



**SPECIAL PROVISIONS
FOR
RECTANGULAR RAPID FLASHING BEACON SYSTEM**

**Black Hawk County
STP-U-2432(614)--70-07**

**Effective Date
August 20, 2024**

THE STANDARD SPECIFICATIONS, SERIES 2023, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

232010.01 GENERAL.

A. Description of Work.

1. This part of the specifications includes the furnishing of all labor, materials, tools, equipment and performance of all work and services necessary or incidental for the installation of the pedestrian-activated rectangular rapid flashing beacon (RRFB) system as indicated in the project plans or as specified herein.
2. This work shall consist of furnishing and installing the wireless solar-powered beacon system complete with fluorescent yellow green warning signs, RRFBs with single side-viewable pedestrian LED module (facing sidewalk), ADA compliant pedestrian push button detector with locate tone and voice message capable, solar panel, battery pack with charger, LED driver, and wireless communications equipment, attached to a traffic signal pedestal or other approved mounting system as shown in the plans and as specified by the Engineer.

B. Submittals.

Submit PDF shop drawing file for RRFB assembly, pedestrian push button detectors, pedestrian push button pedestals, and other structures to be furnished on the project. Submit a single PDF of catalog cut files and list manufacturer's specifications for all items in the project documents.

232010.02 MATERIALS.

A. General System Requirements.

1. All materials furnished, assembled, fabricated, or installed shall be corrosion resistant. All mounting hardware shall be Type 304 stainless steel.

2. All components shall be manufactured and assembled as a complete system rated for 24 hour/7 day a week/365 days a year operation.
3. The entire system shall have a minimum 3 year warranty.

B. Rectangular Rapid Flashing Beacons.

1. The Contractor shall furnish and install one or two direction RRFB units mounted to a pedestal pole as indicated in the plans. The RRFB housing shall be a minimum of 1/8 inch thick aluminum.
2. Each RRFB unit shall satisfy the FHWA *Interim Approval for Optional Use of Pedestrian-Actuated Rectangular Rapid-Flashing Beacons at Uncontrolled Marked Crosswalks (IA-21)*, dated March 20, 2018, and the current edition of the MUTCD, including the unit size, mounting location, flash rate, and operational parameters.

C. Solar-Assisted Battery-Powered System.

1. The solar-powered system shall be an easy to install, fully self-contained, weather, corrosion, and vandal-resistant unit with premium grade UV-resistant head. The system shall be power autonomous without the need for an external power supply. The system shall have an operating temperature range of -35°F to 140 F.
2. The batteries shall be sealed, maintenance free, field-replaceable and rated best-in-class. The battery pack shall have a minimum rated lifespan of 3 years.
3. The system shall have the capacity to operate the beacons continuously for a minimum of 15 days without solar charging and have automatic light control to provide useful light during extreme conditions that prevent charging over an extended period.

D. Wireless Communication System.

1. At each crosswalk, all installed solar powered flashing beacon assemblies must communicate wirelessly using an unlicensed radio band 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 IA-21. The wireless communications of one RRFB installation shall not interfere with, or cause unintended operation of, RRFBs at nearby intersections.
2. The system shall have push-button activation. Each flashing beacon unit shall have one pedestrian push button meeting ADA requirements except for an RRFB assembly in advance of the crossing.

E. Pole and Concrete Footing.

1. The flashing beacon assembly shall be installed and mounted as indicated in the plans, using a concrete footing meeting the requirements of Section 4189 of the Standard Specifications. The footing shall include a 1 inch PVC conduit that stubs-out from the side of the footing as detailed per the plans and in Standard Road Plan TS-102. A traffic signal pedestal pole meeting the requirements of Section 4189 of the Standard Specifications, of the length recommended by the RRFB manufacturer, shall be used to support the flashing beacon assembly hardware.

2. The pedestrian push buttons shall be installed on pedestrian push button pedestal poles. Pedestrian push button pedestal poles shall be mounted as per Standard Road Plan TS-102.

F. Pedestrian Push Buttons.

1. The Accessible Pedestrian Signal (APS) push buttons shall be an audible-tactile pedestrian signal system and shall consist of all electronic control equipment, mounting hardware, push buttons and signs designed to provide both a push button with a raised, vibrating tactile arrow on the button, as well as a variety of audible indications for differing pedestrian signal functions.
2. The APS push buttons shall meet the following requirements:
 - a. Edition of the MUTCD adopted by the Iowa DOT, Chapter 4I – Pedestrian Control Features.
 - b. NEMA TS 2-Section 2.1 requirements for Temperature and Humidity, Transient Voltage Protection and Mechanical Shock and Vibration.
 - c. IEC 61000-4-4; 4-5 Transient Suppression requirements.
 - d. FCC Title 47, Part 15, Class A, Electronic Noise requirements.
3. The APS push button enclosure shall meet the NEMA 250 – Type 4X enclosure requirement.
4. APS Functional Requirements: The APS shall have the following functional features:
 - a. The APS shall be programmable and adjustable. Programming and adjustments shall be made using a laptop computer or vendor supplied programmer. No additional hardware or equipment shall be required. The APS push buttons shall be fully compatible with the three latest versions of the Windows operating platform. The programmable features shall be:
 - 1) Push button locator tone.
 - 2) Audible push button informational message upon push button activation that says, “yellow lights are flashing”. This message shall be spoken twice.
 - 3) Audible crossing beacon.
 - 4) Vibrating tactile arrow.
 - 5) Independent minimum and maximum volume limits for the Locator Tone, Walk and Audible Beacons features.
 - b. All audible features shall emanate from the pedestrian push button housing. The APS shall utilize digital audio technology, having a minimum 12 bit sample at a 16k Hz sample rate. Total harmonic distortion shall be less than 3% at 75 decibels. The APS shall provide independent ambient sound adjustment for the Locator Tone feature. The APS shall allow for Locator Tone volume to be set below the ambient noise level. The system shall have, at a minimum, three programmable locator tones. All sound levels shall adjust automatically utilizing an internally mounted, interval ambient sensing microphone in accordance with the MUTCD.
 - c. The APS system shall log cumulative call data. The data shall be date and time stamped and accessible via a laptop.
5. The APS manufacturer must provide the required voice messages in each button determined during the review of the shop drawings/catalog cuts. Additionally, the APS manufacturer must provide the required voice messages to the City of Evansdale.
6. The Contractor shall present an order form to the APS manufacturer, so the appropriate Braille message is added to the pedestrian information sign and the correct voice messages are programmed in the pedestrian push buttons.

G. Signage.

1. All signs shall meet MUTCD requirements. Signs to be installed as part of the RRFB assembly and required mounting hardware shall be considered incidental to this item.
2. Sheeting for warning signs shall meet the requirements of ASTM D 4956 Type XI for fluorescent reflective yellow green sheeting.

232010.03 CONSTRUCTION.

A. General.

1. The solar powered flashing beacon assembly and system shall be installed in accordance with the manufacturer's recommendations, applicable portions of Section 4189 of the Standard Specifications, as shown on the plans, and as directed by the Engineer.
2. Mounting the hardware to the foundation shall be in accordance with Section 4189 of the Standard Specifications modified herein and shall follow all manufacturer recommendations. The traffic signal post and pedestal base shall be installed on the foundation in accordance with the manufacturer's recommendations.
3. The beacons and solar engine shall be attached to the structure using rigid galvanized steel conduit, stainless steel straps, manufacturer recommended mounting brackets, and U-bolts.
4. The beacons shall be installed as shown on the plans. The final elevation and location of the beacons must be approved by the Engineer prior to beginning work.
5. The solar panel shall be installed at the highest point on the assembly structure, or as directed by the Engineer. The solar engine shall be installed at a 45 degree angle facing the equator (due south) with full unobstructed solar exposure for optimum performance of the system.

B. Inspection.

The Contractor shall inspect all the electrical equipment and shall notify the Engineer in writing before the equipment is installed if the equipment appears to be deficient in fit, form, or function.

C. Coordination.

It shall be the sole responsibility of the Contractor to coordinate among suppliers and contractors providing equipment for the project.

232010.04 METHOD OF MEASUREMENT AND PAYMENT.

Lump sum item; no measurement will be made

232010.05 BASIS OF PAYMENT.

- A. Payment will be at the lump sum price for RRFB System.
- B. Lump sum price includes, but is not limited to all labor, materials, and equipment necessary for installation of a functioning pedestrian-activated flashing beacon system as shown in the project plans,
 1. Each system includes, but is not limited to the following:
 - Programming software kit.
 - Wireless communication system.
 - .RRFB LED Light Bars
 - Solar panels.
 - APS push buttons with MUTCD 9 inch by 12 inch R10-25 signs.

- Remote push button pedestal poles.
 - 13 foot pole kits with J-bolts for concrete installation.
 - Concrete footings (1 foot diameter by 4 feet deep) – for push button stations.
 - Concrete footings (2 foot diameter by 4 feet deep) – for traffic signal stations.
 - 36 inch school crossing signs (MUTCD S1-1; fluorescent yellow green).
 - 21 inch by 15 inch down arrow right/left signs (MUTCD W16-7P, fluorescent yellow green).
 - Back-to-back sign mounting brackets.
 - Wiring, conduit, and other miscellaneous brackets and mounting hardware.
2. Advance warning signs with or without RRFB components shall be considered part of the RRFB System and incidental to this item, including all labor, materials, and equipment necessary for installation. Advance warning signs include, but are not limited to the following:
- 36 inch school crossing signs (MUTCD S1-1; fluorescent yellow green).
 - 24 inch by 12 inch ahead plaque (MUTCD W16-9p; fluorescent yellow green).
 - Sign Post: perforated square steel tube, 2 inch square with 12 gauge wall meeting the requirements of Section 4186 of the Standard Specifications.
 - If advance warnings signs are shown in the project plans with RRFBs, substitute RRFB components for a complete RRFB assembly and necessary wireless communication system to function as one complete RRFB System.