

**SECTION 654
RECTANGULAR RAPID FLASHING BEACONS**

PART 1 GENERAL

1.01 SUMMARY

A. Description

1. Furnish and install Rectangular Rapid-Flashing Beacon (RRFB) assemblies meeting the requirements of this Specification; the accompanying RRFB Assembly Standard Details; the Federal Highway Administration (FHWA) Interim Approval for Optional Use of Pedestrian Actuated RRFB at Uncontrolled Marked Crosswalks (IA-21) dated March 20, 2018 (with correction issued 3/21/2018); and the Plans.

B. Related Sections

1. FDOT Specification Section 620 (Grounding and Lightning Protection)
2. FDOT Specification Section 676 (Controller Cabinets)
3. FDOT Specification Section 700 (Highway Signing)

C. Method of Measurement

1. General: Unless otherwise specified herein, midblock crosswalk assemblies must include all materials, equipment, and labor necessary for a complete, functional and accepted installation.
2. Rectangular Rapid Flashing Beacon Assembly: The RRFB sign assembly includes the rectangular beacons, signs, sign support structure, cabinet, electronics, conduit, pull box, wiring, grounding, pedestrian pushbutton and all necessary appurtenances needed to meet the requirements of these Specifications. In addition:
 - a. Solar powered assembly: Includes solar panels and all components for a complete solar powered installation.
 - b. AC powered assembly: Does not include the cost of the Electrical Power Service Assembly.

D. Basis of Payment

1. Price and Payment will be full compensation for all work specified in this Section.
2. Payment will be made under:

Pay Item	Description	Unit
654-2-12	Rectangular Rapid Flashing Beacon, Furnish & Install- AC Powered, Complete Assembly- Back To Back	AS
654-2-22	Rectangular Rapid Flashing Beacon, Furnish & Install - Solar Powered, Complete Assembly - Back To Back	AS

1.02 SYSTEM DESCRIPTION

- A. Design and Performance Requirements for RRFB Assembly
1. Design Wind Speed: 150 mph
 - a. Manufacturer must provide engineering certification that the RRFB assembly's major components along with the recommended attachments for mounting on a 4.5" outer diameter pole, meet the load requirements of Section 3 of AASHTO LTS-6 as modified by FDOT Structures Manual Volume 3 using a Basic Wind Speed (V) of 150 mph in the determination of the design wind pressure.
 - b. Engineer of Record must ensure that the proposed sign assemblies and foundation are designed to withstand all applicable wind loads.
 2. The duration of a predetermined period of operation of the RRFBs following each actuation should be based on the procedures provided in Section 4E.06 of the 2009 MUTCD for the timing of pedestrian clearance times for pedestrian signals. The required duration period for each crosswalk must be shown in the Plans and record documents.
 3. Meet all Conditions of FHWA Interim Approval (IA-21) as further specified below:
 - a. Unless otherwise specified herein, all RRFB sign assemblies must be double-sided and include a RRFB LED light bar on each side of the sign assembly between the bottom of the fluorescent yellow-green W11-2 (Pedestrian), S1-1 (School), or W11-15 (Trail) crossing warning sign and the top of the supplemental diagonal downward arrow (W16-7p) plaque. Double-sided sign assemblies at crosswalks located on one-way roads do not require the additional RRFB LED light bar on the side opposite the approach of traffic.
 - b. Each assembly must have an ADA compliant pedestrian pushbutton (except for an RRFB installed in advance of the crosswalk having an AHEAD plaque) that meets the requirements of IA-21 and:
 - 1) Provides a volume-controlled verbal message "Yellow Lights are Flashing" that is repeated for the duration of flashing and a locator tone that repeats every four seconds when the beacons are dark.;
 - 2) Includes a R10-25 (PUSH BUTTON TO TURN ON WARNING LIGHTS) sign mounted adjacent to or integral with each pedestrian pushbutton explaining the purpose and use of the pedestrian pushbutton detector; and is
 - 3) Positioned per the details that accompany these Specifications.
 4. Unless otherwise shown in the Plans and approved by Engineer, the RRFB assembly, its components, and signs must be U-bolt mounted on a Miami-Dade County TSSQPL approved 4-1/2 inches outer diameter (4 inch nominal) threaded aluminum pedestal pole and square aluminum break away base with a reinforcing collar assembly. Attachment hardware must meet or exceed the requirements of the Florida Department of Transportation (FDOT) Standard Plans, Index No. 700-010.
 5. Unless approved otherwise, provide a suitable surge protection device (SPD) that meet the requirements of FDOT Specification Section 620.
 6. The individual RRFB components must be replaceable independently of other components and be equipped with approved terminal strips or wire-end molded connectors.
 7. RRFB must be capable of being readily reprogrammed in the field in order to support future changes in MUTCD or FDOT requirements.
 8. Certification of Compliance from a third party accredited laboratory, certifying compliance with the required minimum Class 1 yellow peak luminous intensity, must be provided upon request.

1.03 WARRANTY

A. Special Warranty

1. Ensure the midblock crosswalk enhancement assembly has a manufacturer's warranty covering defects for three years from the date of final acceptance in accordance with Section 600. Ensure the warranty includes providing replacements within 10 calendar days of notification for defective parts and equipment during the warranty period at no cost to the Department.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. RRFB assembly and components must be listed on the FDOT APL and the Miami-Dade County TSSQPL.
- B. Aluminum materials must meet the requirements of the Aluminum Association Alloy 6061-T6 (ASTM B209, B221, B308 or B429), except as noted.
- C. Cabinets, Housings, and Hardware: Cabinets used as part of the midblock crosswalk enhancement assembly must meet the applicable criteria of FDOT Section 676.
- D. All housings other than approved cabinets must be powder coat painted dull black (Federal Standard 595A-37038) with a reflectance value not exceeding 25 percent as measured by American Society for Testing and Material E1347. Cabinets and housings must prevent unauthorized access.
- E. Ensure all assembly hardware, including nuts, bolts, external screws and locking washers less than 5/8 inch in diameter, are Type 304 or 316 passivated stainless steel. Stainless steel bolts, screws, and studs must meet ASTM F593. Stainless steel nuts must meet ASTM F594. All assembly hardware greater than or equal to 5/8 inch in diameter must be galvanized. Carbon steel bolts, studs, and threaded rod must meet ASTM A307. Structural bolts must meet ASTM A325.
- F. Electrical Specifications:
 1. Equipment must operate on solar power or a nominal voltage of 120 volts alternating current (V_{AC}). If the device requires operating voltages of less than 120 V_{AC} , supply the appropriate voltage converter.
 2. Solar powered systems must be designed to provide a minimum of 10 days of continuous operation without sunlight. Solar powered systems must automatically charge batteries and prevent overcharging and over-discharging. Solar powered systems must include a charge indicator and AC/DC battery charger.
 3. Ground and bond assemblies in accordance with the accompanying standard details and per NEC and FDOT Specification Section 620 requirements.
 4. Conduits must meet the requirements of Miami-Dade County TCESS Section 630 (Conduit).
 5. Pullboxes must meet the requirements of Miami-Dade County TCESS Section 635 (Pull, Splice, and Junction Boxes).

- 6. Electrical power assembly must meet the requirements of Miami-Dade County TCESS Section 639 (Electrical Power Service Assembly).

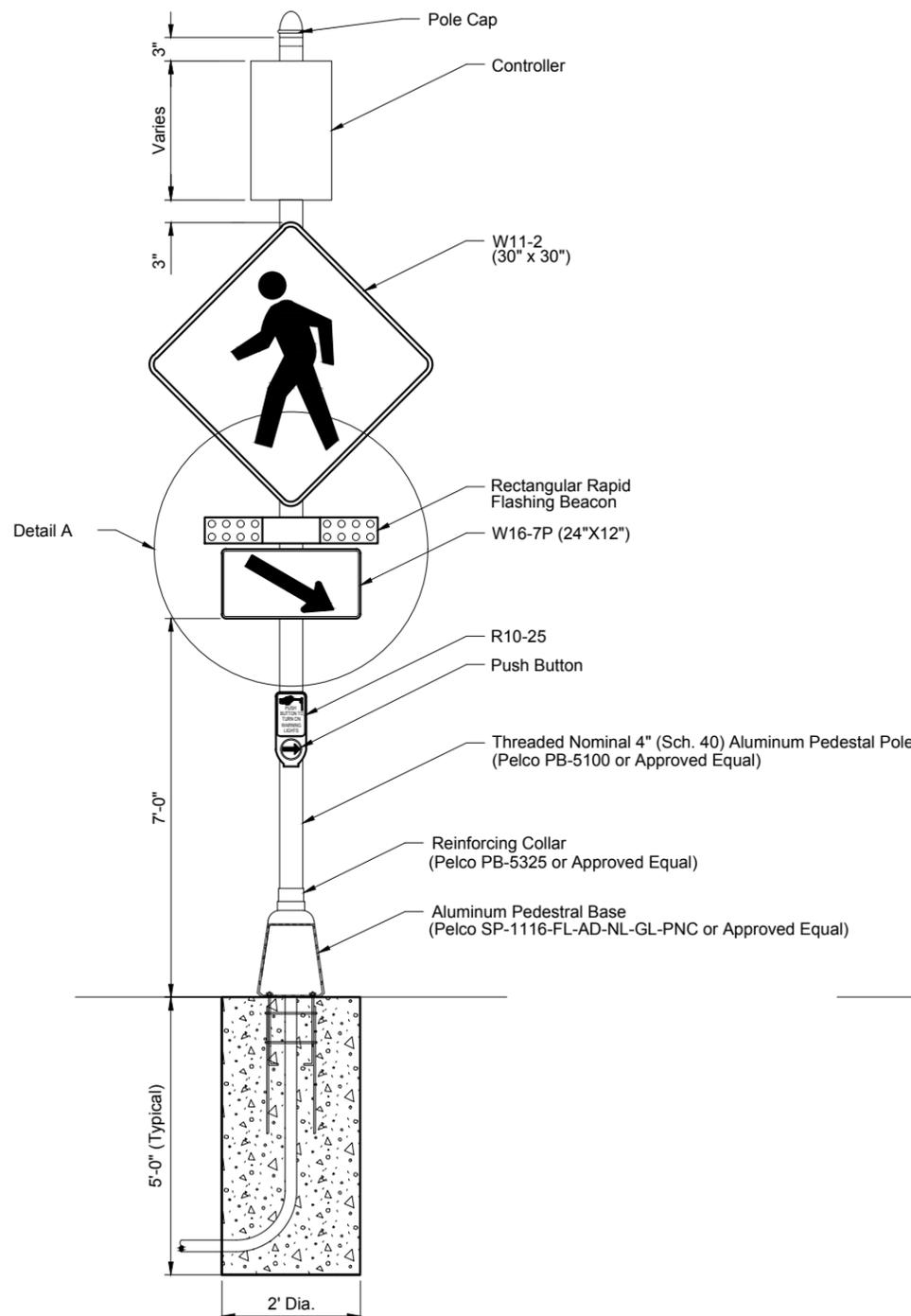
- G. Environmental Specifications: All electronic assemblies shall operate as specified during and after being subjected to the transients, temperature, voltage, humidity, vibration, and shock tests described in National Electrical Manufacturers Association (NEMA) TS2, 2.2.7, 2.2.8, and 2.2.9. Electronics must meet Federal Communications Commission (FCC) Title 47, Subpart B, Section 15.

PART 3 EXECUTION

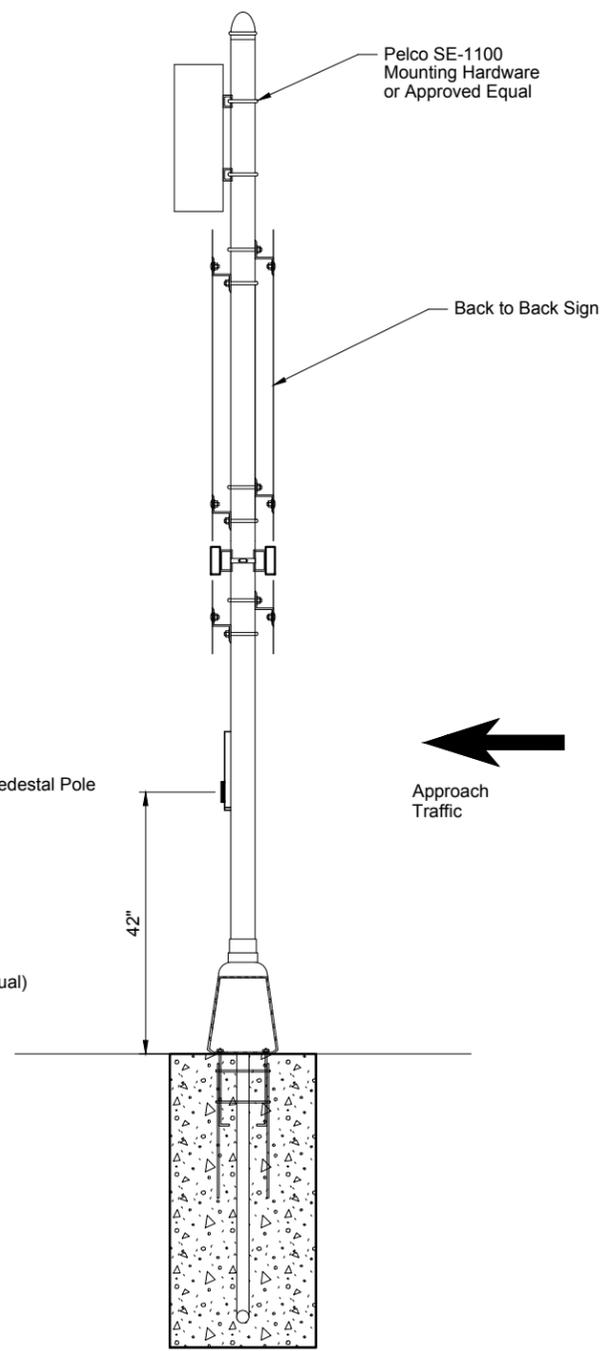
3.01 REPAIRS/RESTORATION

- A. Restore any areas impacted by the installation of the crosswalk enhancement assembly to original condition unless otherwise shown in the Plans. Install crosswalk enhancement assembly in accordance with the Americans with Disabilities Act Standards for Transportation Facilities.

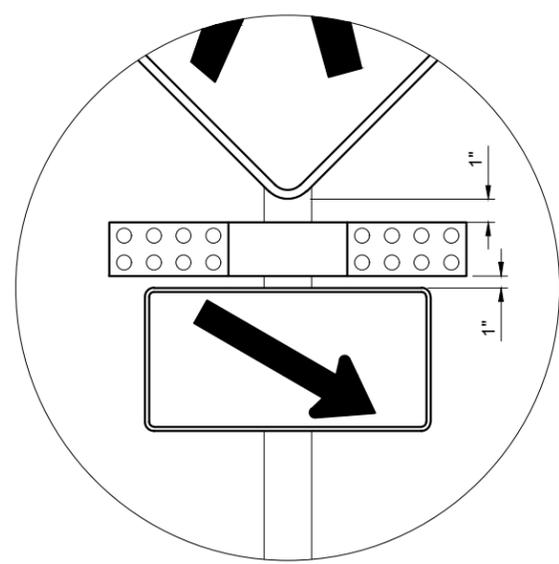
END OF SECTION 654



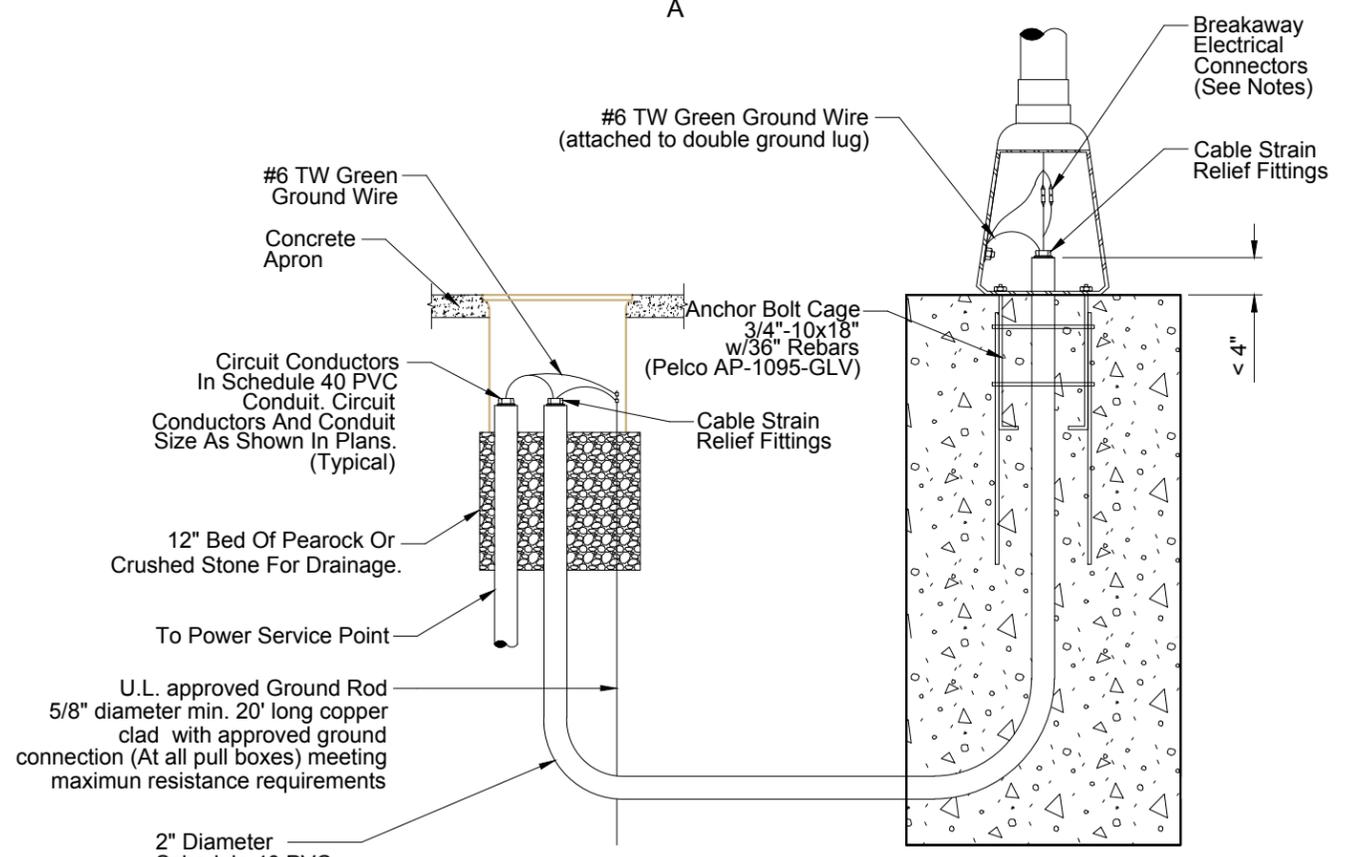
AC POWERED RRFB
FRONT VIEW



AC POWERED RRFB
SIDE VIEW



DETAIL
A



Notes:

1. Fuses: Class CC, 600 VAC, 15 Amps, current limiting, time-delay, UL listed, 200kA VAC RMS Sym. interrupting Rating; Limitron™ Class CC FNQ-R-15 or approved equal.
2. Single-Pole In-Line Fuse Holder with solid Breakaway Option for impact separation: Rated 30A, 600V; Limitron™ HEB-AW-RLC-J for the fused disconnect and HET-AW-RLC-J having a permanently installed solid neutral (for the non-fused disconnect), or approved equal.
3. Cord must be SOW or SOOW type with a 600V rating, minimum 12 AWG.

POLE WIRING DETAIL
AC POWERED RRFB

LATEST REVISION	DESCRIPTION:
04/27/18	

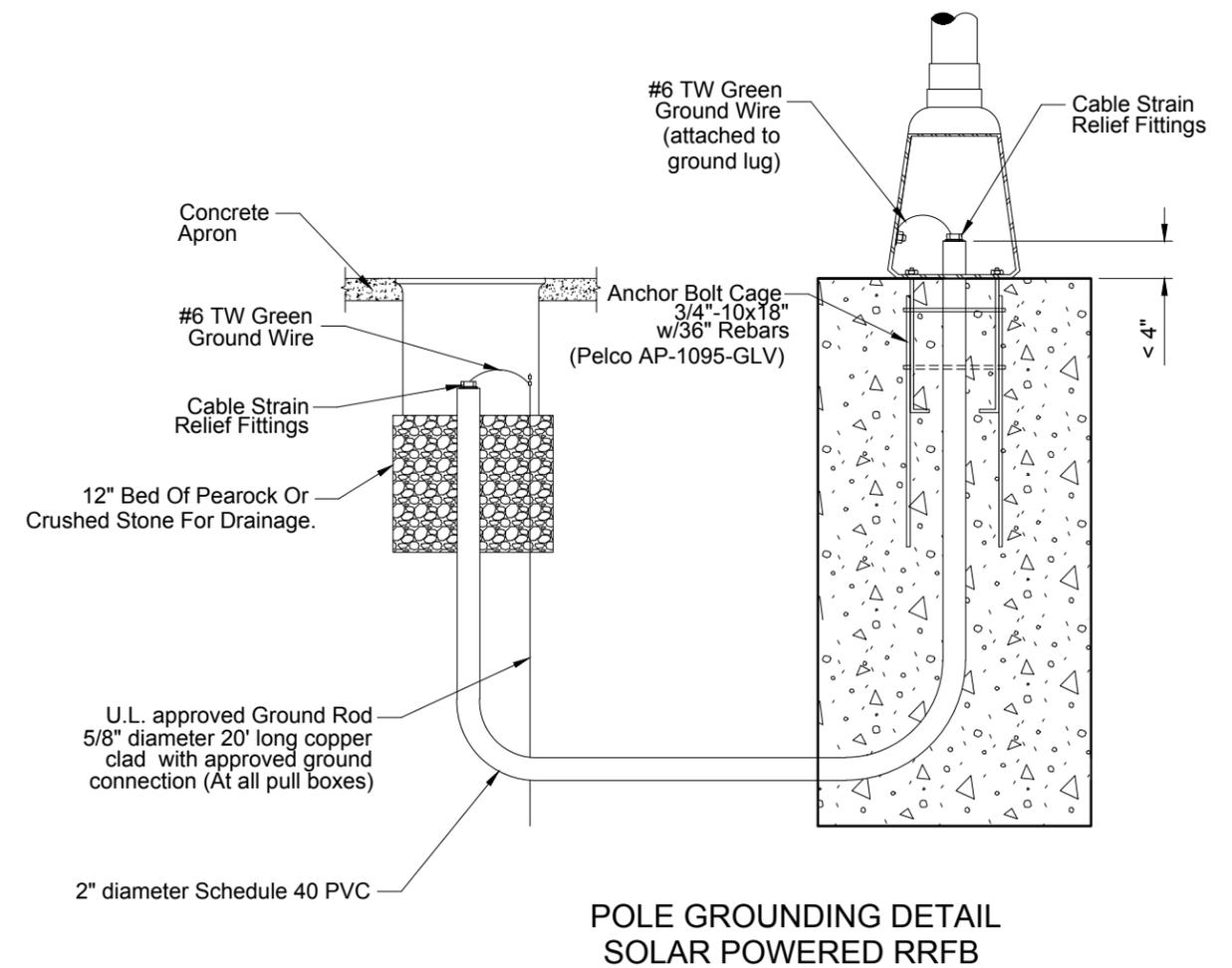
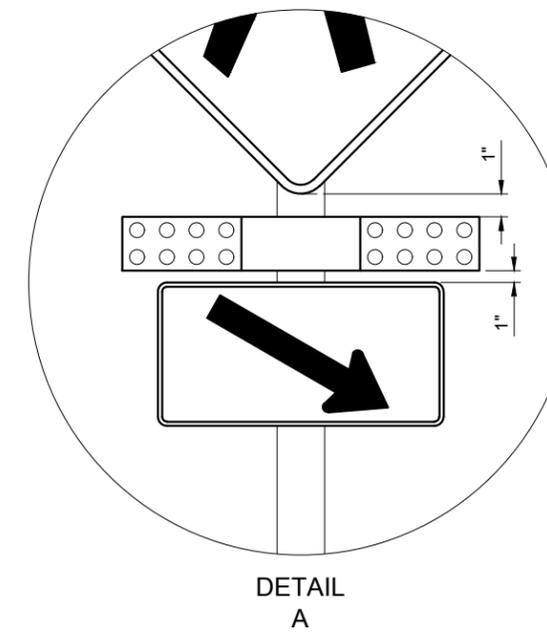
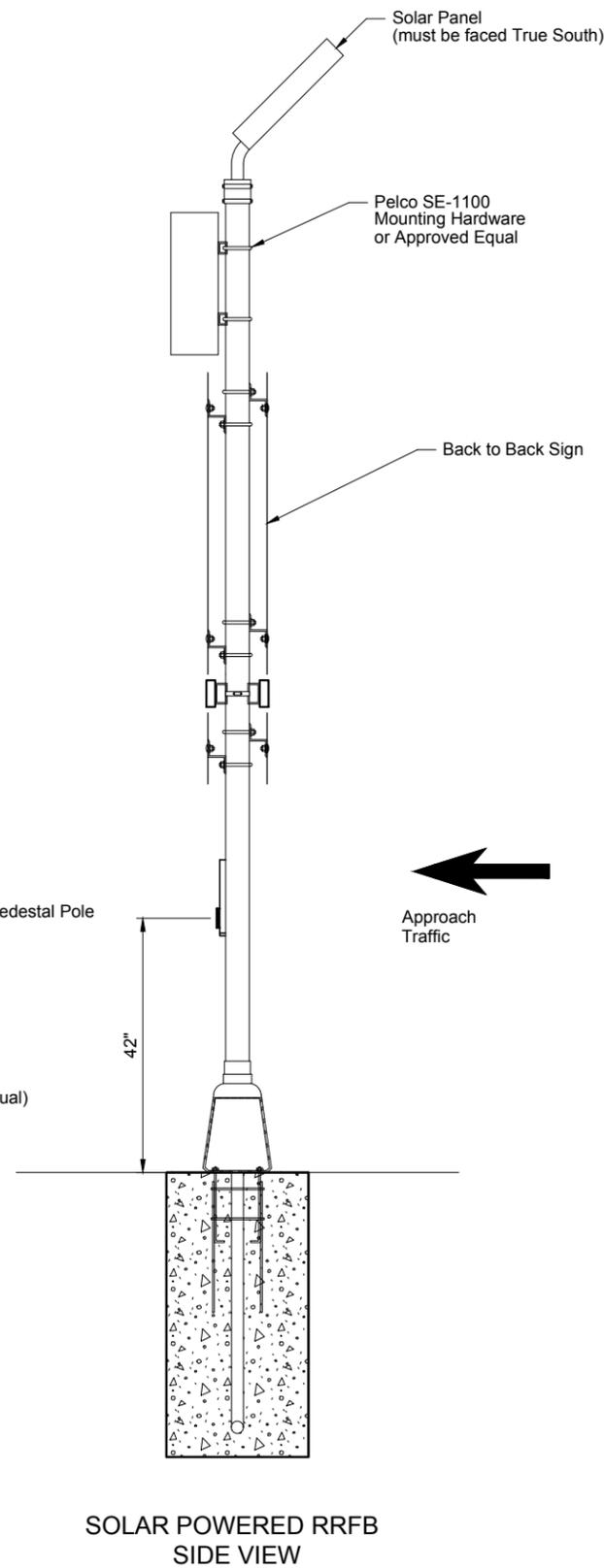
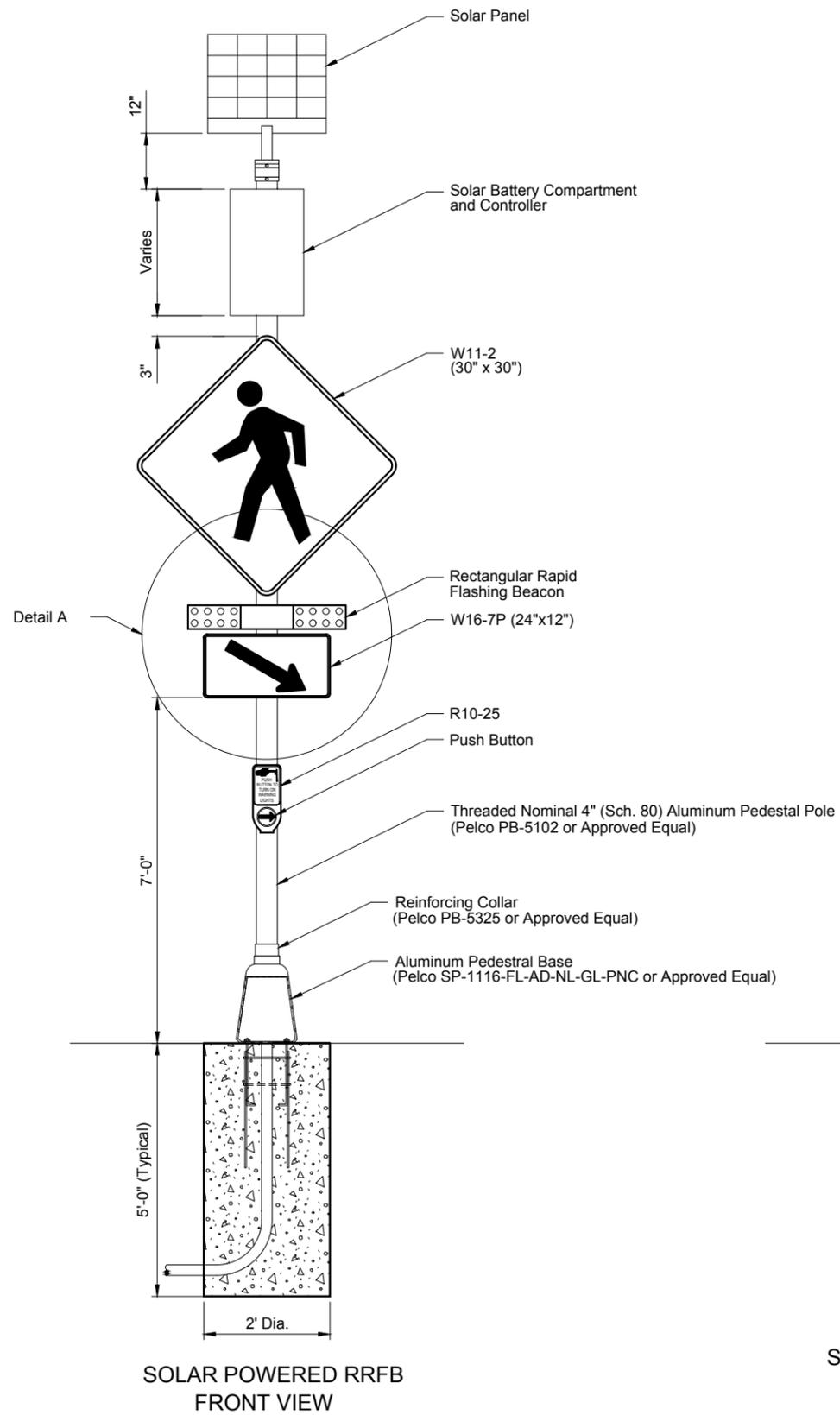
TRAFFIC CONTROL EQUIPMENT STANDARDS AND SPECIFICATIONS

MIAMI-DADE
DTPW TRAFFIC SIGNALS AND SIGNS DIVISION
7100 NW 36th STREET
MIAMI, FLORIDA 33166
305.592.3580

NAME	DATE	NAME	DATE
DRAWN BY: ERNESTO ESTRADA	02-24-15	DRAWN BY: LUIS J. DIAZ	04-27-18
CHECKED BY: NAHUM FERNANDEZ	02-24-15		
APPROVED BY: FRANK AIRA, P.E.			

RECTANGULAR RAPID FLASHING BEACONS (AC POWERED) DETAILS (N.T.S.)

SHEET NO.
654-1



LATEST REVISION 04/27/18	DESCRIPTION: TRAFFIC CONTROL EQUIPMENT STANDARDS AND SPECIFICATIONS		DTPW TRAFFIC SIGNALS AND SIGNS DIVISION 7100 NW 36th STREET MIAMI, FLORIDA 33166 305.592.3580	NAME	DATE	NAME	DATE	RECTANGULAR RAPID FLASHING BEACONS (SOLAR POWERED) DETAILS (N.T.S.)	SHEET NO. 654-2
				DRAWN BY ERNESTO ESTRADA	02-24-15	DRAWN BY LUIS J. DIAZ	04-27-18		
				CHECKED BY NAHUM FERNANDEZ	02-24-15				
				APPROVED BY: FRANK AIRA, P.E.					