SP- 156232
(New)

SPECIAL PROVISIONS
FOR
RECTANGULAR RAPID FLASHING BEACON ASSEMBLY

Linn County
TAP-U-1187(813)--8I-57

Effective Date
December 20, 2022

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.

156232.01 - GENERAL

1.01 DESCRIPTION OF WORK

A. This section covers the furnishing of all labor, materials, tools, equipment and performances of all work and services necessary or incidental for the installation of the pedestrian-activated rectangular rapid flash beacon (RRFB) systems as indicated on the drawings or as specified herein.

B. This work shall consist of furnishing and installing the solar-powered beacon assembly complete with RRFBs, 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.

1.02 SPECIFICATION REFERENCES

TAPCO Rectangular Rapid Flash Beacon: RRFB-XL2 (specification sheet)

1.03 SUBMITTALS

A. **Material and Equipment List:** Within 30 days after awarding of the contract for the project, submit a completed list of materials and equipment. Submit two copies to the Engineer for written approval before any equipment or materials are ordered.

B. **Contractor Certification:** Submit the name and contact information of the licensed electrician and /or certified tech that will be working on the project.

C. **Shop Drawings:** Submit three copies of shop drawings for rectangular rapid flashing beacon system to be furnished on the project. Submit three copies of catalog cuts and manufacturer's specifications for all items in the equipment list.

1.04 METHOD OF MEASUREMENT AND PAYMENT

A. This item will be paid at the contract unit price for each Rectangular Rapid Flashing Beacon Assembly. All labor, materials, and equipment necessary for installation of a functioning pedestrian-activated flashing beacon assembly will not be paid for separately, but shall be considered incidental to this item.

1. Each unit includes, but is not limited to the following:
   - (a) Programming Software Kit
   - (b) Wireless Communication System
   - (c) LED Light Bars
   - (d) Solar Panels
   - (e) APS Pushbuttons with MUTCD R10-25 signs
   - (f) Remote Pushbutton Stations
   - (g) 13 Foot Pole Kits with J-Bolts for Concrete Installation
   - (h) Concrete Footings (1 foot diameter by 3 feet deep) – for pushbutton stations
   - (i) Concrete Footings (2 foot diameter by 3 feet deep) – for traffic signal stations
   - (j) 30 inch Pedestrian Crossing Signs (MUTD W11-2, Fluorescent Yellow Green) or School Crossing Signs (MUTCD S1-1)
   - (k) 24 inch by 12 inch Down Arrow Right/Left Signs (MUTCD W16-7P, Fluorescent YellowGreen)

(l) Back to Back Sign Mounting Brackets
(m) Wiring, conduit, and other miscellaneous brackets and mounting hardware.

156232.02 - PRODUCTS

2.01 RRFB SYSTEM

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 for24 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 two directions RRFB units mounted to the postas indicated on the plans. The RRFB housing shall be a minimum 1/8 inch thick aluminum.
   2. Each RRFB unit shall satisfy the FHWA *Interim Approval for Optional Use of Rectangular Rapids Flashing Beacons* (IA-21), dated March 20, 2018, and the 2009 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 aminimum 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 of time.

D. Wireless Communication System
   1. At each crosswalk, all installed solar powered flashing beacon assemblies must 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 property 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 pushbutton meeting ADA requirements.

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 2403 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. A traffic signal pedestal pole meeting the requirements of the length recommended by the RRFB manufacturer, shall be used to support the flashing beacon assembly hardware.
   2. The pedestrian pushbuttons shall be installed on pedestrian pushbutton stations from Frey Manufacturing, model number CP6ACT4840TCSS, Or approved equal.

F. Pedestrian Pushbuttons
   1. The Accessible Pedestrian Signal (APS) pushbuttons shall be an audible-tactile pedestrian signal system and shall consist of all electronic control equipment, mounting hardware, pushbuttons and signs designed to provide both a pushbutton 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 pushbuttons shall meet the following requirements:
      (a) 2009 MUTCD, Chapter 4E –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 Tile 47, Part 15, Class A, Electronic Noise requirements.
   3. The APS pushbutton enclosure shall meet the NEMA 250 – Type 4X enclosure requirement.
   4. The APS pushbuttons shall be POLARA Model-X (XAV2E-LED) with MUTCD R10-25 signs or approved equals.
   5. Upon installation, the APS shall have the following functional requirements:
      (a) APS Functional Requirements. The APS shall have the following functional features:
         (1) 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 pushbuttons shall be fully compatible with the three latest versions of the Windows operating platform. The programmable features shall be:
            1. Pushbutton locator tone.
            2. Audible pushbutton informational message upon pushbutton 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 Beaconing features.
         (2) All audible features shall emanate from the pedestrian pushbutton 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 percent 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 theambient 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.
         (3) The APS system shall log cumulative call data. The data shall be date and time stamped, and shall be accessible via laptop.
   6. 6. The APS manufacturer must provide the required voice messages in each button as defined below. Additionally, the APS manufacturer must provide the required voice messages to the City of Cedar Rapids.

The Contractor shall present the order form below to the Accessible Pedestrian Signal(APS) manufacturer so the appropriate Braille message is added to the pedestrian information sign and the correct voice messages are programmed in the pedestrian pushbuttons.

G. Signage
   1. All signs shall meet MUTCD requirements. Signs to be installed as part of the RRFB assemble and required mounting hardware shall be considered incidental to this item.

H. TAPCO Rectangular Rapid Flash Beacon: RRFB-XL2 has met the above specification andshall

be used.

2.02 Footings and Foundations:

1. Use Class C structural concrete complying with Section 2403 of the Standard Specifications.
2. Use uncoated reinforcing steel complying with Section 4151 of the Standard Specifications.

156232.03 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. The solar powered flashing beacon assembly and system shall be installed in strict accordance with the manufacturer's recommendations, as shown on the Plans, and as directed by the Engineer, and as modified herein.
B. Mounting of the hardware to the foundation shall follow all manufacturer recommendations and as modified herein. The traffic signal post and pedestal base shall be installed on the foundation in accordance withthe manufacturer recommendations.
C. 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.
D. The beacons shall be installed as shown on the Plans. The final elevation and location ofthe beacons must be approved by the Engineer prior to beginning work.
E. The solar panel shall be installed at the highest point on the assembly structure, or as directed by the Engineer prior to beginning work.

3.02 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, formor function.

3.03 COORDINATION

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

3.01 FOOTINGS AND FOUNDATIONS:

A. Placement: Prior to foundation excavation for signal poles, pedestals, and pedestrian pushbutton station posts, the locations shall be verified in the field by the City of Cedar Rapids Traffic Engineering staff.

B. Excavation: Excavate to the size, shape, and depth specified in the contract documents. Ensure the bottom of all foundations rest securely on firm undisturbedsoil. Minimize over-excavation to ensure support and stability of the foundation.

Construction of the foundations may require hand excavation to verify location of utilities**.**

C. Foundation: Provide a means for holding all of the following elements rigidly inplace while the concrete is being placed.

1. Forms:
   a. Set the forms level or sloped to meet the adjacent paved areas.
   b. Provide preformed expansion material between foundation and adjacentpaved areas.
   c.When installed in an unpaved area, set the top of the foundation 4 inchesabove the surface of the ground.
   d. Remove all forms before backfilling after required cure time.
2. Reinforcing Steel: Install reinforcing steel.
3. Conduit: Install conduit.

4. Anchor Bolts:
   a. Set anchor bolts using a template constructed to accommodate the specified elevation, orientation, and spacing according to the pole and controller manufacturer's requirements.
   b. Center the pole anchor bolts within the concrete foundation.
   c.Protect the anchor bolts until poles are erected.
   d. Orient controller footing with the back of the cabinet toward the intersectionsuch that the signal heads can be viewed while facing the controller, unlessotherwise directed by the Engineer.

5. Concrete:
   a. Place concrete to form a monolithic foundation. Consolidate concrete byvibration methods.
   b. Finish the top of the base level and round the top edges with an edging toolhaving a radius of 1/2 inch. Provide a rubbed surface finish on the exposed surface of the footing or foundation.
   c.Allow the foundation to cure a minimum of 4 days prior to erecting the polesand 7 days prior to installing the mast arms. Times may be shortened if supported by strength test results.

D. Backfill: Place suitable backfill material according to Section 3010 of the Standard Specifications.