SECTION 654
RECTANGULAR RAPID FLASHING BEACONS

DATED: FEBRUARY 2015

MIAMI-DADE COUNTY

TRAFFIC CONTROL EQUIPMENT STANDARDS AND SPECIFICATIONS

FOR MIAMI-DADE COUNTY

INDEX FOR SECTION 654

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654-1	INDEX SHEET.
654-2	STANDARDS AND SPECIFICATIONS.
654-3	RECTANGULAR RAPID FLASHING BEACONS (AC POWERED) DETAILS.
654-4	RECTANGULAR RAPID FLASHING BEACONS (SOLAR POWERED) DETAILS.

LATEST REVISION	DESCRIPTION:	TRAFFIC CONTROL EQUIPMENT STANDARDS AND SPECIFICATIONS	MIAMI-DADE COUNTY	PWWM TRAFFIC SIGNALS AND SIGNS DIVISION 7100 NW 36th STREET MIAMI, FLORIDA 33166 305.592.3580		NAME	DATE	RECTANGULAR RAPID FLASHING BEACONS INDEX SHEET	SHEET NO.
02/24/15					DRAWN BY	ERNESTO ESTRADA	02-24-15		654-1
					CHECKED BY	NAHUM FERNANDEZ	02-24-15		
					APPROVED BY: FRANK AIRA, P.E.				

SECTION 654
RECTANGULAR RAPID FLASHING BEACONS

PART 1 GENERAL

1.01 SUMMARY

A. Description

1. Furnish and install midblock crosswalk enhancement meeting the requirements of these Specifications.

B. Related Sections

1. FDOT Section 676 (Controller Cabinets)
2. FDOT 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

1. Design Wind Speed: 150 mph.
   a. Manufacturer must provide engineering certification that the RRFB system's major components along with the recommended attachments for mounting their system 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. The Engineer of Record must ensure that the proposed sign assemblies and foundation are designed to withstand all applicable wind loads.
2. Rectangular Rapid Flashing Beacon Assemblies:
   a. General
      1) Unless otherwise specified herein, all RRFB sign assemblies at the crosswalk 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) or S1-1 (School) crossing warning sign and the top of the supplemental diagonal downward arrow (W16-7p). Double-sided sign assemblies at crosswalks located on One-way roadways do not require the additional RRFB LED light bar on the side opposite the approach of traffic.
      2) When shown in the Plans or in the event the Engineer of Record determines that sight distance approaching the crosswalk at which RRFBs are used is less than deemed necessary, a single-sided RRFB sign assembly without a pushbutton will be installed on that approach in advance of the crosswalk, as a Warning Beacon to supplement a W11-2 (Pedestrian) or S1-1 (School) crossing warning sign with an AHEAD: (W16-9p) plaque.
      3) Unless otherwise shown on 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 threaded aluminum pedestal pole and square aluminum break away base with a reinforcing collar assembly. Attachment hardware must meet or exceed the requirements of FDOT Design Standards, Index No. 11860.
      4) The individual RRFB components must be replaceable independently of other components and be equipped with approved terminal strips or wire-end molded connectors.
   a. RRFB Dimensions
      1) Each RRFB indication must be a minimum of approximately 5 inches wide by 2 inches high.
      2) The two RRFB indications on each side must be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of approximately seven inches, measured from inside edge of one indication to inside edge of the other indication.
      3) The outside edges of the RRFB indications, including any housings, must not project beyond the outside edges of the W11-2 or S1-1 sign.
   b. Beacon Flashing Requirements
      1) When activated, the two yellow indications in each RRFB must flash in a rapidly alternating "wig-wag" flashing sequence (left light on, then right light on).
      2) The RRFB flash rate must be 70 to 80 periods of flashing per minute. Each beacon must have alternating flash rates, but approximately equal periods of rapid pulsing light emissions and dark operation.
      3) During each of its 70 to 80 flashing periods per minute, the yellow indications on the left side of the RRFB must emit two slow pulses of light after which the yellow indications on the right side of the RRFB shall emit four rapid pulses of light followed by a long pulse.
      4) The flash rate of each individual yellow indication, as applied over the full on-off sequence of a flashing period of the indication, must not be between 5 and 30 flashes per second, to avoid frequencies that might cause seizures.
      5) The light intensity of the yellow indications must meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 for Class 1 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles).
      6) A small light directed at and visible to pedestrians in the crosswalk must be installed integral to the RRFB to give confirmation that the RRFB is in operation.
      7) The LED light outputs and flash pattern must be completely programmable, with the capability be reconfigured in the field if future MUTCD or State guidelines specify a different flash pattern.
   c. Beacon Operation
      1) RRFB assemblies must be normally dark, initiate operation only upon pedestrian actuation via a pedestrian pushbutton, and cease operation at a predetermined time after the pedestrian actuation.
      2) The duration of the predetermined period must be programmable and capable of matching the pedestrian clearance time for pedestrian signals as determined by MUTCD procedures. The required duration period must be shown on the Plans and record documents.
      3) The timer that controls flashing must automatically reset each time a pedestrian call is received.
      4) All RRFBs associated with a single crosswalk (including those with an advance crossing sign, if used) must simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.
   d. Pedestrian Pushbutton
      1) Each assembly (except for an RRFB installed in advance of the crosswalk having an AHEAD plaque) must have a pedestrian pushbutton.
      2) Pedestrian pushbuttons must be an ADA compliant with a directional arrow and must provide 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.
      3) Position pushbuttons per the details that accompany these Specifications.

B. A R10-25 (PUSH BUTTON TO TURN ON WARNING LIGHTS) sign must be mounted adjacent to or integral with each pedestrian pushbutton.

1.03 WARRANTY

C. 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. Use midblock crosswalk enhancement assemblies and components that are listed on the FDOT APL and the Miami-Dade County TSSQPL. Unless otherwise called for in Details provided with these Specifications, the components depicted therein do not represent any specific manufacturer's product.

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: Equipment must operate on solar power or a nominal voltage of 120 volts alternating current (VAC). If the device requires operating voltages of less than 120 VAC, supply the appropriate voltage converter. 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.

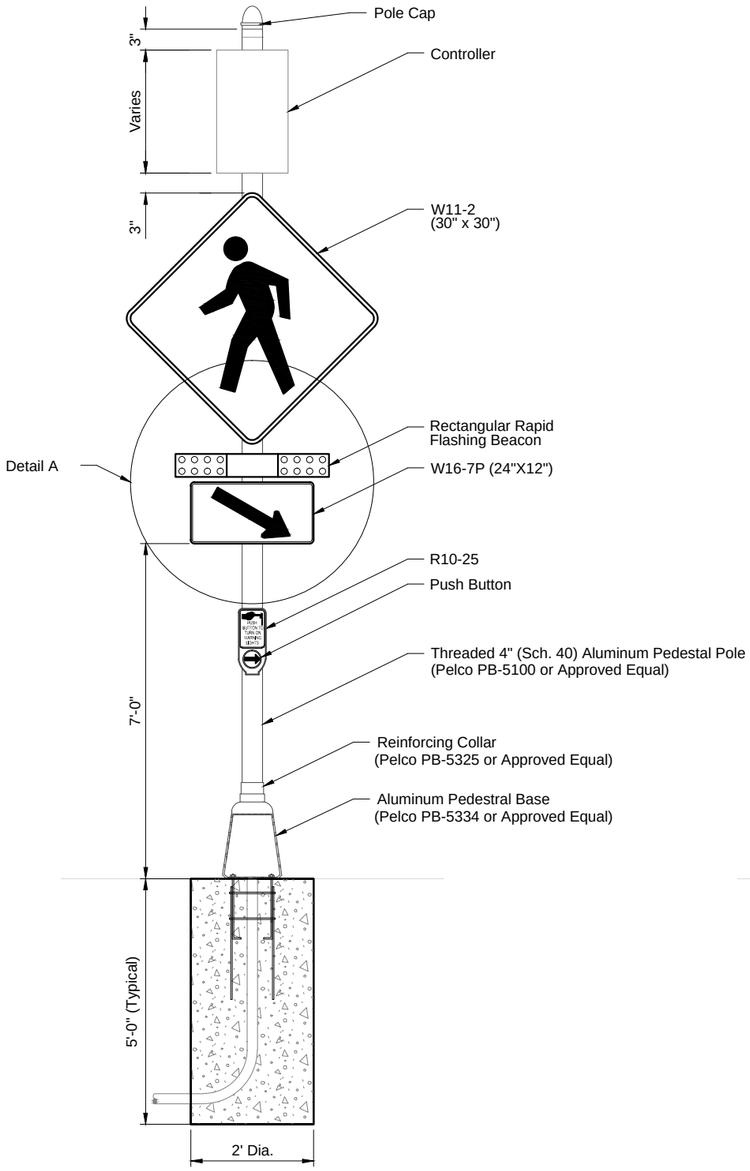
G. Environmental Specifications: All electronic assemblies shall operate as specified during and after being subjected to the transients, temperature, voltage, humidity, vibration, and shock tests described in National Electrical Manufacturers Association (NEMA) TS2, 2.2.7, 2.2.8, and 2.2.9. Electronics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

PART 3 EXECUTION

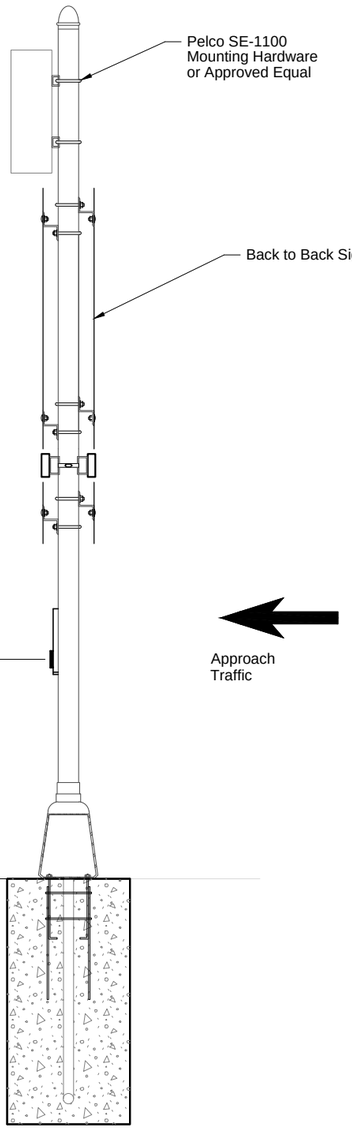
3.01 REPAIRS/RESTORATION

Restore any areas impacted by the installation of the crosswalk enhancement assembly to original condition unless otherwise shown in the Plans. Install crosswalk enhancement

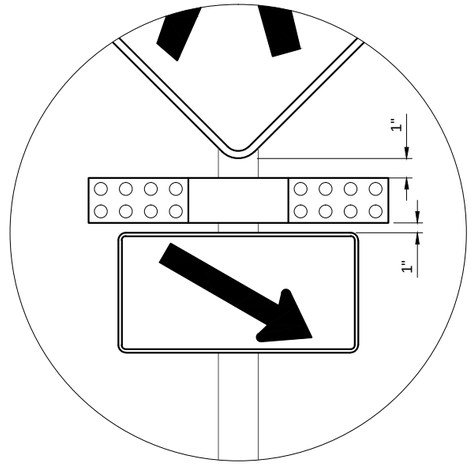
assembly in accordance with the Americans with Disabilities Act Standards for Transportation Facilities.



AC POWERED RRFB
FRONT VIEW



AC POWERED RRFB
SIDE VIEW



DETAIL
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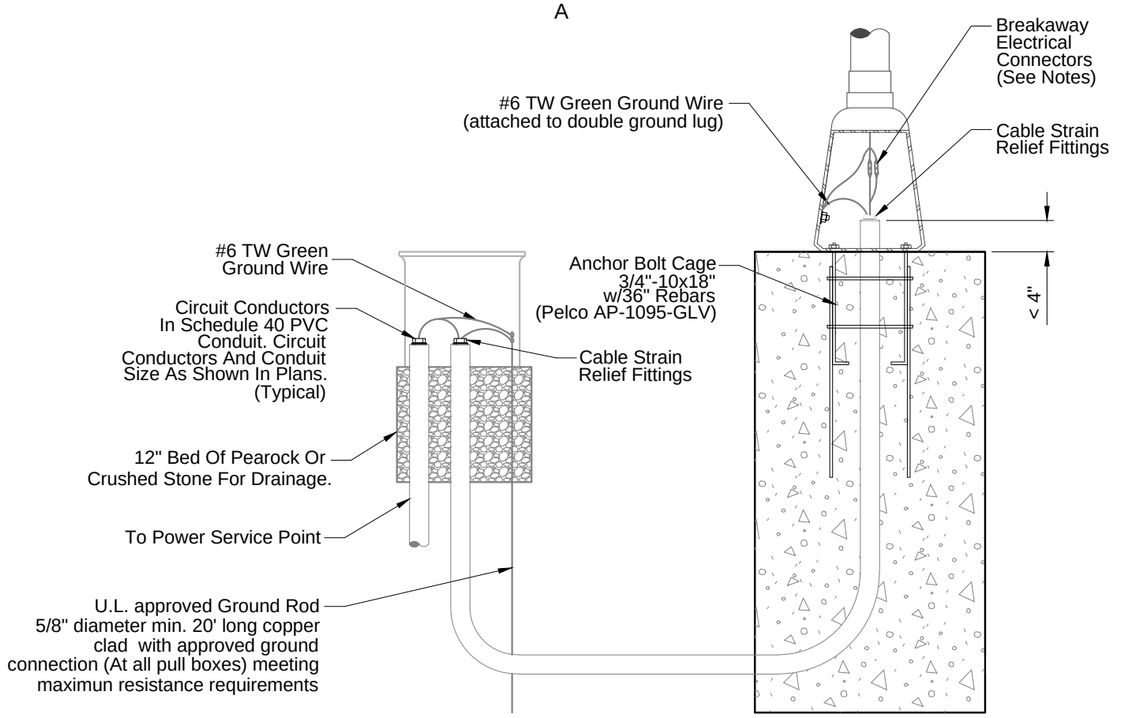

Notes:

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

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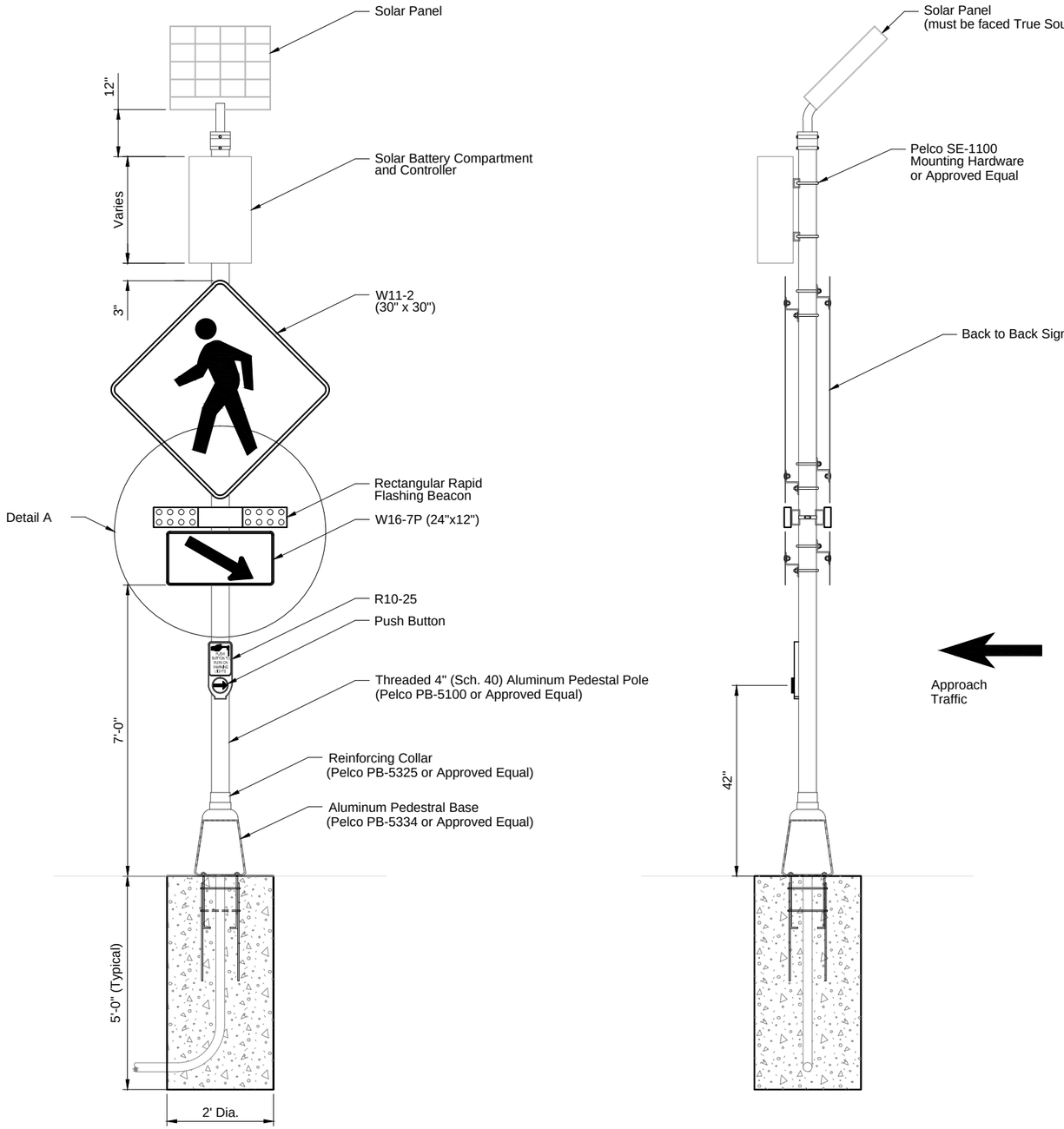
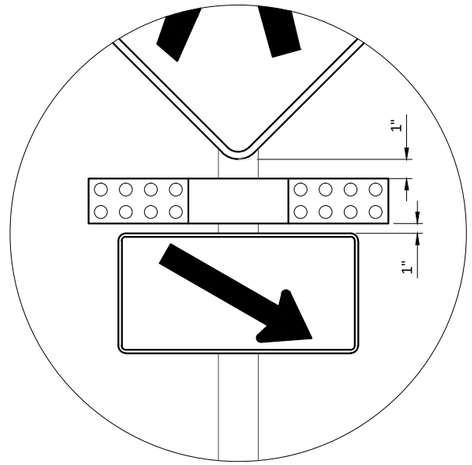
02/24/15					DRAWN BY	ERNESTO ESTRADA	02–24–15		654–3
					CHECKED BY	NAHUM FERNANDEZ	02–24–15		
					APPROVED BY: FRANK AIRA, P.E.				



SOLAR POWERED RRFB
FRONT VIEW

SOLAR POWERED RRFB
SIDE VIEW



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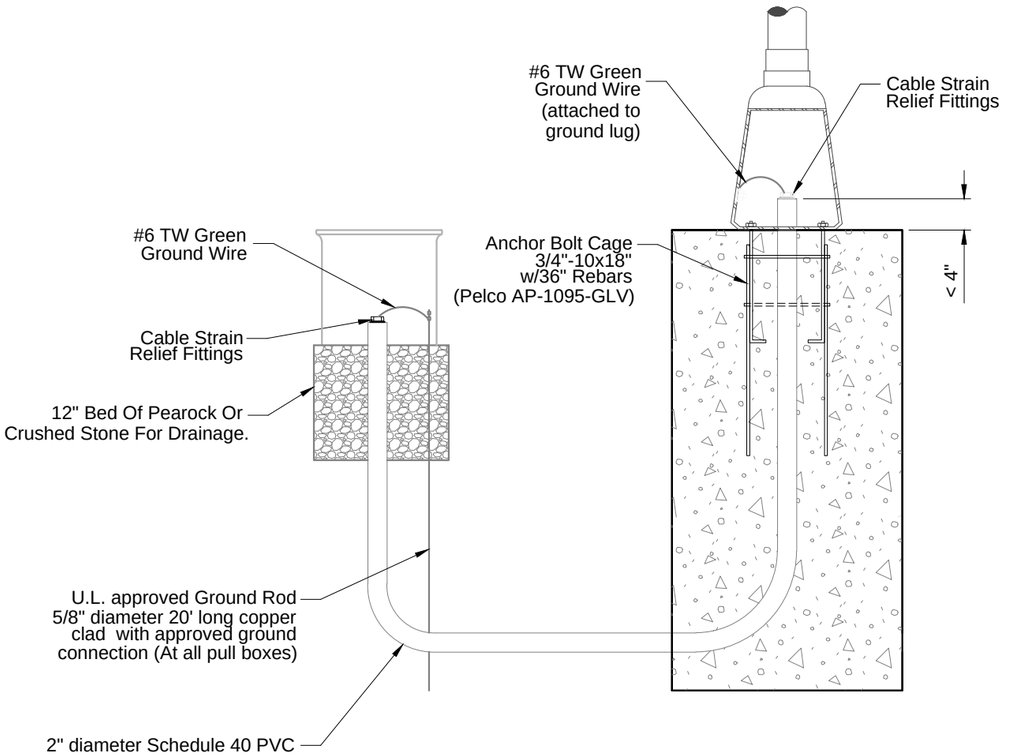

POLE GROUNDING DETAIL
SOLAR POWERED RRFB

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