



Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

October 28, 2020

SUBJECT: Route FAU 167 (Chapel Hill Road)
Section 19-00014-00-SW (Johnsburg)
McHenry County
Contract No. 61G72
Item 068
November 6, 2020 Letting
Addendum A

NOTICE TO PROSPECTIVE BIDDERS:

Attached is an addendum to the plans or proposal. This addendum involves revised and/or added material.

1. Revised pages 9 – 12 of the Special Provisions.

Prime contractors must utilize the enclosed material when preparing their bid and must include any changes to the Schedule of Prices in their bid.

Very truly yours,

A handwritten signature in black ink, appearing to read "Jack A. Elston".

Jack A. Elston, P.E.
Bureau Chief, Design and Environment

- (b) Armor-Tile Cast In Place System by Armor-Tile
- (c) Duratek Tiles by Detectile

All cutting of tiles shall be included in the cost of DETECTABLE WARNINGS.

Method of Measurement. Measurement for detectable warnings shall be per square foot for the actual length of detectable warning multiplied by the width of detectable warning placed. When side curbs are required for construction of the curb ramp in accordance with the IDOT Highway Standard(s), the side curbs will be measured for payment as PORTLAND CEMENT CONCRETE SIDEWALK, of the thickness specified.

Basis of Payment. Detectable warning will be paid for at the contract unit price per square foot for DETECTABLE WARNINGS.

SOLAR-POWERED FLASHING BEACON ASSEMBLY (COMPLETE)

Description:

This work shall be performed in accordance with the applicable portions of Sections 720, 801, 806, 878 and 888 of the Standard Specifications insofar as applicable, and the latest edition of the MUTCD except as modified herein. This work consists of furnishing and installing a photovoltaic (solar) powered flashing LED warning sign system complete in place.

Solar Electric System Design:

The solar electric system shall be designed to act as a standalone power source for the system. It shall be designed for a flashing output for 25 seconds with a duty cycle of 50 calls per day at the location shown in the plans in the month with the lowest solar radiation. Loading shall be calculated based on the maximum power consumption of each Individual component. If a manufacturer provides a range of power consumption for an item, the largest possible value of the load shall be used for design purposes. The projected days of autonomy shall be no less than 5 days. The projected battery state-of-charge (SOC) shall be no less than 85% throughout the year. The minimum acceptable array to load ratio shall be 1.1 in the month with the lowest solar radiation.

System deratings shall be accounted for in the design to cover any losses from module output mismatch loss, dirt/dust accumulation losses and wiring losses.

Solar Electric Modules and Mounting Structures:

The module cells shall feature an antireflective coating and a low iron glass covering. Cells shall be encapsulated to protect them from the environment. Each module shall feature a weather tight junction box for connecting the array output cable to the module terminals. Modules shall feature a minimum manufacturer's warranty of 15 years for power output. All modules shall feature an anodized aluminum frame for mechanical support. Modules shall be from an established manufacturer/supplier with at least a 15-year history of production.

Solar modules shall be securely mounted to a suitable top of pole or side of pole mount structure that has been specifically designed to hold solar modules. All hardware used to install the modules to the mounts and the mount to the pole and all security hardware shall be stainless steel. Any specialty tools required for the security hardware shall be furnished to the Village. Mounts shall be powder coated or hot dip galvanized steel. Mill finished or powder coated aluminum mounts are considered acceptable alternates for smaller solar arrays (40W or less).

Solar/Flasher Controls:

The system shall feature an integrated control unit. The controller shall be a solid-state unit capable of managing battery charging and load/flasher control in a single unit. Charge control/flasher circuitry built from multiple components will not be allowed.

The charge control portion shall be designed such that it draws low power to minimize the parasitic load on the system. The unit shall use an ambient temperature sensor to adjust the charge termination point thus prolonging battery life (temperature compensated charging).

The charge circuit shall also employ a pulse-width-modulation algorithm for charging the batteries and be a solid-state series switch type configuration.

Load/flasher control shall be accomplished using a low-voltage-disconnect (LVD) circuit to disconnect power to the flasher control circuit when battery voltage falls to a low state-of-charge (typically 20%). The flasher circuitry shall be all solid-state and provide two complimentary drive outputs. When flashing, the unit shall have an output duty cycle of 50% per circuit and shall be capable of 50-60 flashes per minute for each lamp. On board short circuit protection shall be provided.

An 8-position terminal block with all positions labeled for ease of maintenance shall be included. Manual switches shall be provided to select the lamp activation source as either manual on or control from an external source. A status LED for charging and LVD shall be included on the face of the controller. The controller shall include an integral heat sink.

Spread Spectrum Radio Link:

The crosswalk flasher units shall be linked to each other and shall operate wirelessly to minimize effects of external RF interference. The radio shall have an output of no less than 4-milliwatt and shall not require a license for operation. The radio shall operate from a nominal 12VDC source and include a status LED lamp to indicate power on. The radio shall also include transmit-receive status LED lamps to show message traffic between units.

The radio shall use a Frequency Hopping Spread Spectrum (FHSS) radio protocol. The minimum antenna configuration shall be an omni directional whip with a stainless-steel mounting bracket. A data cable between the radio and the logic control unit shall be included. In the event that multiple systems are collocated, the radio hop sequence shall be field adjustable with programming software, straight data cable and a laptop computer. Changing hop sequences between collocated systems shall ensure that all can function without cross interference.

Additionally the radio shall be capable of using up to two additional levels of encryption including DT address settings to further encrypt data transfer.

Logic Control Unit:

The system shall be equipped with a logic control device consisting of a PLC type device. The logic control device shall include input status indicators consisting of LED lamps. The device shall also include status Indicators consisting of LED lamps showing run, power and error status indicators. The control device shall include a data cable to allow connection between its communications port and the radio. The logic device shall have a minimum of 4 dry contact output relays with a minimum output rating of .5A.

The software for the logic control device shall allow the user to adjust the run time of the flashers from a minimum run time of 10 seconds to a maximum of 80 seconds. A set of toggle switches on the electronics panel shall allow the user to set the time. Toggle switches in the ON position shall be indicated by an input status LED lamp. A TEST button shall also be included with the time selection switches to allow each flasher unit to be tested individually.

The software shall include a communications fault routine that causes the lamps to flash intermittently in the event that the radios lose link with each other. The controller shall also have an input dedicated to monitoring the battery. The logic devices shall be configured as a master-slave system using a MODBUS protocol for operation.

PED Push Button:

The PED push button shall be a vandal resistant unit. It shall have minimal travel and include both a visible and audible feedback to indicate when the button is pressed.

Visible feedback shall be a high intensity LED built into the unit and the audible feedback shall be a piezo beeper. The button assembly shall include a minimum of a 5"x 7" adjustable push button station assembly with an international crossing sign mounted on it showing the direction of travel desired.

System Batteries:

The system shall come equipped with the number and type of batteries required for loading. The battery type shall be a sealed-maintenance free valve-regulated design. The battery shall use an Absorbed Glass Mat (AGM) to suspend the electrolyte making it immobile. Alternately, the battery may be a gel type that employs a thixotropic gel to immobilize the electrolyte. Acceptable battery sizes shall be group U1, 22, 24, 27 and group 31.

Capacity of the batteries at 25°C shall be 36Ah to 115Ah, respectively, at the C/100 rate depending on battery size. Batteries shall use a copolymer polypropylene case and cover. Non-removable pressure regulated flame arresting safety valves shall be standard.

Rated operating temperature shall be from -40°F to +176°F.

System Enclosure:

The system shall include a single pre-wired enclosure for ease of installation. The unit shall be an aluminum enclosure with a minimum material thickness of 0.125". The cabinet shall have a mill finish. Mounts shall be included as part of the enclosure and shall be suitable for mounting to a 4.5" outer diameter pole. The enclosure shall also be capable of accepting band style mounts if needed. The enclosure shall feature a minimum of one police lock with key. The keyhole for the lock shall have a cover attached to the door with a rivet. The door shall be attached to the unit using a continuous stainless-steel hinge that is riveted to the door and the enclosure body. The hinges shall be installed such that the rivets are not exposed when the door is closed. An integral rigid doorstop shall be included in the unit so that the door can be fixed in the open position. The door shall cover the entire front side of the cabinet and be constructed of a single piece of aluminum. It shall have a neoprene gasket around the entire edge of the door and have three screened louvered vents on each side of each compartment. The louver screening shall be aluminum for longevity. An integral rain lip shall also be provided at the top of the main cabinet body to minimize entry of rain. An adjustable latch striker shall be included in the side of the main cabinet body to allow the user to adjust the pressure between the door gasket and the body of the cabinet.

The battery compartment shall have a minimum of ½" of styrofoam sheeting around the battery to minimize heat transfer between the battery and the wall of the enclosure. The name of the system manufacturer shall be stamped on the inside of the enclosure door along with a phone number for troubleshooting assistance.

System Wiring:

All systems shall feature a color-coded wiring harness for both the lamps and the solar array output. The lamp harness shall consist of a wiring assembly suitable for use with a two-lamp system to be installed on a 15' pole. The harness shall be color coded for ease of connection to the lamps. A seven pin keyed locking connector shall be included in the harness to allow the lamps to be disconnected from the control electronics. An integral fuse assembly shall be included in the lamp positive wire of the harness. All connections shall be terminated with a crimped spade terminal for easy installation. Wire for the harness shall be TEW or MTW.

The solar array output harness shall consist of a jacketed pair of conductors suitable for the solar array output current. The jacket shall be a UV resistant PVC or XLP material. Spade terminals shall be included for ease of installation.

Systems using solar arrays over 225-watts shall include supplemental harnesses for any additional electronics needed for power control. Supplemental harness assemblies shall also be keyed to prevent confusion in the connector orientation.

LED Lamp Assemblies:

Each sign panel lighting assembly shall contain 16 LED lamps. There will be 2 sign panels per post with 8 lamps per sign. The lamps shall be equally spaced around the sign border. All lamps shall operate from a nominal 12VDC supply and employ high intensity LED elements.

The rectangular rapid flash beacon (RRFB) assembly shall be constructed on a black aluminum frame with a minimum cross section of 2x4" and a width of 24" facing traffic. The lamp assembly shall contain 2 2x5" lamps. All lamps shall operate from a nominal 12VDC supply and employ high intensity LED elements. All lamp elements used in the RRFB beacon kits shall comply with SAE J845 and J1889. The frame shall have a black finish on the faces that feature RRFB lamps and non-lamp faces shall be mill finished aluminum. Assemblies featuring pedestrian confirmation lamps on the end cap shall use a high bright LED lamp assembly with a minimum of at least 1 high intensity lamp. The end caps shall be recessed a minimum of 0.75" from the end of the frame to act as a protective shroud for the end cap lamp(s). Standard units shall include a saddle style mount for a pole of 4.5" O.D. and shall be adaptable to round pole mounts as small as 3" O.D. The RRFB lamp assembly shall have two lamps on the front and rear face of the RRFB frame facing traffic, and dual pedestrian end cap lamps

All units shall include a color-coded wiring harness to connect into the main harness coming from the system enclosure. The RRFB side of the harness shall be terminated in a keyed connector with six male pins. Hardware to install the lighting shall be stainless steel.

Posts:

Posts shall be UL classified and designed to current AASHTO standards for 90 mph wind, 3-second gusts, and minimum 50-year life with all attached components and shall arrive at the job site in a black powder coat finish with a matching shroud or aluminum nut covers and ground connector. Post length shall be in accordance with the MUTCD for proper sign mounting height and the manufacturer's recommendations.

Foundations:

24" diameter concrete foundations shall be constructed in accordance with the lighting foundation detail in the plans.

Signs:

Each post shall have a R10-25 sign, pedestrian crossing sign (W11-2, 30" x 30") with flashing LEDs in the border and a diagonal arrow plaque (W16-7L or W16-7R, 24" x 12") mounted on both sides of the post facing traffic.

Documentation:

Each system shall come with a complete installation and user's guide.
Minimum information to be covered shall be as follows:

1. Description of all the system components and their basic function.
2. Installation of a typical system including sections specifically covering pole installation, all aspects of installation of the solar power system and LED lamp installation.
3. Troubleshooting and maintenance of the system.
4. Complete appendices on all of the components used in the system
5. Quick start timer programming instructions.
6. Complete drawings or illustrations throughout to support and clarify the text.
7. Phone/FAX numbers for technical support of the system.

Method of Measurement:

This work will be measured for payment for each sign assembly installed.

Basis of Payment:

This work will be paid for at the contract unit price per each for SOLAR-POWERED FLASHING BEACON ASSEMBLY (COMPLETE), which price shall include all labor, equipment, materials, and incidental expenses necessary to furnish the components, signs, posts, foundations, hardware, cables, connectors, and brackets necessary for installation of each sign assembly.

DRAINAGE AND UTILITY STRUCTURES TO BE ADJUSTED OR RECONSTRUCTED

Description. This work shall consist of adjusting or reconstructing drainage and utility structures in accordance with Section 602 of the Standard Specifications, with the following modifications:

Adjustment or reconstruction will be made with existing frames and grates or lids unless otherwise specified. New frames and grates or lids will be paid for separately when shown on the plans.

When new frames are installed, the existing frames shall be removed by the Contractor and transported to the Village's Public Works facility. This work shall be included in the cost of DRAINAGE & UTILITY STRUCTURES TO BE ADJUSTED or DRAINAGE & UTILITY STRUCTURES TO BE RECONSTRUCTED.

Concrete adjustment rings less than 4 inches thick shall not be allowed. High Density Polyethylene (HDPE) plastic adjusting rings and ring wedges shall be used for all adjustments less than 4" or in combination with 4 inch minimum concrete adjustment rings. Bricks shall not be used.

Basis of Payment. When adjustment or reconstruction is specified, this work will be paid for at the contract unit price per each for DRAINAGE & UTILITY STRUCTURES TO BE ADJUSTED or DRAINAGE