specification for Construction, the *NEC*, and local utility company requirements.

13. Wire, Cable, and Equipment Grounding Conductor. All material must meet the requirements outlined in section 918 of the Standard Specification for Construction, the *NEC*, and local utility company requirements.

14. Electrical Service and Distribution. All material must meet the requirements outlined in sections 918 of the Standard Specification for Construction, the *NEC*, and local utility company requirements.

A. Furnish a fusible service entrance rated disconnect switch 240V/60 ampere (A). Equip switch with hasp allowing switch to be padlocked in ON or OFF position. Equip fuse clips with rejection.

B. Provide equipment rack constructed of at least three hot dipped double channels cross beams mounted on 2-inch hot-dipped galvanized tubes. Provide 12-inch diameter by 44-inch, grade 3500 concrete foundations with domed top to drain water away from tubes. Install tubes with a minimum of 30-inch embedment in foundation.

C. Furnish a lighting controller consisting of user configurable photocell, lighting contactor, terminal blocks, ON-OFF-AUTO interface switch, and a manual dimmer control switch. Mount interface devices on internal door and a stainless-steel piano hinge and padlock hasp on the external door.

D. Coordinate all lug and terminal sizes with conductor size and potential ampacity.

E. Any alternate proposal will require the submittal of a section of a proposed panel section showing the proposed pattern with proposed finish applied. The basis of design for the luminaire is the Hubbell Lighting ‘INT White’.

**c. Construction.**

1. Prior to ordering materials, submit the following documents to the Engineer for approval:

A. Shop drawings with product data sheets for luminaire with mounting arm, anchoring hardware, and dimensioned sketch of installed lighting system, including photometric performance calculations of signage illumination, in one package. Submittal includes stamped structural calculations for lighting system anchoring system using 1/2-inch radial ice in 90 mph winds as basis of design.

B. Product data sheets and shop drawing for meter socket, disconnect switch, lighting controller, and equipment rack with foundation materials in one package. Include in the submittal a dimensioned sketch of the proposed equipment rack installation. Note, a submittal may reference other shop drawings for foundation materials only if the other shop drawing reviews are complete and had no exceptions.

C. Submit product data sheets and shop drawing for conduit, conductors, junction boxes, grounding materials, and other incidentals in one package. Note, a submittal may reference other shop drawings for foundation materials only if the other shop drawing reviews are complete and had no exceptions.

2. Install the lighting units in accordance with applicable items in section 819 of the Standard Specifications for Construction, approved shop drawing submittal, and the manufacturer's installation instructions, or as directed the Engineer for a complete working unit as shown on the plans.

3. Conduit Infrastructure.

A. Install conduit infrastructure in accordance with section 818 of the Standard Specifications for Construction.

B. Clean all conduit before pulling cables with dry swap and mandrill; mandrill width 1/2-inch smaller than the diameter of the conduit.

C. Place a coupling on the ends of all conduit terminations. Ensure the coupling does not reduce the size of the conduit. Remove burrs or sharp projections that may damage the cable.

D. Cap and plug all unused conduits. Seal used conduits with duct seal. Neatly coil, strap together, and hang on racks all cables within handholes.

E. Install polypropylene pull rope in all conduits. In unused conduits, attach the pull ropes to the plugs.

4. Wire, Cable, and Equipment Grounding Conductor. Install wire, cable, and equipment grounding conductors in accordance with section 818 of the Standard Specifications for Construction.

5. Electrical Service. Install electrical service in accordance with section 818 of the Standard Specifications for Construction.

A. Ensure the final service location is confirmed by the local utility and approved by the Engineer before work commences.

B. Place photocell to face north and be user-adjusted to turn on/off lights between 1 and 3 foot-candles.

C. Ensure all conductors land on lugs or terminals.

D. Coat all field cuts or untreated steel surfaces with a zinc-rich compound. Coat all field wire terminations and lugs with a non-oxidizing compound.

E. Ensure all conduits at equipment rack penetrate enclosures from the bottom. Clear and trim brush for service entrance, as required by utility.

F. Provide manufacturer’s calculations and supporting test data indicating lumen maintenance life and product warranty documentation to the Engineer. Ensure final photometric calculations are based on lumen photopic values; scotopic lumen values are not recognized.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

**Pay Item Pay Unit**

Gateway Light System Lump Sum

**Gateway Light System** includes payment in full for furnishing and installing a complete flood light system as specified herein.