

SCHOOL RELATED SIGNS



S1-1
36" x 36"
(DIAMOND GRADE FLUORESCENT YELLOW GREEN)



W16-9P
36" X 12"
(DIAMOND GRADE FLUORESCENT YELLOW GREEN)



W16-7
30" X 18"
(DIAMOND GRADE FLUORESCENT YELLOW GREEN)



S5-1
24" x 48"
(DIAMOND GRADE FLUORESCENT YELLOW GREEN)
(HIGH INTENSITY WHITE)



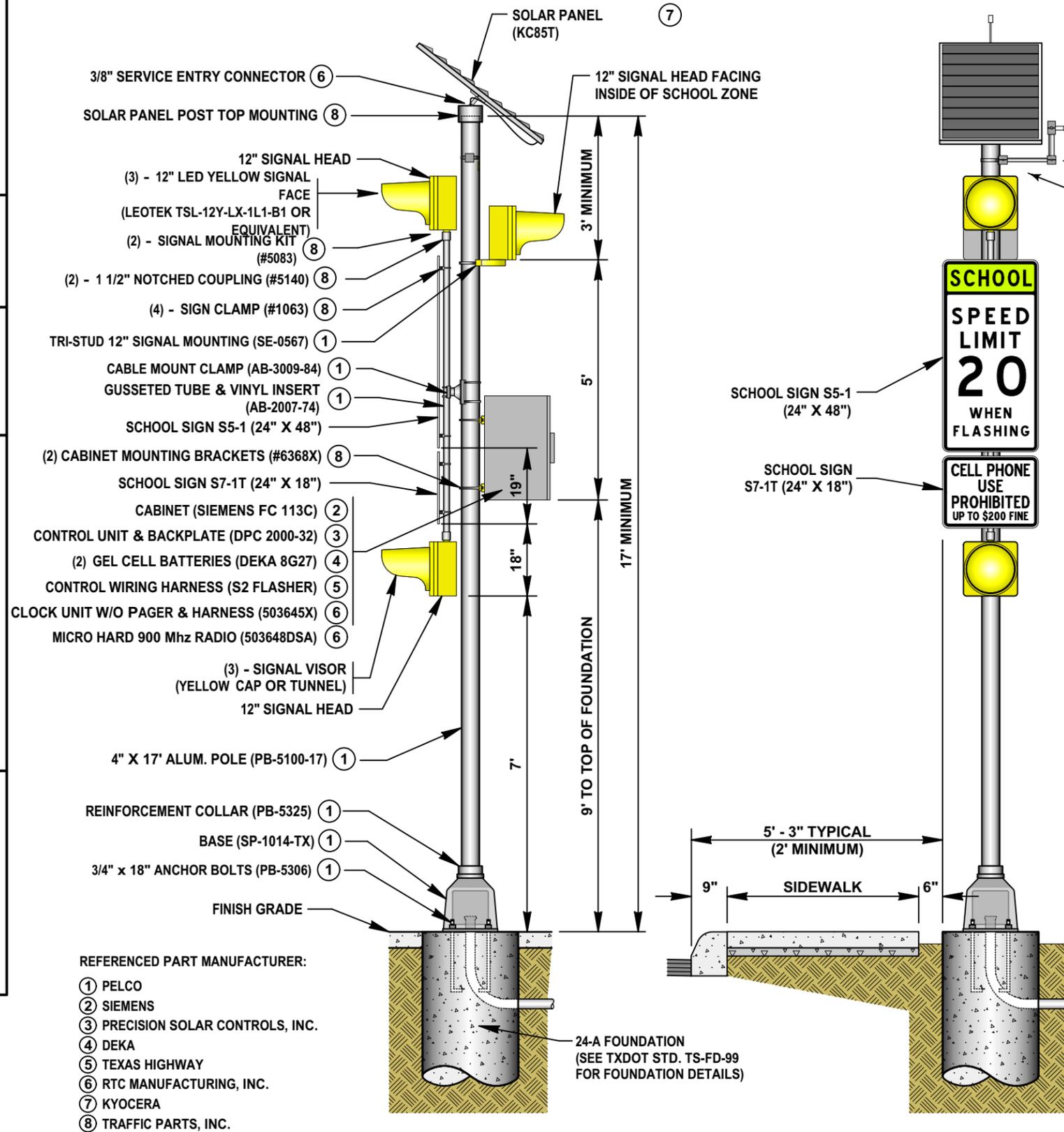
S7-1T
24" x 18"
(HIGH INTENSITY WHITE)



S5-2A (COSA)
24" x 9"
(HIGH INTENSITY WHITE)



R2-1
24" x 30"
(HIGH INTENSITY WHITE)



- REFERENCED PART MANUFACTURER:
- ① PELCO
 - ② SIEMENS
 - ③ PRECISION SOLAR CONTROLS, INC.
 - ④ DEKA
 - ⑤ TEXAS HIGHWAY
 - ⑥ RTC MANUFACTURING, INC.
 - ⑦ KYOCERA
 - ⑧ TRAFFIC PARTS, INC.

GENERAL NOTES

1. SPEED LIMIT LEGEND SHALL BE AS SPECIFIED BY THE ENGINEER.
2. IF FOUNDATION ENCROACHES ON ADJACENT SIDEWALK, TOP OF FOUNDATION SHALL MATCH SIDEWALK ELEVATION COMPLETELY. SIDEWALK SECTION SHALL BE REPLACED AS NECESSARY. REFER TO SHEET TS-FD-99 FOR FOUNDATION INFORMATION.
3. A CONFIRMATION BEACON SHALL BE PROVIDED ON THE BACK SIDE OF THE POLE AS SHOWN.
4. SOLAR PANEL SHALL BE ORIENTED TO PROVIDE THE MAXIMUM EXPOSURE TO THE SUN.
5. MANUFACTURER'S NAMES AND PRODUCT NUMBERS ARE PROVIDED FOR REFERENCE ONLY. EQUIVALENT PRODUCTS MAY BE USED WITH APPROVAL FROM THE ENGINEER.
6. ROAD SIDE SCHOOL FLASHER TO BE USED FOR NON-MULTI-LANE ROADWAYS AND ROADWAYS WITH POSTED SPEEDS OF 35 MPH OR LESS. FOR OTHER LOCATIONS THE MAST ARM FLASHER ASSEMBLY SHOULD BE USED UNLESS DIRECTED OTHERWISE BY THE CITY.
7. THE WIRING FOR THE BEACONS SHALL BE A THHN/THWN #16 AWG STRANDED CONDUCTOR WITH THE FOLLOWING COLOR ASSIGNMENTS:

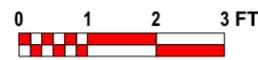
LAMP + = WHITE
LAMP 1 = BLUE (TOP FRONT BEACON)
LAMP 2 = YELLOW (BOTTOM FRONT BEACON)
LAMP 3 = GREY (REAR BEACON)
8. THE CONTRACTOR SHALL COIL AN EXTRA 12 INCHES OF WIRING AT THE BEACONS AND THE CABINET
9. THE CONTRACTOR SHALL FURNISH A FULLY OPERATIONAL SCHOOL FLASHER COMMUNICATIONS SYSTEM. ADDITIONAL COMMUNICATIONS REPEATER STATIONS AND/OR MASTER RADIOS MAY BE REQUIRED IN ORDER TO ENABLE COMMUNICATIONS FROM THE SCHOOL FLASHER LOCATION BACK TO THE TRAFFIC MANAGEMENT CENTER. A COMMUNICATIONS ANALYSIS SHOULD BE COMPLETED BY CONSOLIDATED TRAFFIC CONTROLS, INC. ((817) 265-3421) TO DETERMINE WHICH ADDITIONAL COMPONENTS ARE REQUIRED.


 CITY OF SAN ANTONIO
 TRANSPORTATION AND CAPITAL IMPROVEMENTS
 TRAFFIC MANAGEMENT

TRAFFIC SIGNAL STANDARDS
ROADSIDE POLE MOUNTED SOLAR POWERED SCHOOL FLASHER ASSEMBLY

DRWN: MSJ	APVD: DPW	DATE: 10/08/07	TS-RSSF-14 (SHEET 1 OF 1)
RVSD: MAB	APVD: DPW	DATE: 04/04/12	
RVSD: MSJ	APVD: TCI	DATE: 09/29/14	

SIDE VIEW



FRONT VIEW

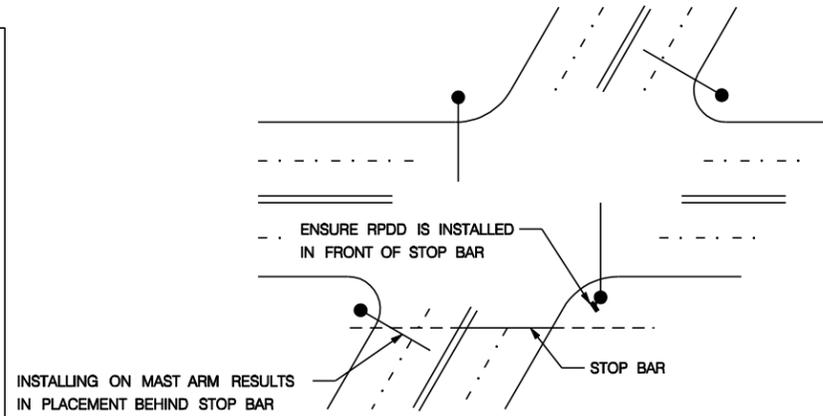
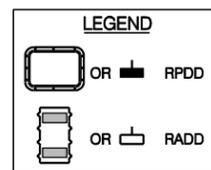
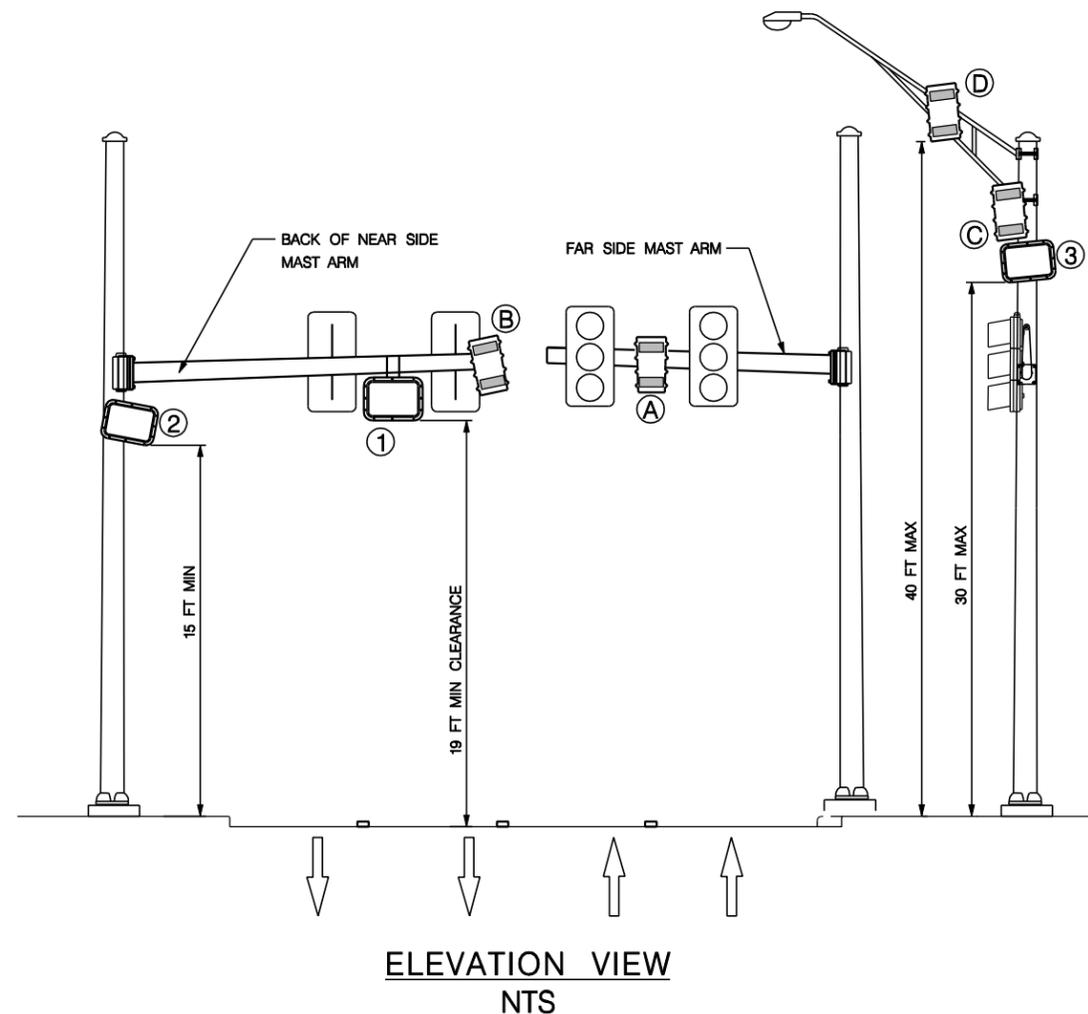
MOUNTING LOCATIONS

PRESENCE (RPDD)

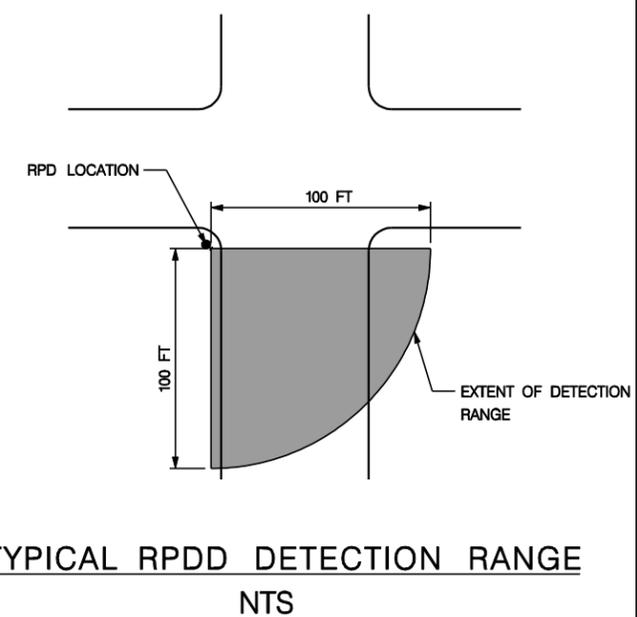
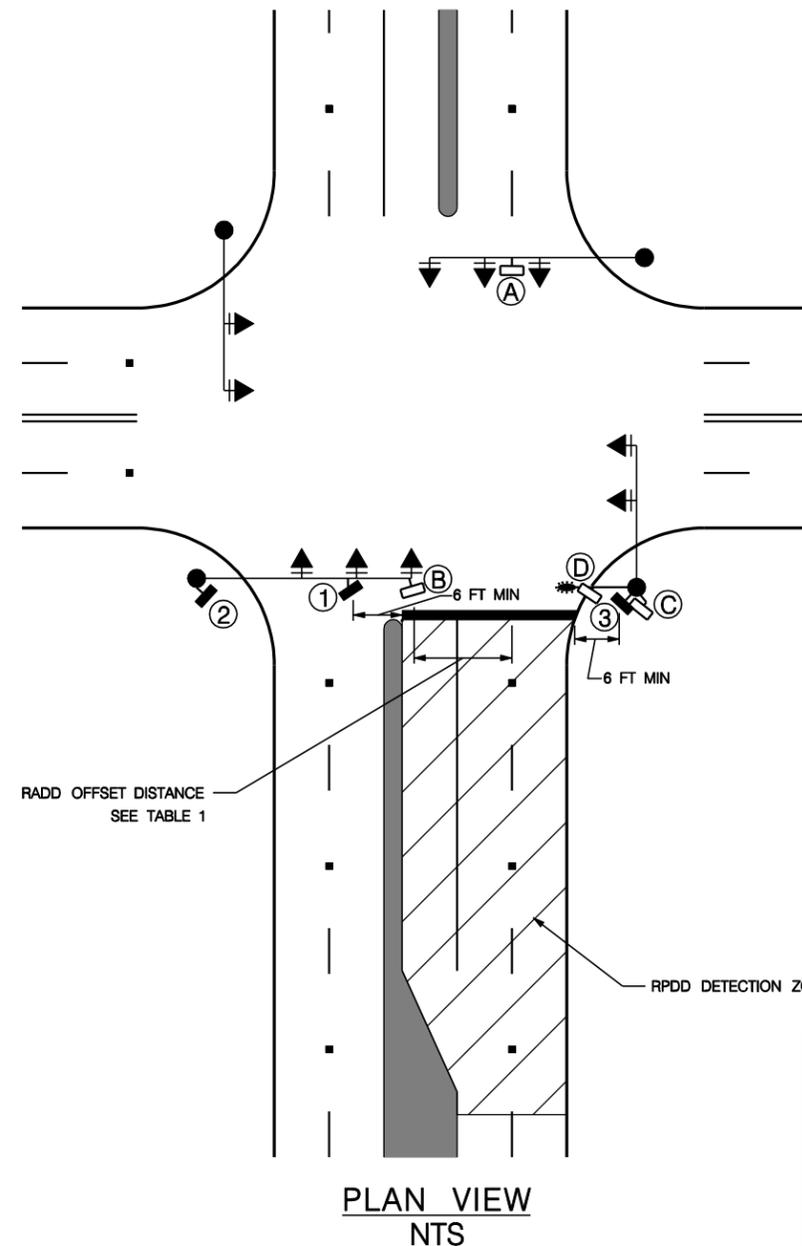
- ① PREFERRED PLACEMENT FOR MAST ARMS. MOUNT ON AND BELOW MAST ARM ON NEAR SIDE OF STREET.
- ② PREFERRED PLACEMENT FOR TIMBER POLE OR STRAIN POLE INSTALLATIONS. MOUNT AS HIGH AS POSSIBLE TO A MAXIMUM OF 30 FT ON TIMBER OR SPAN WIRE POLES. ON MAST ARM POLES, MOUNT BELOW CONNECTION OF MAST ARM TO A MINIMUM OF 15 FT.
- ③ ALTERNATE PLACEMENT LOCATION. MOUNT AS HIGH AS POSSIBLE TO A MAXIMUM OF 30 FT TO PREVENT OCCLUSION OF THE LEFT TURN LANES. THIS PLACEMENT TO BE USED ONLY IF RPDD CANNOT BE MOUNTED IN THE PREFERRED PLACEMENT LOCATIONS.

ADVANCE (RADD)

- Ⓐ PREFERRED PLACEMENT FOR MAST ARMS. ALIGN RADD WITH CENTER OF TRAVEL LANES.
- Ⓑ ALTERNATE PLACEMENT FOR MAST ARMS. MOUNT ON BACK SIDE OF OPPOSING MAST ARM.
- Ⓒ TIMBER OR STRAIN POLE PLACEMENT. MOUNT ON NEAR SIDE POLE.
- Ⓓ ALTERNATE TIMBER OR STRAIN POLE PLACEMENT. MOUNT LUMINAIRE ARM ON NEAR SIDE POLE WITH A MAXIMUM 40 FT MOUNTING HEIGHT.



SKewed INTERSECTION RPDD PLACEMENT NTS



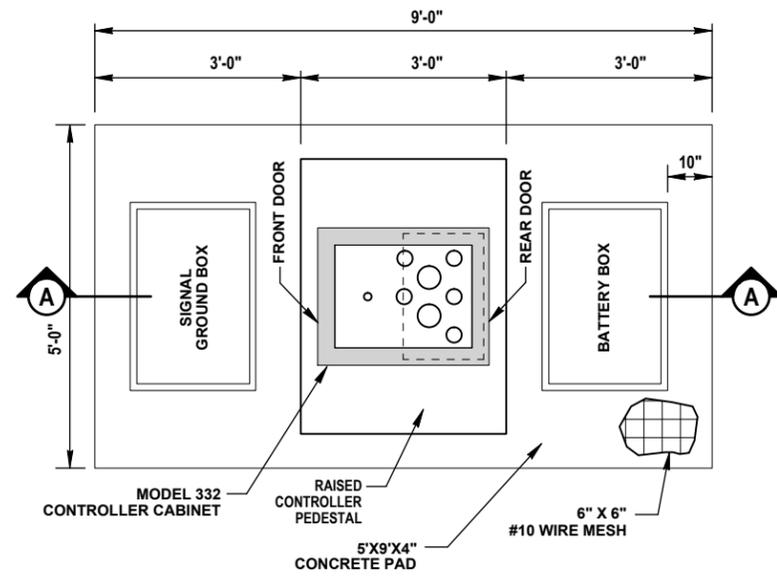
- NOTES:
- 1) A MINIMUM 6 FT HORIZONTAL OFFSET MUST BE MAINTAINED BETWEEN THE RPDD AND THE DETECTION ZONE
 - 2) THE RPDD SHALL BE MOUNTED SUCH THAT AT LEAST 20 FT ALONG THE FARTHEST LANE TO BE MONITORED IS WITHIN THE FIELD OF VIEW OF THE RPDD
 - 3) AIM RPDD AT THE CENTER OF THE LANES TO BE MONITORED, APPROXIMATELY 50 FT FROM THE RPDD UNIT
 - 4) MOUNT RPDD SO THAT ITS FIELD OF VIEW IS NOT OCCLUDED BY POLES, SIGNS, OR OTHER STRUCTURES
 - 5) RADD MOUNTING HEIGHT SHALL NOT BE LESS THAN 17 FT OR GREATER THAN 40 FT. RADD MOUNTING LOCATION SHALL HAVE A MAXIMUM 50 FT LATERAL OFFSET FROM CENTER OF TRAVEL LANES TO BE MONITORED

APRIL 2010

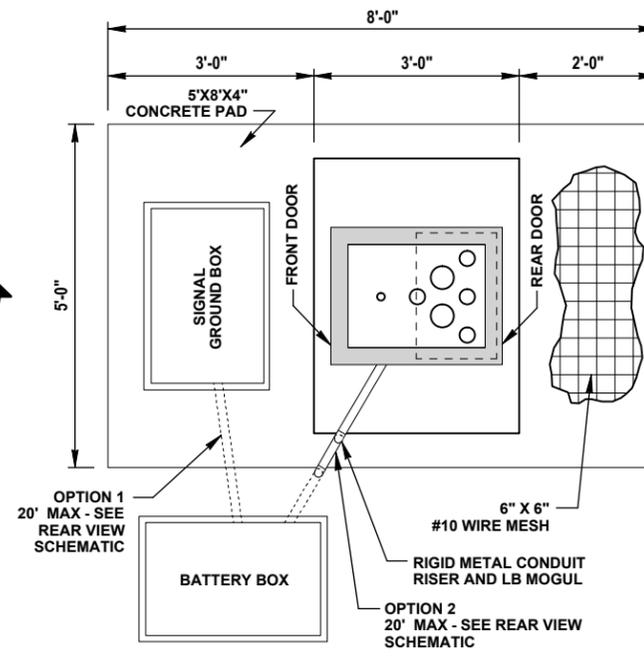
CITY OF SAN ANTONIO
 DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGNAL STANDARDS
**RADAR PRESENCE DETECTOR (RPDD)
 AND RADAR ADVANCE DETECTOR (RADD)
 PLACEMENT**
 SHEET 1 OF 1

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: DNM	DSGN. BY: DNM	CHKD. BY: GDG
		SHEET NO.: OF



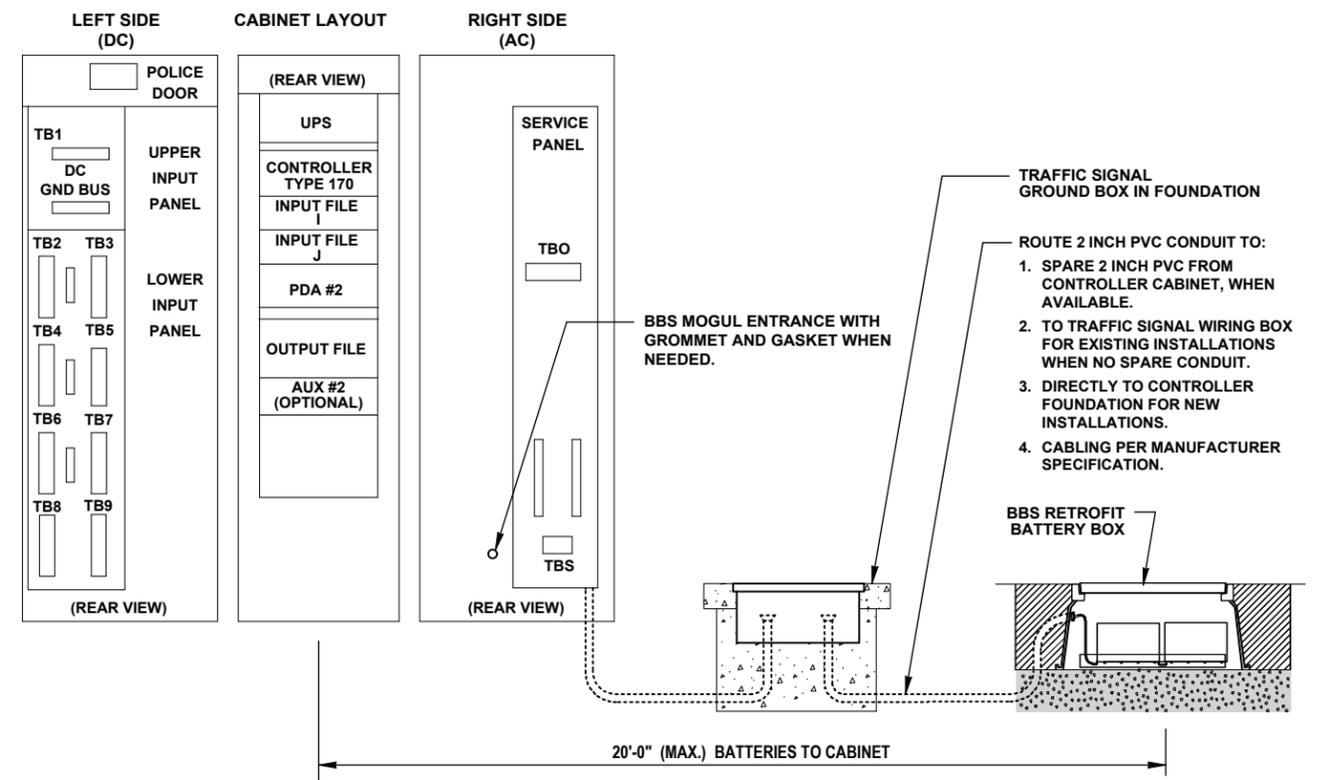
TOP VIEW
(NEW FOUNDATION)



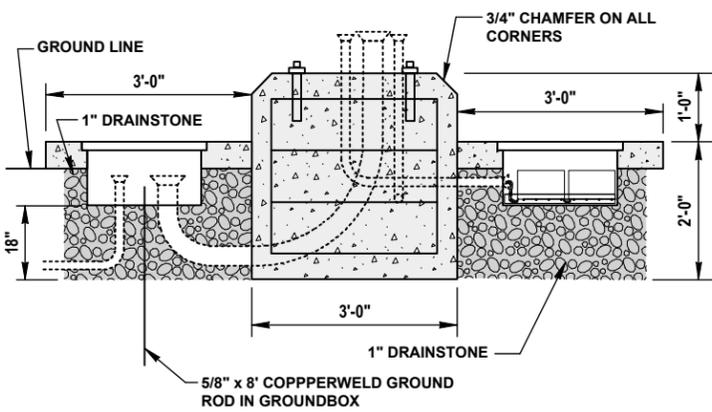
TOP VIEW
(RETROFITTED FOUNDATION)

OPTION 1:
USE AVAILABLE CONDUIT SPACE TO CONNECT WIRING FROM
GROUND BOX TO CABINET.

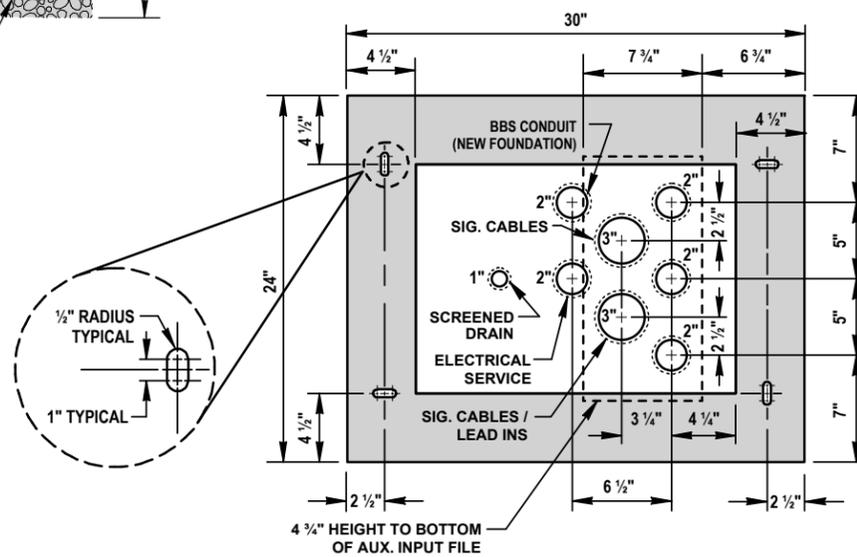
OPTION 2:
BBS CONDUIT AND CABLES TO BE ROUTED THROUGH EXISTING
CONDUITS WHEN AVAILABLE. A 2" RMC WITH LB MOGUL MAY BE
INSTALLED ON THE RIGHT SIDE (REARVIEW) OF THE CABINET FOR
THE BBS CABLING IF NO SPARE CONDUITS ARE AVAILABLE IN THE
EXISTING FOUNDATION.



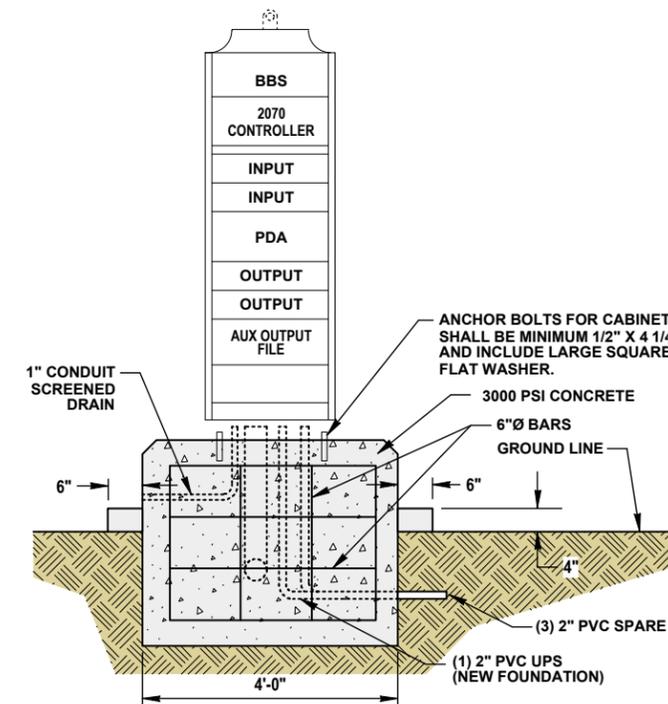
REAR VIEW SCHEMATIC



SECTION A-A



BASE PLATE TEMPLATE



REAR VIEW

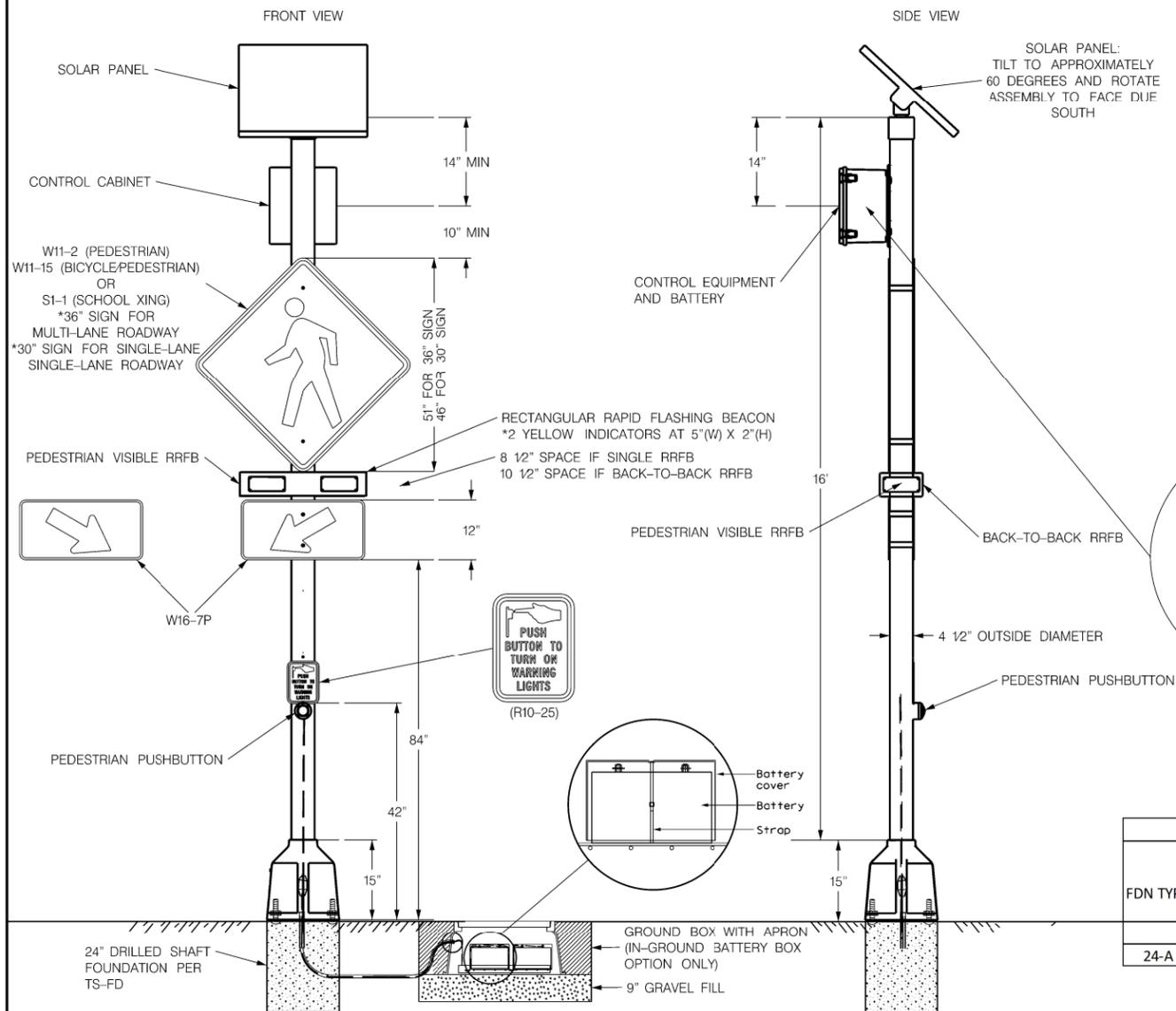
NOTES:

1. CONTRACTOR TO INSTALL GROUND BOX, CONDUIT, CONTROLLER FOUNDATION, CONCRETE SLAB AND CONDUIT FROM GROUND BOX TO CABINET. SEE BATTERY BACKUP SYSTEM SPECIFICATION FOR ADDITIONAL WIRING DETAILS.
2. FOR NEW FOUNDATIONS A DEDICATED BBS CONDUIT FROM THE FOUNDATION TO THE BATTERY BOX SHALL BE PROVIDED BY THE CONTRACTOR.

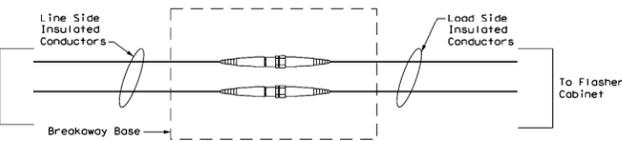
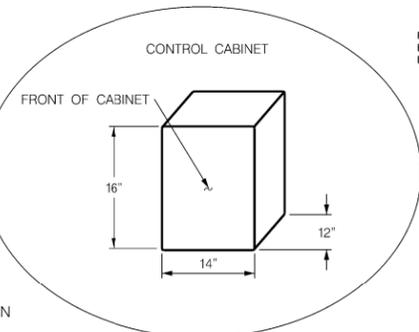
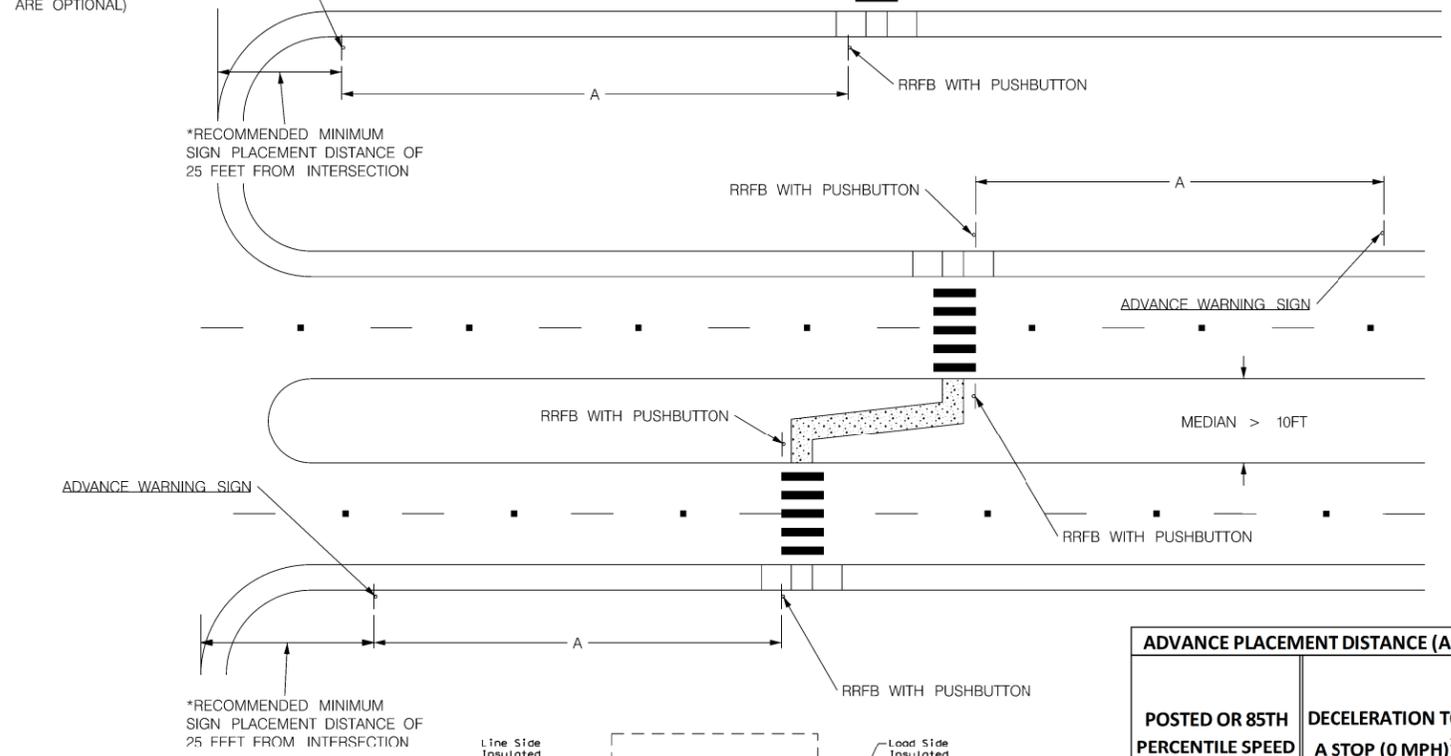
 CITY OF SAN ANTONIO Department of Public Works TRAFFIC MANAGEMENT		TRAFFIC SIGNAL STANDARDS TYPE 332 CABINET FOUNDATION WITH BATTERY BACKUP SYSTEM	
		DRWN: RB RVSD: MAB RVSD:	CHKD: GG APVD: DPW APVD:

NOTES:

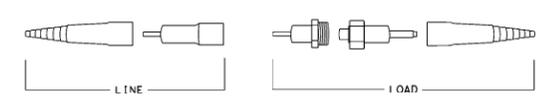
- RECTANGULAR RAPID FLASHING BEACONS (RRFB) SHOULD ONLY BE CONSIDERED AT MARKED CROSSWALKS WHERE THE CROSSING IS NOT CONTROLLED BY A TRAFFIC CONTROL DEVICE SUCH AS A TRAFFIC SIGNAL OR STOP SIGNS. RRFB PROVIDES FOR THE IMPROVEMENT OF SAFETY OF CROSSWALKS WHEN TRAFFIC SIGNALS DO NOT MEET WARRANTS, AND SHOULD ONLY BE USED WITH SIGNS AND PAVEMENT MARKINGS TO WARN AND CONTROL TRAFFIC AT LOCATIONS WHERE PEDESTRIANS ENTER OR CROSS A STREET.
- ALL OF THE FOLLOWING CONDITIONS MUST BE MET BEFORE RRFB CAN BE CONSIDERED:
 - AN ESTABLISHED CROSSWALK WITH ADEQUATE VISIBILITY, MARKINGS AND SIGNS
 - A POSTED SPEED LIMIT OF 40 MPH OR LESS (DOES NOT INCLUDE SCHOOL SPEED ZONES)
 - 20 PEDESTRIANS OR MORE CROSSING IN ONE HOUR
 - LOCATION DEEMED AS A HIGH RISK AREA (E.G. SCHOOLS, SHOPPING CENTERS, ETC.)
 - CROSSWALK IS MORE THAN 300 FT. FROM AN EXISTING, TRAFFIC CONTROLLED PEDESTRIAN CROSSING
- RRFB ARE USER-ACTUATED AMBLER LEDs THAT SUPPLEMENT WARNING SIGNS. A RRFB CONSIST OF TWO RAPIDLY AND ALTERNATELY FLASHED RECTANGULAR YELLOW INDICATORS HAVING LED-ARRAY BASED PULSING LIGHT SOURCES.
- RRFB SIGNAL INDICATIONS SHALL NOT BE DIMMED DURING DAYTIME CONDITIONS AND THE LIGHT OUTPUT FROM THE RRFB SIGNAL INDICATIONS MUST MEET THE SAE J595 REQUIREMENTS FOR PEAK LUMINOUS INTENSITY FOR CLASS 1 AT ALL TIMES DURING DAYLIGHT HOURS 4(09)-24(I) - DIMMING OF RRFBs DURING DAYTIME HOURS, INTERIM APPROVALS VALID UNDER THE 2009 MUTCD.
- RRFB FLASH PATTERN PER COSA SPECIFICATION FOR RECTANGULAR RAPID FLASHING BEACON (RRFB).
- RRFB FLASH DURATION SHALL BE SUFFICIENT FOR PEDESTRIAN CROSSING TIME AS THAT OUTLINED IN CHAPTER 4 OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
- RRFB LIGHT INTENSITY SHALL MEET THE MINIMUM SPECIFICATIONS OF SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) STANDARD J595 DATED JANUARY 2005. SAE J595 CLASS 1 YELLOW LED LIGHTS ARE TO BE USED FOR RRFBs UNDER 1A-11 4(09)-17(I) - RRFB LIGHT INTENSITY, INTERIM APPROVALS VALID UNDER THE 2009 MUTCD.
- ORIENT SOLAR PANEL FOR OPTIMUM EXPOSURE TO SUNLIGHT (FACE TO THE SOUTH). PRIOR TO INSTALLATION THE LOCATION SHOULD BE CHECK TO ENSURE THERE IS NO OVERHEAD OBSTRUCTION THAT WOULD BLOCK THE SOLAR PANEL FROM RECEIVING FULL SUNLIGHT. UNLESS SPECIFIED ELSEWHERE, MOUNT A MINIMUM OF 14' ABOVE GRADE. THE NOMINAL OUTSIDE DIMENSIONS OF EACH CABINET MUST BE 14" WIDE BY 16" HIGH BY 12" INCHES DEEP WITH THE DOOR CLOSED. ALL DIMENSIONS MAY BE PLUS OR MINUS 3".
- PEDESTAL POLE FOUNDATION SHALL BE DESIGNED PER THE TXDOT STANDARD SPECIFICATIONS 2004, TS-FD, 24-A (ITEM 656). ENSURE THE MATERIALS AND CONSTRUCTION METHODS USED CONFORM TO THE REQUIREMENTS OF ITEM 656.
- IF MEDIAN EXCEEDS 10 FEET IN WIDTH, A "Z-CROSSING" OR "STAGGERED CROSSING" IS PREFERRED.
- IF ROADWAY DOES NOT HAVE MEDIAN, TWO BACK-TO-BACK RRFB WILL NEED TO BE IMPLEMENTED AT CROSSWALK.



- ADVANCE WARNING SIGN (TYP)
 1. 36" W11-2 (PEDESTRIAN)
 OR
 2. S1-1 (SCHOOL XING)
 OR
 3. W11-15 (BIKE/PEDESTRIAN)
 (LEDS WITHIN SIGN FACE ARE OPTIONAL)



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS EXPLODED VIEW

ADVANCE PLACEMENT DISTANCE (A)	
POSTED OR 85TH PERCENTILE SPEED	DECELERATION TO A STOP (0 MPH) ¹
20 MPH	100 FT ²
25 MPH	155 FT
30 MPH	200 FT
35 MPH	250 FT
40 MPH	305 FT

1 TYPICAL CONDITION IS THE WARNING OF A POTENTIAL STOP SITUATION. THE DISTANCES ARE BASED ON THE 2011 AASHTO POLICY, EXHIBIT 3-3, STOPPING SIGHT DISTANCE, PROVIDING A PRT OF 2.5 SECONDS, A DECELERATION RATE OF 11.2 FEET/SECOND².

2 THE MINIMUM ADVANCE PLACEMENT DISTANCE IS LISTED AS 100 FEET TO PROVIDE ADEQUATE SPACING BETWEEN SIGNS.

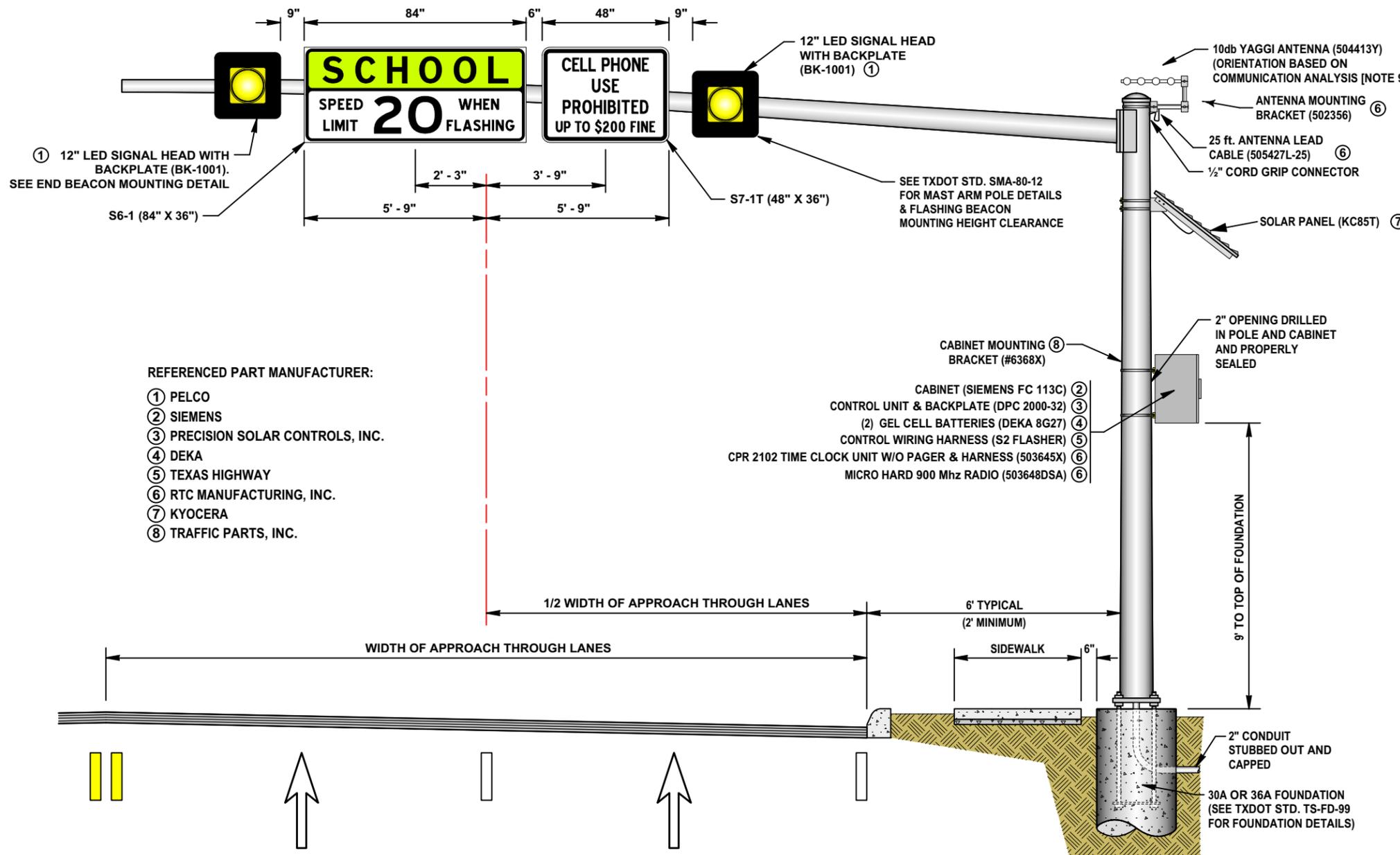
3 RRFB SHOULD NOT BE USED FOR ROADWAYS WITH SPEED LIMITS EXCEEDING 40 MPH.

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT			ANCHOR BOLT DESIGN			FOUNDATION DESIGN LOAD		
		VERT BARS	SPIRAL & PITCH	LENGTH - FT			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR CIA	ANCHOR TYPE	MOMENT K-FT	SHEAT KIPS
				TEXAS CONE PENETROMETER N BLOWS/FT	10	15						
24-A	24"	4-#5	#2 AT 12"	5.7	5.3	4.5	3/4"	36	12 (3/4)"	1	10	1

NOVEMBER 2013
 CITY OF SAN ANTONIO
 DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGNAL STANDARDS
SOLAR POWERED RECTANGULAR RAPID FLASHING BEACON (RRFB)

DRWN BY: _____	DSGN BY: _____	CHKD BY: _____	DATE: _____
PROJECT NO.: _____		SHEET NO.: _____ OF _____	



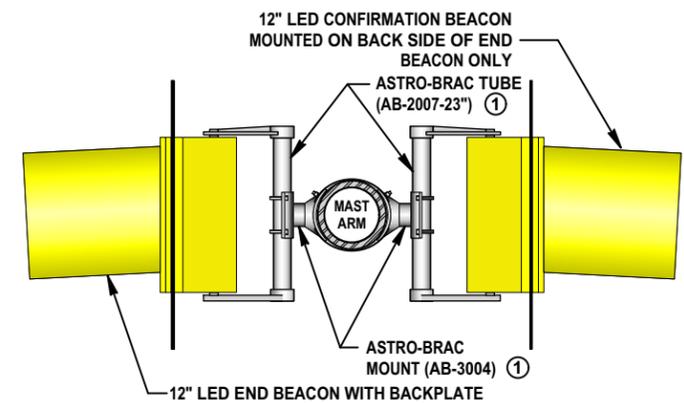
REFERENCED PART MANUFACTURER:

- ① PELCO
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- ③ PRECISION SOLAR CONTROLS, INC.
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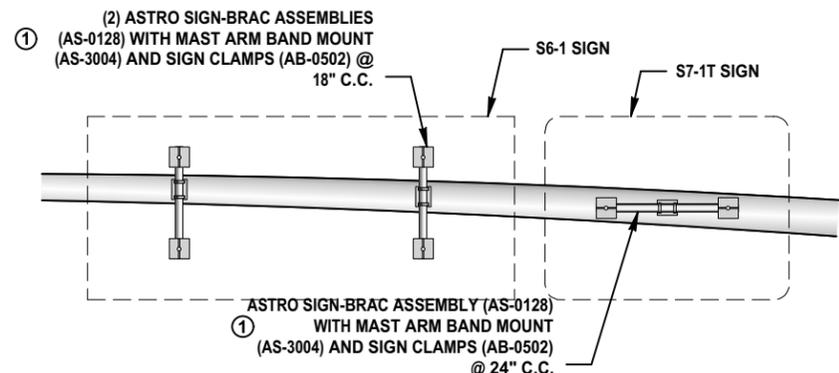
GENERAL NOTES

- ①. SPEED LIMIT LEGEND SHALL BE AS SPECIFIED BY THE ENGINEER.
- ②. MAST ARM LENGTH SHALL BE LONG ENOUGH TO PROVIDE SIGN PLACEMENT AND BEACON SPACING AS INDICATED. FOUNDATION WIDTH AND DEPTH WILL DEPEND ON MAST ARM LENGTH USED. REFER TO SHEET TS-FD-99 FOR FOUNDATION INFORMATION.
- ③. A CONFIRMATION BEACON WITH BACKPLATE SHALL BE PROVIDED ON THE BACK SIDE OF THE MAST ARM OPPOSITE THE OUTERMOST FRONT FACING BEACON.
- ④. SOLAR PANEL SHALL BE ORIENTED TO PROVIDE THE MAXIMUM EXPOSURE TO THE SUN.
- ⑤. MANUFACTURER'S NAMES AND PRODUCT NUMBERS ARE PROVIDED FOR REFERENCE ONLY. EQUIVALENT PRODUCTS MAY BE USED WITH APPROVAL FROM THE ENGINEER.
- ⑥. MAST ARM SCHOOL FLASHER TO BE USED FOR MULTI-LANE ROADWAYS AND ROADWAYS WITH POSTED SPEEDS GREATER THAN 35 MPH. FOR OTHER LOCATIONS THE ROADSIDE FLASHER ASSEMBLY SHOULD BE USED.
- ⑦. THE WIRING FOR THE BEACONS SHALL BE A THHN/THWN #16 AWG STRANDED CONDUCTOR WITH THE FOLLOWING COLOR ASSIGNMENTS:
LAMP + = WHITE
LAMP 1 = BLUE (LEFT FRONT BEACON)
LAMP 2 = YELLOW (RIGHT FRONT BEACON)
LAMP 3 = GREY (REAR BEACON)
- ⑧. THE CONTRACTOR SHALL COIL AN EXTRA 12 INCHES OF WIRING AT THE BEACONS AND THE CABINET
- ⑨. THE CONTRACTOR SHALL FURNISH A FULLY OPERATIONAL SCHOOL FLASHER COMMUNICATIONS SYSTEM. ADDITIONAL COMMUNICATIONS REPEATER STATIONS AND/OR MASTER RADIOS MAY BE REQUIRED IN ORDER TO ENABLE COMMUNICATIONS FROM THE SCHOOL FLASHER LOCATION BACK TO THE TRAFFIC MANAGEMENT CENTER. A COMMUNICATIONS ANALYSIS SHOULD BE COMPLETED BY CONSOLIDATED TRAFFIC CONTROLS, INC. ((817) 265-3421) TO DETERMINE WHICH ADDITIONAL COMPONENTS ARE REQUIRED.

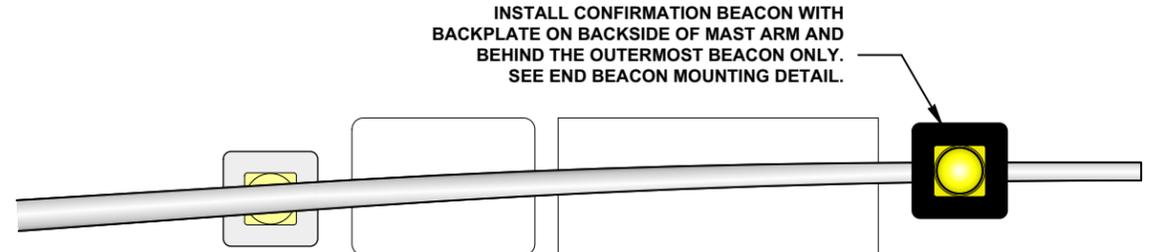
APPROACH FRONT VIEW



END BEACON MOUNTING DETAILS



FRONT VIEW SIGN MOUNTING DETAIL



REAR VIEW CONFIRMATION BEACON DETAIL



CITY OF SAN ANTONIO
TRANSPORTATION AND CAPITAL IMPROVEMENTS
TRAFFIC MANAGEMENT

TRAFFIC SIGNAL STANDARDS

**MAST ARM MOUNTED
SOLAR POWERED SCHOOL
FLASHER ASSEMBLY**

DRWN: MSJ	APVD: DPW	DATE: 10/08/07	TS-MASF-14 (SHEET 1 OF 1)
RVSD: MAB	APVD: DPW	DATE: 04/04/12	
RVSD: MSJ	APVD: TCI	DATE: 09/22/14	