LIGHTING FOR COVERED BRIDGE

**From Woodstock BHO 1444(52) & Woodstock ST 1444(58)

xx. DESCRIPTION. This work shall consist of furnishing and installing an outdoor lighting system within a covered bridge.

xx. GENERAL REQUIREMENTS. The Outdoor Lighting System shall provide interior bridge lighting via photocell to provide a minimum of one (1) foot-candle at any point along the interior travelway.

xx. MATERIALS. The lighting system shall consist of the following major features:

(a) Wet location, widespread area 100 Watt high pressure light-emitting diode (LED) light fixtures rated 120 VAC. Fixtures shall be ceiling-mount type for mounting with conduits and junction boxes. Ballasts shall be high power factor.

(b) An electrical interface for the outdoor lighting system shall be provided by the local utility at the location indicated on the Plans.

(c) The two (2) lights nearest the east and west portals will be controlled by an adjustable photocell. The photocell shall be located to operate lights at dusk and to prevent inadvertent operation, either via surrounding lighting or via bridge lighting. All accessories for a complete operating system shall be provided in accordance with these specifications.

(d) The Contractor shall lay out the light locations in the field for approval by the Engineer.

(e) All equipment shall be new and shall be of industrial grade quality as to material and workmanship in accordance with best engineering practice. All equipment shall be UL and/or Factory Mutual approved.

(f) The Contractor shall provide three (3) replacement LED light fixtures to the Owner.

xx. CONDUIT.

(a) Rigid Metal Conduit and Fittings.

Rigid Steel Conduit - ANSI C 80.1

Fittings and conduit bodies - ANSI/NEMA FB 1; threaded type, material to match conduit.

All exposed conduits shall be painted with two (2) coats of approved enamel paint. The Contractor shall submit paint samples to the Owner for approval.

(b) Electrical Metallic Tubing (EMT) and Fittings.

EMT - ANSI C 80.3 galvanized tubing.

Fittings and conduit bodies - ANSI/NEMA FB 1; steel compression type.

(c) Flexible Conduit and Fittings.

Conduit - Flexible metal conduit with PVC jacket.

Fittings and conduit bodies - ANSI/NEMA FB 1.

(d) Conduit Supports. Clamps, straps, and supports shall be steel or malleable iron.

xx. CONDUCTORS, CABLES, AND CONNECTORS.

(a) Conductor material shall be annealed copper, electrical conductor equality, and 98% conductivity. No aluminum conductors shall be allowed in any application of this project. Individual conductor insulation shall be Type THWN and shall be UL listed and labeled for the use herein intended. All wiring should be in conduit, minimum size ¾ inch.

(b) Conductors sized AWG #10 and smaller shall be connected by either color coded twist-on spring loaded or color coded die compression type connectors. Connectors which pierce insulation as means of making contact with the conductor will not be allowed.

(c) Branch circuit conductors shall not be smaller than AWG #12. Conductors shall have PVC insulation rated at 600 volts and the ampacity shall be sized at 60°C., unless otherwise shown on the Plans.

(d) No Romex (Type NM) cable can be used on this project.

xx. DISCONNECT SWITCHES.

(a) Fusible disconnect switch assemblies shall be NEMA KS1; Type HD quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: Designed to accommodate Class R J fuses. Acceptable manufacturers include Square D, General Electric, Cutler-Hammer, and ITE-Siemans. Substitutions may be allowed as determined by Engineer.

(b) Enclosures. NEMA KS 1; NEMA 3R.

(c) References.

ANSI/UL 198C - High Intensity Capacity Fuses; Current Limiting Types.

FS W-F-870 - Fuse holders (for plug and enclosed cartridge fuses).

FS-W-S-865 - Switch, box (enclosed), surface-mounted.

Fuses shall be 600 amperes and less: ANSI/UL 198E, Class RK1; as indicated on the Plans; dual element, current limiting one-time fuse, 250 volt, with an interrupting rating of 200,000 rms amperes. Acceptable manufacturers are Littelfuse, Bussman, and Edison, or approved equal.

(d) Installation. Install disconnect switches where indicated on the Plans.

Install fuses in fusible disconnect switches.

(e) The following bill of materials is suggested; quantities are not indicated. The Contractor shall be responsible for verifying in the field and actual quantities required.

Kenall Herculux Defender (100W HPS) H99FD-C-100S-1, 120V or Atlas Lighting Products VN12-100HQPK with tamper proof screws or RAB Lighting VANS100 HPS or approved equal.	Light Fixture with photocell
¾" EMT	Conduit
RGS	Conduit
#12, Copper, THWN	Conductors

(f) Breakers and Load and Lighting Panels. Breakers shall be AFCI type molded case, toggle type, thermal-magnetic with common trip for multiple pole types. Breakers shall have minimum symmetrical interrupt capacity of 10,000 amperes RMS at 240 volts.

Breakers shall be either bolt-in or stab-in type.

xx. PLACING OF CONDUIT, PULL BOXES, AND JUNCTION BOXES. The Contractor shall maintain on the job site a set of as-built Plans on which shall be indicated any changes made during installation that differ from that shown on the Plans. The Contractor shall also indicate any other information that may be pertinent to future use, modification, and/or maintenance of the system installed. These plans shall be labeled "As-Builts" and the Contractor's notes shall be shown clearly and legibly in contrasting colored ink. The As-Built plans shall be delivered to the Engineer before the Contractor's work is considered complete.

(a) Testing, Start-Up, and Inspection. During the course of this work, test all circuits for grounds and shorts and eliminate any found.

Provide any tests required by inspection authorities having jurisdiction.

(b) Installation. The work shall comply with the following codes and standards:

(1) National Electrical Code

(2) All applicable State and Local Codes.

(3) Underwriters' Laboratories.

(4) National Fire Protection Association (NFPA).

The Contractor shall obtain all permits, inspections, licenses, etc., required by any authorities having jurisdiction.
Review existing grounding system in accordance with the National Electrical Code, National Electrical Safety Code, local requirements, and system manufacturer's recommendations.

Provide additional ground rods if required by utility, and install additional ground rods and conductors as required until resistance to ground complies with the regulatory requirements.

(c) System Grounding.

(1) Circuit Grounding. Install grounding bushings, studs, jumpers, and bonding conductors as required at panel boards and system equipment.

(2) Bonding. Provide bonding jumpers as required by Code.

(3) Install as many ground rods as necessary to achieve a safe and adequate system ground. Ground electrical service to water service.

(4) Grounding. Exothermically weld cable connection to ground rods. Bronze fitting approved for purpose is also acceptable.

All metallic conduit shall be grounded but shall not be used as the grounding conductor.

A separate green insulated grounding conductor shall be installed for every feeder, sub-feeder, and branch conduit installed in conduit.

(d) Lighting. The work to be performed shall consist of furnishing all material and installing, and testing a lighting system for the covered bridge. The system shall be complete with light fixtures, conduit, conductors, and accessories as specified herein. All equipment or components shall be listed by UL and/or Factory Mutual for the intended use.

The work shall involve but not necessarily be limited to the following:

(1) Exterior connections to existing power pole in accordance with local and State requirements.

(2) Installation of lighting, wiring, and conduits as indicated on the Plans.

(3) Provide all design, equipment, materials, labor, etc. required for a complete and functionally integrated system as specified herein.

(4) The system shall operate as specified in an environmentally wide variation of seasonal temperatures and weather conditions (-30°C to +55°C). Any adjustments required to achieve this shall be at the Contractor's expense.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Lighting for Covered Bridge) to be measured for payment will be on a lump sum basis in the complete and accepted work.

xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (Lighting for Covered Bridge) will be paid for at the Contract lump sum price. Payment will be full compensation for furnishing, transporting, handling, and placing the materials specified, including but not limited to power stanchion, lights, light fixtures, conduit, conduit boxes, junction boxes, ballasts, fuses, electrical devices and feeders, and support anchors; backcharges from the utility company(ies) and manufacturer; connections to the power source; permits; testing; and the furnishing of all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
900.645 Special Provision (Lighting for Covered Bridge)	Lump Sum