SP-156183
(New)

SPECIAL PROVISIONS
FOR
RECTANGULAR RAPID-FLASHING BEACON

Scott County
STP-U-2290(615)--70-82

Effective Date
April 20, 2021

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

156183.01 DESCRIPTION.
This work shall consist of furnishing and installing the Rectangular Rapid Flashing Beacon (RRFB) Assembly complete with RRFB; power supply; traffic signal post; foundation; pedestrian push button; warning signs and plaques; controller and cabinet; and wireless communication equipment as shown on the plans. All equipment and hardware required to mount the RRFB and associated equipment to the assembly shall be included in the unit cost of this item.

156183.02 MATERIALS.
All components shall be manufactured and assembled as a complete system and consist of the following:

A. Rectangular Rapid Flashing Beacon: Each RRFB assembly shall satisfy the FHWA Interim Approval of Rectangular Rapid Flashing Beacons (IA-21), dated March 20, 2018, and all subsequent FHWA Official Interpretation Letters and the 2009 edition of the MUTCD, including the unit size, mounting location, flash rate, and operational parameters unless modified herein by this special provision.

1. The RRFB assembly shall be programmable to allow the City Traffic Engineer to set the duration of the flashing beacon display based on the crossing time requirements established in the MUTCD.

2. The Contractor shall furnish and install two direction RRFB units with far side indicator light mounted to the sign structure as indicated on the plans. The minimum size of the LED beacon shall be 7 inches by 3 inches with a minimum spacing between the two indications of at least 7 inches. The RRFB shall be able to be seen at least 1000 feet in advance of the crossing during the day. The RRFB shall have an operating temperature meeting NEMA specifications.

B. Solar Power Supply: The solar power supply shall be easy to install, fully self-contained weather, corrosion, and vandal-resistant, with a UV-resistant solar panel. The solar power supply

shall be power autonomous without need of an external power supply. The batteries shall be sealed, maintenance free, and field-replaceable independently of other components.

1. The battery pack shall have a minimum rated lifespan of three years.

2. The power supply system shall have the capacity to operate the RRFB for 30 days at a normal use of 400 activations of 30 seconds per day without solar charging.

3. The RRFB shall have an automatic light control to provide useful light during extreme conditions that prevent charging over an extended period of time. The manufacturer shall provide documentation for each installation consisting of solar power calculations to verify load, duty cycle and battery capacity based on location.

4. The solar panel shall be installed at the highest point on the assembly structure, or as directed by the Engineer, and away from the travelled way. The solar panel shall be installed at an angle specified by the manufacturer facing the equator (due south) with a full unobstructed solar exposure for optimum performance of the system, or as recommended by the manufacturer and directed by the Engineer.

C. Control Cabinet.

1. Shall be NEMA 3R Type.

2. Shall be 15.0 inches (tall) by 12.5 inches (wide) and 9.9 inches (deep) and be constructed of 0.080 inch thick aluminum.

3. To promote airflow for internal components, the cabinet shall have vents with screening included on all vents and drains to prevent insects and other foreign matter from entering.

4. For security, the cabinet must include at least two tamper resistant stainless steel hingers and a replaceable No. 2 traffic lock with keys.

5. To facilitate maintenance or repairs, the cabinet shall include a removable control panel to which all control circuit components either mount or connect.

6. For easy installation on a wide range of pole sizes and types, the cabinet shall utilize four 5/16-18 stainless steel mounting studs that mate to a range of bracket options. To ensure a secure mount to the supporting post, two banding style brackets that fit poles with a 2 3/8 inch or larger diameter shall be included as standard equipment. Mounting brackets also available for square pole, wooden post, and wall mount applications.

7. To prevent corrosion, all materials used in the construction or mounting of the control cabinet shall be either aluminum or stainless steel. Anti-vandal mounting hardware shall be available as an option.

8. A UV resistant label shall be applied to the exterior of the cabinet and include system specific information including model number, serial number, date of manufacture, as well as any applicable regulatory compliance information.

D. Controller: The RRFB controller shall meet the requirements of Section 2525 of the Standard Specifications except where modified herein:

1. **Power Options:** The controller unit shall be available in solar powered option.

2. **Controller to Controller Communication:** At each location all installed RRFB assemblies shall communicate wirelessly using an unlicensed radio band so as to simultaneously

commence operation of their alternating rapid flashing indications and cease operation simultaneously. The communication equipment shall comply with FCC requirements and the vendor representative shall field test the equipment prior to placing the units in operation to demonstrate the RRFBs ability to achieve proper operation under the requirements of FHWA Memorandum IA-21 and all subsequent interpretation letters. Up to ten optional RF channels shall be available to allow multiple RRFB Systems to operate within close proximity of each other.

3. **Timing:** The controller shall provide the full programmed timing upon all push button activations.

E. Wireless Transceiver.

1. Shall operate wirelessly at 900 Mhz, utilizing Frequency Hopping Spread Spectrum (FHSS) technology to minimize the effects of external RF interference.

2. Shall seamlessly integrate with the controller to ensure sequential activation of other radio-equipped devices in the system.

3. Shall include an integrated LCD and two user-interface buttons for setup and troubleshooting, including readouts of flash duration (timeout), battery conditions, and LED testing functionality.

4. Shall include two LED indicators for status and troubleshooting.

5. Shall be capable of operating as a Parent (Gateway) or Child (Node or Repeater).

6. Shall be capable of providing site-survey data for verification of signal strength between network devices.

7. Shall include network-wide modification of sign controller settings and output durations, using programmability from any networked transceiver without the use of additional equipment or software.

8. Shall synchronize the system components to activate the indications within 120 msec of one other and remain synchronized throughout the duration of the flash (timeout) cycle.

9. Shall operate on the license-free ISM band.

10. Shall comply with part 15 of FCC rules.

11. Shall operate from 3.3VDC to 15VDC.

12. Shall be, in the unlikely event of failure, replaceable independently of other components.

F. Traffic Signal Post: The traffic signal post shall meet the requirements of Section 2525 of the Standard Specifications.

G. Foundation: Concrete foundation shall meet the requirements of Section 2525 of the Standard Specifications.

H. Pedestrian Push Button: The pedestrian push button shall meet the requirements of Section 2525 of the Standard Specifications and be Polara Bulldog model.

I. Beacon Flashing Requirements.

1. As a specific exception to the requirements for the flash rate of beacons provided in Paragraph 3 of Section 4L.01, RRFBs shall use a much faster flash rate and shall provide 75 flashing sequences per minute. During each 800 millisecond flashing sequence, the left and right RRFB indications shall operate using the following sequence:
   - **a.** The RRFB indication on the left-hand side shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
   - **b.** The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
   - **c.** The RRFB indication on the left-hand side shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
   - **d.** The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
   - **e.** Both RRFB indications shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 50 milliseconds.
   - **f.** Both RRFB indications shall be illuminated for approximately 50 milliseconds. Both RRFB indications shall be dark for approximately 250 milliseconds.

2. The flash rate of each individual RRFB indication, as applied over the full flashing sequence, shall not be between 5 and 30 flashes per second to avoid frequencies that might cause seizures. The RRFB shall be rated for Class I light intensity output according to the Society of Automotive Engineers (SAE) Standard J595 with a 15 year life expectancy. During the night time hours, the RRFB shall be equipped with an automatic dimming feature.

J. Signs: Each RRFB assembly shall include two crossing signs (W11-2, W11-15 or S1-1) 36 inch by 36 inch dimension, two diagonal downward pointing arrow (W16-7P) plaques 24 inch by 12 inch dimension, mounted back-to-back and a R10-25 9 inch by 12 inch dimension, mounted as part of or above the pedestrian push button. All signs shall meet the latest requirements of the MUTCD.

K. Warranty: All materials shall be warranted for 3 years from date of acceptance.

156183.03 CONSTRUCTION.

A. The RRFB Assembly shall be installed strictly according to the manufacturer's recommendations, the applicable portions of the Standard Specifications as modified herein, and as shown on the plans.

B. The final elevation and location of the beacons shall be approved by the Engineer prior to the Contractor beginning work.

156183.04 METHOD OF MEASUREMENT.
Rectangular Rapid Flashing Beacon shall be measured by each installed.

156183.05 BASIS OF PAYMENT.
The unit price shall include all labor, equipment, materials and documentation required to furnish and install the RRFB assembly (includes two complete signs) with power supply; traffic signal post; foundation; pedestrian push button; warning signs and plaques; controller; wireless communication equipment; and mounting hardware.