

Plotted on: 9/25/2024

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SHEET NO.	DESCRIPTION
GENERAL	
1	TITLE SHEET
2-3	GENERAL NOTES
4	QUANTITY SUMMARY
TRAFFIC SIGNAL PLANS	
5	WW WHITE RD AT SINCLAIR RD EXISTING CONDITIONS
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39	* COSA LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET
ENVIRONMENTAL STANDARDS	
40	* EPIC

PLANS PREPARED BY:

**PAPE-DAWSON
ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

THE STANDARD SHEETS SPECIFICALLY SHOWN
PRECEDING (*), HAVE BEEN SELECTED BY ME OR
UNDER MY RESPONSIBLE SUPERVISION AS BEING
APPLICABLE TO THIS PROJECT.



Justin Clark
JUSTIN W. CLARK, P.E.
DATE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF
TRANSPORTATION NOVEMBER 1, 2014 AND SPECIFICATION ITEMS
LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS
PROJECT.

SPANISH TRAILS

PLANS OF PROPOSED TRAFFIC SIGNAL AND PAVEMENT MARKINGS

SAN ANTONIO, TEXAS
BEXAR COUNTY

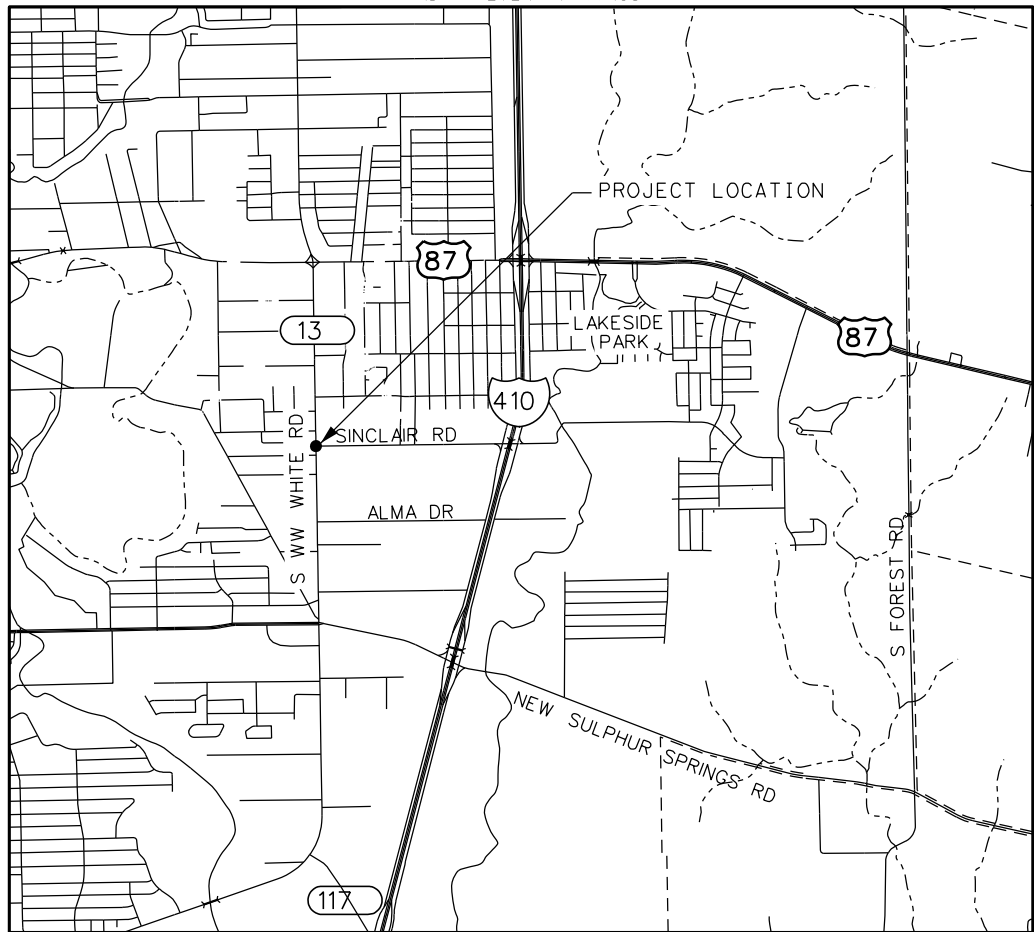
DESIGN SPEED = 45 MPH

TOTAL DISTURBED AREA = 1.90 AC

TOTAL PROJECT LENGTH = 0.05 MILES

LIMITS: INTERSECTION OF S WW WHITE RD AND SINCLAIR RD.

CONSISTING OF: INSTALLATION OF TRAFFIC SIGNAL
AND PAVEMENT MARKINGS



SCALE: N.T.S.

EXCEPTIONS: NONE
EQUATIONS: NONE
RR X-ING'S: NONE

PLANS APPROVED BY:
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT



Chris R. Georges P.E.
CHRIS R. GEORGES, P.E., PTOE

9/25/2024
DATE

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GENERAL NOTES

1.

ALL CONSTRUCTION SHALL CONFORM TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION JUNE 2008, OR LATEST.
2.

NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE PLANS, BUT NOT INCLUDED IN THE BID PROPOSAL. THIS INCIDENTAL WORK WILL BE REQUIRED AND SHALL BE INCLUDED IN THE PAY ITEM TO WHICH IT RELATES.
3.

THE CONTRACTOR SHALL PROVIDE ACCESS FOR THE DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE.
4.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION ANY DAMAGE DONE TO EXISTING FENCES, CONCRETE ISLANDS, STREET PAVING, CURBS, SHRUBS, BUSHES OR DRIVEWAYS. (NO SEPARATE PAY ITEM).
5.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL SIGNS AND BARRICADES ARE PROPERLY INSTALLED AND MAINTAINED. ALL LOCATIONS AND DISTANCES WILL BE DECIDED UPON IN THE FIELD BY THE CONTRACTOR, USING THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". THE CITY'S CONSTRUCTION INSPECTOR AND TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT BARRICADES AND SIGNS. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE CONSTRUCTION INSPECTOR, THE BARRICADES AND SIGNS DO NOT CONFORM TO ESTABLISHED STANDARDS OR ARE INCORRECTLY PLACED OR ARE INSUFFICIENT IN QUANTITY TO PROTECT THE GENERAL PUBLIC, THE CONSTRUCTION INSPECTOR SHALL HAVE THE OPTION TO STOP OPERATIONS UNTIL SUCH TIME AS THE CONDITIONS ARE CORRECTED.
6.

IF THE NEED ARISES, ADDITIONAL BARRICADES AND DIRECTIONAL DEVICES MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.
7.

DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.171 C.P.S. MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
8.

CONTRACTOR SHALL NOTIFY THE CITY INSPECTOR TWENTY FOUR (24) HOURS PRIOR TO BACKFILL OF ANY UTILITY TRENCHES TO SCHEDULE FOR DENSITY TEST AS REQUIRED.
9.

CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES, MARKS, ETC. IF ANY ARE DESTROYED OR REMOVED BY THE CONTRACTOR OR HIS EMPLOYEES, THEY SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
10.

CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO CONSTRUCTION TO DETERMINE THE LOCATION OF EXISTING UTILITIES. CONTRACTOR SHALL NOTIFY THE FOLLOWING AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO EXCAVATION OPERATION:

SAN ANTONIO WATER SYSTEM (SAWS)

233-2010

BEXAR METROPOLITAN WATER DISTRICT (BEXAR MET)

354-6538 /357-5741

COSA DRAINAGE

207-8048

COSA SIGNAL OPERATIONS

207-7720 /207-7765

TEXAS STATE WIDE ONE CALL LOCATOR

1-800-344-8377

- CITY PUBLIC SERVICE ENERGY

- TIME WARNER

- AT&T

- MCI
11.

THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE NOT GUARANTEED, BUT SHALL BE INVESTIGATED AND VERIFIED BY THE CONTRACTOR BEFORE STARTING WORK. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO AND FOR THE MAINTENANCE AND PROTECTION OF THE EXISTING UTILITIES EVEN IF THEY ARE NOT SHOWN ON THE PLANS. LOCATION AND DEPTH OF EXISTING UTILITIES SHOWN HERE ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTHS MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION AND HE SHALL BE RESPONSIBLE FOR PROTECTION OF SAME DURING CONSTRUCTION.
12.

ALL WASTE MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE HIS SOLE REponsibility TO DISPOSE OF THIS MATERIAL OFF THE LIMITS OF THE PROJECT. NO WASTE MATERIAL SHALL BE PLACED IN EXISTING LOWS THAT WILL BLOCK OR ALTER FLOW LIMITS OF EXISTING ARTIFICIAL OR NATURAL DRAINAGE.
13.

THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIAL IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT.
14.

THE CONTRACTOR SHALL MAINTAIN ALL ADJOINING STREETS AND TRAVELED ROUTES FREE FROM SPILLED AND /OR TRACKED CONSTRUCTION MATERIALS AND /OR DEBRIS.
15.

IF THE CONTRACTOR ENCOUNTERS ANY ARCHAEOLOGICAL DEPOSITS DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR MUST STOP EXCAVATION IMMEDIATELY, CONTACT THE CITY INSPECTOR, AND CALL THE CITY HISTORIC PRESERVATION OFFICE AT 207-7306 OR 207-3327 FOR AN ARCHAEOLOGICAL INVESTIGATION. THE CONTRACTOR CANNOT BEGIN EXCAVATION AGAIN WITHOUT WRITTEN PERMISSION FROM THE CITY.

IF MORE THAN THREE (3) DAYS ARE REQUIRED FOR INVESTIGATION (NOT INCLUDING HOLIDAY AND WEEKENDS) AND IF THE CONTRACTOR IS UNABLE TO WORK IN OTHER AREAS, THEN THE CONTRACTOR WILL BE ALLOWED TO NEGOTIATE FOR ADDITIONAL CONSTRUCTION TIME UPON WRITTEN REQUEST WITHIN TEN (10) DAYS AFTER THE FIRST NOTICE TO THE CITY OF ARCHAEOLOGICAL INVESTIGATION FOR EACH EVENT.

IF THE TIME REQUIRED FOR INVESTIGATION IS LESS THAN OR EQUAL TO THREE (3) DAYS FOR EACH EVENT, CONTRACT DURATION WILL NOT BE EXTENDED.
16.

IF SUSPECTED CONTAMINATION IS ENCOUNTERED DURING CONSTRUCTION OPERATIONS, C.O.S.A. SHALL BE NOTIFIED IMMEDIATELY WHEN CONTAMINATED SOILS AND /OR GROUNDWATER ARE ENCOUNTERED AT LOCATIONS NOT IDENTIFIED IN THE PLANS. THE NOTIFICATION SHOULD INCLUDE THE STATION NUMBER, TYPE OF CONTAMINATED MEDIA, EVIDENCE OF CONTAMINATION AND MEASURES TAKEN TO CONTAIN THE CONTAMINATED MEDIA AND PREVENT PUBLIC ACCESS. THE CONTAMINATED SOIL AND /OR GROUNDWATER SHALL NOT BE REMOVED FROM THE LOCATION WITHOUT PRIOR C.O.S.A. APPROVAL.

THE CONTRACTOR MUST STOP THE EXCAVATION IMMEDIATELY AND CONTACT THE C.O.S.A. INSPECTOR. THE CONTRACTOR CANNOT BEGIN EXCAVATION ACTIVITIES WITHOUT WRITTEN PERMISSION FROM THE CITY.
17.

CONTRACTOR IS TO INCLUDE A MAILBOX POST BLOCKOUT FOR VACANT LOTS AND ALL

18.

CONTRACTOR SHALL NOT REMOVE OR ADJUST ANY VIA FACILITIES. THE CONTRACTOR MUST CONTACT VIA FOURTEEN DAYS PRIOR, FOR THE REMOVAL OF BENCHES, STOP POLES OR ANY OTHER VIA FACILITIES THAT MAY BE PRESENT. PLEASE PROVIDE THIRTY DAYS PRIOR NOTICE FOR SHELTER REMOVAL (TELEPHONE NOS: (210) 362-2155 OR (210) 362-2096). THE CONTRACT-OR WILL BE LIABLE FOR ANY DAMAGES TO VIA FACILITIES NOT REMOVED BY VIA. THE CON-TRACTOR IS REQUIRED TO REPLACE ALL FLATWORK REMOVED OR DAMAGED IN THE COURSE OF EXECUTING THE CONTRACT UNLESS OTHERWISE NOTED BY VIA. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING VIA FACILITIES IF ADJACENT TO WORK AREA.

TREE PROTECTION AND PRESERVATION GENERAL NOTES

1.

NO UTILITY OR STREET EXCAVATION WORK SHALL BEGIN IN AREAS WHERE TREE PRESERVATION AND TREATMENT MEASURES HAVE NOT BEEN COMPLETED AND APPROVED.
2.

TREE PROTECTION FENCING SHALL BE REQUIRED. TREE PROTECTION FENCING SHALL BE INSTALLED, MAINTAINED AND REPAIRED BY THE CONTRACTOR DURING SITE CONSTRUCTION. DURING CONSTRUCTION ACTIVITY, AT LEAST A SIX-INCH LAYER OF COARSE MULCH SHALL BE PLACED AND MAINTAINED OVER THE ROOT PROTECTION ZONE (NO SEPARATE PAY ITEM).
3.

THE CONTRACTOR SHALL AVOID CUTTING ROOTS LARGER THAN ONE INCH IN DIAMETER WHEN EXCAVATING NEAR EXISTING TREES. EXCAVATION IN THE VICINITY OF TREES SHALL PROCEED WITH CAUTION. THE CONTRACTOR SHALL CONTACT THE CITY INSPECTOR FOR GUIDANCE.
4.

ROOTS WILL BE CUT WITH A ROCK SAW OR BY HAND, NOT BY AN EXCAVATOR OR OTHER ROAD CONSTRUCTION EQUIPMENT.
5.

ALL CURB AND SIDEWALK WORK SHALL USE ALTERNATIVE CONSTRUCTION METHODS TO MINIMIZE EXTENSIVE ROOT DAMAGE TO TREES (REFER TO DETAILS).
6.

EXPOSED ROOTS SHALL BE COVERED AT THE END OF THE DAY USING TECHNIQUES SUCH AS COVERING WITH SOIL, MULCH, OR WET BURLAP.
7.

NO EQUIPMENT, VEHICLES OR MATERIALS SHALL OPERATE OR BE STORED WITHIN THE ROOT PROTECTION ZONE OF ANY TREE NEAR THE PROJECT. ROOT PROTECTION ZONE IS 1 FOOT OF RADIUS PER INCH OF TREE'S DIAMETER. A 10-INCH DIAMETER TREE WOULD HAVE A 10 FOOT RADIUS ROOT PROTECTION ZONE AROUND THE TREE. ROOTS OR BRANCHES IN CONFLICT WITH THE CONSTRUCTION SHALL BE CUT CLEANLY ACCORDING TO PROPER PRUNING METHODS. OAK WOUNDS SHALL BE PAINTED OVER WITHIN 30 MINUTES TO PREVENT OAK WILT.
8.

SAPLINGS, SHRUBS OR BUSHES TO BE CLEARED FROM THE PROTECTED ROOT ZONE AREA OF A LARGE TREE SHALL BE REMOVED BY HAND AS DESIGNATED BY THE INSPECTOR.
9.

NO WIRES, NAILS OR OTHER MATERIAL MAY BE ATTACHED TO PROTECTED TREES.
10.

TREES, TREE LIMBS, BUSHES AND SHRUBS LOCATED IN THE CITY STREET OR ALLEY RIGHT-OF-WAY OR PERMANENT EASEMENTS WHICH INTERFERE WITH PROPOSED CONSTRUCTION ACTIVITIES SHALL BE PROPERLY PRUNED FOLLOWING THE ANSI A-300 STANDARDS FOR PRUNING. ALL TREE PRUNING SHALL BE COMPLETED BY A CITY OF SAN ANTONIO TREE MAINTENANCE LICENSED CONTRACTOR (ARTICLE 21-171, CITY CODE) ONLY AFTER APPROVAL FROM THE CAPITAL PROJECTS MANAGEMENT THROUGH THE INSPECTOR.
11.

NO EXCESSIVE TREE TRIMMING WILL BE PERMITTED.
12.

ALL DEBRIS GENERATED BY THE PRUNING AND TRIMMING OF THE TREES AND /OR BUSHES SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF PROPERLY (NO SEPARATE PAY ITEM).
13.

TREES MUST BE MAINTAINED IN GOOD HEALTH THROUGHOUT THE CONSTRUCTION PROCESS. MAINTENANCE MAY INCLUDE, BUT NOT LIMITED TO: WATERING THE ROOT PROTECTION ZONE, WASHING FOLIAGE, FERTILIZATION, PRUNING, ADDITIONAL MULCH APPLICATIONS AND OTHER MAINTENANCE AS NEEDED ON THE PROJECT.
14.

ANY TREE REMOVAL SHALL BE APPROVED BY THE CITY ARBORIST. (207-0278)
15.

TREES WHICH ARE DAMAGED OR LOST DUE TO THE CONTRACTOR'S NEGLIGENCE DURING CONSTRUCTION SHALL BE MITIGATED TO THE CITY'S SATISFACTION.
16.

TREE PLANTING FOR MITIGATION OR ENHANCEMENT: ALL PLANTED TREES SHALL BE PRUNING AND OTHER MAINTENANCE AS NEEDED ON THE PROJECT. TREES THAT DIE WITHIN TWELVE (12) MONTHS SHALL BE REPLACED WITH A TREE OF EQUAL SIZE AND SPECIES.

ACCESSIBILITY REQUIREMENTS

1.


THE CONTRACTOR SHALL PROVIDE AND MAINTAIN VEHICULAR AND PEDESTRIAN ACCESS AT ALL TIMES TO LOCAL RESIDENCES AND BUSINESSES.
2.

WHEN THE WORK REQUIRES THE EXCAVATION OF THE STREET AND THE REMOVAL OF THE EXISTING DRIVEWAY APPROACHES AND SIDEWALKS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ALL-WEATHER ACCESS TO THE BUSINESSES AND RESIDENCES. THE TEMPORARY DRIVEWAY APPROACHES SHALL BE CONSTRUCTED WITH FLEXIBLE BASE OR GRAVEL MATERIAL AT NO SEPARATE COST TO THE CITY.
3.

PRIOR TO INITIATING THE CONSTRUCTION OF NEW DRIVEWAY APPROACHES, THE CONTRACTOR SHALL GIVE ADVANCE WARNING IN PERSON, OR IN WRITING, OF AT LEAST 48 HOURS TO EACH RESIDENCE THAT WILL BE IMMEDIATELY AFFECTED, SO THAT ALTERNATE PLANS MAY BE MADE BY THE RESIDENTS.
4.


FOR BUSINESSES WITH MORE THAN ONE DRIVEWAY, AT LEAST ONE DRIVEWAY SHALL REMAIN OPEN WHILE THE OTHER NEW DRIVEWAY APPROACHES ARE CONSTRUCTED. FOR BUSINESSES WITH ONLY ONE DRIVEWAY, THE NEW DRIVEWAY APPROACH SHALL BE CONSTRUCTED IN HALF WIDTHS, UNLESS A

REV. NO. | DATE | DESCRIPTION | BY



PAPE-DAWSON
ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

WW WHITE RD AT SINCLAIR RD

GENERAL NOTES

SHEET 1 OF 2

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
QY	JWC	JWS	12044-07	100%	2

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THE FOLLOWING CHANGES ARE MADE TO THE CITY OF SAN ANTONIO'S
GENERAL NOTES:

TRAFFIC SIGNAL NOTES

- PRIOR TO CONSTRUCTION, THE CITY SHALL APPROVE ALL LOCATIONS FOR POLES, CONTROLLER FOUNDATION AND ELECTRICAL SERVICE PEDESTAL. CONTRACTOR SHALL STAKE LOCATIONS BEFORE CONTACTING GOVERNING AGENCY FOR APPROVAL.
- ALL ELECTRICAL WORK SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE.
- CONTRACTOR SHALL FURNISH AND MAINTAIN ALL TRAFFIC CONTROL DEVICES, LIGHTING, OR WARNING DEVICES REQUIRED TO COMPLETE THE WORK. ALL CONSTRUCTION SIGNS AND TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ALL PERMITS, TESTS, APPROVALS AND ACCEPTANCES REQUIRED TO COMPLETE CONSTRUCTION OF THIS PROJECT.
- THREE (3) COPIES OF EQUIPMENT SUBMITTALS FOR ALL TRAFFIC SIGNAL COMPONENTS SHALL BE SENT TO THE CITY OF SAN ANTONIO.THE ENGINEER AND/OR PROJECT MANAGER SHALL ENSURE THAT MATERIAL COMPLIES WITH THE CITY OF SAN ANTONIO SPECIFICATIONS AND STANDARDS AND THESE PLANS. SUBMITTALS SHALL CONSIST OF THE APPROPRIATE COMBINATION OF CATALOG SHEETS, MATERIAL LISTS, MANUFACTURER'S BROCHURES, TECHNICAL BULLETINS, SPECIFICATIONS, DIAGRAMS, OR PRODUCT SAMPLES NECESSARY TO DESCRIBE A SYSTEM, PRODUCT, OR ITEM. SPECIFIC ITEM NUMBERS AND PRODUCT CODES WILL BE CLEARLY IDENTIFIED WHEN MULTIPLE PRODUCTS ARE LISTED ON THE SAME SHEET.
- ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS PROJECT SHALL CONFORM TO APPLICABLE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION (LATEST EDITION), TEXAS DOT STANDARD SPECIFICATIONS, CITY BUILDING CODE AND REGULATIONS AS WELL AS PROVISIONS APPLICABLE TO THE PROJECT AND OTHER SAFETY CODES AND INSPECTION REQUIREMENTS OF THE FIRE DEPARTMENT.
- MATERIALS FURNISHED BY THE CONTRACTOR SHALL BE NEW, UN- DEPRECIATED STOCK, ALL EQUIPMENT SHALL BE NEW, UNLESS NOTED OTHERWISE ON THE PLANS.
- INSTALL GROUND MOUNT SIGNS, STOPLINES AND PAVEMENT MARKINGS AS SHOWN ON THE PLANS.
- GROUND BOX COVERS SHALL BE POLYMER CONCRETE WITH "TRAFFIC SIGNAL" LEGIBLY IMPRINTED IN 1 INCH LETTERS (MINIMUM HEIGHT).
- SALVAGEABLE MATERIALS EQUIPMENT SHALL BE DETERMINED BY THE CITY INSPECTOR AND DELIVERED TO THE CITY OF SAN ANTONIO TRAFFIC OPERATIONS FACILITY LOCATED AT 223 SOUTH CHERRY, SAN ANTONIO, TX 78203. THE CONTRACTOR SHALL CONTACT THE CITY SERVICES & SUPPLY SUPERINTENDENT, AT (210) 207-7771 SEVEN (7) DAYS PRIOR TO DELIVERY OF THE SALVAGED MATERIAL. THE CONTRACTOR SHALL BECOME THE OWNER AND DISPOSE OF UNSALVAGED MATERIAL IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ORIGINAL CONDITION, OR BETTER, ANY DAMAGE DONE TO EXISTING BUILDINGS, RETAINING WALLS, UTILITIES, FENCES, PAVEMENT, CURBS, TRAFFIC SIGNAL EQUIPMENT, OR DRIVEWAYS (NO SEPARATE PAY ITEM). CONTRACTOR SHALL RESTORE THE CONSTRUCTION AREA TO ORIGINAL CONDITION, OR BETTER, PRIOR TO FINAL INSPECTION.
- FINAL ADJUSTMENT OF TRAFFIC SIGNAL HEADS (VEHICLE AND PEDESTRIAN), AS REQUIRED BY THE ENGINEER, SHALL BE DONE BY THE CONTRACTOR AND SHALL BE SUBSIDIARY TO FURNISHING AND INSTALLING TRAFFIC SIGNAL HEADS OR SECTIONS.
- ALL TRAFFIC SIGNAL SECTIONS SHALL BE MADE OF POLYCARBONATE RESIN AND SHALL BE SUPPLIED BY THE SAME MANUFACTURER.
- ALL VEHICLE AND PEDESTRIAN SIGNAL FACES SHALL BE COVERED SO THAT THE INDICATION(S) CANNOT BE SEEN FROM THE TIME OF INSTALLATION UNTIL PLACED IN OPERATION.
- EXISTING TRAFFIC CONTROLS SHALL REMAIN IN OPERATION UNTIL NEW CONTROLS ARE READY. CONTRACTOR SHALL COORDINATE "TURN-ON" OF THE NEW TRAFFIC SIGNAL WITH THE ENGINEER.
- WHEN NECESSARY TO TURN OFF AN EXISTING SIGNAL, CONTRACTOR SHALL PROVIDE AN OFF-DUTY UNIFORMED POLICE OFFICER TO CONTROL TRAFFIC UNTIL THE TRAFFIC SIGNAL IS BACK IN SATISFACTORY OPERATION.
- FOR EACH CABLE TERMINATING IN THE CONTROLLER CABINET AN EXTRA 10 FEET LENGTH SHALL BE PROVIDED. ALL CABLES SHALL BE CONTINUOUS WITHOUT SPLICES FROM TERMINAL POINT TO TERMINAL POINT OR AS DIRECTED/APPROVED BY THE ENGINEER. THE NUMBER OF CONDUCTORS REQUIRED SHALL BE AS SHOWN ON THE PLANS.
- CONTRACTOR SHALL CONTACT CITY OF SAN ANTONIO INSPECTOR AT (210) 207-4579 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
- CONTRACTOR SHALL CONTACT THE CITY ENGINEER AT (210) 207-4507 AND THE CITY INSPECTOR AT (210) 227-3954 A MINIMUM OF FOURTEEN (14) DAYS PRIOR TO THE TRAFFIC SIGNAL TURN-ON.
- CONTRACTOR SHALL PROVIDE RED-LINE MARK-UPS OF CONSTRUCTION WITHIN SEVEN (7) WORKING DAYS OF PROJECT ACCEPTANCE.
- PRECONSTRUCTION MEETING WITH COSA PERSONNEL WILL BE REQUIRED PRIOR TO CONTRACTOR INITIATING ANY TRAFFIC SIGNAL RELATED WORK.



- UPON COMPLETION OF THE PROJECT, A RECORD DRAWING ON MYLAR WILL BE REQUIRED.
- CONTRACTOR SHALL PROVIDE 3M OPTICOM CERTIFIED TECHNICIAN TO RE-INSTALL OPTICOM EQUIPMENT. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR SET-UP AND INSTALLATION OF OPTICOM EQUIPMENT.
- CONTRACTOR, AT CONTRACTORS EXPENSE, SHALL FIELD LOCATE AND STAKE THE LOCATION OF POLES, PULLBOXES, CABINETS, AND DETECTORS FOR APPROVAL BY THE ENGINEER PRIOR TO CONSTRUCTION. POLE AND PULL BOX LOCATIONS MAY BE MOVED BY THE ENGINEER PRIOR TO CONSTRUCTION TO ACCOMMODATE FIELD CONDITIONS.
- FOR ALL PROPOSED MAST ARM POLE ASSEMBLIES, MOUNTING BRACKET ASSEMBLY OPTION "C" (ASTRO-BRACS) AS SHOWN ON THE STATE STANDARD SHEET(S) "SINGLE MAST ARM ASSEMBLIES (SMA)" SHALL BE SUPPLIED BY THE CONTRACTOR. MOUNTING BRACKET ASSEMBLIES (ASTRO-BRACS) SHALL BE SUBSIDIARY TO ITEM 682 "VEHICLES AND PEDESTRIAN SIGNAL HEADS".
- ALL STEEL POLE ASSEMBLIES AND PEDESTAL POLES FURNISHED BY THE CONTRACTOR SHALL BE FROM THE SAME MANUFACTURER.
- CONTRACTOR SHALL SUPPLY ORNAMENTAL CAPS IN PLACE OF THE MAST ARM TENON ENDS.
- EACH POLE FOUNDATION SHALL HAVE ONE ADDITIONAL 2 INCH CONDUIT STUBBED OUT 2 FEET FROM THE FOUNDATION AND CAPPED. FURNISHING OF THIS CONDUIT SHALL BE SUBSIDIARY TO ITEM 308.
- CONTRACTOR SHALL UNCOVER AND LOCATE ALL MARKED UNDERGROUND FACILITIES PRIOR TO EXCAVATING FOR DRILLED SHAFT FOUNDATIONS.
- OVERHEAD UTILITIES MAY EXIST ON THE PROPERTY. NO ATTEMPT WAS MADE TO MARK THE OVERHEAD UTILITIES SINCE THEY ARE CLEARLY VISIBLE. THE CONTRACTOR SHALL LOCATE ALL OVERHEAD UTILITIES PRIOR TO BEGINNING CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTORS AND OWNERS ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY, TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CONTACT CPS ENERGY AT 978-3500.
- CONTRACTOR SHALL UNCOVER AND LOCATE ALL MARKED UNDERGROUND FACILITIES PRIOR TO EXCAVATION.
- THE CITY MUST ISSUE A WRITTEN AUTHORIZATION TO PROCEED WITH CONSTRUCTION.
- THE CITY SHALL PROVIDE ALL ON-SITE INSPECTION OF CONSTRUCTION AND SHALL BE THE SOLE AUTHORITY TO DETERMINE ADEQUACY OF MATERIALS AND CONSTRUCTION.
- THE LENGTH OF TIME FOR ANY TRAFFIC SIGNAL DE-ACTIVATION AND RE-ACTIVATION FOR THIS PROJECT WILL BE MINIMIZED. DE-ACTIVATION CAN ONLY OCCUR DURING OFF-PEAK TIME PERIODS TO MINIMIZE TRAFFIC DISRUPTIONS. OFF-DUTY POLICE OFFICERS ARE REQUIRED IF TRAFFIC SIGNAL DE-ACTIVATION REQUIRES MORE THAN 20 MINUTES (NO SEPARATE PAY ITEM).
- REMOVE EXISTING ELECTRICAL SERVICES, PEDESTAL POLES, STRAIN POLES, MAST ARM POLE ASSEMBLIES, LUMINAIRES, SIGNAL HEADS, CONTROLLERS, CABLES, AND OTHER ACCESSORIES. REMOVE MATERIALS SO THAT DAMAGE DOES NOT OCCUR. REMOVE AND SALVAGE ALL ITEMS SHOWN ON THE PLANS OR AS DIRECTED.
- REMOVE ALL EXISTING CABLE REGARDLESS OF TYPE OR NUMBER FROM EXISTING CONDUIT. REMOVE EXISTING CONDUIT 24" BELOW GRADE AS IT TURNS UP INTO THE GROUND BOX. COMPLETELY REMOVE THE GROUND BOXES FROM THE PROJECT ENSURING THAT THE CABLE AND CONDUIT HAS BEEN ALREADY REMOVED AND BACKFILL HOLE WITH MATERIAL EQUAL IN COMPOSITION AND DENSITY TO THE SURROUNDING AREA.
- REMOVE ABANDONED CONCRETE FOUNDATIONS TO A POINT 2 FT. BELOW FINAL GRADE. BACKFILL HOLE WITH MATERIAL EQUAL IN COMPOSITION AND DENSITY TO THE SURROUNDING AREA. REPLACE SURFACING MATERIAL WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION.
- CONTRACTOR SHALL ACCEPT OWNERSHIP OF UNSALVAGEABLE MATERIALS AND DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.
- UPON RECEIPT OF THE ELECTRICAL PERMIT, THE CONTRACTOR SHALL FAX A COPY TO THE CITY OF SAN ANTONIO TRAFFIC SIGNAL CONSTRUCTION SECTION AT (210) 207-7769, ATTN: ADRIAN OLGUIN. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO INSPECTOR FOR THE CITY'S RECORDS.
- ALL CONSTRUCTION SHALL CONFORM TO TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES, NOVEMBER 2014.

MISC NOTES

- CONTRACTOR SHALL REMOVE ALL CONFLICTING SIGNS.NO SEPARATE PAY ITEM.
- CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.

VIA NOTES

- THE CONTRACTOR SHALL NOT REMOVE ANY VIA FACILITIES.
- THE CONTRACTOR SHALL CONTACT VIA FOURTEEN DAYS PRIOR, FOR THE REMOVAL OF BENCHES, STOP POLES OR ANY OTHER VIA FACILITIES THAT MAY BE PRESENT.
- THE CONTRACTOR SHALL CONTACT VIA THIRTY DAYS PRIOR TO SHELTER REMOVAL.
- THE CONTRACTOR WILL BE LIABLE FOR ANY DAMAGES TO VIA FACILITIES NOT REMOVED BY VIA.
- THE CONTRACTOR SHALL REPLACE ALL FLATWORK REMOVED OR DAMAGED IN THE COURSE OF EXECUTING THE CONTRACT UNLESS OTHERWISE NOTED BY VIA.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING VIA FACILITIES ADJACENT TO WORK AREA.

REV. NO.	DATE	DESCRIPTION	BY		
<div>PAPE-DAWSON ENGINEERS <small>SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800</small></div>					
<div>CITY OF SAN ANTONIO PUBLIC WORKS DEPARTMENT WW WHITE RD AT SINCLAIR RD</div>					
<div>GENERAL NOTES</div>					
SHEET 2 OF 2					
DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
QY	JWC	JWS	12044-07	100%	3

Plotted on: 9/25/2024

Design Filename: P:\120\44\07\Design\Civil\Traffic\1204407_QTY.dgn

ITEM	308.1	500.1	502.1	502.12	502.13	533.1	533.3	535.1	535.2	535.4
INTERSECTION	DRILL SHAFTS (36 IN)	CONCRETE CURB (TY II)	CONCRETE SIDEWALKS (4'')	CONCRETE SIDEWALK(TXDOT TYPE 3 CURB RAMPS)	CONCRETE SIDEWALK(TXDOT TYPE 6 CURB RAMPS)	ELIM EXT PAV MRK & MRKS (4'')	ELIM EXT PAV MRK & MRKS (24'')	4 INCH WIDE YELLOW LINE	4 INCH WIDE WHITE LINE	8 INCH WIDE WHITE LINE
	LF	LF	SY	SF	SF	LF	LF	LF	LF	LF
WW WHITE AT SINCLAIR	39	44	33	300	281	1806	18	1048	40	100
TOTALS	39	44	33	300	281	1806	18	1048	40	100

ITEM	535.5	535.51	535.8	535.9	537.9	618.1	618.2	618.4	618.5	620.1
INTERSECTION	24 INCH WIDE WHITE LINE	12 INCH WIDE BLACK LINE	RIGHT WHITE ARROW	LEFT WHITE ARROW	REFL PAV MRKR TY II-C-R	CONDUIT (PVC SCHEDULE 40) (2 IN) (TRENCH)	CONDUIT (PVC SCHEDULE 40) (2 IN) (BORE)	CONDUIT (PVC SCHEDULE 40) (3 IN) (TRENCH)	CONDUIT (PVC SCHEDULE 40) (3 IN) (BORE)	ELECTRICAL CONDUCTOR (NO. 8) (BARE)
	LF	LF	EA	EA	EA	LF	LF	LF	LF	LF
WW WHITE AT SINCLAIR	378	620	2	2	28	325	315	445	630	1835
TOTALS	378	620	2	2	28	325	315	445	630	1835


ITEM	620.2	620.3	621.1	624.8	628.1	633.1	655.1	680.1	680.2	682.1
INTERSECTION	ELECTRICAL CONDUCTOR (NO. 6) (BARE)	ELECTRICAL CONDUCTOR (NO. 6) (INSULATED)	3 COND TRAY CABLE #12	GROUND BOX TY D (162922)W/APRON	ELC SRV TY D 120/240 070(NS)AL(E)PS(U)	BATTERY BACKUP SYSTEM (EXTRENAL CABINET)	TYPE 332 CABINET AND FOUNDATION	INSTALL HWY TRF SIG (SYSTEM)	REMOVING TRAFFIC SIGNALS	INSTALL VEHICLE SIGNAL SECTION WITH BACK PLATE (12 INCH) (3 SECTION)
	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA
WW WHITE AT SINCLAIR	10	20	590	5	1	1	1	1	1	3
TOTALS	10	20	590	5	1	1	1	1	1	3

ITEM	682.2	682.3	682.4	684.1	684.12	684.13	686.24	686.248	687.1	688.2
INTERSECTION	INSTALL VEHICLE SIGNAL SECTION WITH BACK PLATE (12 INCH) (4 SECTION)	INSTALL VEHICLE SIGNAL SECTION WITH BACK PLATE (12 INCH) (5 SECTION)	INSTALL PEDESTRIAN SIGNAL HEAD (12 IN) LED (2 IND)	TRAFFIC SIGNAL CABLES (TYPE A) (14 AWG) (CONDUCTOR NO. 9)	TRAFFIC SIGNAL CABLES (TYPE A) (14 AWG) (CONDUCTOR NO. 4)	TRAFFIC SIGNAL CABLES (TYPE A) (14 AWG) (CONDUCTOR NO. 3)	INSTALL TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)(1 ARM 40')(LUM)(ILSN)	INSTALL TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)(1 ARM 48')(LUM)(ILSN)	INSTALL PEDESTAL POLE ASSEMBLY	INSTALL AUDIBLE PED. DETECT. (2 IN TACTILE PUSH BTN AND SIGN)
	EA	EA	EA	LF	LF	LF	EA	EA	EA	EA
WW WHITE AT SINCLAIR	4	1	6	2700	615	775	2	1	6	6
TOTALS	4	1	6	2700	615	775	2	1	6	6

ITEM	688.3	693.6	693.7	696.1	696.14	696.2	6001.1	6185.1	8100.1	8100.2
INTERSECTION	INSTALL PED DETECTOR CONTROLLER UNIT	INSTALL INTERNALLY LIGHTED STREET NAME SIGN (DOUBLE SIDED) (LED) (6 FT)	INSTALL INTERNALLY LIGHTED STREET NAME SIGN (DOUBLE SIDED) (LED) (8 FT)	INSTALL RADAR ADVANCED DETECTION DEVICE	INSTALL RADAR DETECTION DEVICE COMM CABLE	INSTALL RADAR PRESENCE DETECTION DEVICE	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	INSTALL ITS TRAFFIC MONITORING CAMERA ASSEMBLY	INSTALL ITS TRAFFIC MONITORING CAMERA CABLING
	EA	EA	EA	EA	LF	EA	DAY	DAY	EA	LF
WW WHITE AT SINCLAIR	1	2	1	2	1200	3	42	3	1	115
TOTALS	1	2	1	2	1200	3	42	3	1	115

NOT TO SCALE


REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

WW WHITE RD AT SINCLAIR RD

QUANTITIES SUMMARY

SHEET 1 OF 1









DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
QY	JWC	JWS	12044-07	100%	4

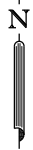
Plotted on: 6/11/2024

Design Filename: P:\120\44\07\Design\Civil\Traffic\1204407_TS1G01.dgn

CONTRACTOR SHALL CONTACT
DIGTESS @ 1-800-DIG-TESS OR
TEXAS-811 FOR UTILITY LOCATION
AT LEAST 72 HOURS PRIOR TO
BEGINNING CONSTRUCTION

LEGEND

	STRAIN POLE
	TIMBER POLE
	LUMINAIRE
	EX. ELEC. SERVICE
	FLASHING VEHICLE SIGNAL
	SPAN WIRE
	GROUND BOX
	GROUND MOUNTED SIGN



ELIM 4" SOLID
YELLOW (27 LF)

ELIM 4" SOLID
WHITE (8 LF)

EXISTING GROUND
BOX BE REMOVED

EXISTING ELECTRIC
SERVICE TO BE REMOVED

ELIM 4" SOLID
WHITE (85 LF)

REMOVE 1 RPM

REMOVE AND SALVAGE ALL
SIGNAL FLASHERS (6)

ELIM 4" SOLID
YELLOW (16 LF)

REMOVE 1 RPM

ELIM 4" SOLID
WHITE (8 LF)

REMOVE AND SALVAGE ALL STRAIN
POLES (4), AND OBLITERATE
FOUNDATIONS 2 FT BELOW GRADE.

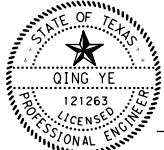
ELIM 24" SOLID
WHITE (18 LF)

ELIM 4" SOLID WHITE (304 LF)

ELIM 4" SOLID
YELLOW (1056 LF)

ELIM 4" SOLID WHITE (302 LF)

DESIGN



QING YE, P.E.

6/11/2024
DATE

APPROVAL



JUSTIN W. CLARK, P.E.

6/11/2024
DATE



- NOTES:
1. ALL DIMENSIONS ARE IN FEET UNLESS SPECIFIED OTHERWISE.
 2. EXISTING PAVEMENT MARKINGS TO BE REMOVED SHALL BE GROUND OFF AND SEALED PRIOR TO APPLICATION OF NEW PAVEMENT MARKINGS.
 3. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
 4. ALL TRAFFIC SIGNAL EQUIPMENT DEEMED SALVAGEABLE BY THE CITY INSPECTOR SHALL BE DELIVERED TO THE CITY OF SAN ANTONIO TRAFFIC OPERATIONS FACILITY LOCATED AT 223 SOUTH CHERRY ST. SAN ANTONIO, TX 78203.
 5. ALL SAWCUTS SHALL BE SUBSIDIARY TO VARIOUS PERTINENT PROJECT BID ITEMS. THERE SHALL BE NO ADDITIONAL PAYMENT FOR SAWCUTS UNLESS SPECIFIED OTHERWISE IN THIS PLAN SET.
 6. ALL UTILITY VALVE AND/OR METER ADJUSTMENTS SHALL BE SUBSIDIARY TO VARIOUS PERTINENT PROJECT BID ITEMS. THERE SHALL BE NO ADDITIONAL PAYMENT FOR UTILITY VALVE AND/OR METER ADJUSTMENTS UNLESS SPECIFIED OTHERWISE IN THIS PLAN SET.
 7. ALL ITEMS NOT SPECIFICALLY CALLED OUT IN THESE PLANS TO BE REMOVED, SHALL REMAIN.

**PAPE-DAWSON
ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

WW WHITE RD AT SINCLAIR RD

**EXISTING SIGNAL
LAYOUT**

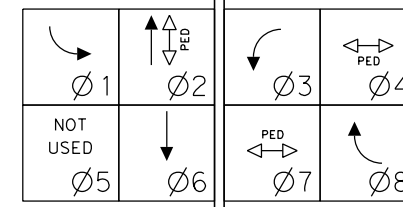
SHEET 1 OF 6

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
QY	JWC	JWS	12044-07	100%	5

CAUTION:
THE CONTRACTOR IS SPECIFICALLY CAUTIONED
THAT UNDERGROUND UTILITIES INCLUDING GAS
ARE KNOWN TO EXIST IN THE VICINITY OF THIS
WORK. CONTRACTOR SHALL CALL FOR LOCATES
PRIOR TO BEGINNING WORK AND SHALL EXERCISE
CAUTION WHEN INSTALLING SIGNAL EQUIPMENT
INCLUDING POLE FOUNDATIONS AND CONDUITS

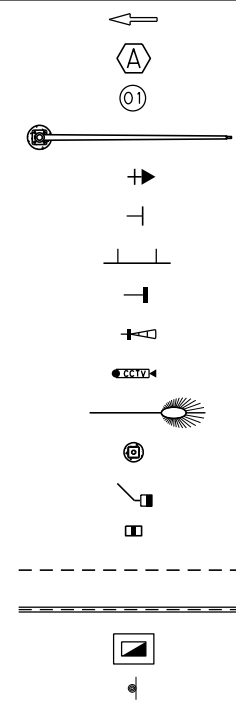
CONTRACTOR SHALL CONTACT
DIGTESS @ 1-800-DIG-TESS OR
TEXAS-811 FOR UTILITY LOCATION
AT LEAST 72 HOURS PRIOR TO
BEGINNING CONSTRUCTION

PHASE DIAGRAM



CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2 & 6, RED 1 & 8

LEGEND



DIRECTION OF TRAVEL
EQUIPMENT ID
CABLE RUN ID
SIGNAL POLE
VEHICLE SIGNAL HEAD
MAST ARM SIGN
ILSN
RPDD
RADD
CCTV
LUMINAIRE
PEDESTAL POLE
PEDESTRIAN SIGNAL
PR. ELEC. SERVICE
CABLE RUN (TRENCH)
CABLE RUN (BORE)
GROUND BOX
GROUND MOUNTED SIGN

Plotted on: 9/26/2024











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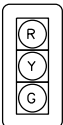
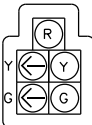
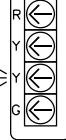
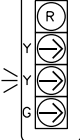

WW WHITE RD
(SPEED LIMIT 45 MPH)

SINCLAIR RD
(SPEED LIMIT 40 MPH)

PROPOSED TRAFFIC SIGNS

SIGN	DESCRIPTION	DESIGNATION
	R10-4b L/R (9" x 12")	PB
	ILSN (SEE DETAIL)	S1
	ILSN (SEE DETAIL)	S2
	ILSN (SEE DETAIL)	S3
	R10-12 (30" x 36")	S4
	R3-5L (30" x 36")	S5
	R3-5R (30" x 36")	S6
	R10-10R (30" x 36")	S7
	R10-17T (30" x 30")	S8
	R10-15R (30" x 30")	S9

TRAFFIC SIGNAL HEADS

12" LED VEHICLE SIGNAL SECTIONS WITH RETROREFLECTIVE BACKPLATES					16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES					
KEY	1	2	3	4	W1 THRU W6
QTY	3	1	2	2	6

NOTES:

1. ALL DIMENSIONS ARE IN FEET UNLESS SPECIFIED OTHERWISE.
2. ALL TRAFFIC SIGNAL EQUIPMENT DEEMED SALVAGEABLE BY THE CITY INSPECTOR SHALL BE DELIVERED TO THE CITY OF SAN ANTONIO TRAFFIC OPERATIONS FACTORY LOCATED AT 223 SOUTH CHERRY ST. SAN ANTONIO, TX 78203.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
4. ALL UTILITY VALVE AND/OR METER ADJUSTMENTS SHALL BE SUBSIDIARY TO VARIOUS PERTINENT PROJECT BID ITEMS. THERE SHALL BE NO ADDITIONAL PAYMENT FOR UTILITY VALVE AND/OR METER ADJUSTMENTS UNLESS SPECIFIED OTHERWISE IN THIS PLAN SET.
5. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
6. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
7. THE CONTRACTOR SHALL BE REQUIRED TO KEEP THE EXISTING TRAFFIC SIGNAL EQUIPMENT OPERATIONAL OR HAVE A POLICE OFFICER PRESENT DURING CONSTRUCTION OF THE PROPOSED TRAFFIC SIGNAL.
8. CONTRACTOR SHALL CONTACT CITY OF SAN ANTONIO (COSA) TRAFFIC SIGNAL INSPECTORS AT 210-207-8462 PRIOR TO INSTALLING RADARS OR ITS CAMERA. RADARS AND ITS CAMERA DEVICES SHALL BE INSTALLED UNDER THE SUPERVISION OF COSA INSPECTORS.

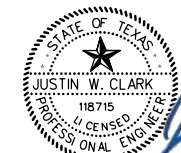
DESIGN




QING YE, P.E.

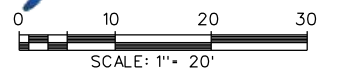
1/26/2024
DATE

APPROVAL



Justin Clark
JUSTIN W. CLARK, P.E.

5/26/2024
DATE



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

WW WHITE RD AT SINCLAIR RD

PROPOSED SIGNAL LAYOUT

SHEET 2 OF 6

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
QY	JWC	JWS	12044-07	100%	6

Plotted on: 8/5/2024

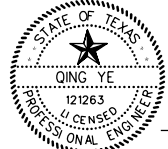
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CONDUIT AND CONDUCTOR SCHEDULE																													
	RUN NUMBER		①	②	②A	③	④		⑤	⑥	⑦	⑧		⑨	⑩		⑪		⑫		⑬	⑭		⑮		⑯	⑰		
	CONDUIT SIZE IN INCHES		3	3	3	3	3	2	2	2	2	3	2	2	3	2	3	2	3	2	2	3	2	3	2	2	3	2	
	NUMBER OF CONDUITS		1	1	1	2	2	1	1	1	1	2	1	1	2	1	2	1	2	1	1	2	1	2	1	1	2	1	
	LENGTH OF RUN (FT)		25	8	20	11	64	64	25	35	31	32	32	10	26	26	102	102	10	10	13	80	80	15	15	15	120	120	
	TRENCH (T) / BORE (B)		T	T	T	T	B	B	T	T	T	T	T	T	T	T	B	B	T	T	T	T	T	T	T	T	B	B	
CABLE	CIRCUIT		NUMBER OF CONDUCTORS																										
*6 XHHW (SOLID)	120 POWER HOT		1																										
	120 POWER COMMON		1																										
*6 BARE (SOLID)	BARE BOND GROUND		1																										
*8 BARE (SOLID)	BARE BOND GROUND			1	2	2	1	1	1	1	2	1	1	2	1	2	1	2	1	1	2	1	2	1	1	2	1		
9 COND. *14 AWG TYPE "A", STRANDED	SIGNALS	Ø	2																										
		Ø	6 + 1			2	2																	2			2		
		Ø	8+3			3	1					2				2		2							1			1	
9 COND. *14 AWG TYPE "A", STRANDED	PED. SIGNALS	POLE C		1	1			1																					
		POLE D		1	1				1																				
		POLE E		1						1																			
		POLE F		1							1		1				1												
		POLE J		1							1						1				1								
		POLE L		1	1															1							1	1	
3 COND. *16 AWG TYPE "A", STRANDED	PED. APS PUSHBUTTONS	POLE C		1	1			1																					
		POLE D		1	1				1																				
		POLE E		1						1																			
		POLE F		1							1		1				1												
		POLE J		1							1									1									
4 COND. *14 AWG TYPE "A", STRANDED	ILSN SIGNS	POLE L		1	1																					1	1		
		POLE G		1									1				1												
		POLE H		1									1					1		1									
		POLE K		1				1																	1			1	
3 COND. *12 AWG TRAY CABLE	LUMINAIRE	POLE G		1									1			1													
		POLE H		1									1					1		1									
		POLE K		1				1																		1		1	
ETHERNET CABLE	CCTV CAMERA	POLE G			1							1			1														
POWER & DATA CABLE	PRESENCE DETECTION	POLE G			1							1			1														
		POLE H			1							1					1		1										
		POLE K			1	1											1		1						1		1		
	ADVANCED DETECTION	POLE G			1							1			1											1			
		POLE K			1	1																				1		1	

POLE & EQUIPMENT INFORMATION				
ID	DESCRIPTION / ATTACHMENTS	NORTHING	EASTING	FND. ELEV
A	PROPOSED CPS ENERGY METER WITH TXDOT TYPE D PEDESTAL SERVICE	N/A	N/A	N/A
B	INSTALL SAN ANTONIO MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY WITH BATTERY BACKUP CABINET AND MODEL 2070 CONTROLLER WITH INTELIGHT MAXTIME SOFTWARE ON COSA BASE-MOUNT FOUNDATION (5' X 9')	N/A	N/A	N/A
C	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON 6 FT DRILLED SHAFT FOUNDATION (24-A), ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4bR SIGN AS ILLUSTRATED.	13690803.6	2158537.7	FLUSH W/ LANDING
D	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON 6 FT DRILLED SHAFT FOUNDATION (24-A), ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4bL SIGN AS ILLUSTRATED.	13690798.5	2158529.5	FLUSH W/ LANDING
E	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON 6 FT DRILLED SHAFT FOUNDATION (24-A), ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4bL SIGN AS ILLUSTRATED.	13690866.9	2158538.0	FLUSH W/ LANDING
F	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON 6 FT DRILLED SHAFT FOUNDATION (24-A), ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4bL SIGN AS ILLUSTRATED.	13690878.5	2158529.0	FLUSH W/ LANDING
G	INSTALL 30 FT SMA ON 13 FT DRILLED SHAFT FOUNDATION (36-A) WITH 40 FT MAST ARM, ONE LUMINAIRE, ONE ILSN, ONE RADD, ONE RPDD, ONE CCTV CAMERA, AND TWO VEHICLE SIGNAL HEADS AS ILLUSTRATED.	13690889.4	2158518.2	LEVEL W/ CROWN OF ROAD
H	INSTALL 30 FT SMA ON 13 FT DRILLED SHAFT FOUNDATION (36-A) WITH 48 FT MAST ARM, ONE LUMINAIRE, ONE ILSN, ONE RPDD, ONE R3-5L SIGN, ONE R3-5R SIGN, ONE R10-10R, ONE R10-17T, ONE R10-15R, AND THREE VEHICLE SIGNAL HEADS AS ILLUSTRATED.	13690882.3	2158438.5	LEVEL W/ CROWN OF ROAD
J	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON 6 FT DRILLED SHAFT FOUNDATION (24-A), ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4bR SIGN AS ILLUSTRATED.	13690878.2	2158436.8	FLUSH W/ LANDING
K	INSTALL 30 FT SMA ON 13 FT DRILLED SHAFT FOUNDATION (36-A) WITH 40 FT MAST ARM, ONE LUMINAIRE, ONE ILSN, ONE RADD, ONE RPDD, ONE R10-12 SIGN, AND THREE VEHICLE SIGNAL HEADS AS ILLUSTRATED.	13690790.8	2158439.0	LEVEL W/ CROWN OF ROAD
L	INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-4bR SIGN AS ILLUSTRATED.	13690798.7	2158437.1	FLUSH W/ LANDING

SIGNS SHALL BE ATTACHED TO POLES AND MAST ARMS AS SHOWN ON PLANS.


DESIGN



QING YE, P.E.

8/5/2024
DATE

APPROVAL




JUSTIN W. CLARK, P.E.


8/5/2024
DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

WW WHITE RD AT SINCLAIR RD

CONDUIT AND
CONDUCTOR SCHEDULE










SHEET 3 OF 6

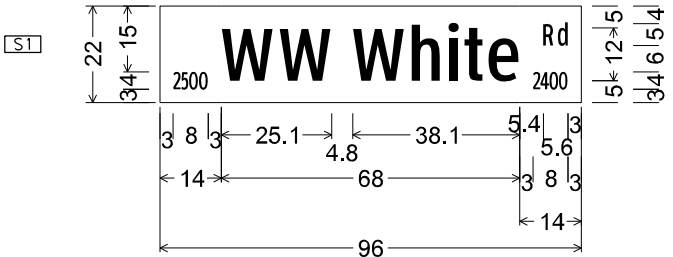
DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
QY	JWC	JWS	12044-07	100%	7

Plotted on: 8/5/2024

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ELECTRICAL SERVICE DATA											
Electric Service ID	Electrical Service Description (see ED (5) - 14)	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole / Amp	Two - Pole Contactor Amps	Panelbd/ Load center. Amp Rating	Circuit No.	Branch Ckt. Bkr. Pole / Amps	Branch Circuit Amps	KVA Load
TL-1	ELEC SERV TY D (120/240)070(NS)AL(E)PS(U)	3"	3/*6	N/A	2P/70	30	70	A (Signal) B (Lum) C (ILSN)	1P/50 1P/15 1P/15	40 5 8	6.4

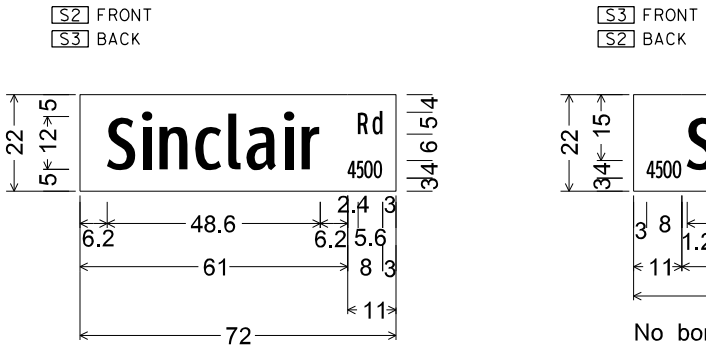
POLE SCHEDULE												
	POLE											
	POLE TYPE	PED	PED	PED	PED	SMA	SMA	PED	SMA	PED		
	POLE HEIGHT (FT)	10	10	10	10	30	30	10	30	10		
	MAST ARM LENGTH (FT)	N/A	N/A	N/A	N/A	40	48	N/A	40	N/A		
	LUMINAIRE (YES/NO)	N/A	N/A	N/A	N/A	YES	YES	N/A	YES	N/A		
	ILSN ARM LENGTH (FT)	N/A	N/A	N/A	N/A	6	8	N/A	6	N/A		
	FOUNDATION TYPE	24-A	24-A	24-A	24-A	36-A	36-A	24-A	36-A	24-A		
	FOUNDATION DEPTH (FT)	6	6	6	6	13	13	6	13	6		
CABLE	CIRCUIT	NUMBER OF CONDUCTORS										
•8 BARE (SOLID)	BARE BOND GROUND	1	1	1	1	1	1	1	1	1	1	
9 COND. •14 AWG TYPE "A", STRANDED	SIGNALS	Ø	2				2					
		Ø	6 + 1							2		
		Ø	8+3					3		1		
9 COND. •14 AWG TYPE "A", STRANDED	PED. SIGNALS	POLE C	1									
		POLE D		1								
		POLE E			1							
		POLE F				1						
		POLE J							1			
		POLE L										1
3 COND. •16 AWG TYPE "A", STRANDED	PED. APS PUSHBUTTONS	POLE C	1									
		POLE D		1								
		POLE E			1							
		POLE F				1						
		POLE J							1			
		POLE L										1
4 COND. •14 AWG TYPE "A", STRANDED	ILSN SIGNS	POLE G				1						
		POLE H					1					
		POLE K								1		
3 COND. •12 AWG TRAY CABLE	LUMINAIRE	POLE G				1						
		POLE H					1					
ETHERNET CABLE	CCTV CAMERA	POLE G				1						
POWER & DATA CABLE	PRESENCE DETECTION	POLE G				1						
		POLE H					1					
		POLE K								1		
	ADVANCED DETECTION	POLE G				1						
		POLE K								1		



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"2500" White, ClearviewHwy-1-W specified length;

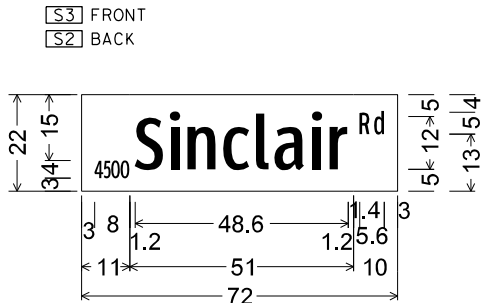
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"WW White", ClearviewHwy-2-W specified length;

No border, White on Blue;
"Rd" White, ClearviewHwy-1-W;
"2400" White, ClearviewHwy-1-W specified length;



No border, White on Blue;
"Sinclair", ClearviewHwy-2-W 56% spacing;

No border, White on Blue;
"Rd" White, ClearviewHwy-1-W;
"4500" White, ClearviewHwy-1-W specified length;



No border, White on Blue;
"4500" White, ClearviewHwy-1-W specified length;

No border, White on Blue;
"Sinclair", ClearviewHwy-2-W 56% spacing;

No border, White on Blue;
"Rd" White, ClearviewHwy-1-W;
" " White, ClearviewHwy-1-W specified length;


DESIGN

STATE OF TEXAS

121263

QING YE

PROFESSIONAL ENGINEER



QING YE, P.E.

8/5/2024

DATE


APPROVAL

STATE OF TEXAS

118715

JUSTIN W. CLARK

PROFESSIONAL ENGINEER




JUSTIN W. CLARK, P.E.

8/5/2024


DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

WW WHITE RD AT SINCLAIR RD

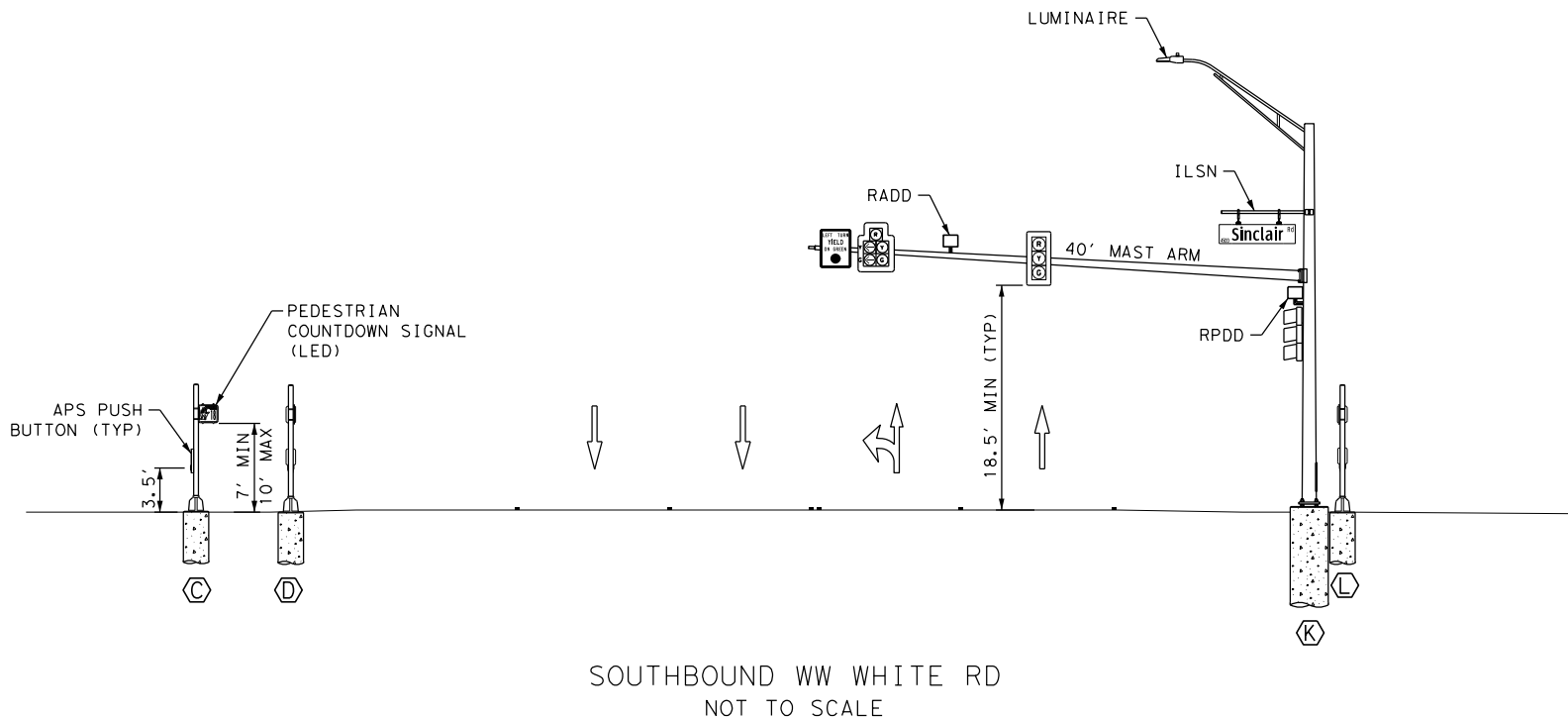
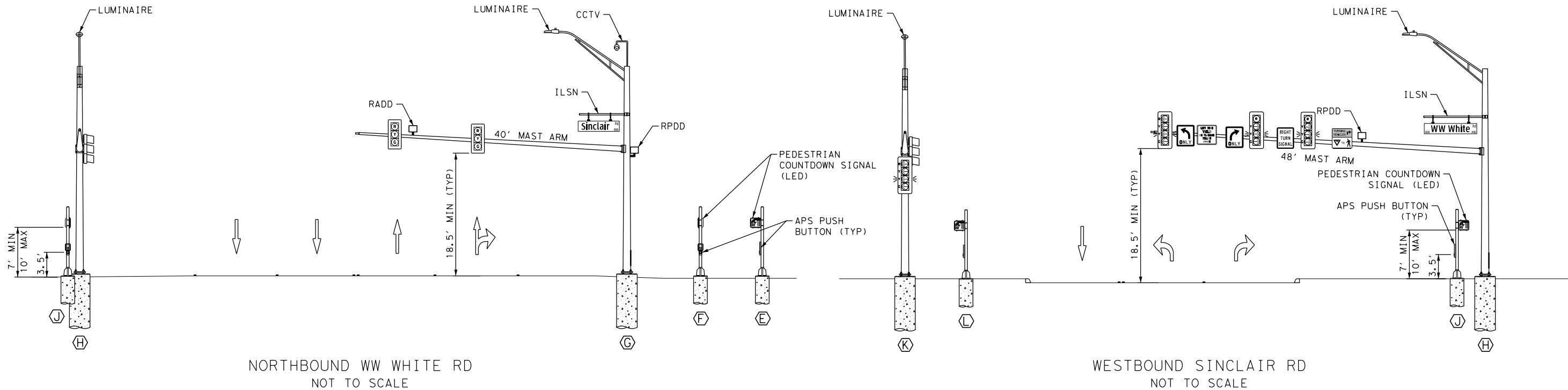
CONDUIT AND CONDUCTOR SCHEDULE

SHEET 4 OF 6

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
QY	JWC	JWS	12044-07	100%	8

Plotted on: 8/5/2024

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DESIGN



Qing Ye

QING YE, P.E.

8/5/2024
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APPROVAL



Justin W. Clark

JUSTIN W. CLARK, P.E.

8/5/2024
DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

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ENGINEERS**

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WW WHITE RD AT SINCLAIR RD

ELEVATION VIEWS

SHEET 5 OF 6

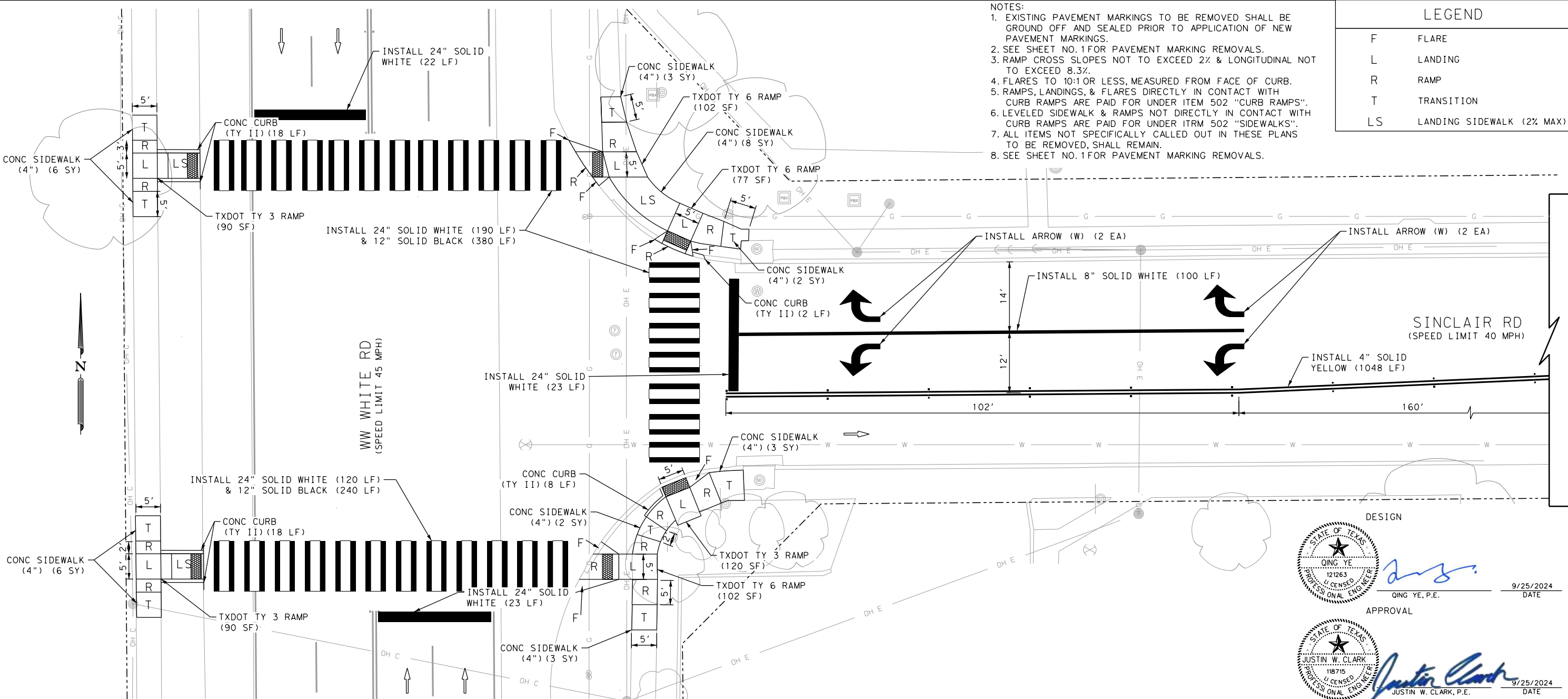
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QY	JWC	JWS	12044-07	100%	9

Plotted on: 9/25/2024

Design File name: P:\20\44\07\Design\Civil\Traffic\1204407-TS1605.dgn

- NOTES:
- EXISTING PAVEMENT MARKINGS TO BE REMOVED SHALL BE GROUND OFF AND SEALED PRIOR TO APPLICATION OF NEW PAVEMENT MARKINGS.
 - SEE SHEET NO.1 FOR PAVEMENT MARKING REMOVALS.
 - RAMP CROSS SLOPES NOT TO EXCEED 2% & LONGITUDINAL NOT TO EXCEED 8.3%.
 - FLARES TO 10:1 OR LESS, MEASURED FROM FACE OF CURB.
 - RAMPS, LANDINGS, & FLARES DIRECTLY IN CONTACT WITH CURB RAMPS ARE PAID FOR UNDER ITEM 502 "CURB RAMPS".
 - LEVELLED SIDEWALK & RAMPS NOT DIRECTLY IN CONTACT WITH CURB RAMPS ARE PAID FOR UNDER ITRM 502 "SIDEWALKS".
 - ALL ITEMS NOT SPECIFICALLY CALLED OUT IN THESE PLANS TO BE REMOVED, SHALL REMAIN.
 - SEE SHEET NO.1 FOR PAVEMENT MARKING REMOVALS.

LEGEND	
F	FLARE
L	LANDING
R	RAMP
T	TRANSITION
LS	LANDING SIDEWALK (2% MAX)



DESIGN

STATE OF TEXAS
121263
QING YE
PROFESSIONAL ENGINEER

QING YE, P.E.

9/25/2024
DATE

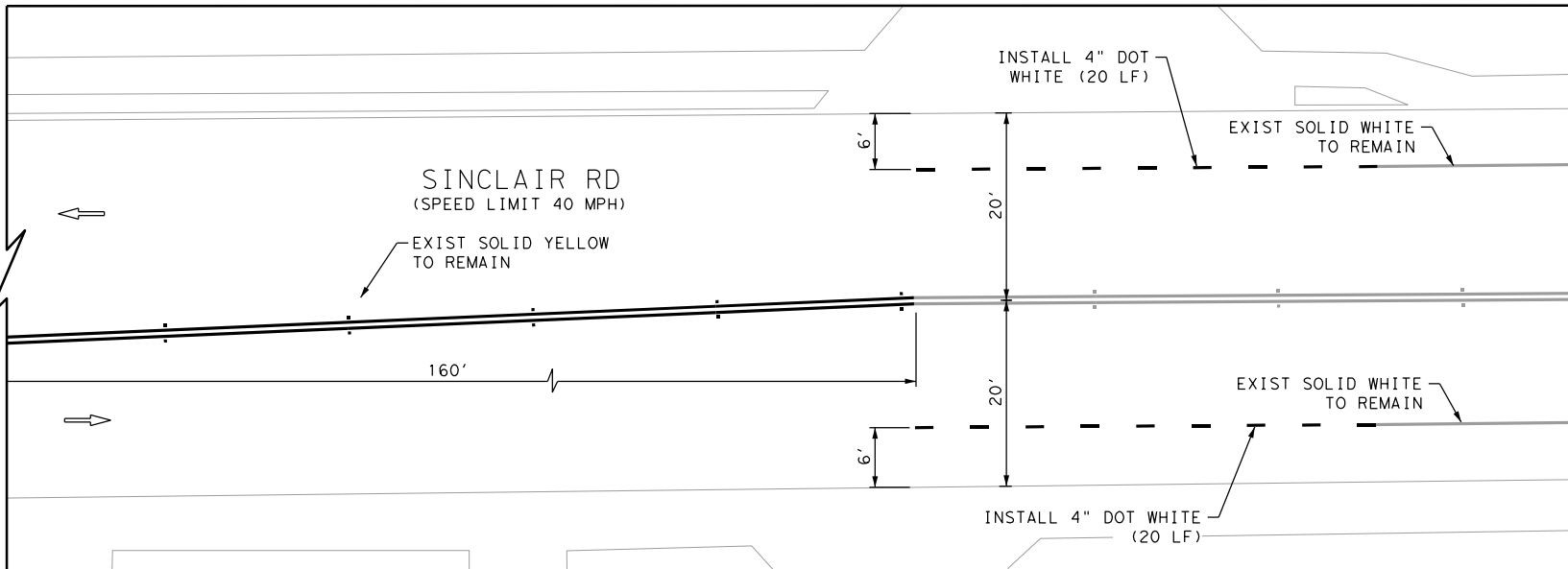
APPROVAL

STATE OF TEXAS
118715
JUSTIN W. CLARK
PROFESSIONAL ENGINEER

JUSTIN W. CLARK, P.E.

9/25/2024
DATE

0 10 20 30
SCALE: 1" = 20'



REV. NO. DATE DESCRIPTION BY

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

WW WHITE RD AT SINCLAIR RD

PROPOSED PAVEMENT MARKINGS AND CURB RAMP LAYOUT

SHEET 6 OF 6

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
QY	JWC	JWS	12044-07	100%	10

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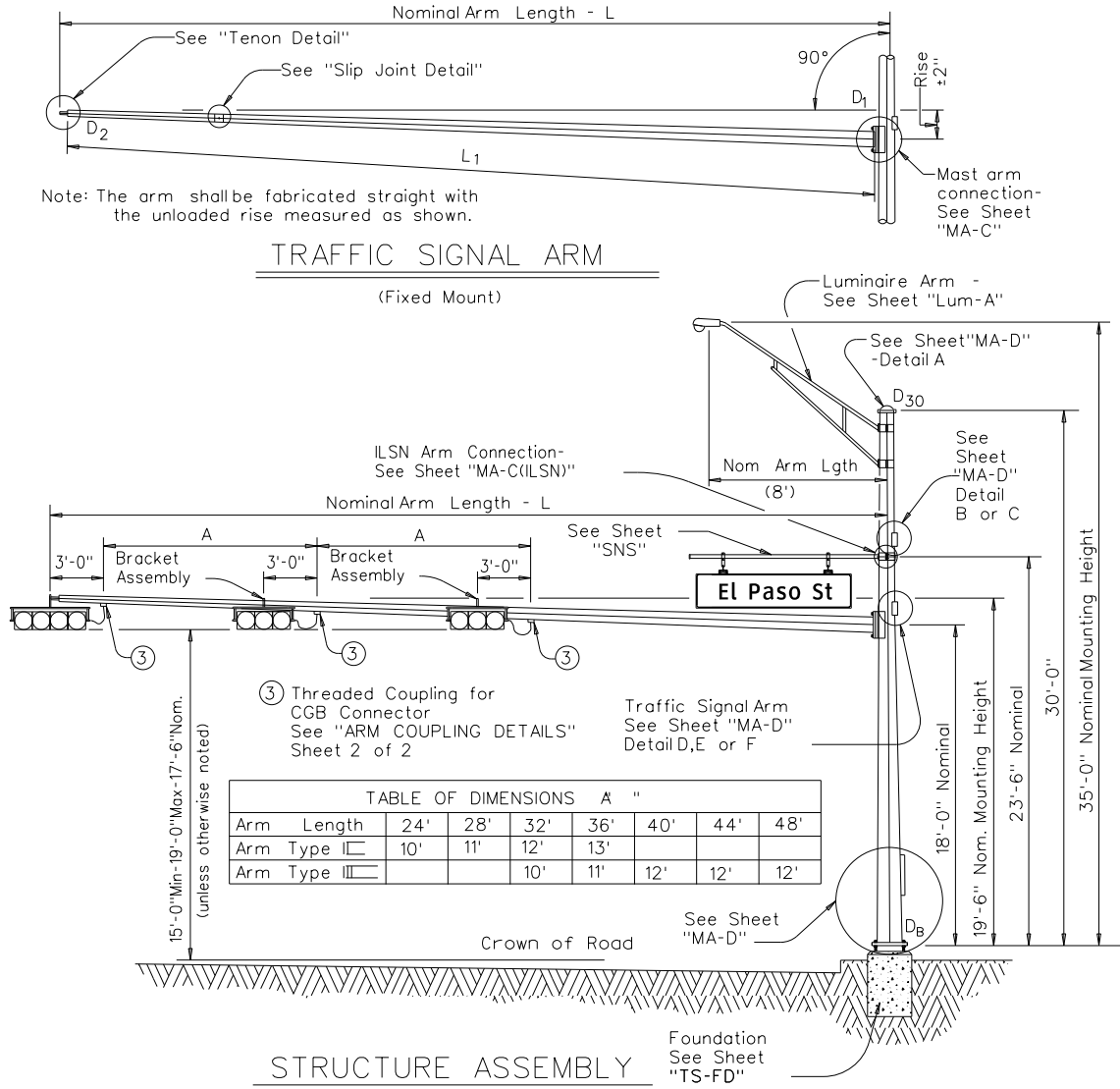
DATE: 9/25/2024
FILE: P:\120\44\07\Design\Civil\Standards\Traffic Signals\smo-80.dgn

Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D _B	D ₁₉	D ₂₄	D ₃₀	① thk	D _B	D ₁₉	D ₂₄	D ₃₀	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L ₁	D ₁	D ₂	① thk	Rise	L ₁	D ₁	② D ₂	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

D_B = Pole Base O.D.
D₁₉ = Pole Top O.D. with no Luminaire and no ILSN
D₂₄ = Pole Top O.D. with ILSN w/out Luminaire
D₃₀ = Pole Top O.D. with Luminaire
D₁ = Arm Base O.D.
D₂ = Arm End O.D.
L₁ = Shaft Length
L = Nominal Arm Length

- ① Thickness shown are minimums, thicker materials may be used.
② D₂ may be increased by up to 1" for polygonal arms.



SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
	ft	Designation	Quantity	Designation	Quantity	Designation
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	
32	32L-80		32S-80		32-80	
36	36L-80		36S-80		36-80	
40	40L-80	2	40S-80		40-80	
44	44L-80		44S-80		44-80	
48	48L-80	1	48S-80		48-80	

Traffic Signal Arms (1 per Pole)

Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	2
44					44III-80	
48					48III-80	1

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	3


ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	2
9' Arm	1

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity	Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD". Templates may be removed for shipment.
1 1/2"	3'-4"		
1 3/4"	3'-10"	3	

SHEET 1 OF 2

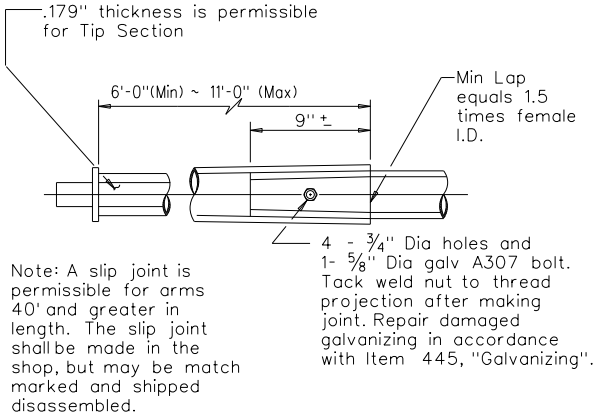
 Texas Department of Transportation
Traffic Operations Division
**TRAFFIC SIGNAL
SUPPORT STRUCTURES**
SINGLE MAST ARM ASSEMBLY
(80 MPH WIND ZONE)
SMA-80(1)-12

© TxDOT August 1995		DN: MS		CK: JSY	DW: MMF	CK: JSY
5-96 11-99 1-12	REVISIONS		CONT	SECT	JOB	HIGHWAY
			-	-	-	-
			DIST	COUNTY		SHEET NO.
			SAT	BEXAR		11

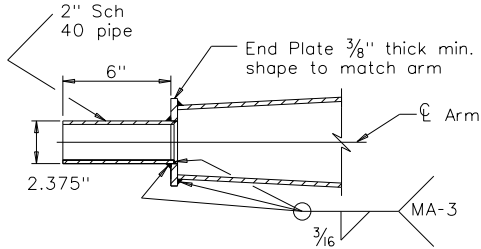
122A

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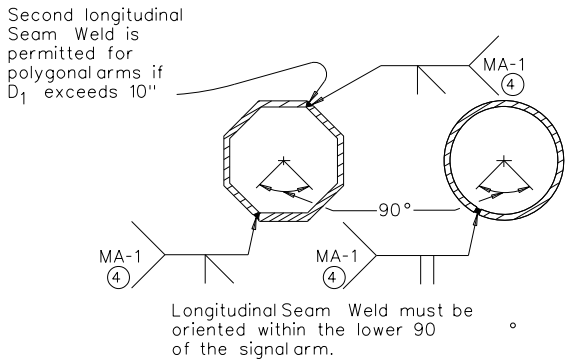
SLIP JOINT DETAIL



TENON DETAIL

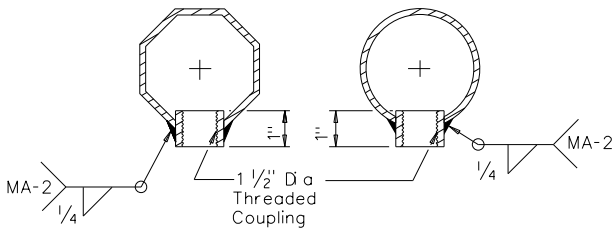
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 1/2" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

④ 60% Min. penetration
100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

VIBRATION WARNING

Most Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backplates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

SHEET 2 OF 2



TRAFFIC SIGNAL SUPPORT STRUCTURES SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

5-96 1-12	© TxDOT August 1995		DN: MS	CK: JSY	DW: MMF	CK: JSY
	REVISIONS		CONT	SECT	JOB	HIGHWAY
	-	-	-	-	-	-
	DIST	COUNTY		SHEET NO.		
SAT		BEXAR		12		

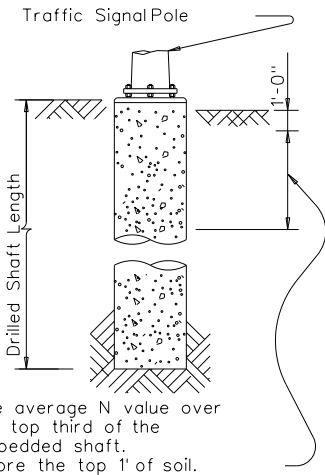
122B

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FOUNDATION DESIGN TABLE													
FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④ ⑤ ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	F _y (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #8	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

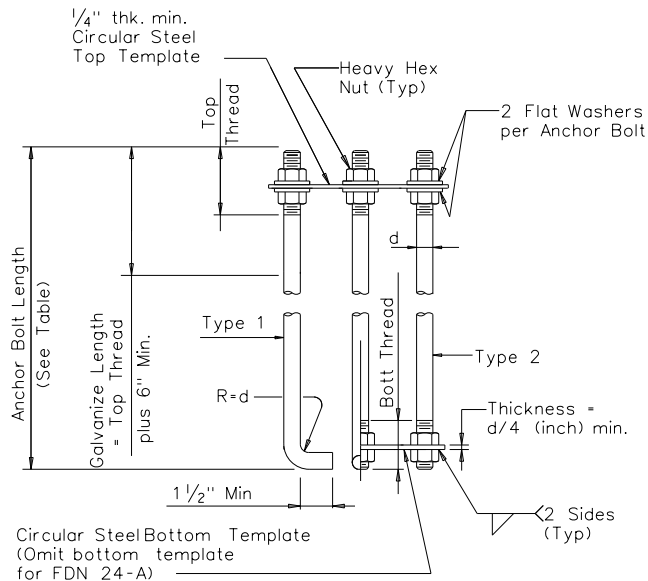
FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)					
		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'			
			36' X 36'		
			40' X 36'		
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'		
				32' X 32'	
				36' X 36'	



ANCHOR BOLT & TEMPLATE SIZES						
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R ₂	R ₁
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1½"	3'-4"	6"	4"	17"	10"	7"
1¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

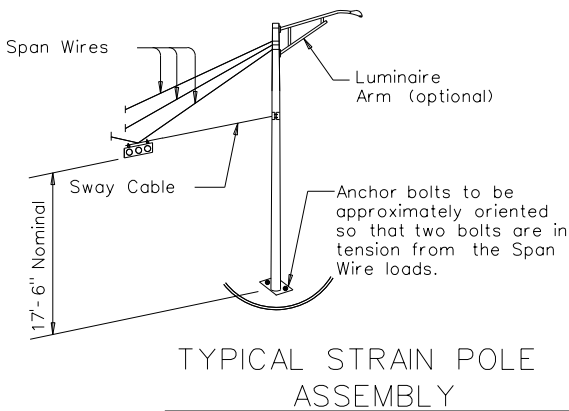
⑦ Min dimensions given, longer bolts are acceptable.

- EXAMPLE:
- For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
 - For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.

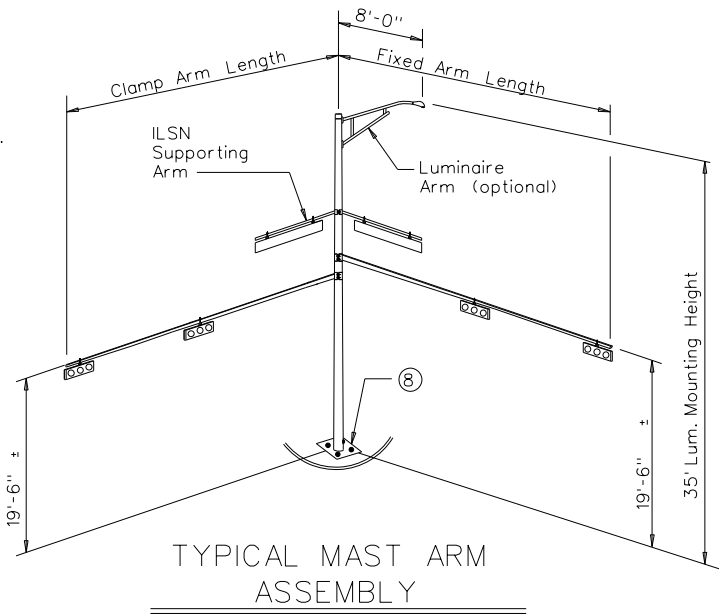


HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)
ANCHOR BOLT ASSEMBLY

⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



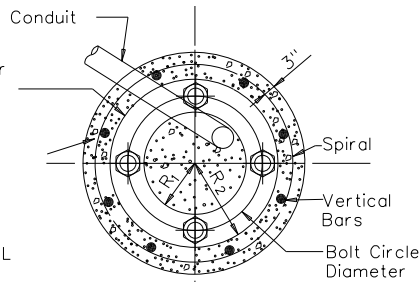
TYPICAL STRAIN POLE ASSEMBLY



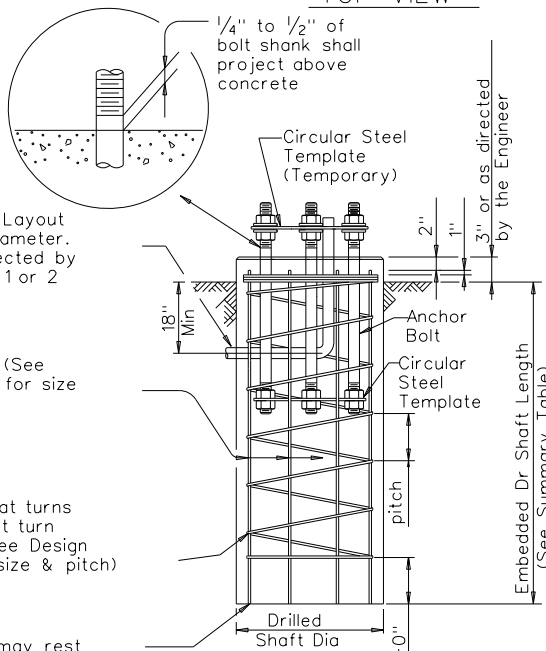
TYPICAL MAST ARM ASSEMBLY

Steel Template with holes ⅛" greater than bolt diameter

Bond anchor bolts to rebar cage, two locations using #3 bar or #6 copper jumper. Mechanical connectors shall be UL Listed for concrete encasement.



TOP VIEW



ELEVATION

FOUNDATION DETAILS

Vertical bars may rest on bottom of drilled hole if materials firm enough to do so when concrete is placed.

NOTES:

- Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
- Foundation Design Loads are the allowable moments and shears at the base of the structure.
- Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.
- Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
- If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
- Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (FEET) ⑥				
				24-A	30-A	36-A	36-B	42-A
POLE C	10	24-A	1	6				
POLE D	10	24-A	1	6				
POLE E	10	24-A	1	6				
POLE F	10	24-A	1	6				
POLE G	10	36-A	1		13			
POLE H	10	36-A	1		13			
POLE J	10	24-A	1	6				
POLE K	10	36-A	1		13			
POLE L	10	24-A	1	6				
TOTAL DRILLED SHAFT LENGTHS				36*	39			

* = 24-A PED POLE FOUNDATIONS ARE SUBSIDIARY TO ITEM 687.1.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

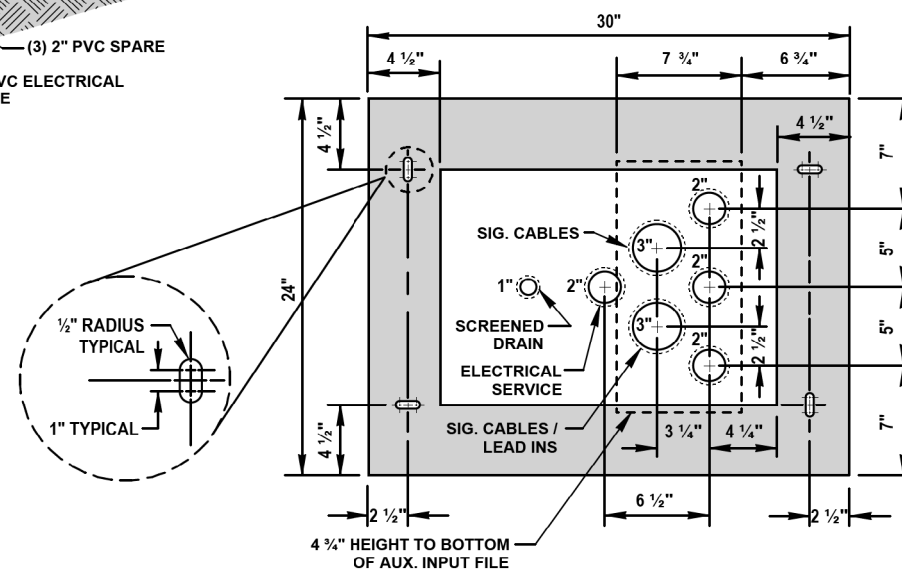
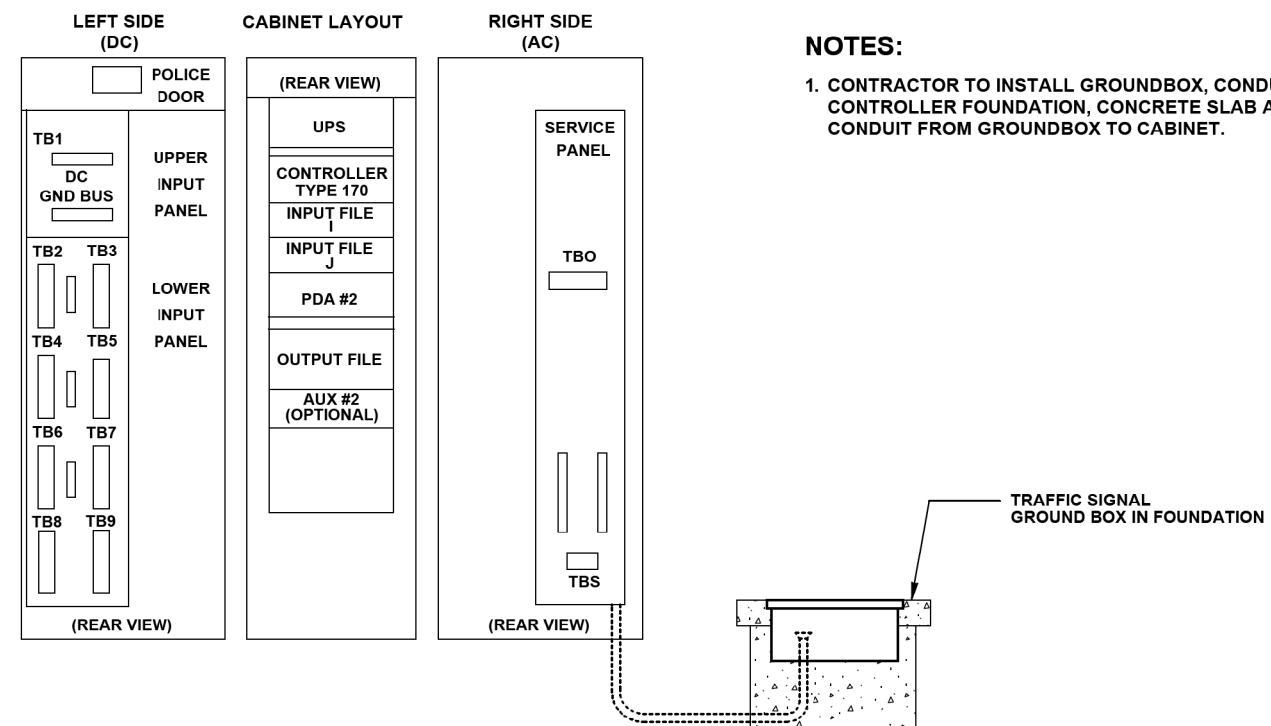
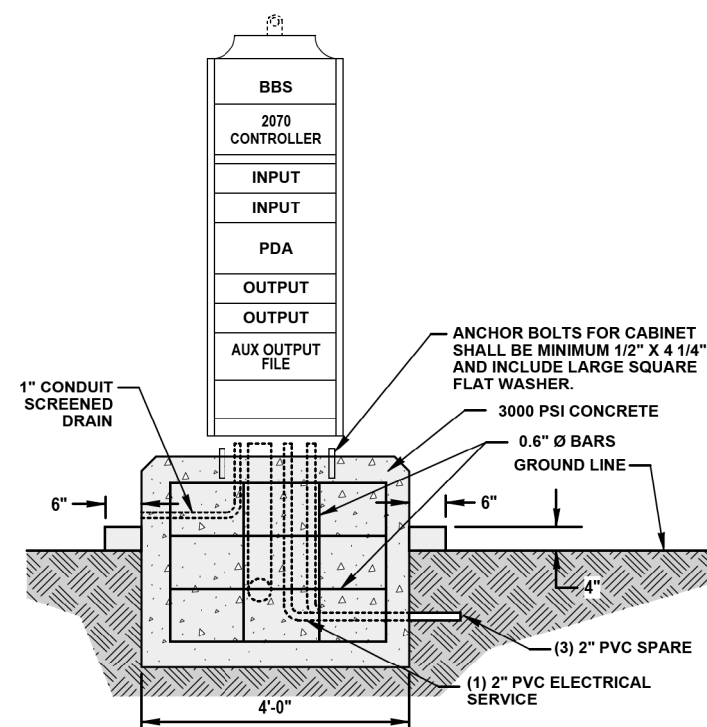
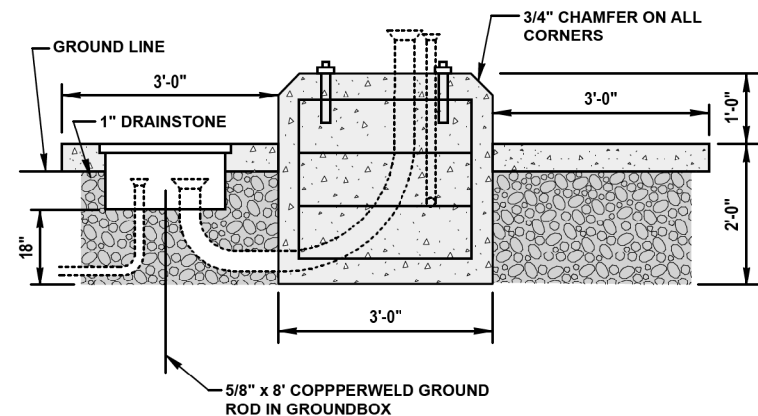
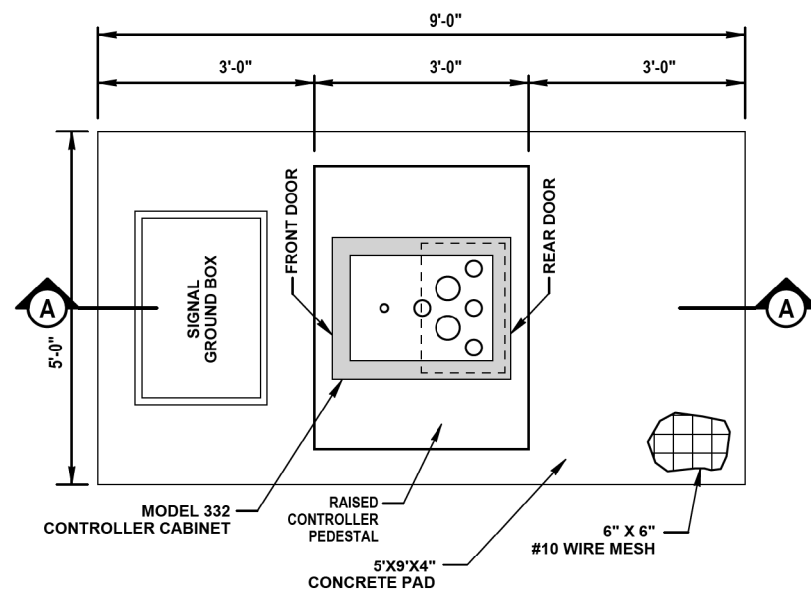
Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".



TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

© TxDOT August 1995	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-96 11-99 1-12	REVISIONS			
	CONT	SECT	JOB	HIGHWAY
	-	-	-	-
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		13



NOTES:

1. CONTRACTOR TO INSTALL GROUNDBOX, CONDUIT, CONTROLLER FOUNDATION, CONCRETE SLAB AND CONDUIT FROM GROUNDBOX TO CABINET.

MARCH 2017

CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS DEPARTMENT

TRAFFIC STANDARDS

TYPE 332 CABINET FOUNDATION

SHEET 1 OF 1

100% SUBMITTAL	PROJECT NO.: 12044-07	DATE: 9/25/2024
DRWN. BY: PD	DSGN. BY: Pape-Dawson	CHKD. BY: MAB
		SHEET NO.: 14

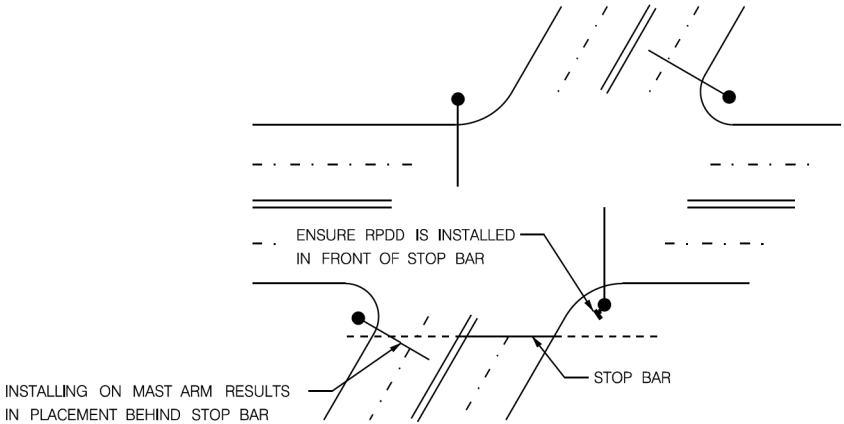
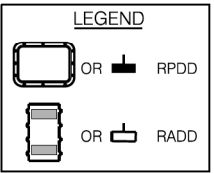
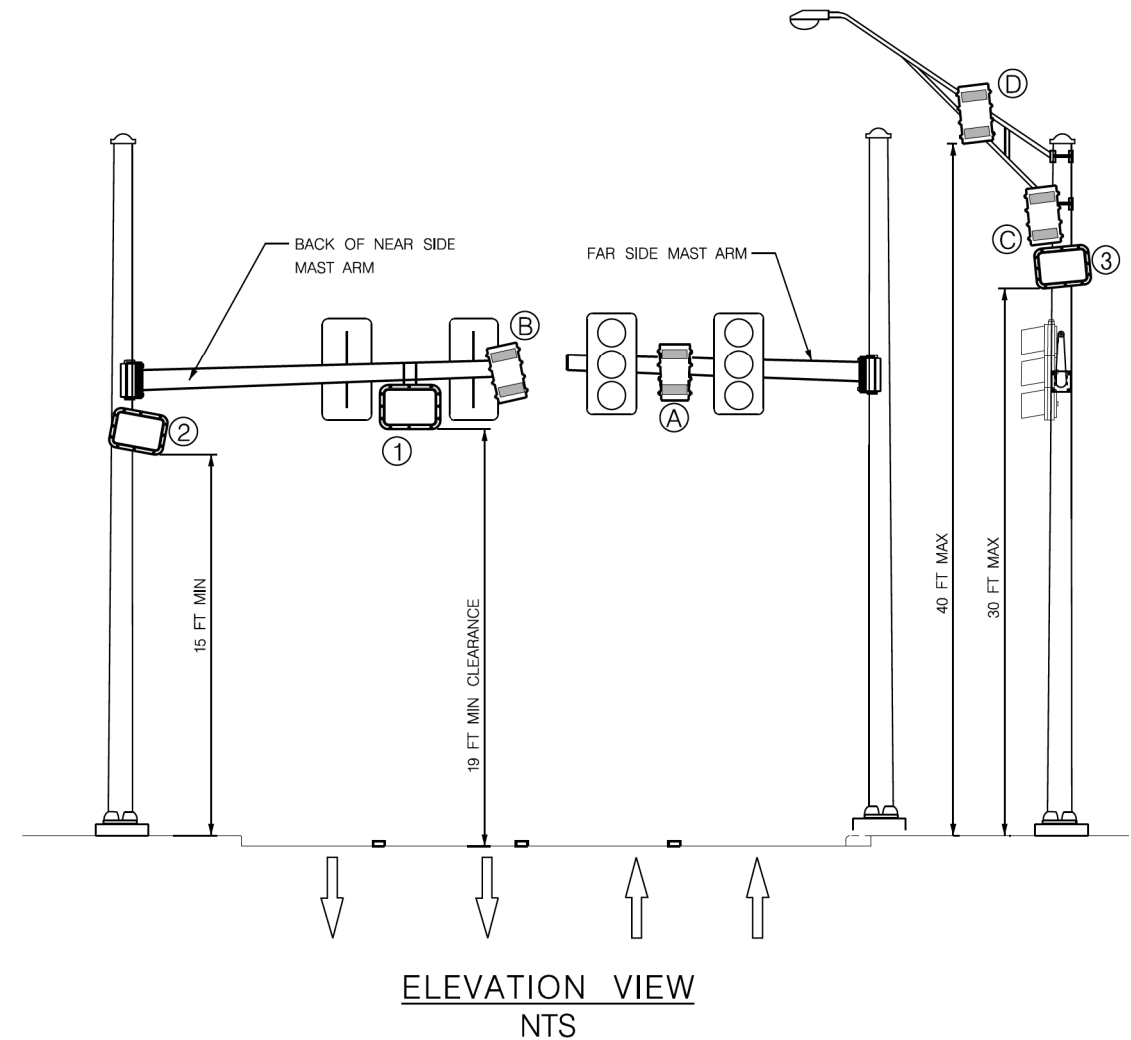
MOUNTING LOCATIONS

PRESENCE (RPDD)

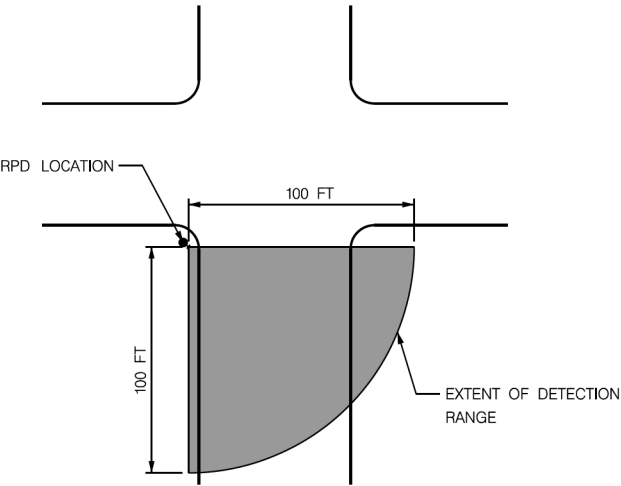
- ① PREFERRED PLACEMENT FOR MAST ARMS. MOUNT ON AND BELOW MAST ARM ON NEAR SIDE OF STREET.
- ② PREFERRED PLACEMENT FOR TIMBER POLE OR STRAIN POLE INSTALLATIONS. MOUNT AS HIGH AS POSSIBLE TO A MAXIMUM OF 30 FT ON TIMBER OR SPAN WIRE POLES. ON MAST ARM POLES, MOUNT BELOW CONNECTION OF MAST ARM TO A MINIMUM 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)

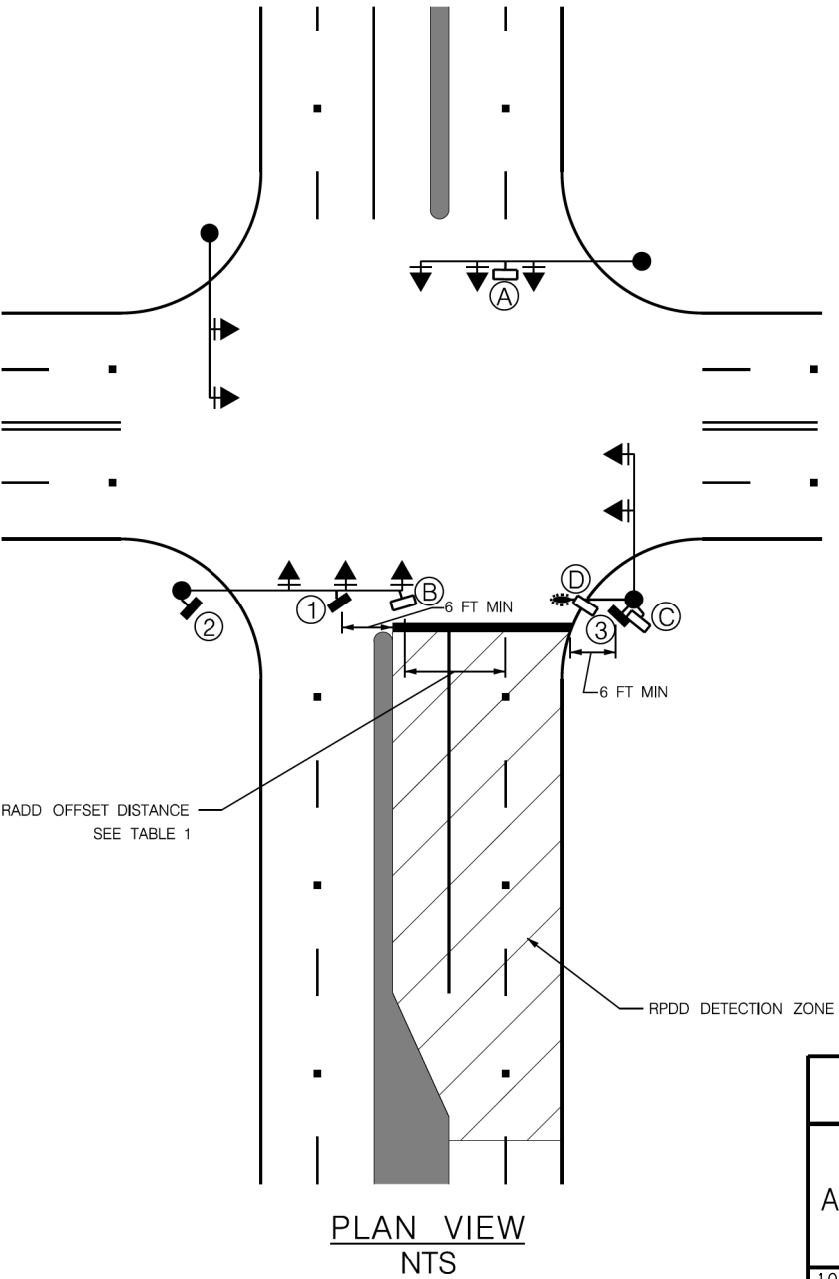
- Ⓐ PREFERRED PLACEMENT FOR MAST ARMS. ALIGN RADD WITH CENTER OF TRAVEL LANES.
- Ⓑ ALTERNATE PLACEMENT FOR MAST ARMS. MOUNT ON BACK SIDE OF OPPOSING MAST ARM.
- Ⓒ TIMBER OR STRAIN POLE PLACEMENT. MOUNT ON NEAR SIDE POLE.
- Ⓓ ALTERNATE TIMBER OR STRAIN POLE PLACEMENT. MOUNT LUMINAIRE ARM ON NEAR SIDE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



SKEWED INTERSECTION RPDD PLACEMENT
NTS



TYPICAL RPDD DETECTION RANGE
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

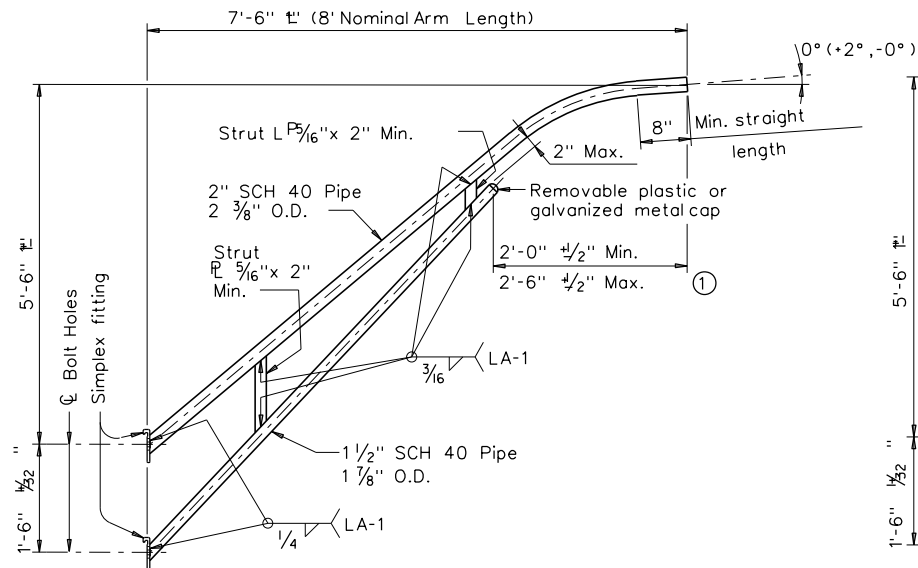
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

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

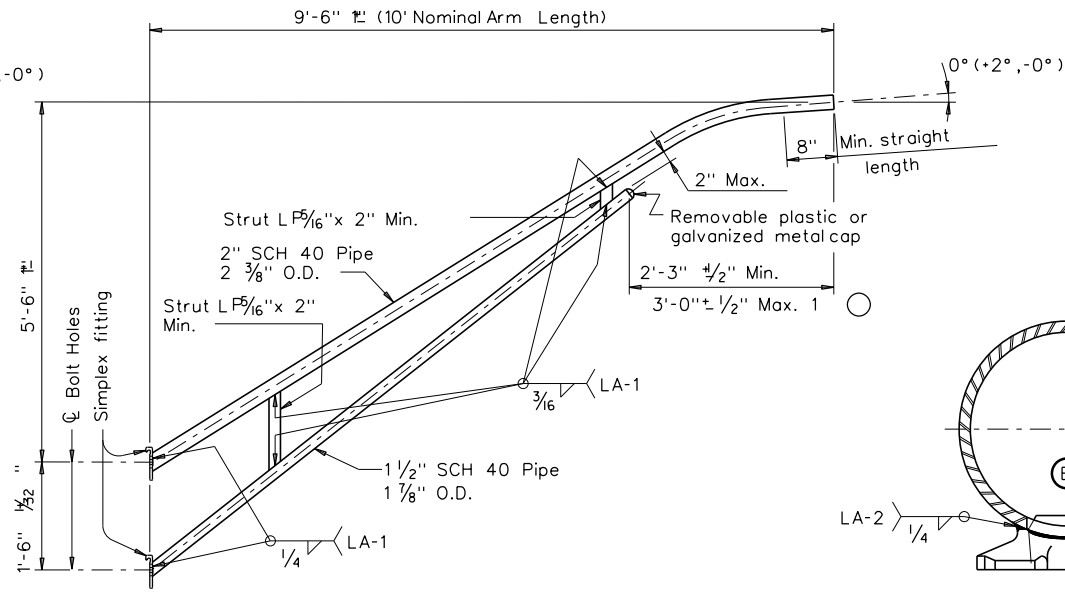
100% SUBMITTAL	PROJECT NO.: 12044-07	DATE: 9/25/2024
DRWN. BY: DNM	DSGN. BY: DNM	CHKD. BY: GDG
		SHEET NO.: 15

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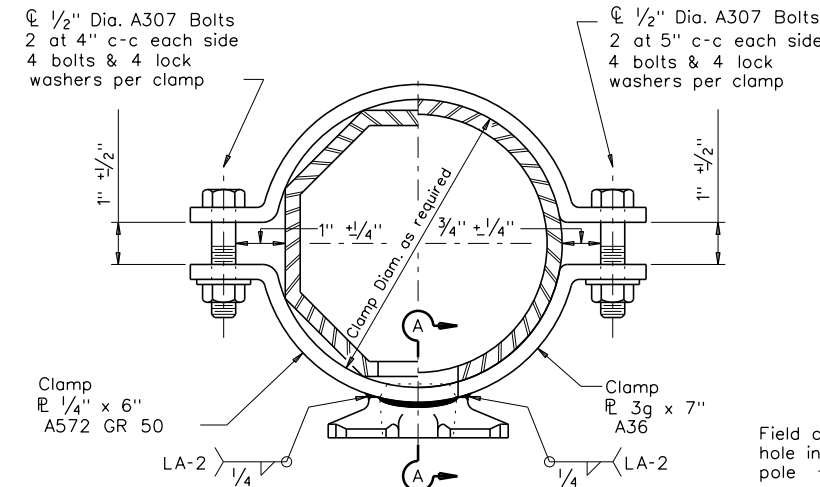
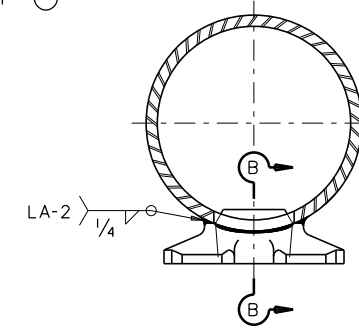


8-FOOT LUMINAIRE ARM

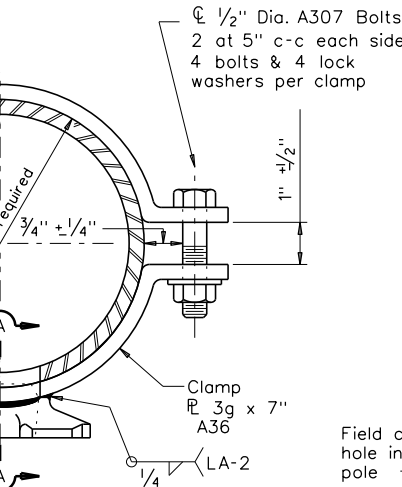


10-FOOT LUMINAIRE ARM

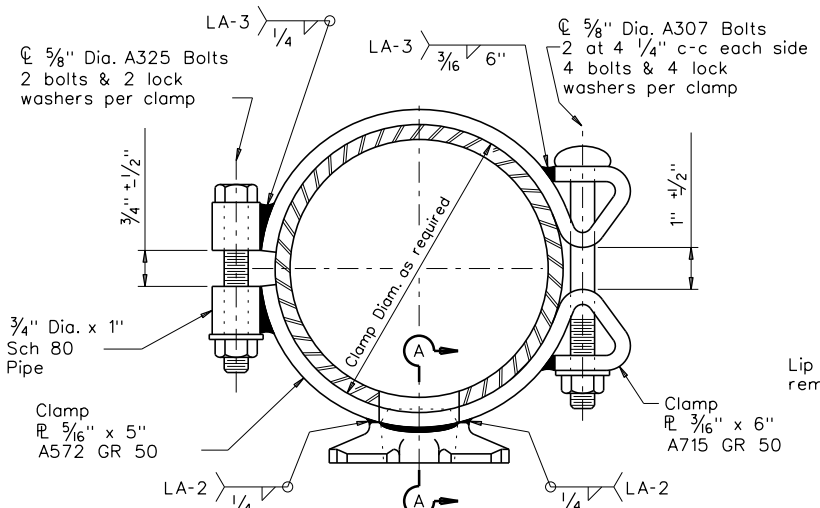
DIRECT ATTACHMENT
DETAIL



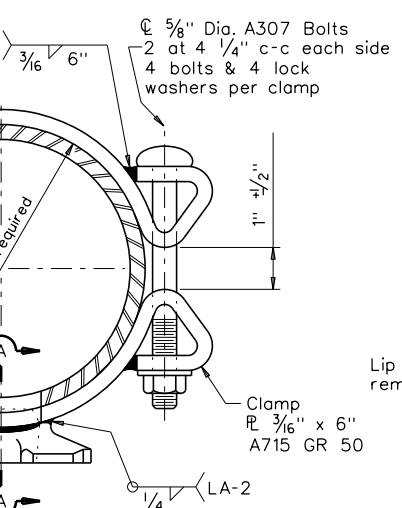
CLAMP ATTACHMENT
DETAIL NO.1
(HALF SECTION)



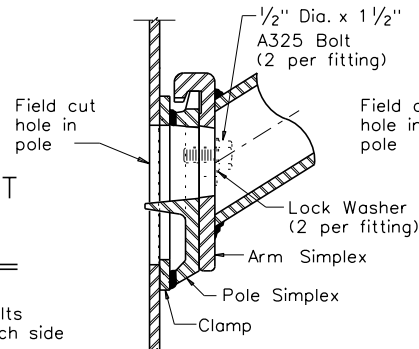
CLAMP ATTACHMENT
DETAIL NO.2
(HALF SECTION)



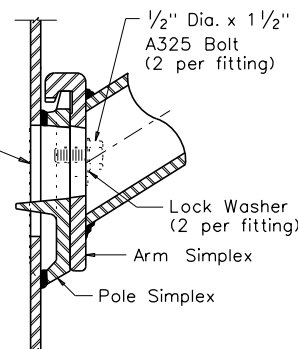
CLAMP ATTACHMENT
DETAIL NO.3
(HALF SECTION)



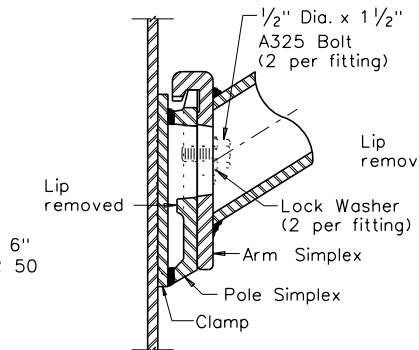
CLAMP ATTACHMENT
DETAIL NO.4
(HALF SECTION)



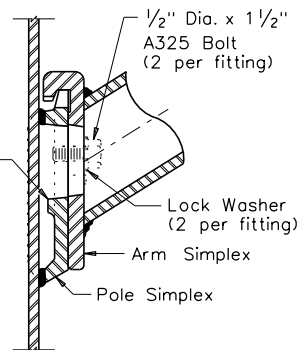
UPPER SIMPLEX FITTING



UPPER SIMPLEX FITTING



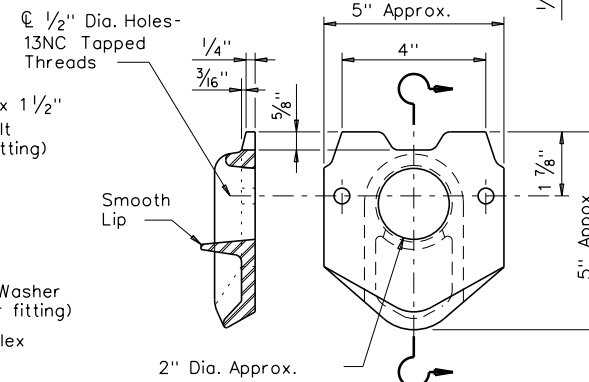
LOWER SIMPLEX FITTING



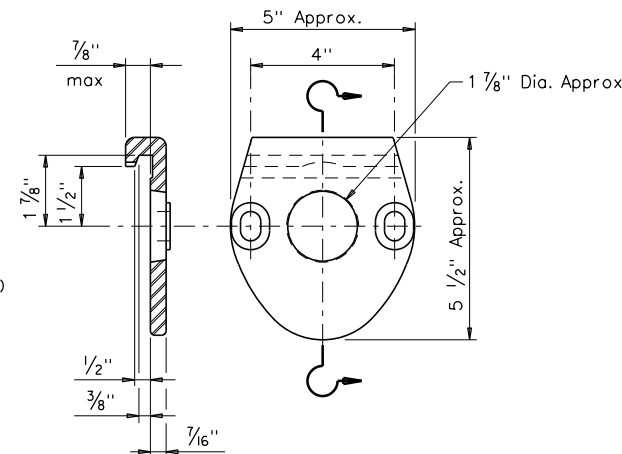
LOWER SIMPLEX FITTING

SECTION A-A

SECTION B-B



POLE SIMPLEX DETAIL



ARM SIMPLEX DETAIL

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 3 or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 4 or A1011 HSLAS-F Gr.50 4
Arm Strut Plates 2	ASTM A36, A572 Gr.50 4 or A588
Misc.	ASTM designations as noted

- ① Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.
- ② Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.
- ③ A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.
- ④ ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified Fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing".

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

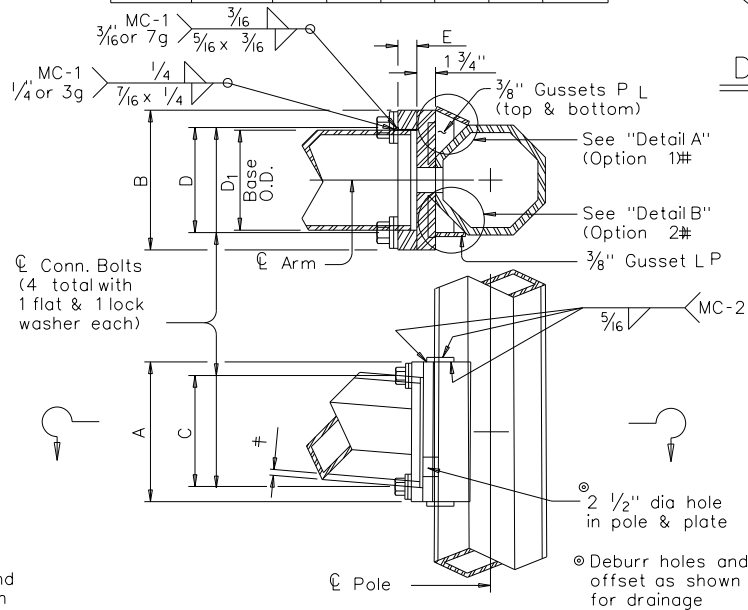
If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.

Texas Department of Transportation
Traffic Operations Division
**STANDARD ASSEMBLY
DRAWINGS FOR LUMINAIRE
SUPPORT STRUCTURES**
ARM DETAILS
LUM-A-12

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5-96 1-99 1-12	REVISIONS	CONT	SECT	JOB
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DIST	COUNTY	SHEET NO.		
SAT	BEXAR	16		

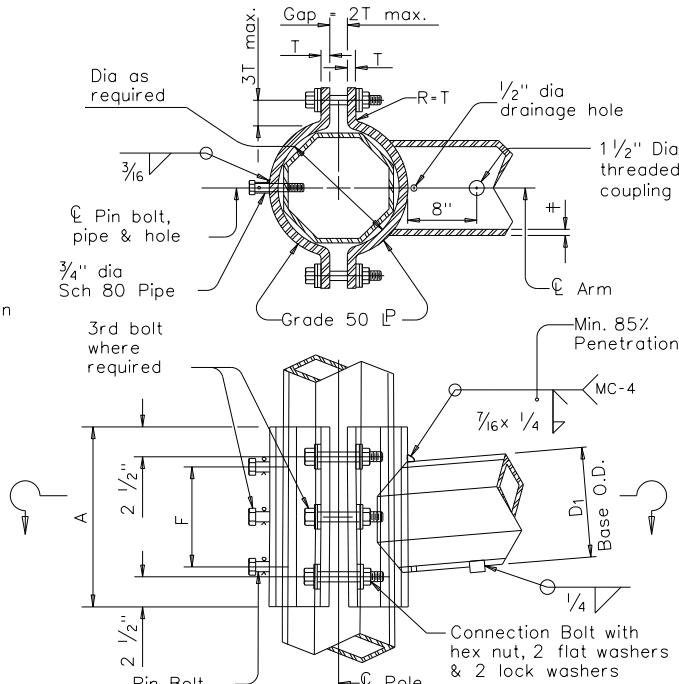
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ARM SIZE		A	B	C	D	E	CONN BOLT DIA
D ₁	⌀						
in.	in.	in.	in.	in.	in.	in.	
7.0	.179	11	11	8	8	1 3/4	1 1/4
7.5	.179	11	11	8	8	1 3/4	1 1/4
8.0	.179	11	11	8	8	2	1 1/4
9.0	.179	13	13	10	10	2	1 1/4
10.0	.179	13	13	10	10	2	1 1/4
9.5	.239	13	13	10	10	2	1 1/4
10.0	.239	14	14	11	11	2	1 1/2
11.0	.239	14	14	11	11	3	1 1/2
11.5	.239	14	14	11	11	3	1 1/2

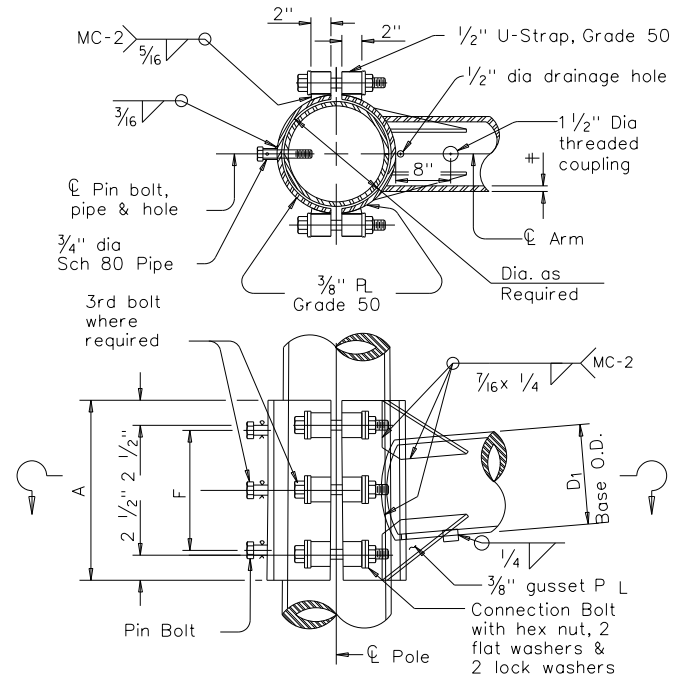


FIXED MOUNT DETAIL 2

ARM SIZE		A	F	T	CONN. BOLTS		PIN BOLTS	
D ₁	⌀				No.	Dia	No.	Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	6	$\frac{3}{4}$	4	$\frac{3}{4}$	2	$\frac{5}{8}$
7.5	.179	14	8	$\frac{3}{4}$	4	$\frac{3}{4}$	2	$\frac{5}{8}$
8.0	.179	14	8	$\frac{3}{4}$	4	$\frac{3}{4}$	2	$\frac{5}{8}$
9.0	.179	16	10	$\frac{7}{8}$	4	1	2	$\frac{5}{8}$
10.0	.179	18	10	$\frac{7}{8}$	4	1	2	$\frac{5}{8}$
9.5	.239	18	10	1	6	1	3	$\frac{5}{8}$
10.0	.239	18	10	1	6	1	3	$\frac{5}{8}$



CLAMP-ON DETAIL 2



MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

- GENERAL NOTES:

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

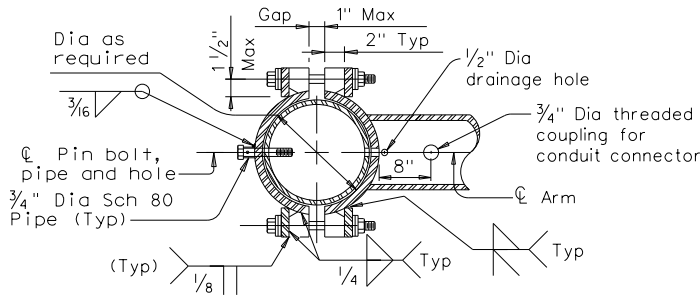
Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and $\frac{3}{4}$ " dia pipe shall have $\frac{3}{16}$ " dia holes for a $\frac{1}{8}$ " dia galvanized cotter pin. Back clamp plate shall be furnished with a $\frac{3}{4}$ " dia hole for each pin bolt. An $\frac{1}{16}$ " dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

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REVISIONS 5-96 5-09 1-12		CONT	SECT	JOB		HIGHWAY
		-	-	-		-
		DIST	COUNTY			SHEET NO.
		SAT	BEXAR			17

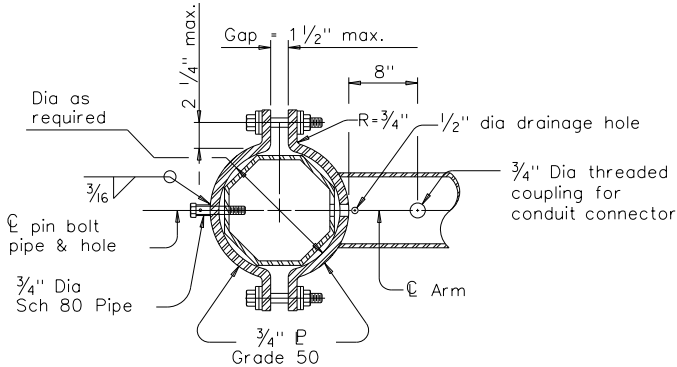
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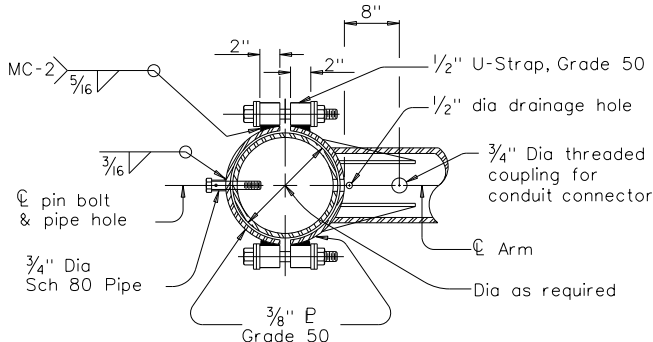
TABLE OF DIMENSIONS for ILSN Support Arm Clamp-on Details 1,2 and 3						
ILSN ARM SIZE	A	F	CONN. BOLTS		PIN BOLTS	
			No.	Dia	No.	Dia
	in.	in.	ea.	in.	ea.	in.
	3 in. dia Schedule 40 Pipe	10	4	4	¾	2



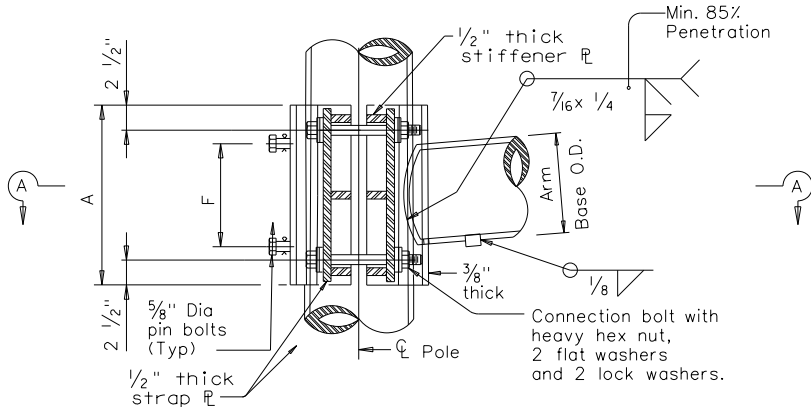
SECTION A-A



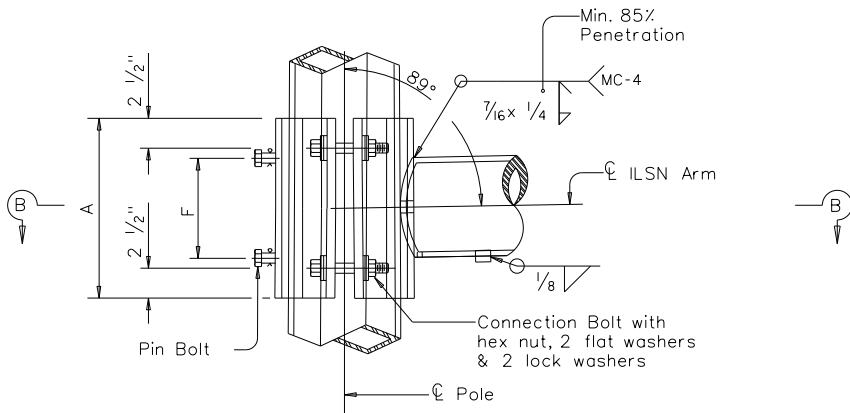
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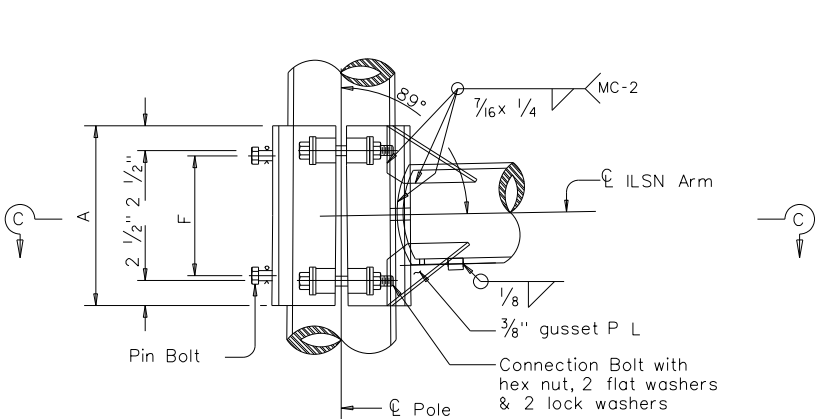
SECTION C-C



ILSN CLAMP-ON DETAIL 1



ILSN CLAMP-ON DETAIL 2



ILSN CLAMP-ON DETAIL 3

GENERAL NOTES:

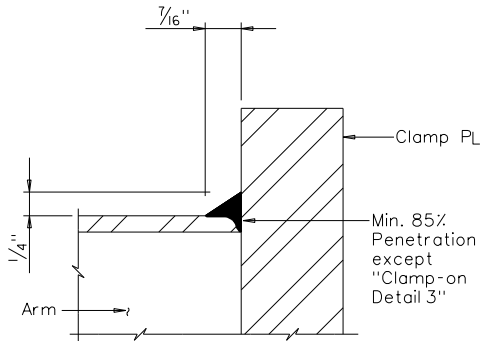
Clamp-on details shall be used for ILSN support arm assemblies. A 1 1/2 inch diameter hole shall be cut in the front clamp plate for wiring access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the details.

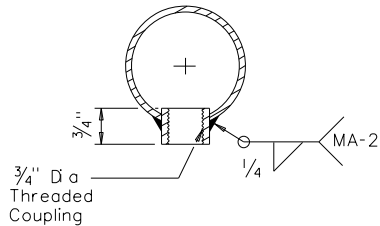
Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and 3/4 inch diameter pipe shall have 3/16 inch diameter holes for a 1/8 inch diameter galvanized cotter pin. Back clamp plate shall be furnished with a 3/4 inch diameter hole for each pin bolt. An 11/16 inch diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.




CLAMP-ON ARM



ILSN ARM COUPLING DETAIL

ARM BASE WELD DETAILS



Texas Department of Transportation
Traffic Operations Division

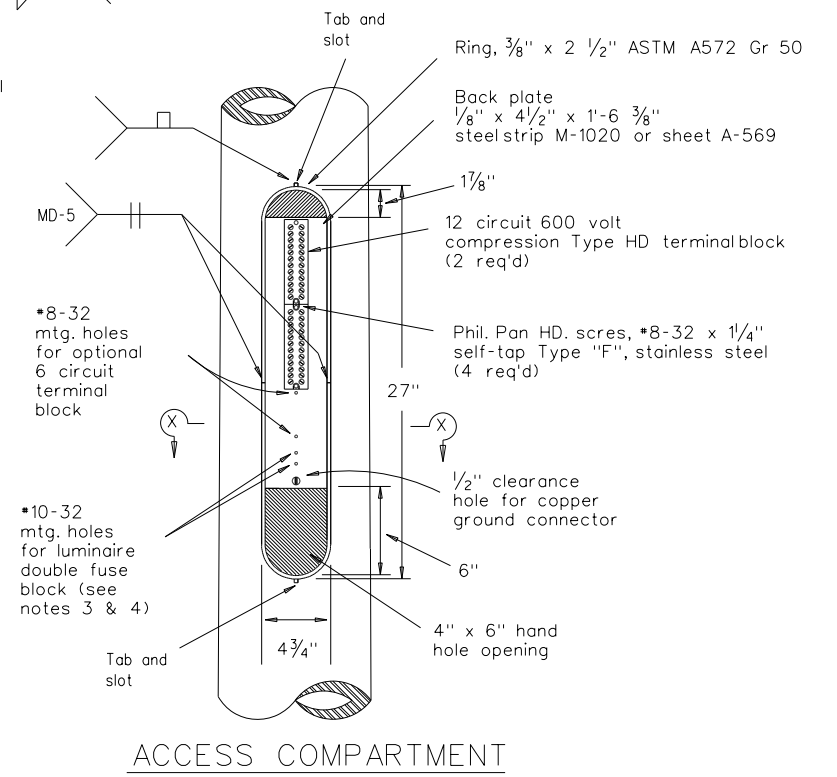
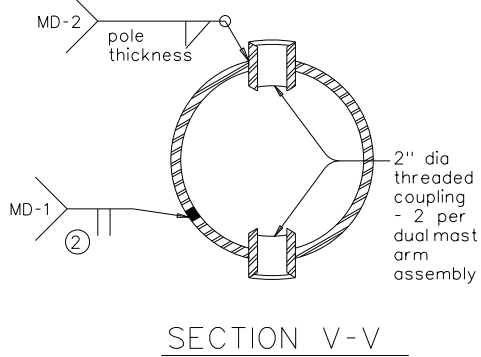
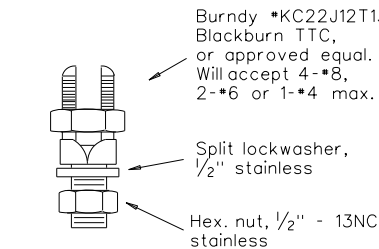
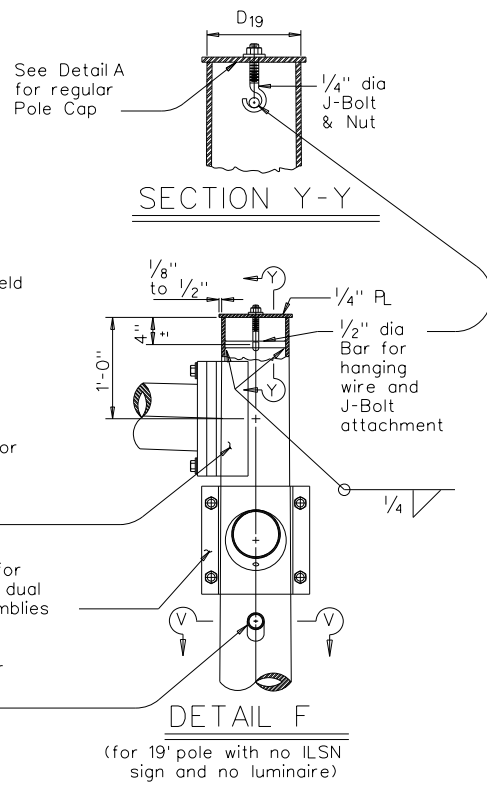
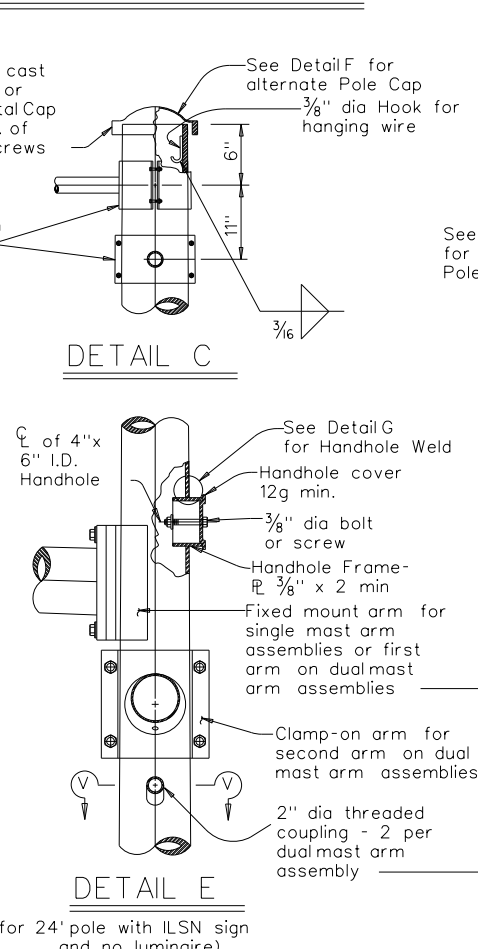
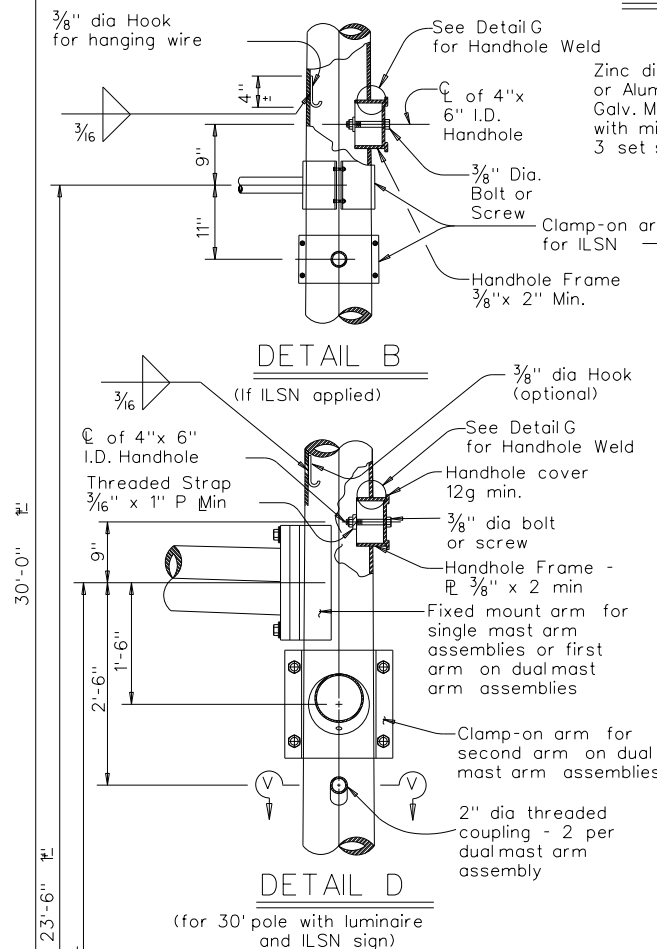
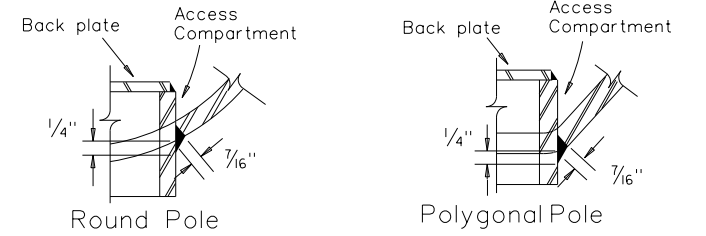
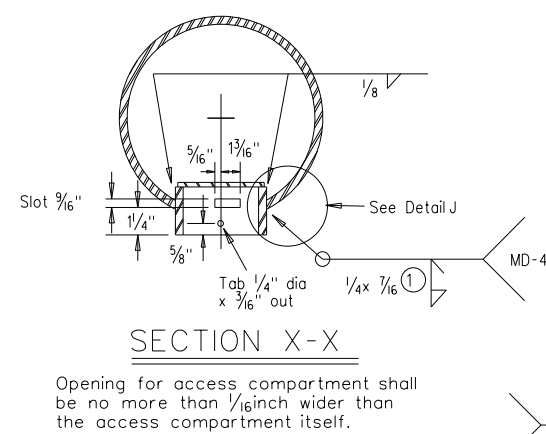
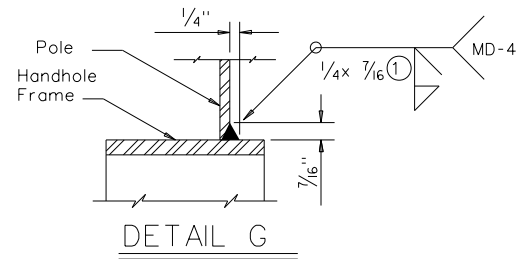
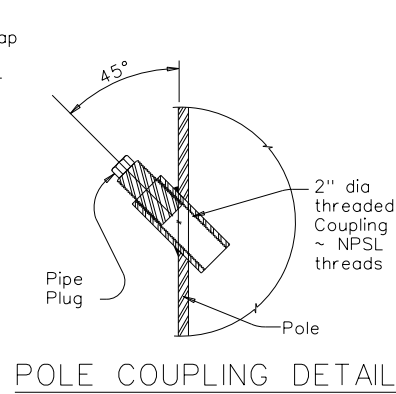
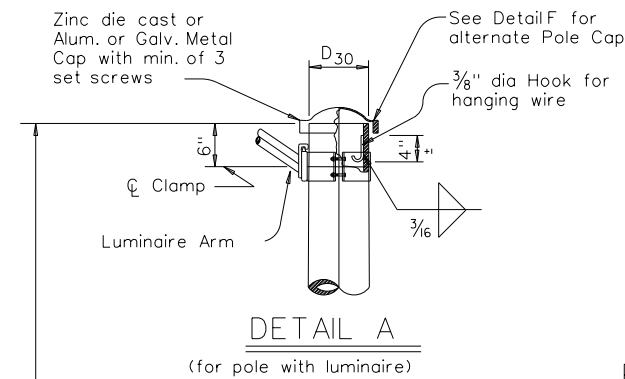
STANDARD ASSEMBLY
FOR TRAFFIC SIGNAL
SUPPORT STRUCTURES

MAST-ARM CONNECTIONS
MA-C(ILSN)-12

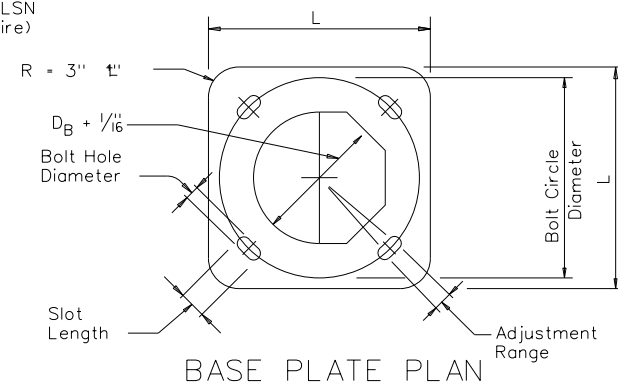
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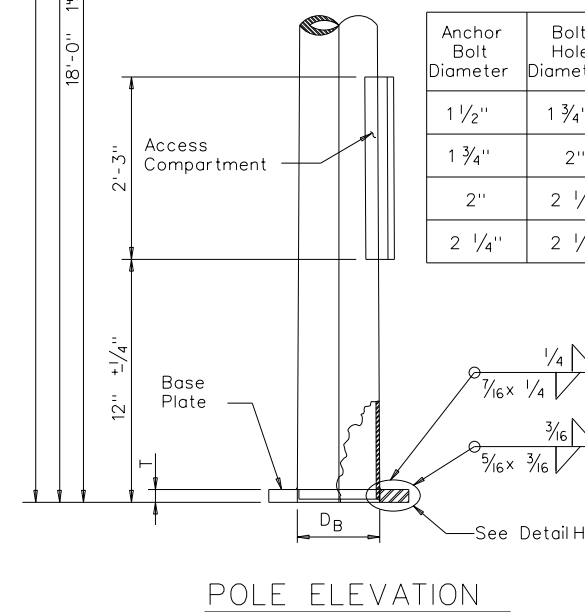
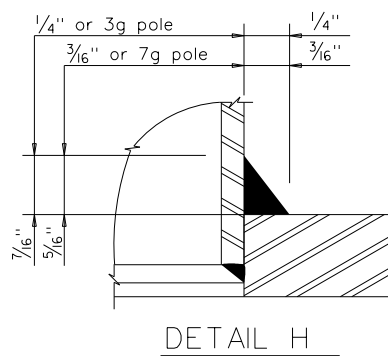
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- ## NOTES:
1. The cover shall be one piece formed from ABS plastic, shall be a pearlgray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
 2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J2T13, or Ilco SSS-5). The traffic signal contractor shall install the kit items in the field.
 3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
 4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

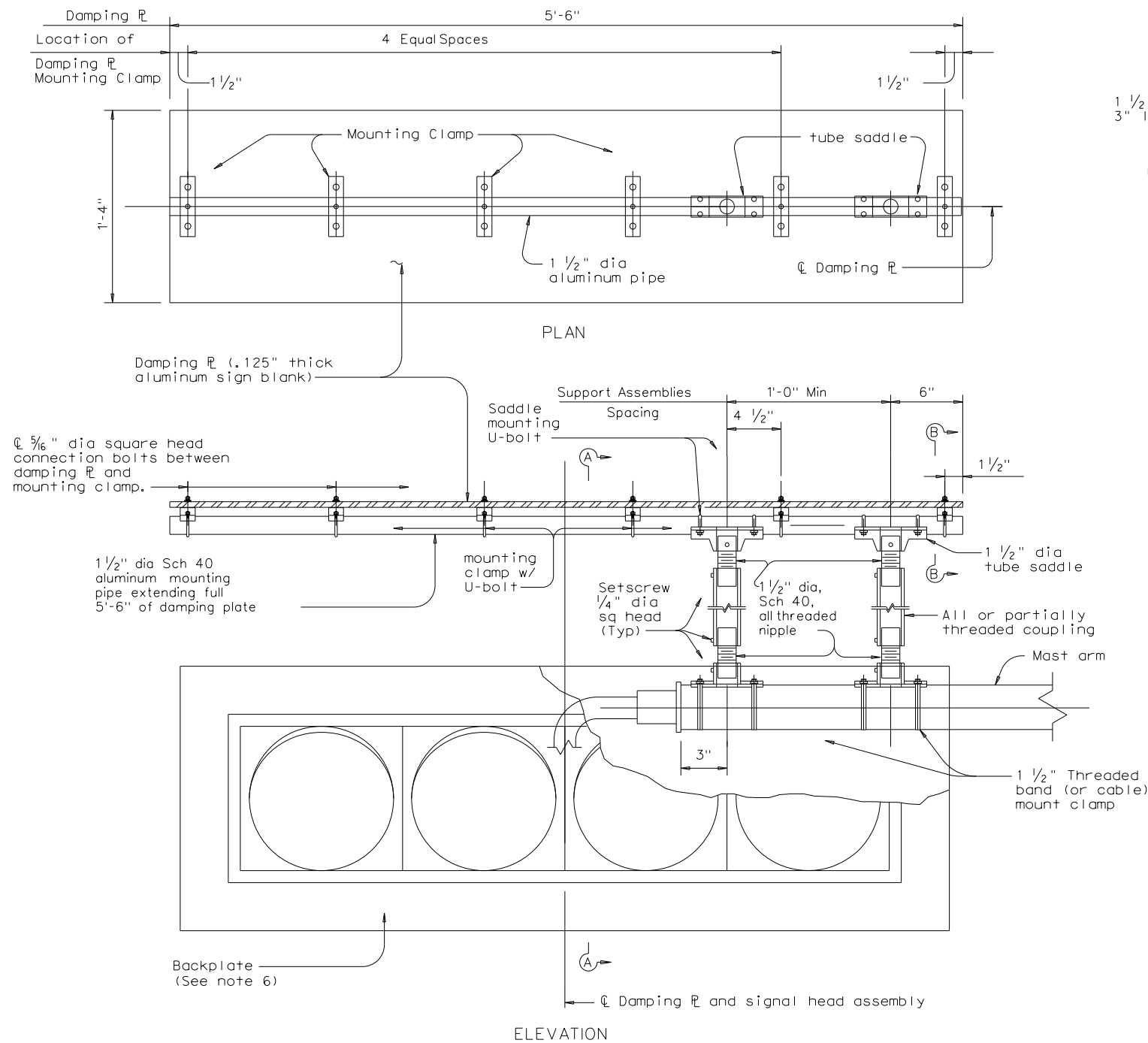


- ① 85% Min. penetration
- ② 60% Min. penetration
100% pemetration within
6" of circumferential
base welds.



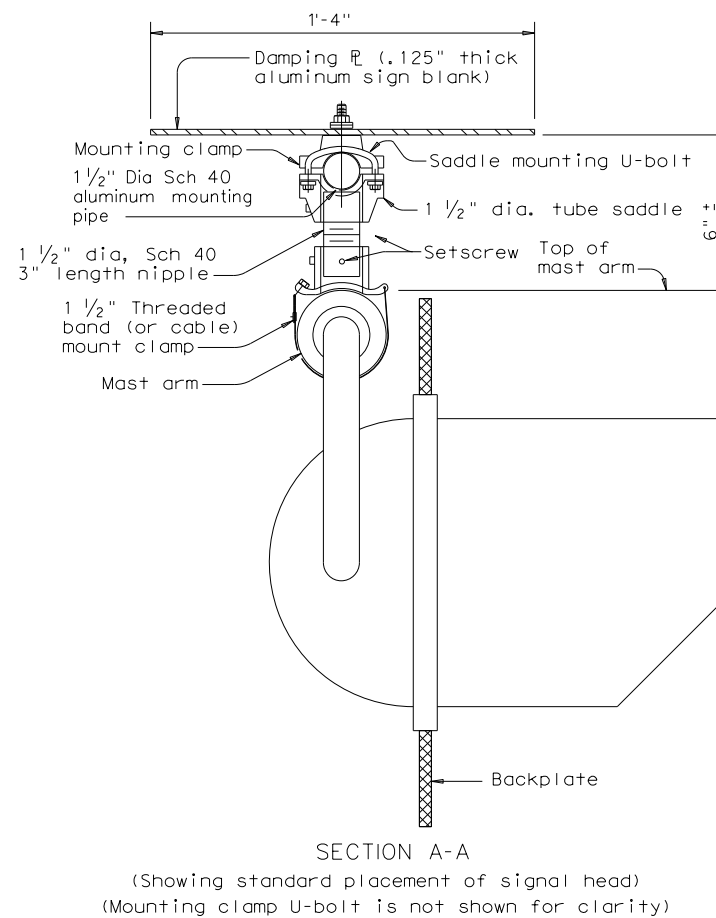
Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base PL Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°

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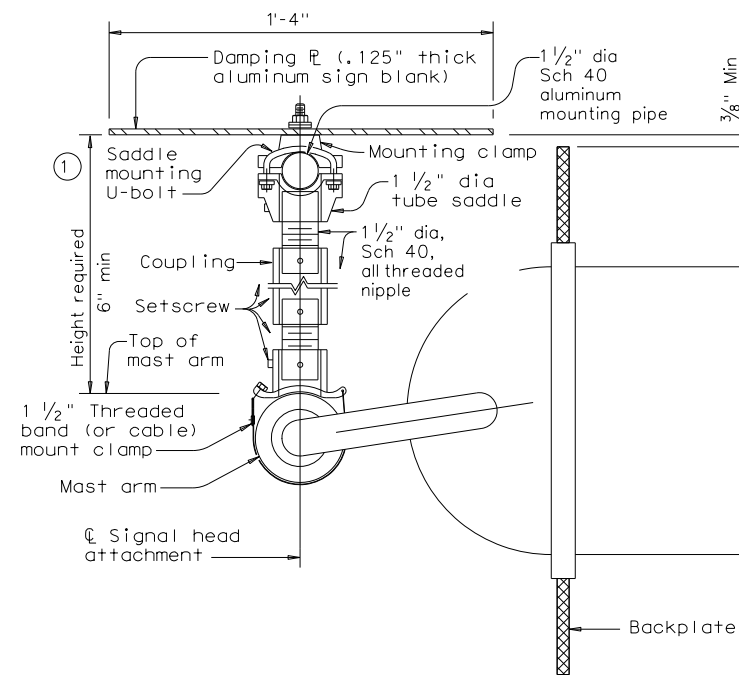


DAMPING PLATE MOUNTING DETAILS

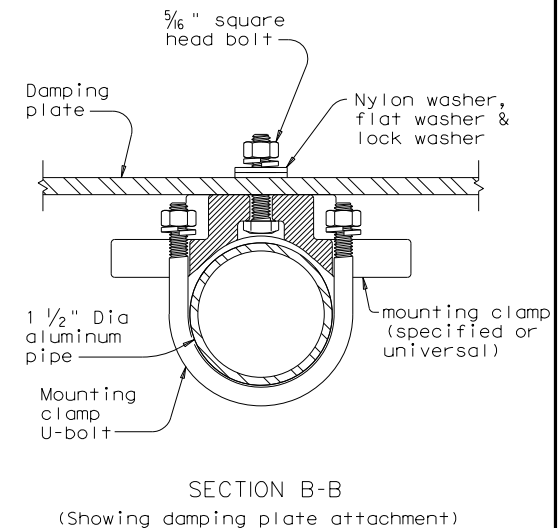
(Showing alternate placement of signal head)



SECTION A-A
(Showing standard placement of signal head)
Mounting clamp U-bolt is not shown for clarity)



SECTION A-A
(Showing alternate placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)



SECTION B-B
(Showing damping plate attachment)

- # GENERAL NOTES:
1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signalmast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.
 2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.
 3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.
 4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".
 5. Contractor will verify applicable field dimensions before the installation.
 6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type B ^{or C} _{FL} retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.

① Recommended supporting assemblies to achieve required height for horizontal section heads			
Height required	One nipple each length	Two nipples each length	One coupling plus each length
6" - 6 3/4"	3"	-	-
7" - 8 1/2"	4"	-	-
9" - 10 1/2"	6"	-	-
11" - 15 1/2"	-	4"	5"
16" - 24"	-	6"	10"

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
*1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
*2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
*4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
*6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
*8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.



Traffic
Operations
Division
Standard

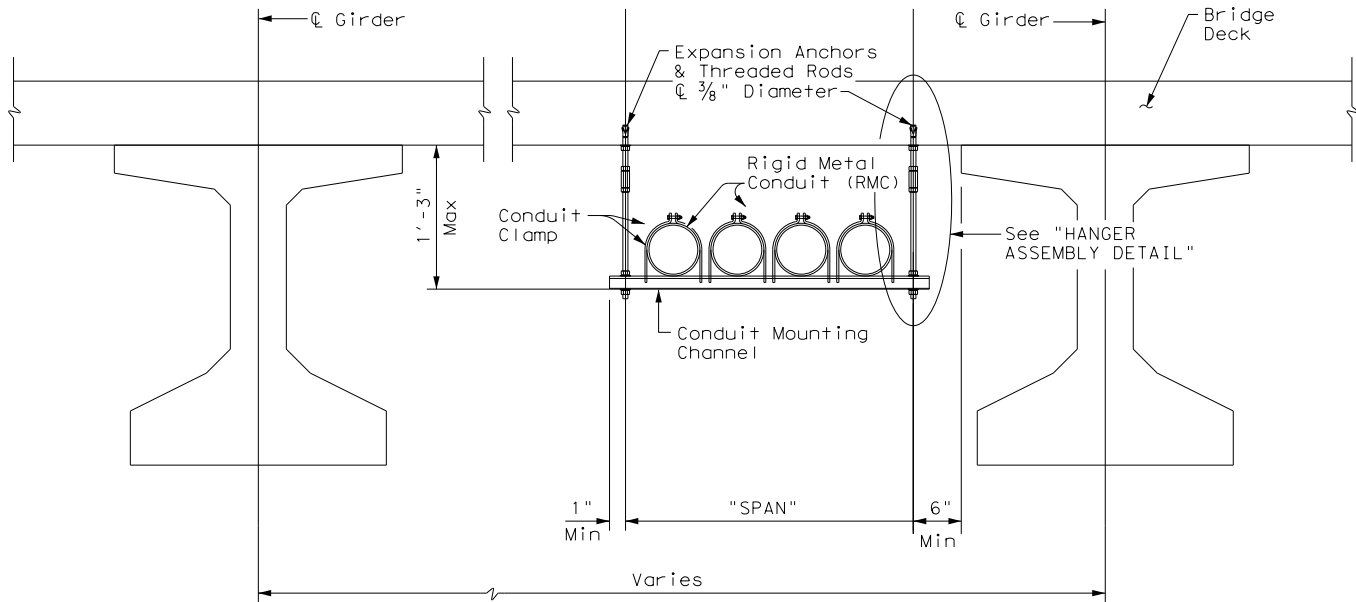
ELECTRICAL DETAILS
CONDUITS & NOTES

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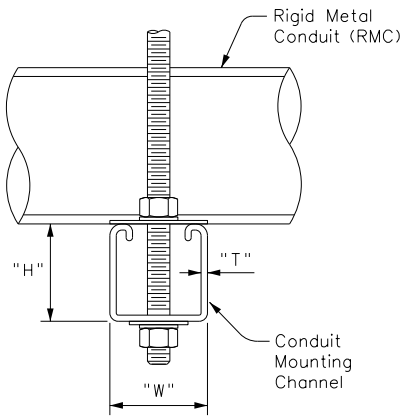
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CONDUIT HANGING DETAIL

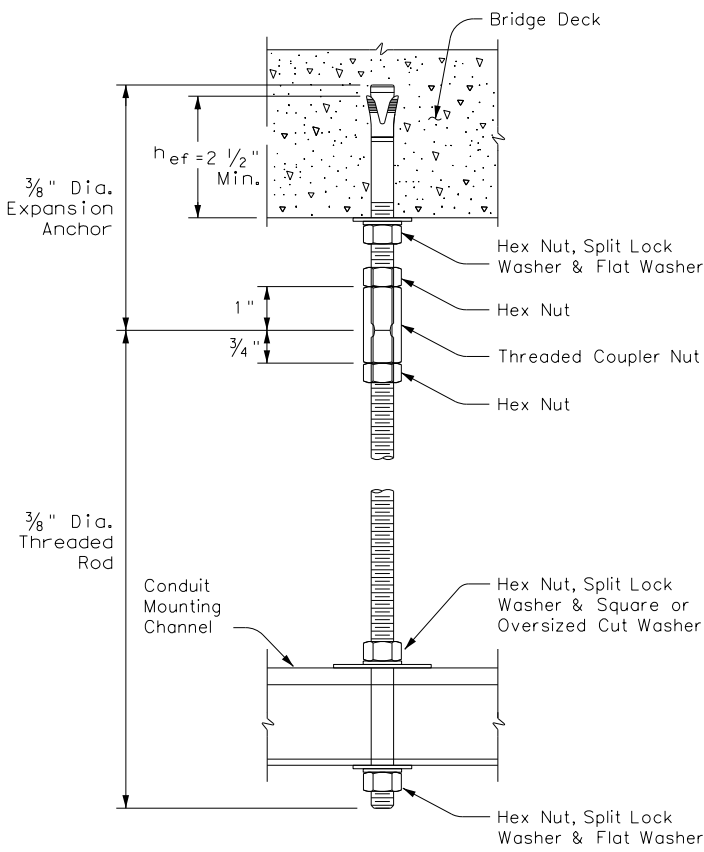
CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

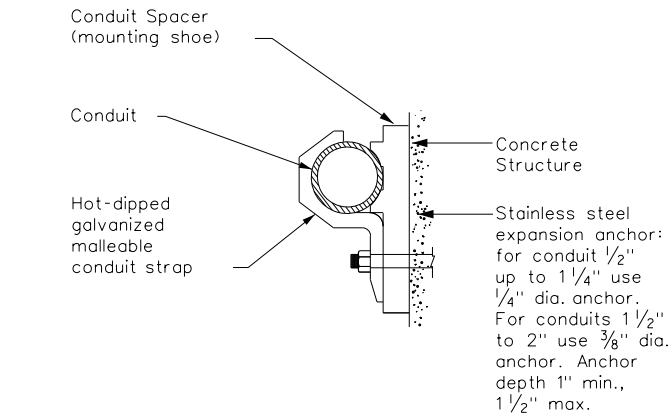


HANGER ASSEMBLY DETAIL

ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT

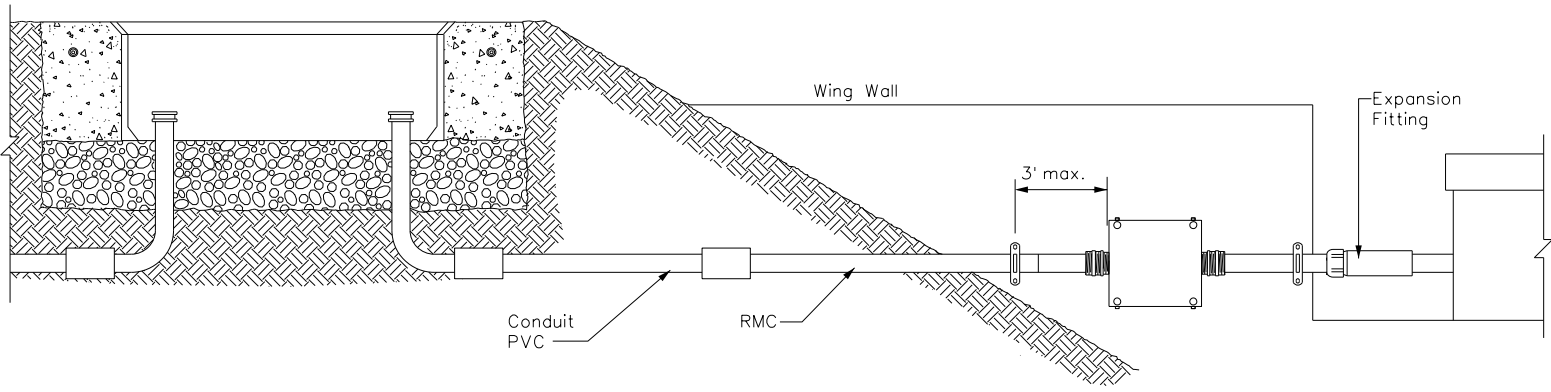
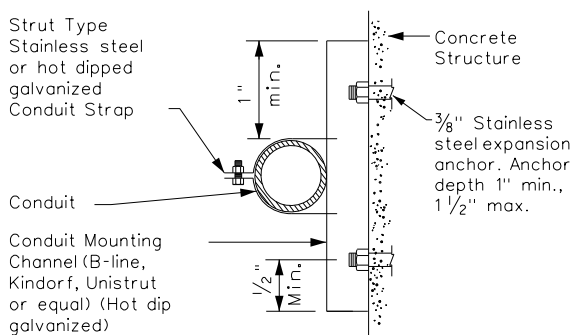


TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL




CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
See ED(1)B.2



EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (ef), as shown. Increase (ef) as needed to ensure sufficient thread length for proper torqueing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (ef). No lateral loads shall be introduced after conduit installation.



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
CONDUIT SUPPORTS

ED(2)-14

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS) 11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

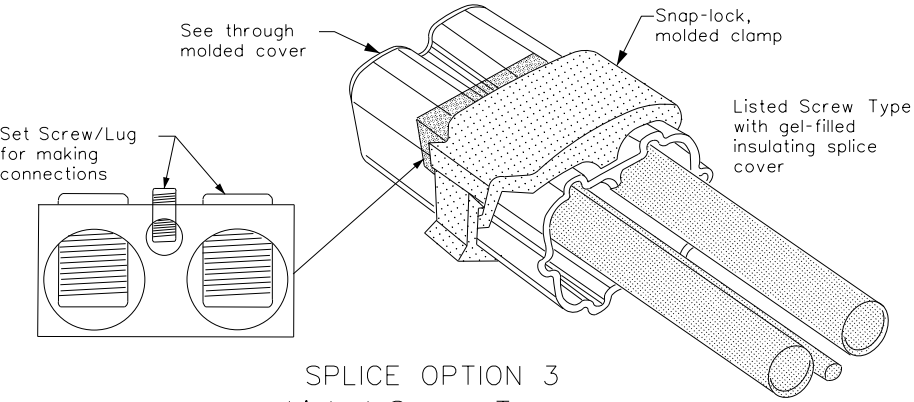
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

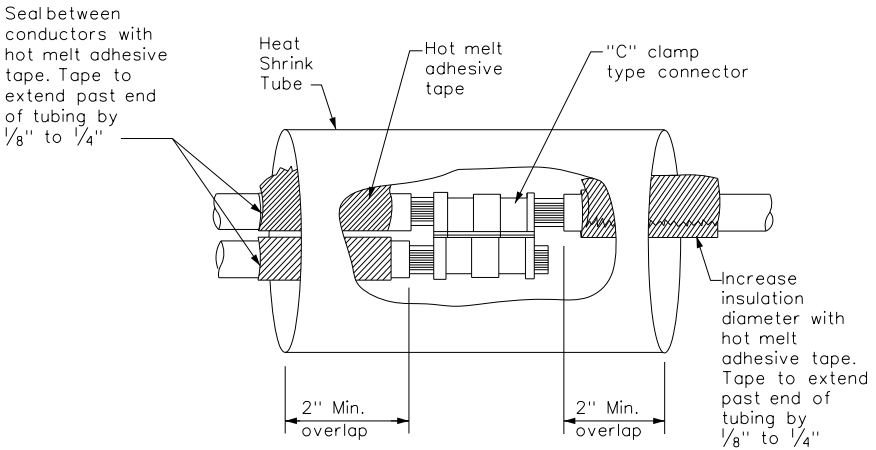
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

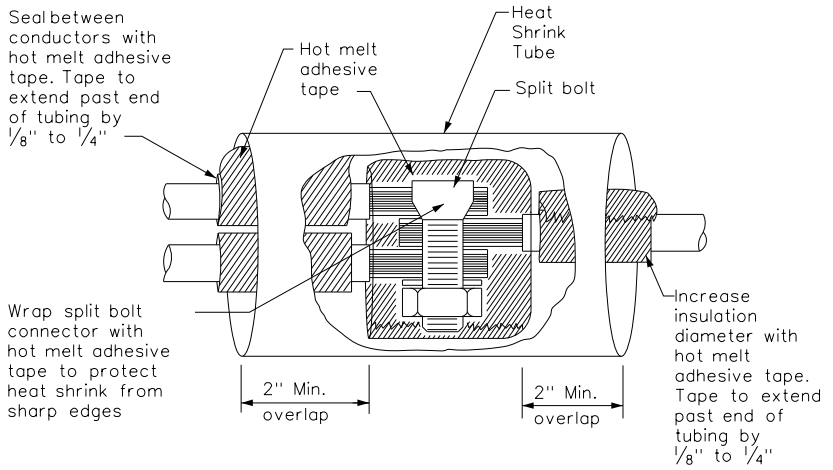
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.




SPLICE OPTION 3
Listed Screw Type



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS

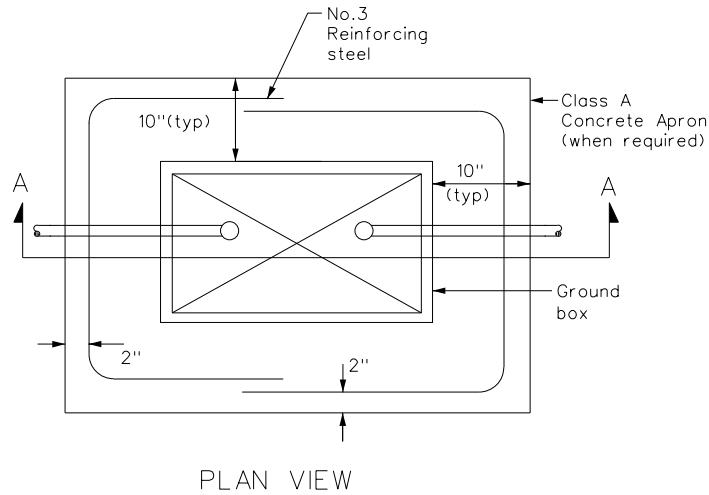
CONDUCTORS

ED(3)-14

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REVISIONS				
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		23

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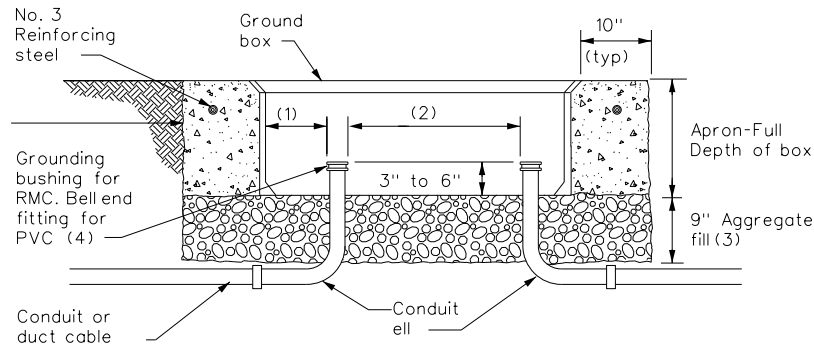


APRON FOR GROUND BOX

- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



SECTION A - A

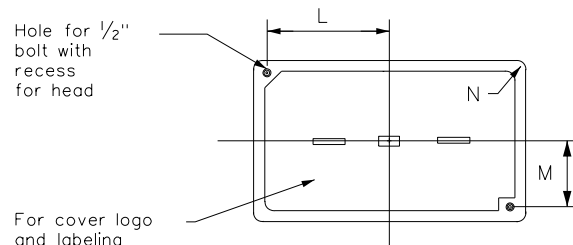
GROUND BOXES

A. MATERIALS

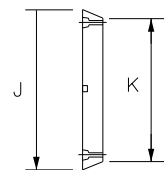
1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.
3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.
4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

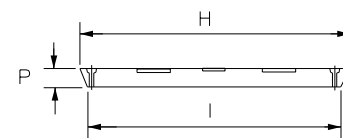
1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.



PLAN VIEW




END



SIDE

GROUND BOX COVER



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS

GROUND BOXES

ED(4)-14

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	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		24

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ELECTRICAL SERVICES NOTES

- 1.Provide new materials.Ensure installation and materials comply with the applicable provisions of the NationalElectrical Code (NEC) and NationalElectricalManufacturers Association (NEMA) standards. Ensure materialis Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the ElectricalService Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
- 2.Provide electricalservices in accordance with ElectricalDetails standard sheets, DepartmentalMaterialSpecification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal(PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electricalservice types A, C, and D, as listed on the MaterialProducers List (MPL) on the Department web site under "Roadway Illumination and ElectricalSupplies," Item 628. Provide other service types as detailed on the plans.
- 3.Provide all work, materials, services, and any incidentals needed to install a complete electricalservice as specified in the plans.
- 4.Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
- 5.The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electricalenclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electricalservice equipment until locks are installed.
- 6.Enclosures with externaldisconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
- 7.When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steelmay be used.
- 8.Provide wiring and electricalcomponents rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electricalconductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
- 9.All electricalservice conduit and conductors attached to the electricalservice including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, allservice conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, willbe paid for separately.
- 10.Provide rigid metalconduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electricalservice grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend allrigid metalconduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
- 11.Use of liquidtight flexible metalconduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
- 12.Ensure all mounting hardware and installation details of services conform to utility company specifications.
- 13.For allelectricalservice enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers willprepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electricalservice data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actualproject plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
- 14.When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
- 15.Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panelinside the enclosure. Provide grounding bushings on all metalconduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metalconduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

- 1.Provide threaded hub for all conduit entries into the top of enclosure.
- 2.Type galvanized steel(GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocellor lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
- 3.Provide aluminum (AL) and stainless steel(SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not point stainless steel.
- 4.Provide pedestalservice (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestalservices. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

- 1.Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
- 2.When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

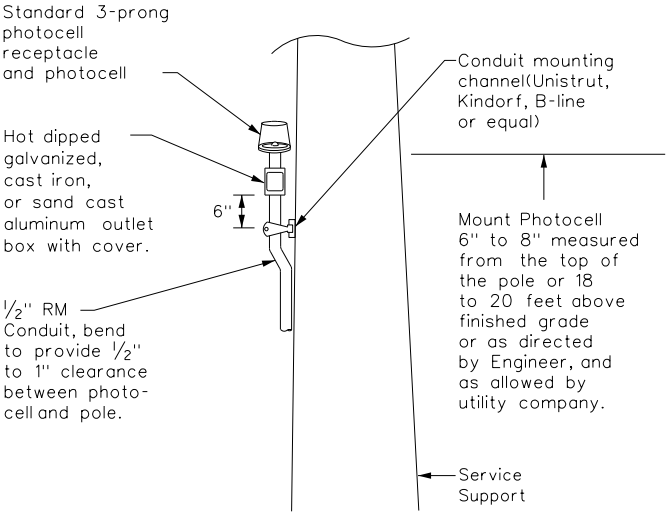
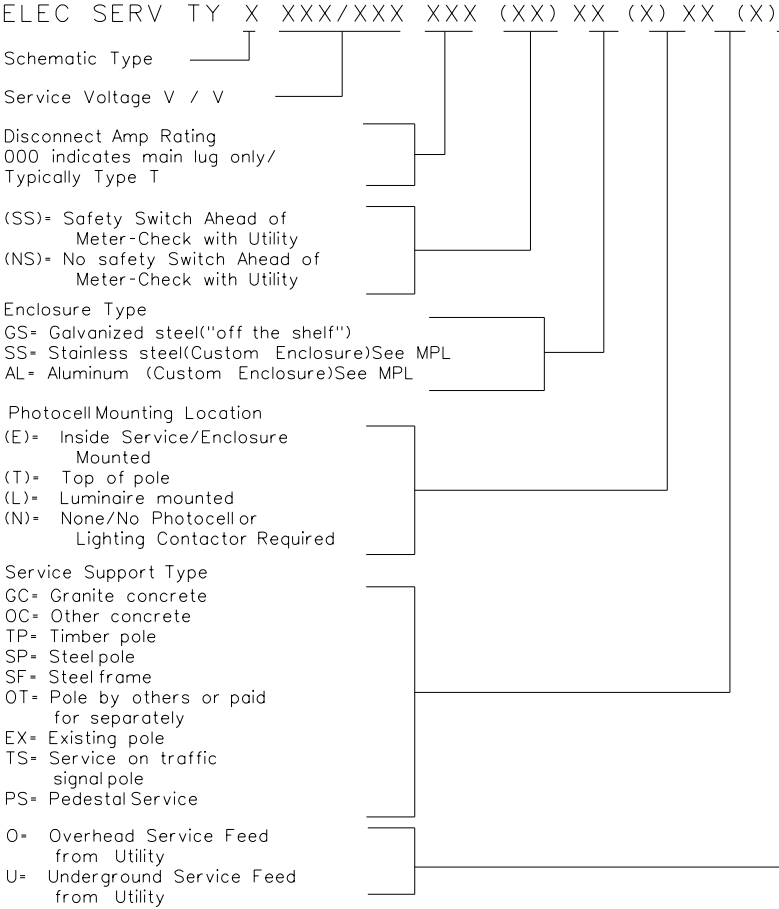
PHOTOELECTRIC CONTROL

- 1.Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA													
Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit * * Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load	
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/*2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1	
									Lighting SB	2P/40	25		
									Underpass	1P/20	15		
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 1/4"	3/*6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3	
							30		Luminaïres	2P/20	9		
									CCTV	1P/20	3		
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 1/4"	3/*6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0	
									Flashing Beacon 2	1P/20	4		


- * Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.
- * * Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.



Texas Department of Transportation

Traffic Operations Division Standard

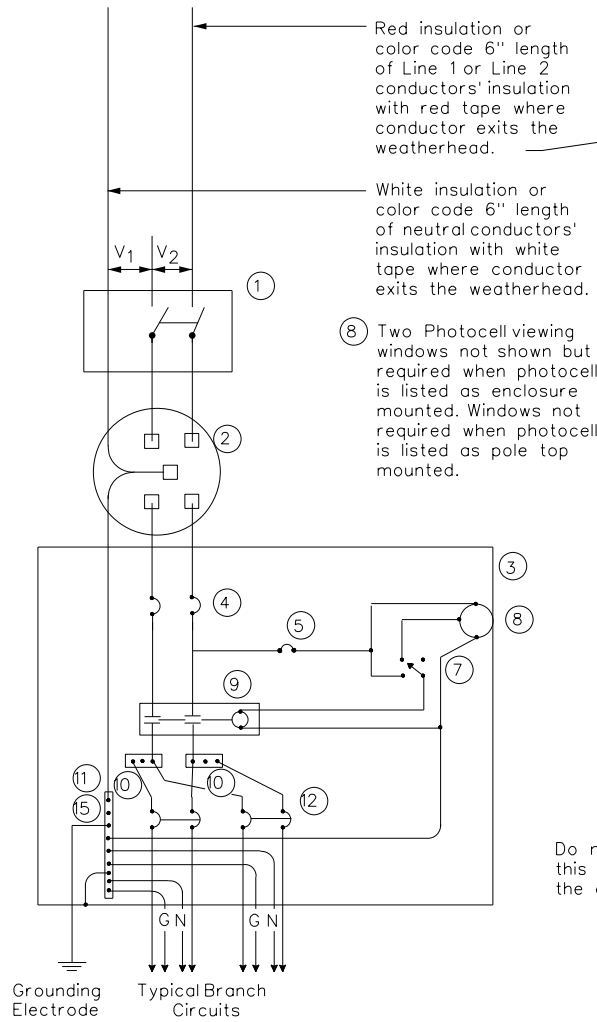
ELECTRICAL DETAILS
SERVICE NOTES & DATA

ED(5)-14

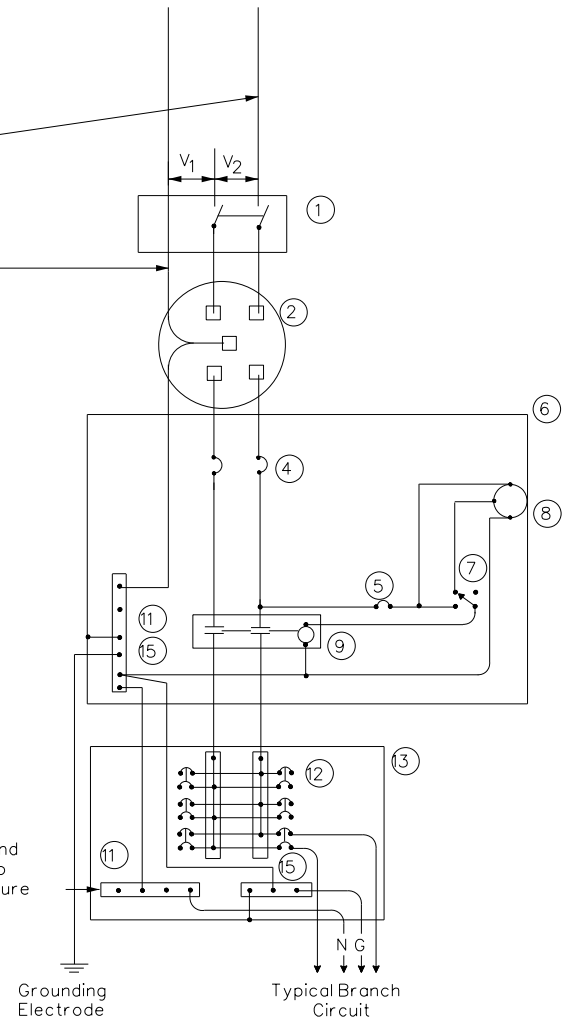
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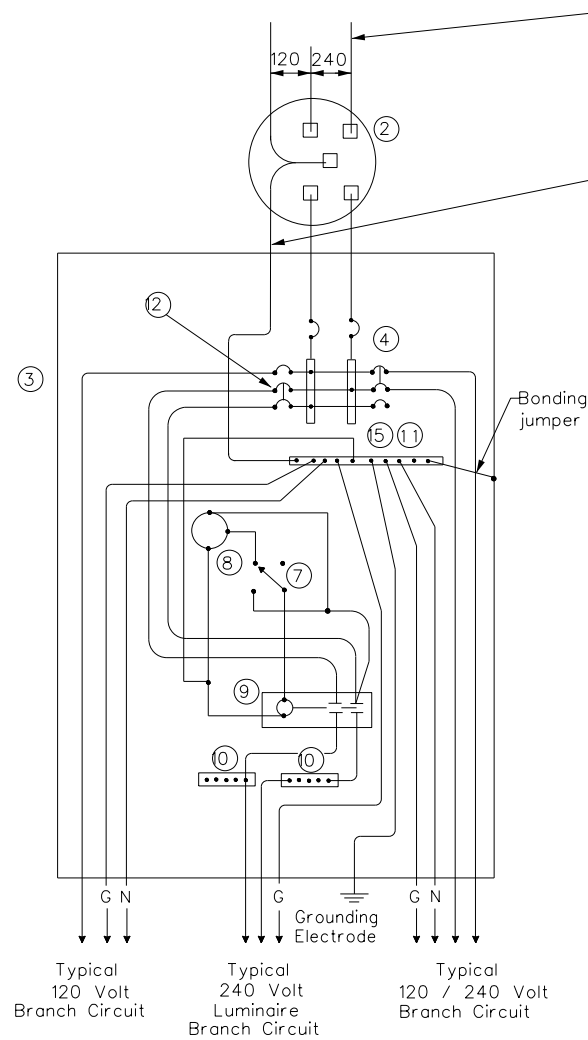
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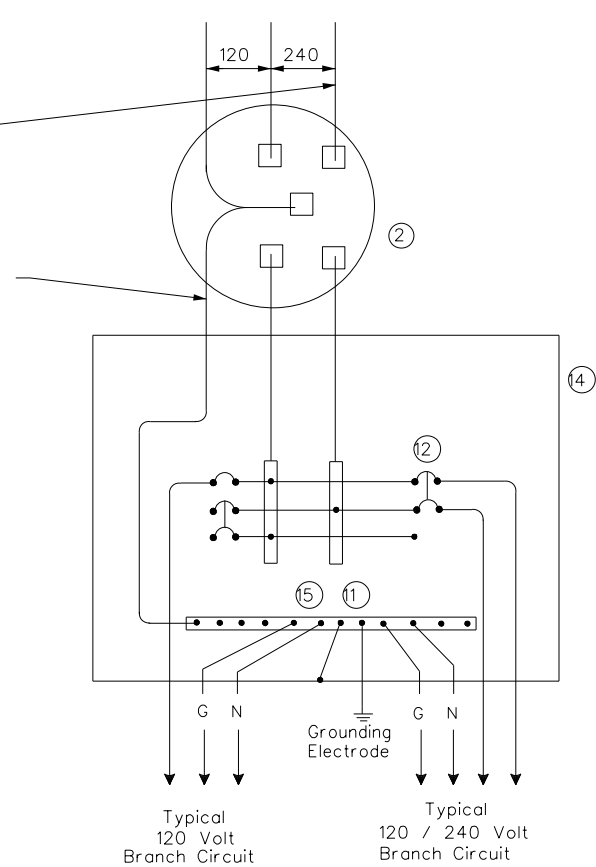
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE




SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE
Galvanized steel-"Buy Off The Shelf"
only. When required install photocell
top of the pole or on luminaire only,
no lighting contractor will be installed.

WIRING LEGEND	
—	Power Wiring
—	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
SERVICE ENCLOSURE
AND NOTES
ED(6)-14

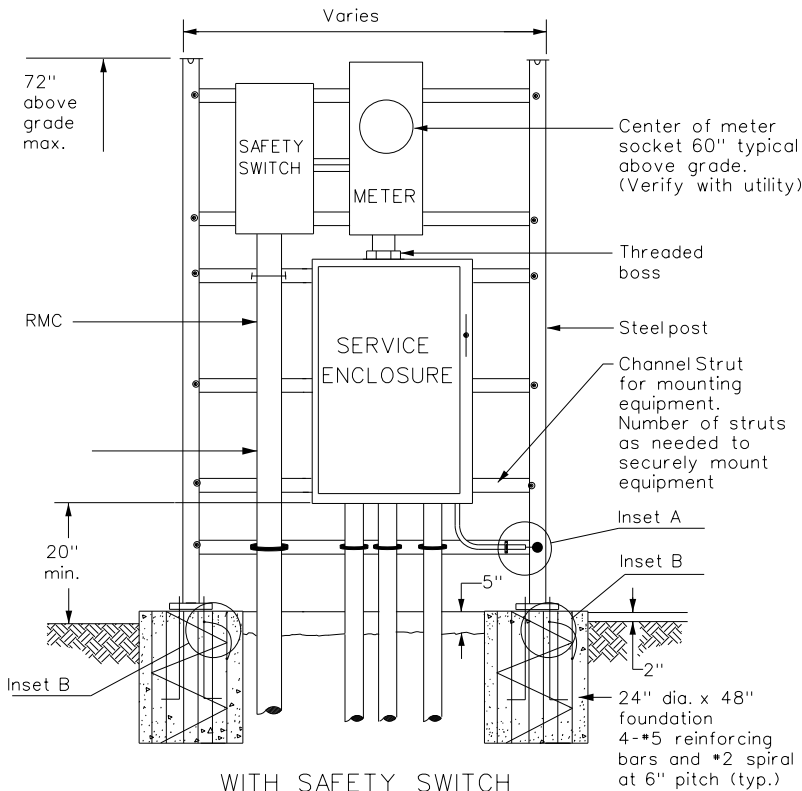
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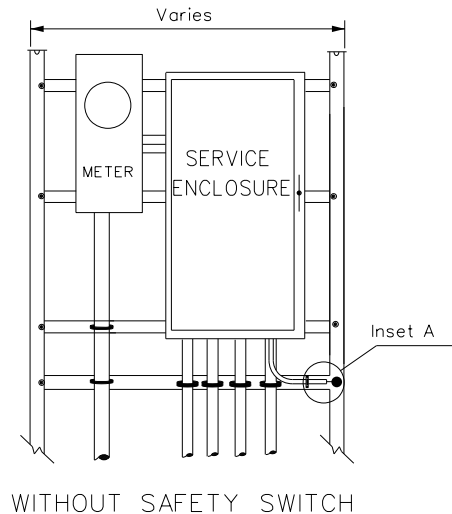
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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

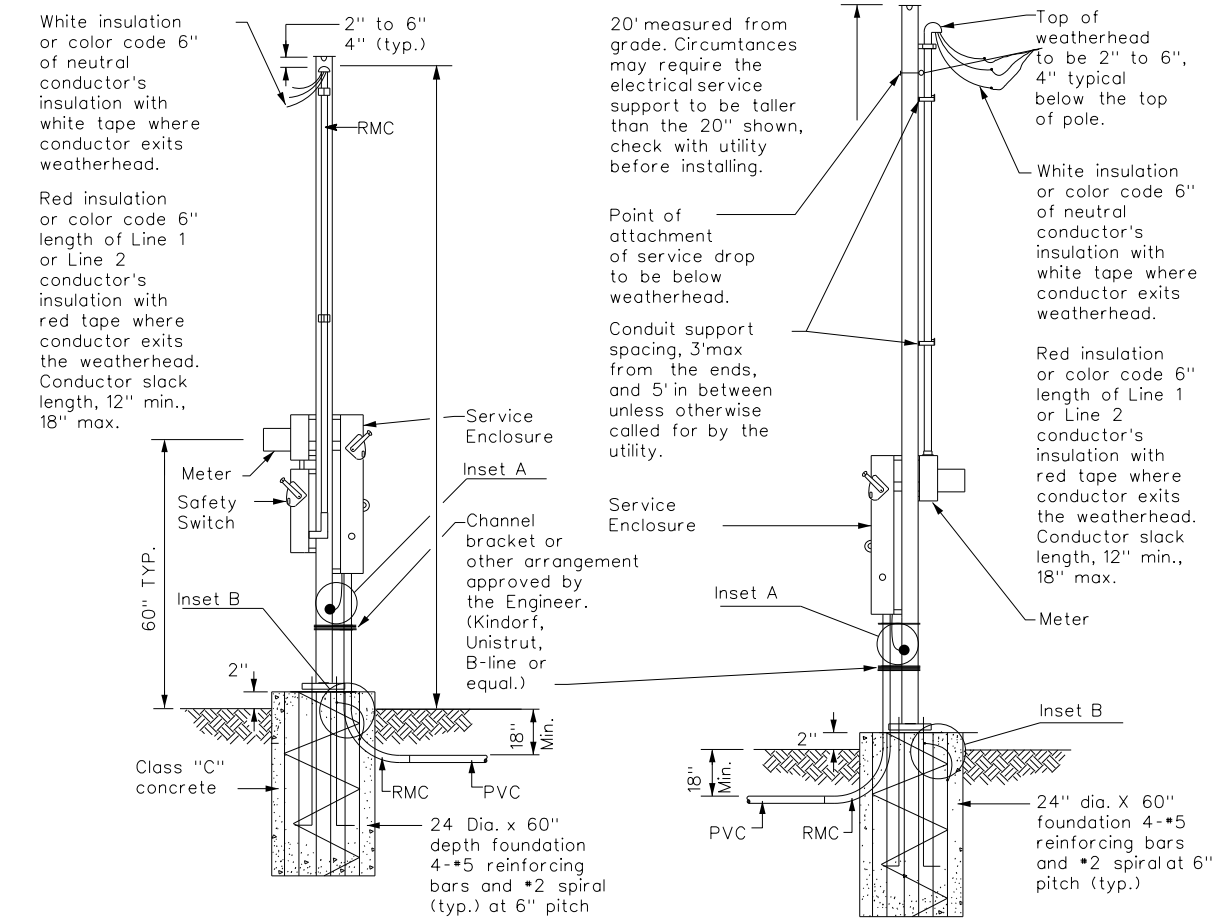
1. Provide steelpole and steel frame supports as per TxDOT Departmental Material Specification (DMS) 11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 1/2 in. or 1 5/8 in. wide by 1 in. up to 3 3/4 in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.
2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.
3. Provide and install galvanized 3/4 in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized 3/4 in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 1/4 in. to 3 1/2 in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.
4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.
5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.
6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.
7. Drill and tap steel poles and frames for 1/2 in. X 13 UNC tank ground fitting. For steelpole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steelpole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.
8. If Steelpole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.
9. Provide 1/4" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.
10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.
11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.



WITH SAFETY SWITCH
FRONT VIEW
SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE

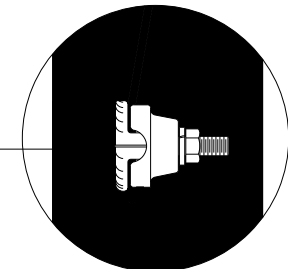


WITHOUT SAFETY SWITCH

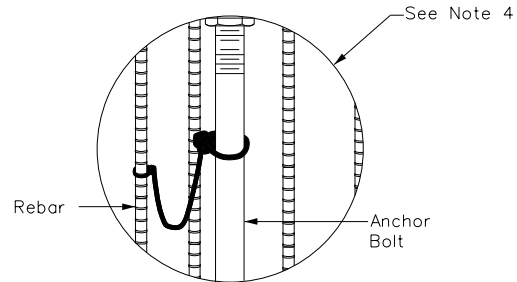


WITH SAFETY SWITCH
WITHOUT SAFETY SWITCH
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE

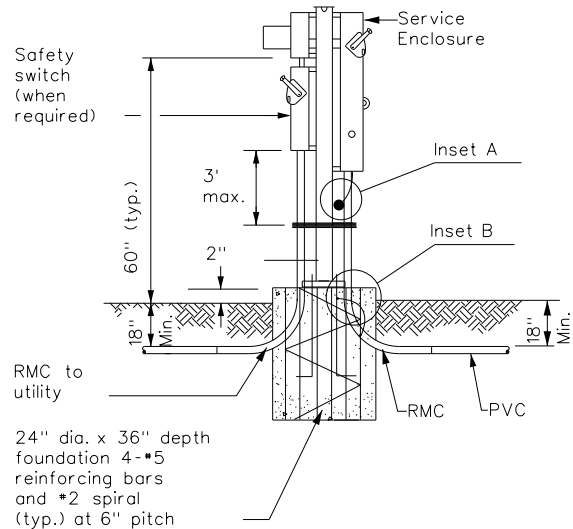
Drill, tap, and thread 1/2" X 13 UNC. Install tank ground fitting, connect electrical service grounding electrode conductor. See Note 7.



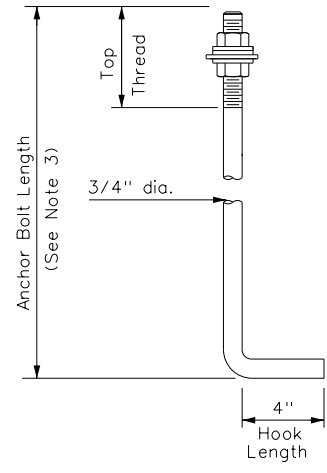
FRONT VIEW
INSET A



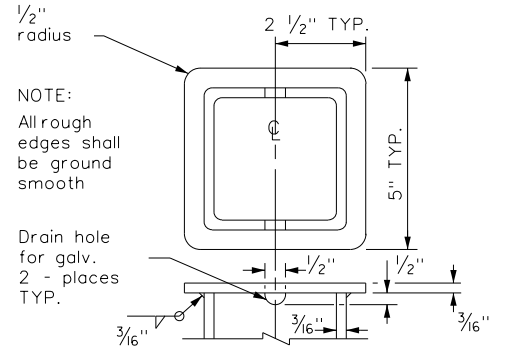
INSET B



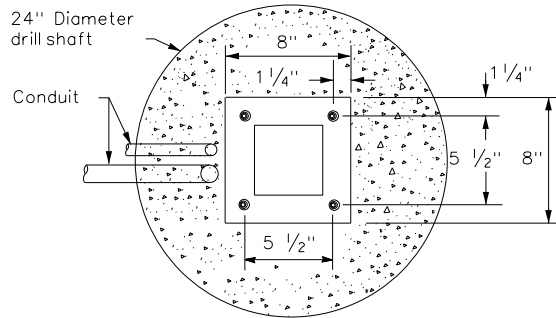
WITH SAFETY SWITCH
SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE



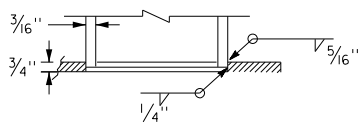
HOOKED ANCHOR DETAIL



POLE TOP PLATE

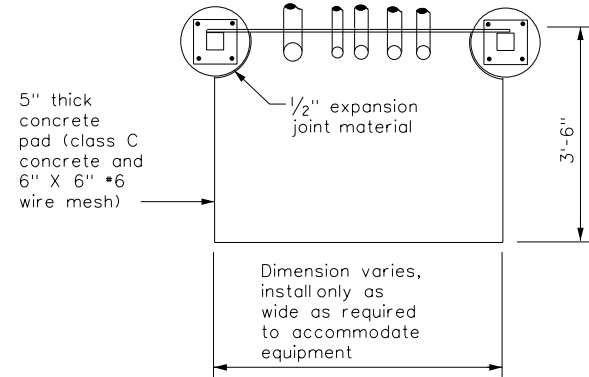


BASE PLATE DETAIL




BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



TOP VIEW
SERVICE SUPPORT TY SF (O) & SF (U)



Texas Department of Transportation

Traffic
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Division
Standard

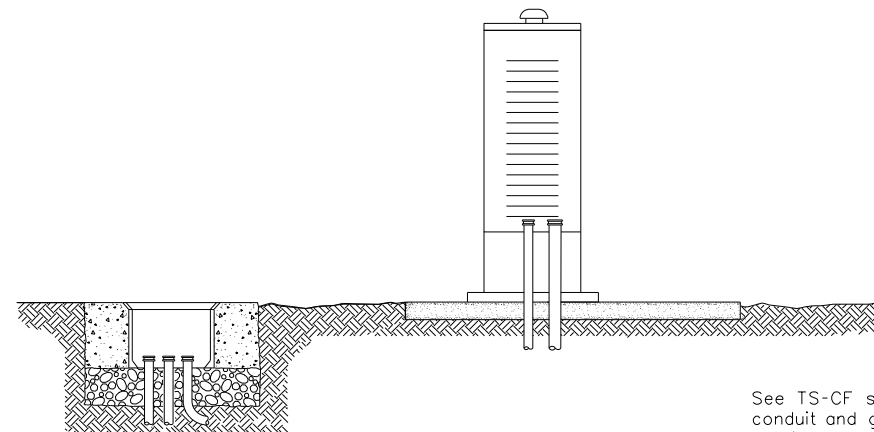
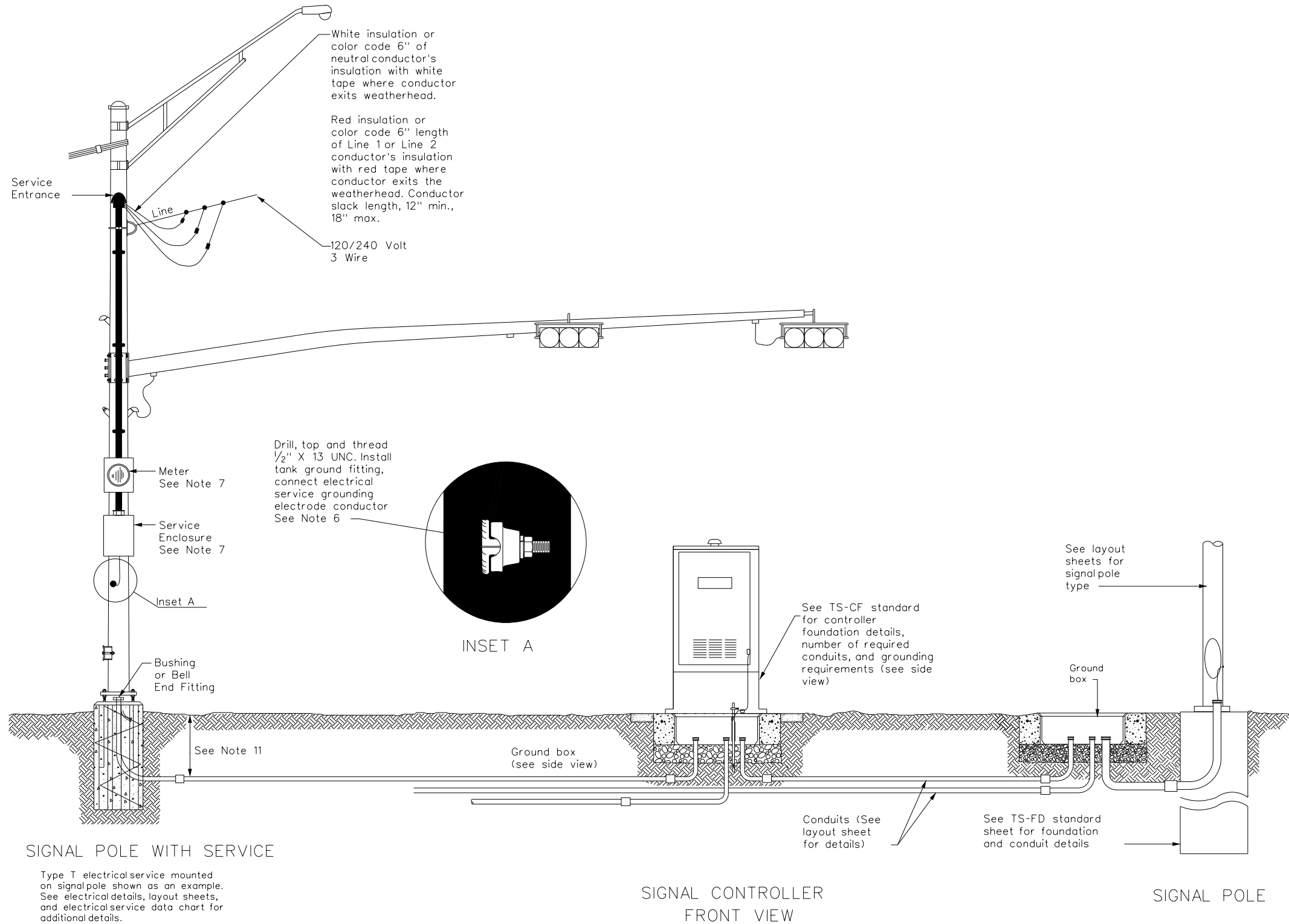
ELECTRICAL DETAILS
SERVICE SUPPORT
TYPES SF & SP
ED(7)-14

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- TRAFFIC SIGNAL NOTES
1. Do not pass luminaire conductors through the signal controller cabinet.
 2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
 3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
 4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
 5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TxDOT standard TS-FD for further details.
 6. Drill and tap signal poles for 1/2 in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
 7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of 3/4 in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
 8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
 9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
 10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
 11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL CONTROLLER
SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.



Texas Department of Transportation

Traffic Operations
Division
Standard

ELECTRICAL DETAILS
TYPICAL TRAFFIC SIGNAL
SYSTEM DETAILS
ED(8)-14

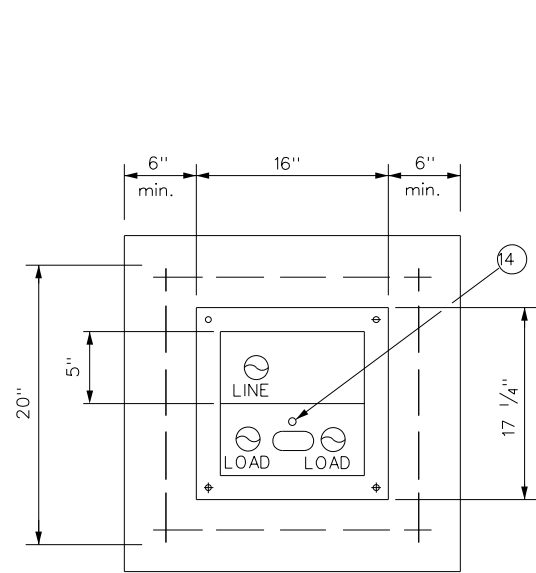
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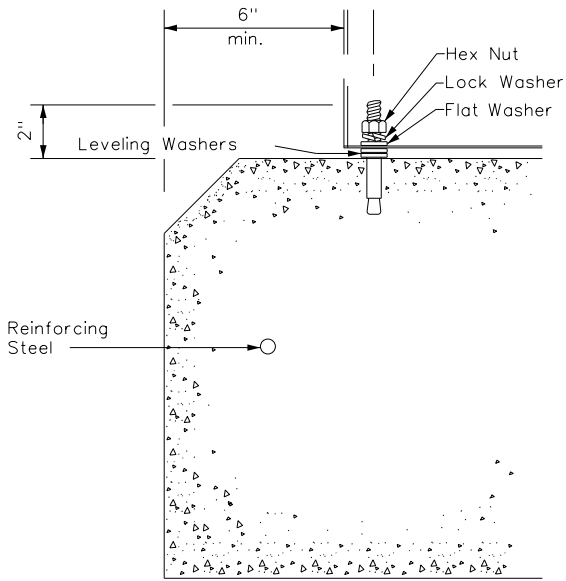
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PEDESTAL SERVICE NOTES

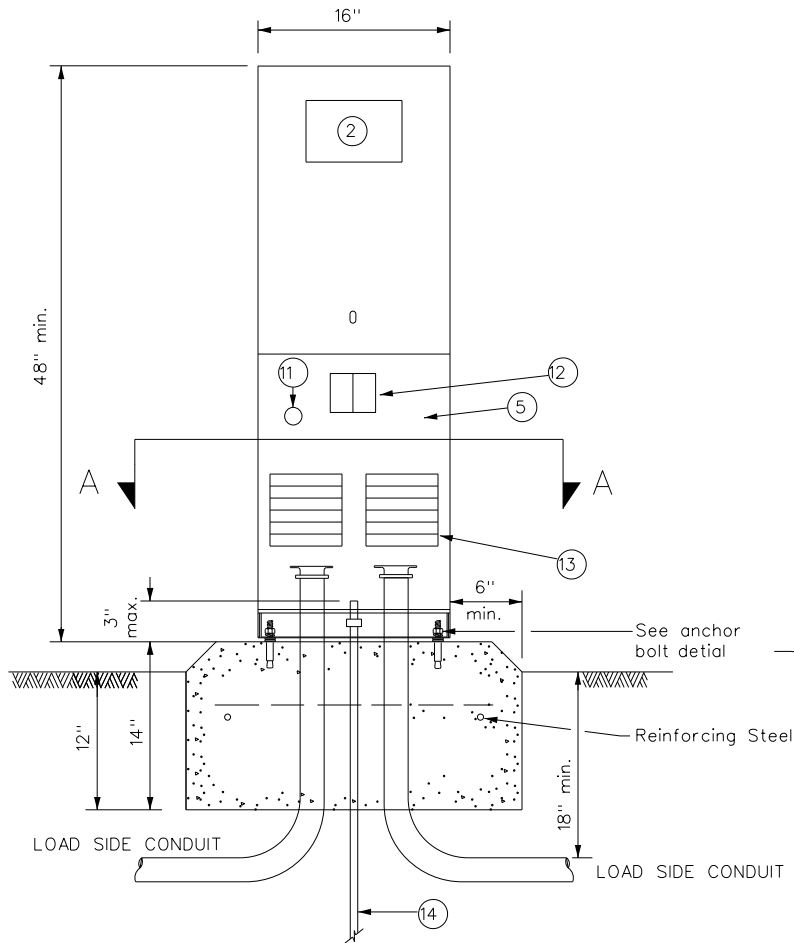
1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS) 11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services." Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.
2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.
3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."
5. Install 1/2 in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a 1/2 in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than 1/8 in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of 1/8 in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within 1/4 in. Repair rocking or movement of the service enclosure at no additional cost to the department.
7. Do not use liquid tight flexible metal conduit (LFMC) on pedestal type services.
8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.



SECTION A-A

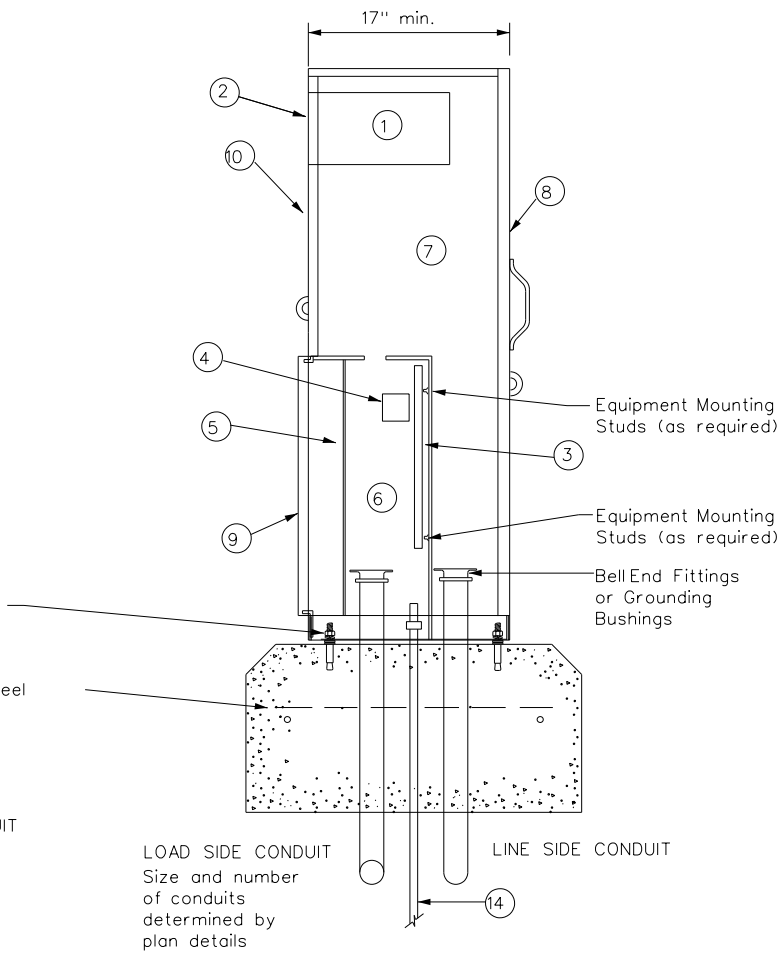


ANCHOR BOLT DETAIL



FRONT VIEW


TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SIDE VIEW

LEGEND

1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS

ELECTRICAL SERVICE SUPPORT

PEDESTAL SERVICE TYPE PS

ED(9)-14

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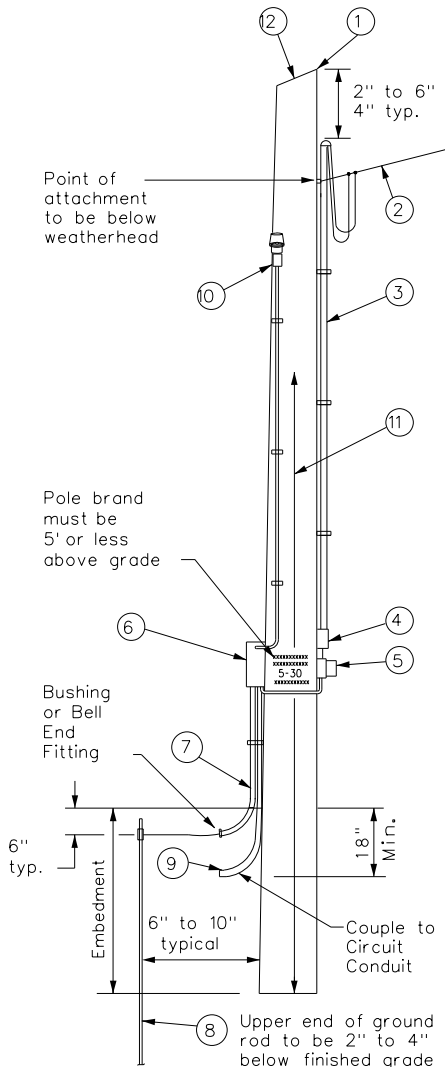
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TIMBER POLE(TP)SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrical service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to $\frac{5}{8}$ in. max. depth and $1\frac{1}{8}$ in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channelsized 1 in. to $3\frac{3}{4}$ in. maximum depth, and $1\frac{1}{2}$ in. to $1\frac{5}{8}$ in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, $\frac{1}{4}$ in. minimum diameter by $1\frac{1}{2}$ in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

- ① Class 5 pole, height as required
- ② Service drop from utility company (attached below weatherhead)
- ③ Service conduit (RMC) and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)
- ④ Safety switch (when required)
- ⑤ Meter (when required)
- ⑥ Service enclosure
- ⑦ 6 AWG bare grounding electrode conductor in $\frac{1}{2}$ in. PVC to ground rod - extend $\frac{1}{2}$ in. PVC 6 in. underground.
- ⑧ $\frac{5}{8}$ in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.
- ⑨ RMC same size as branch circuit conduit.
- ⑩ See pole-top mounted photocell detail on ED(5).
- ⑪ When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.
- ⑫ When required by utility, cut top of pole at an angle to enhance rain run off.

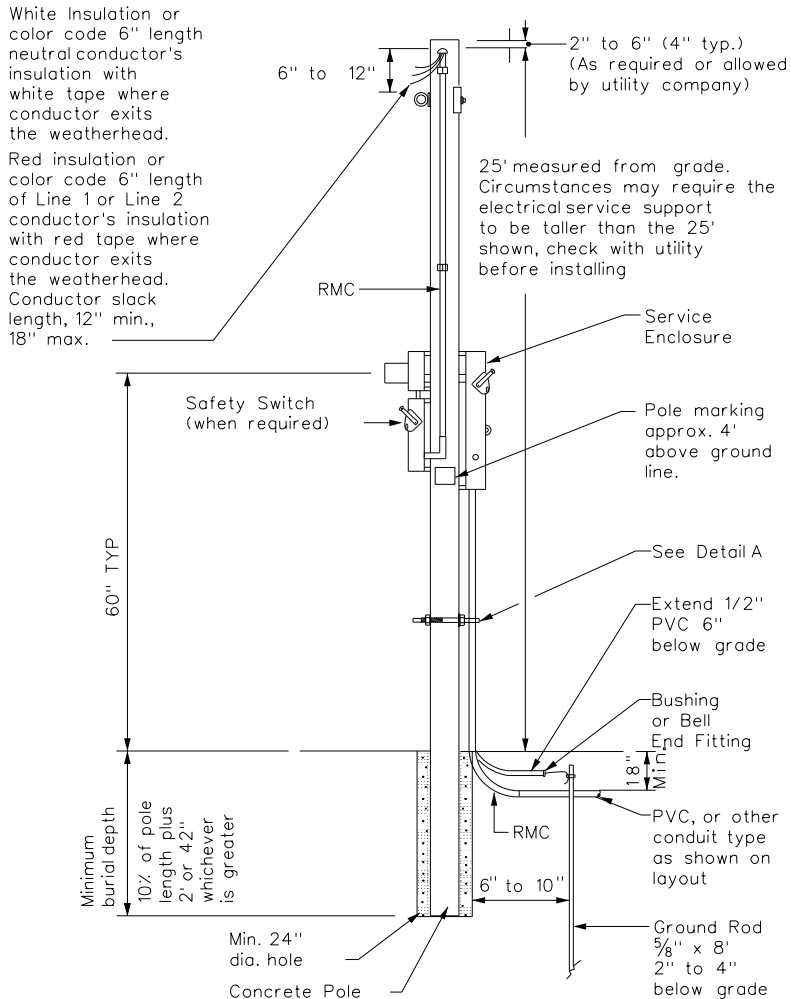


SERVICE SUPPORT TYPE TP (O)

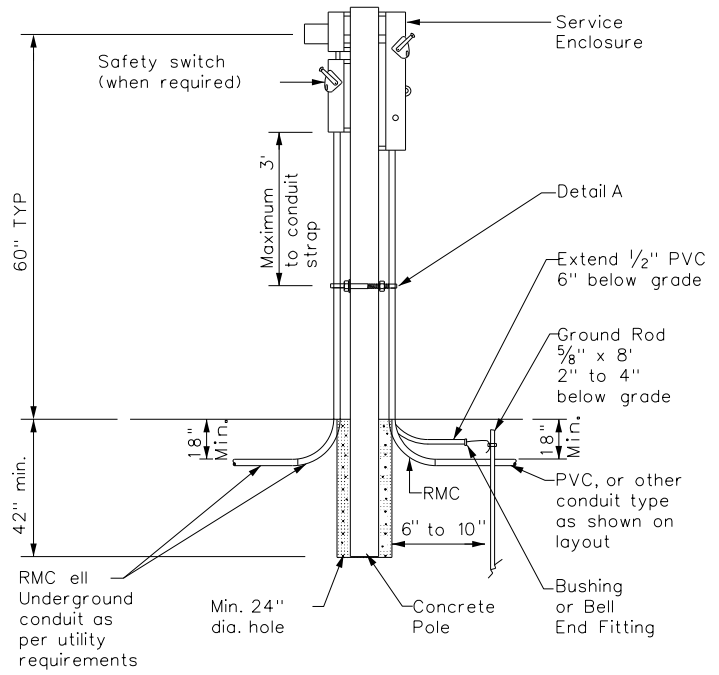
GRANITE CONCRETE(GC)& OTHER CONCRETE(OC)NOTES

Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

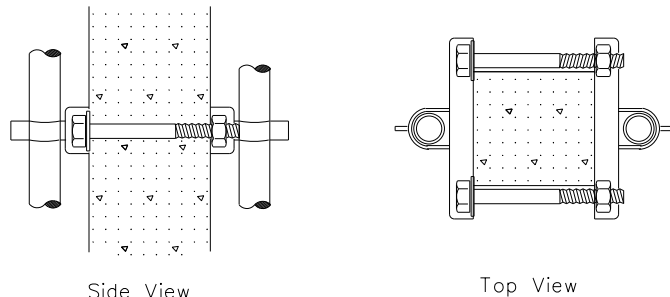
1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut $1\frac{1}{2}$ in. or $1\frac{3}{8}$ in. wide by 1 in. up to $3\frac{3}{4}$ in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1' depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



CONCRETE SERVICE SUPPORT
Overhead(O)




CONCRETE SERVICE SUPPORT
Underground(U)



DETAIL A

See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS

SERVICE SUPPORT

TYPES GC, OC, & TP

ED(10)-14

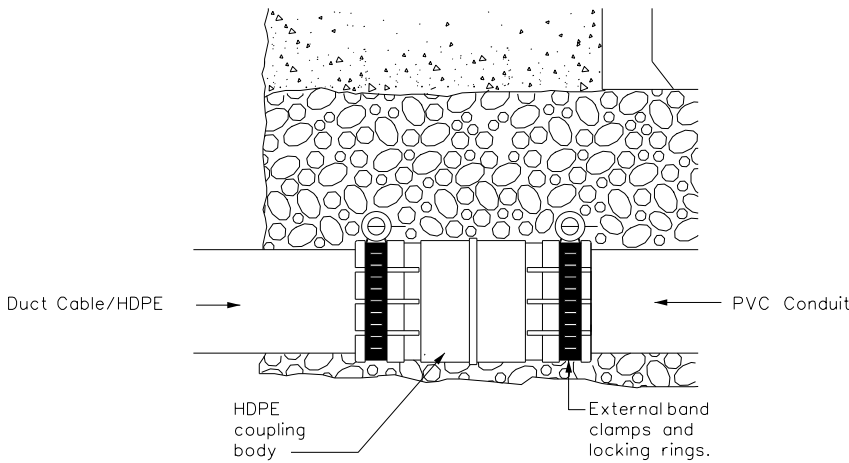
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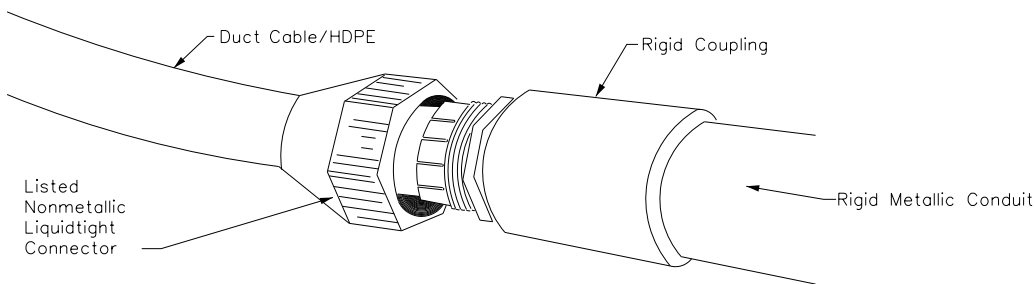
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DUCT CABLE & HDPE CONDUIT NOTES

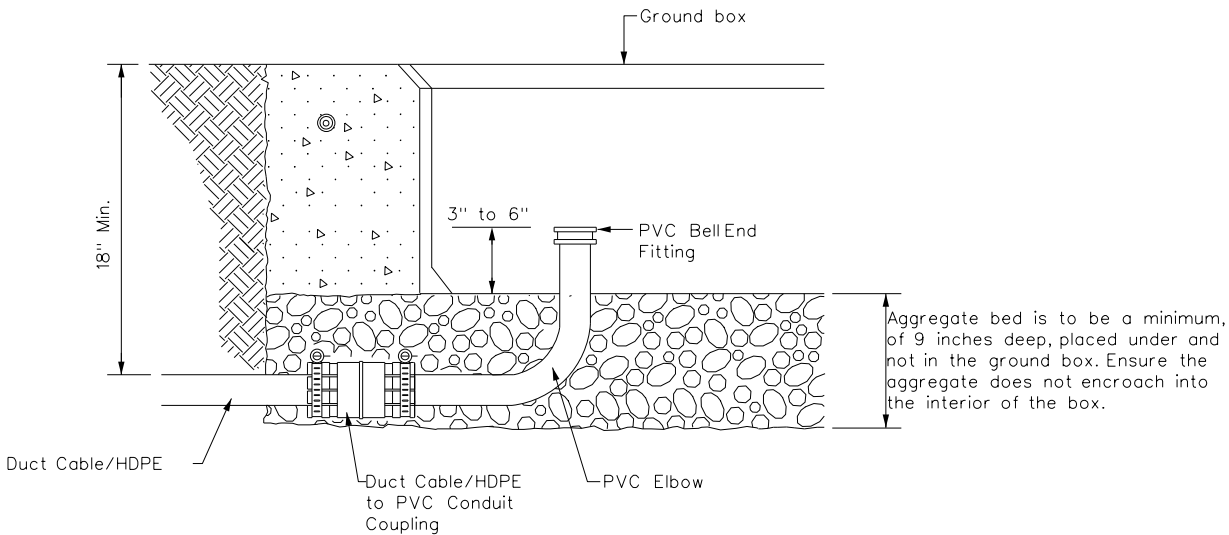
1. Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.
2. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.
3. Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.
4. Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.
5. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."
6. When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.
7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.
8. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.
9. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.



DUCT CABLE/HDPE TO PVC



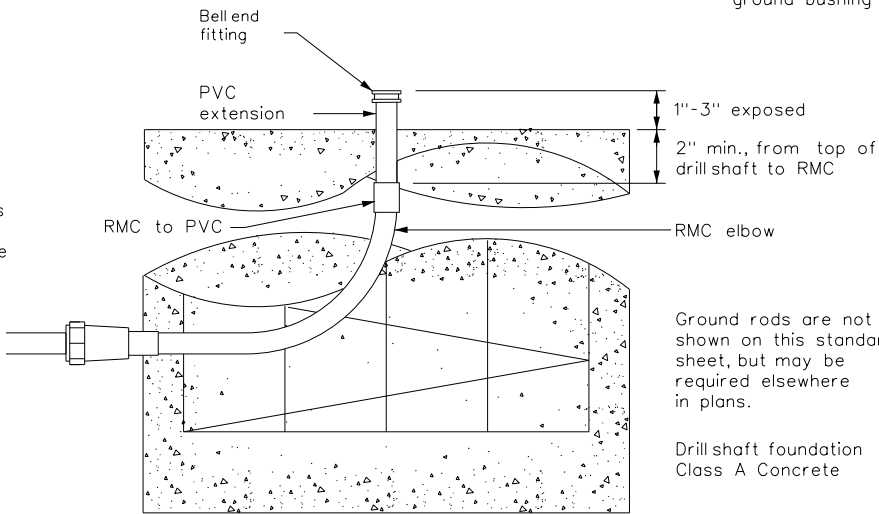
DUCT CABLE/HDPE TO RMC



DUCT CABLE/HDPE AT GROUND BOX

When the upper end of an RMC Elbow does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.

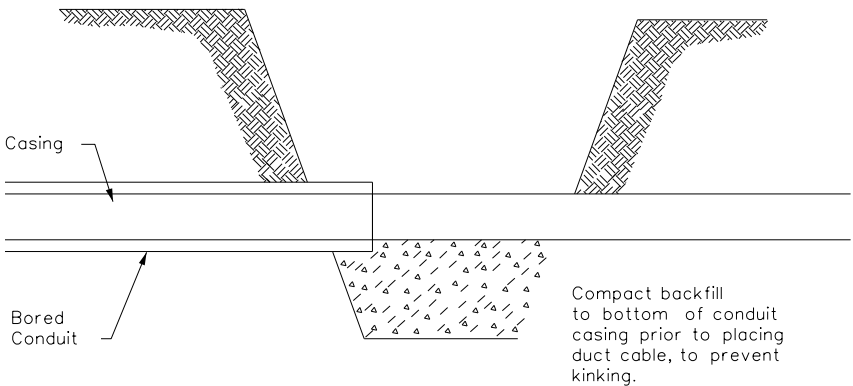
Couple duct to conduit elbow at foundations. Ensure conductors extend into pole base. Do not splice conductors in conduit.




DUCT CABLE / HDPE AT FOUNDATION

Ground rods are not shown on this standard sheet, but may be required elsewhere in plans.

Drill shaft foundation
Class A Concrete



BORE PIT DETAIL



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS

DUCT CABLE/

HDPE CONDUIT

ED(11)-14

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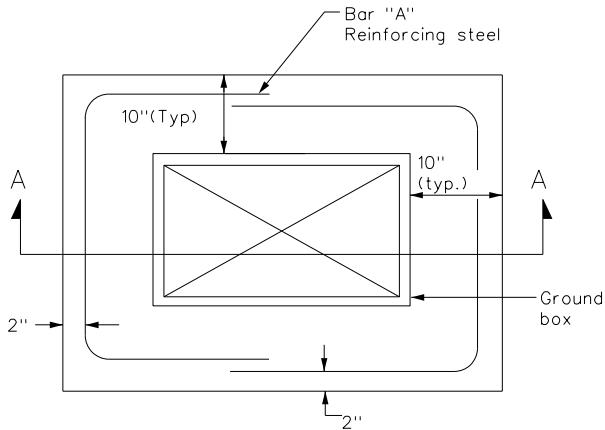
BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

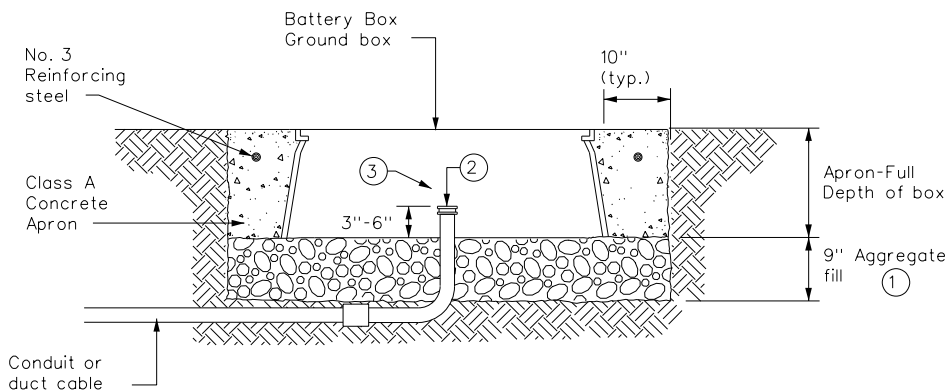
1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.
2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.
3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.
4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



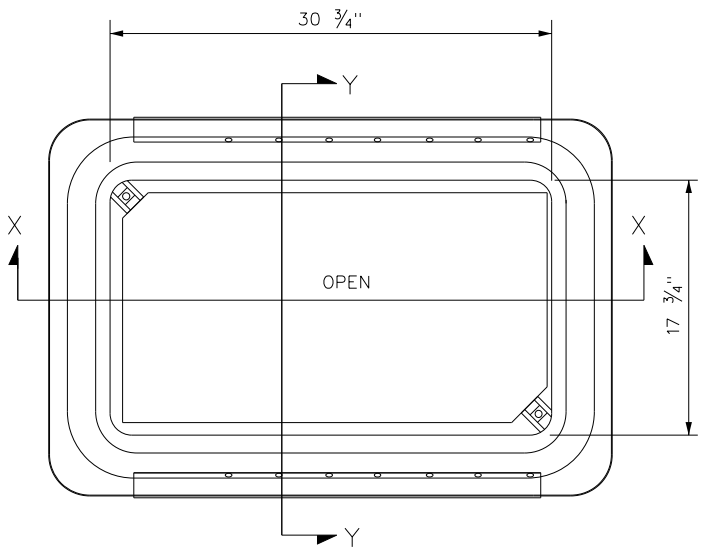
PLAN VIEW



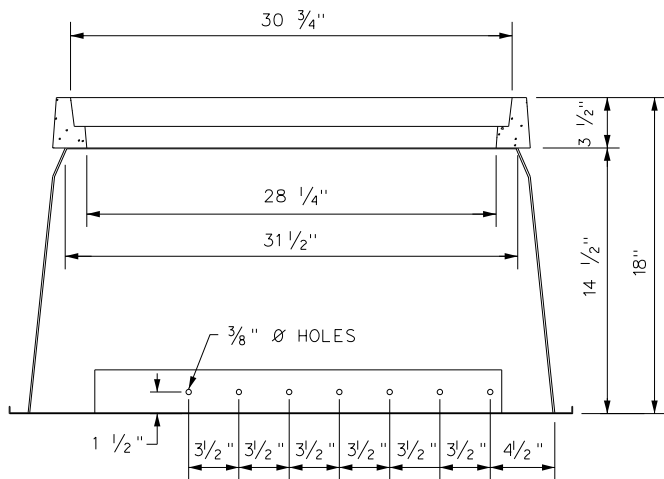
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

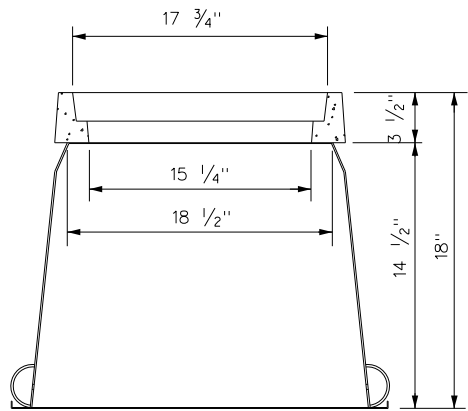
- ① Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.
- ② Install bushing or bell end fitting on the upper end of all ells.
- ③ Install all conduits in a neat and workmanlike manner.



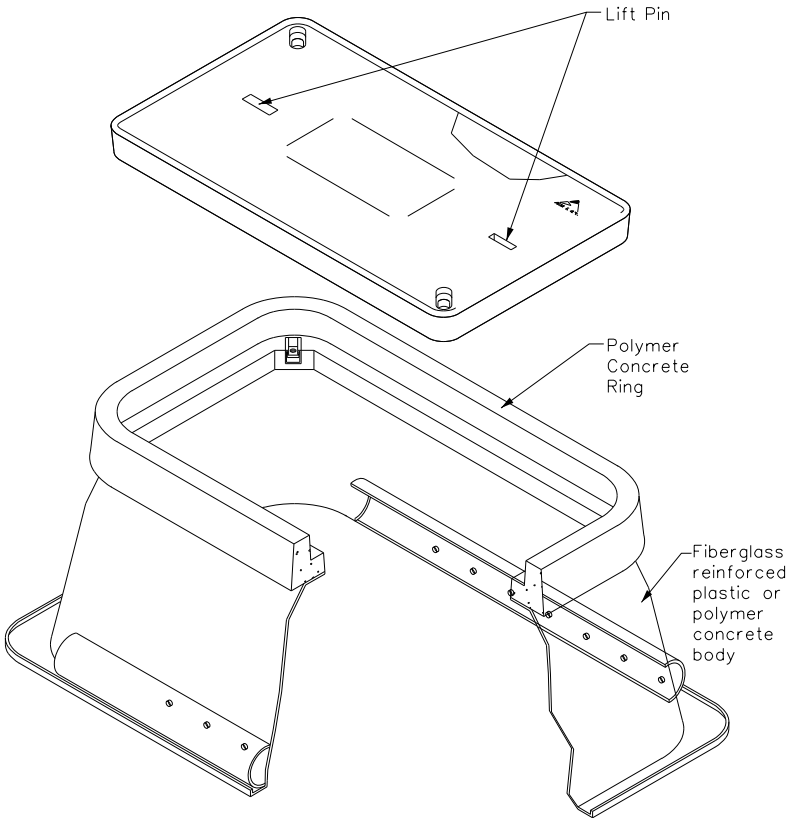
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



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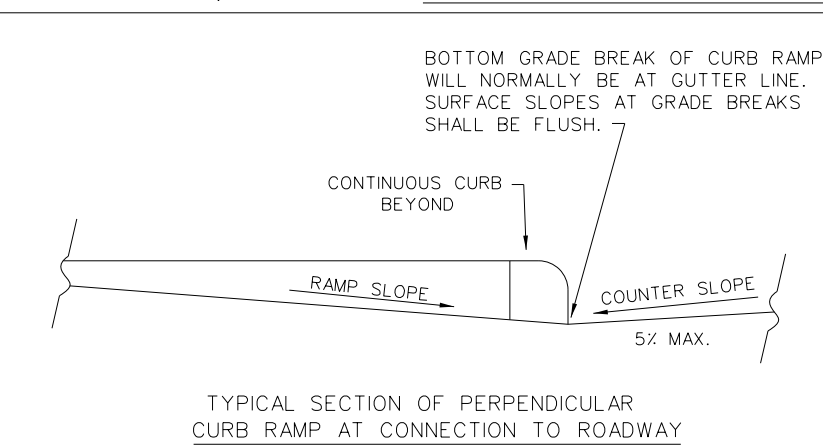
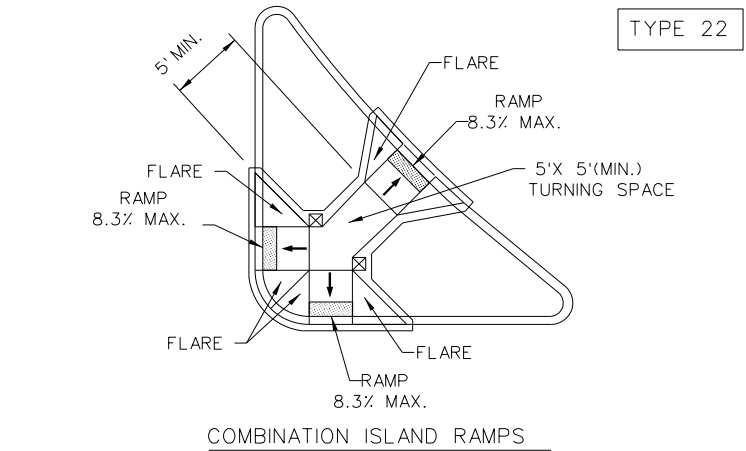
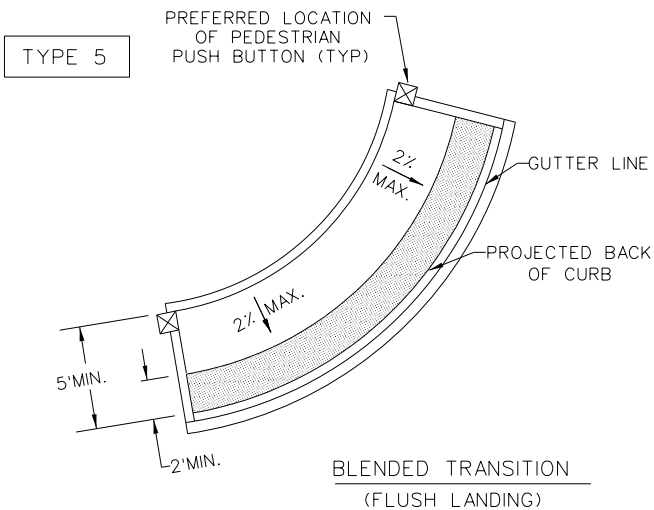
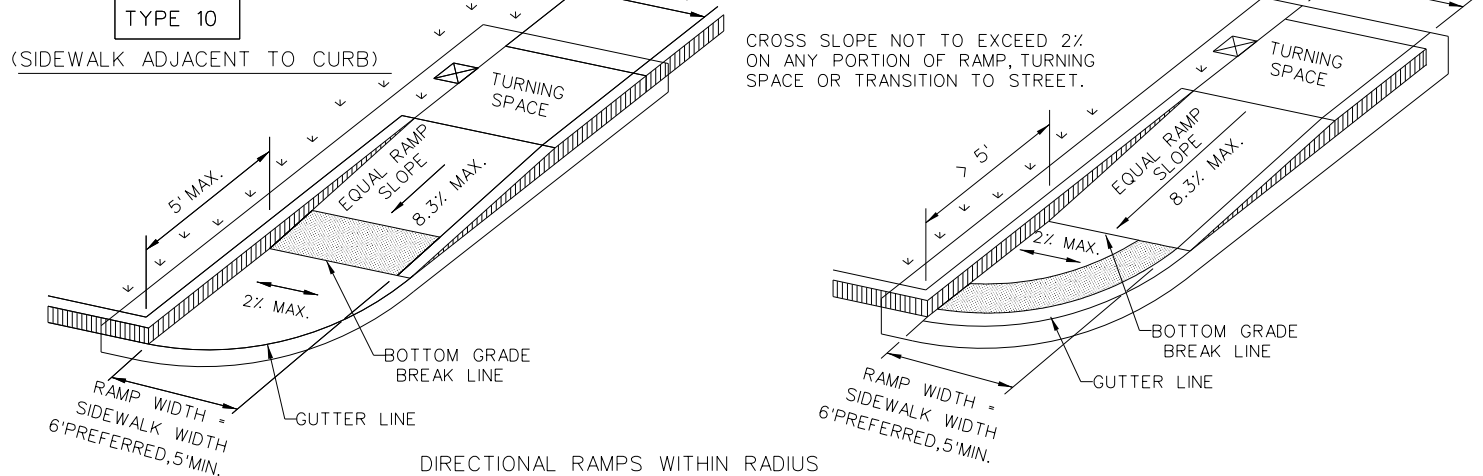
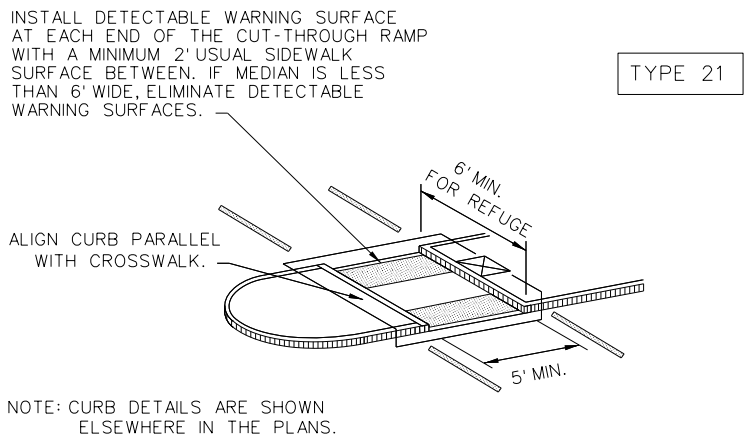
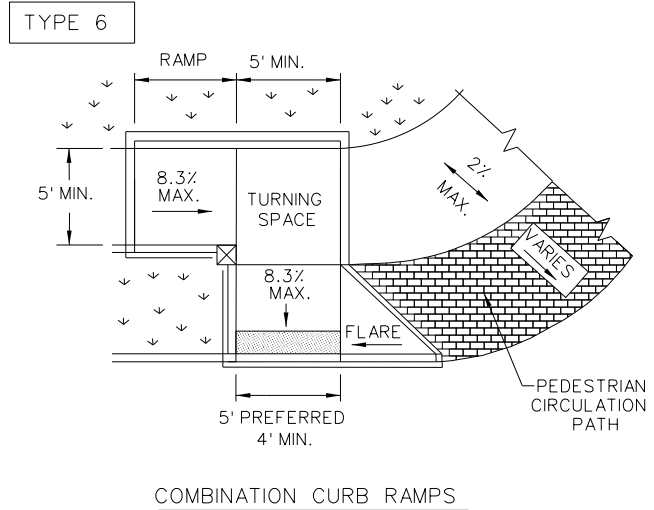
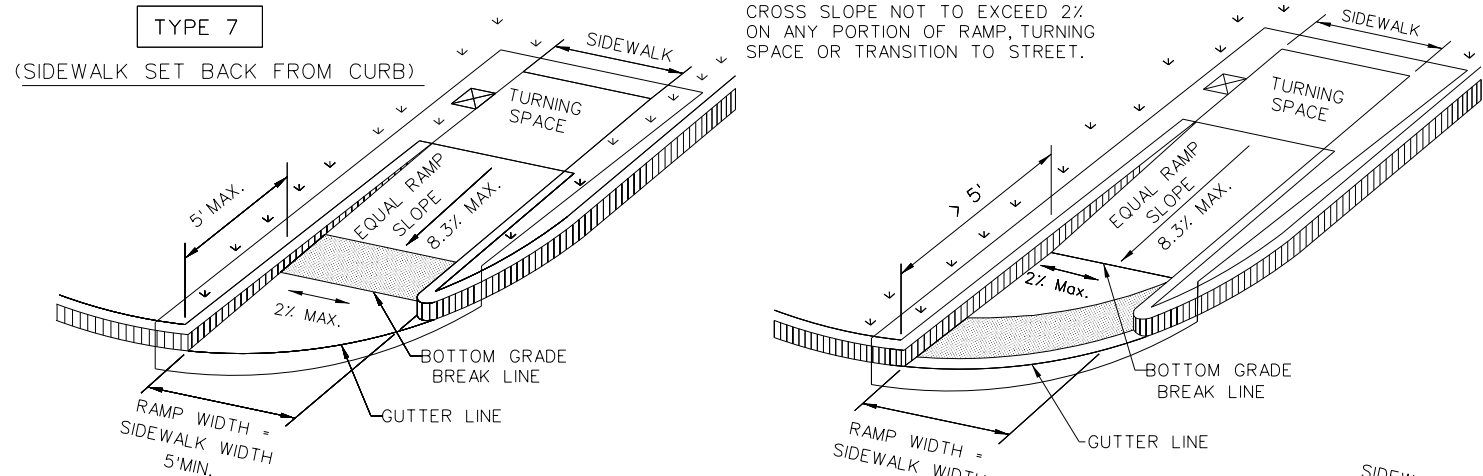
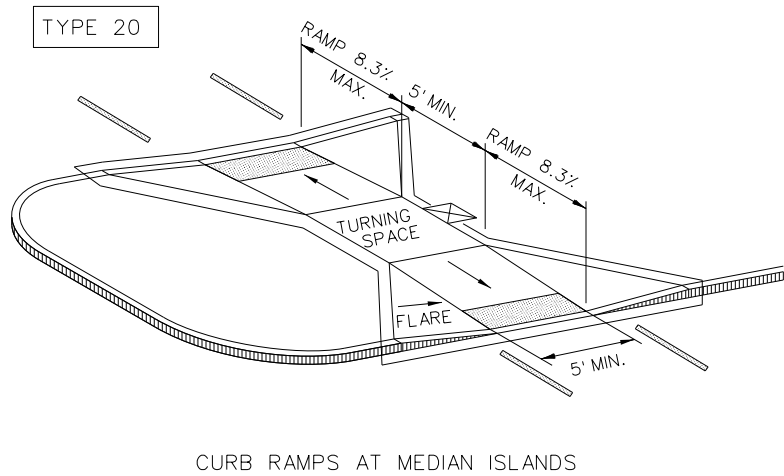
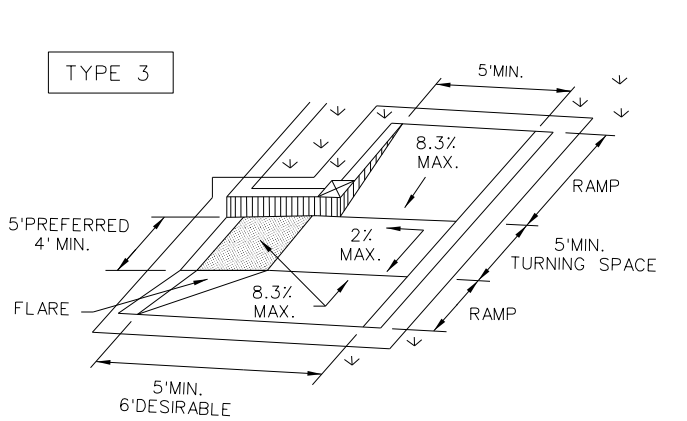
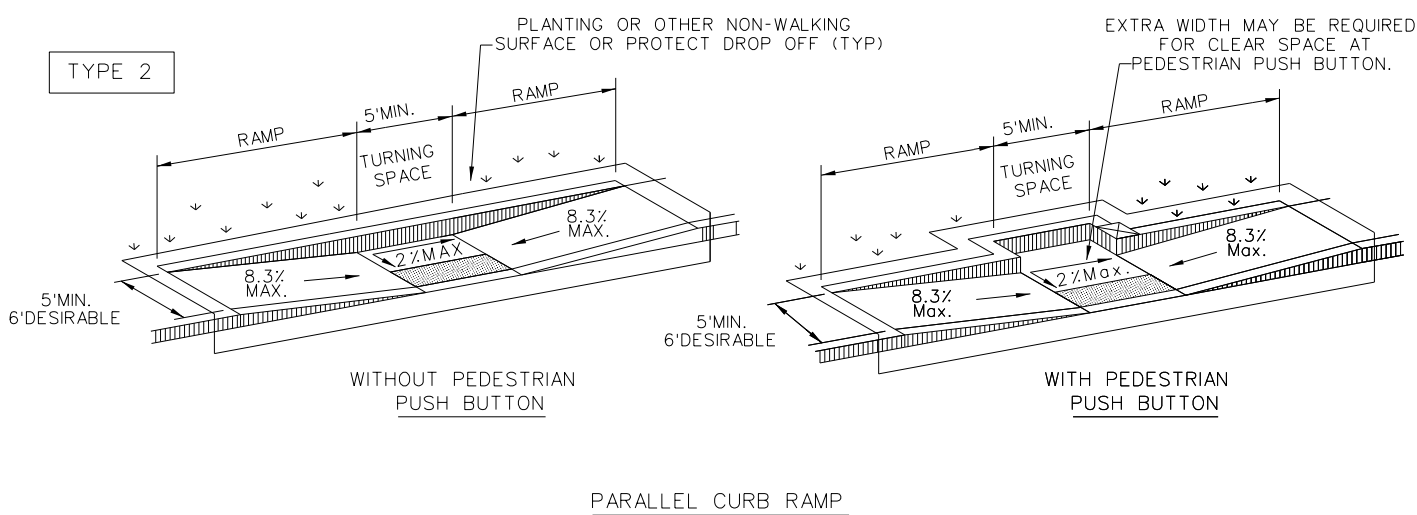
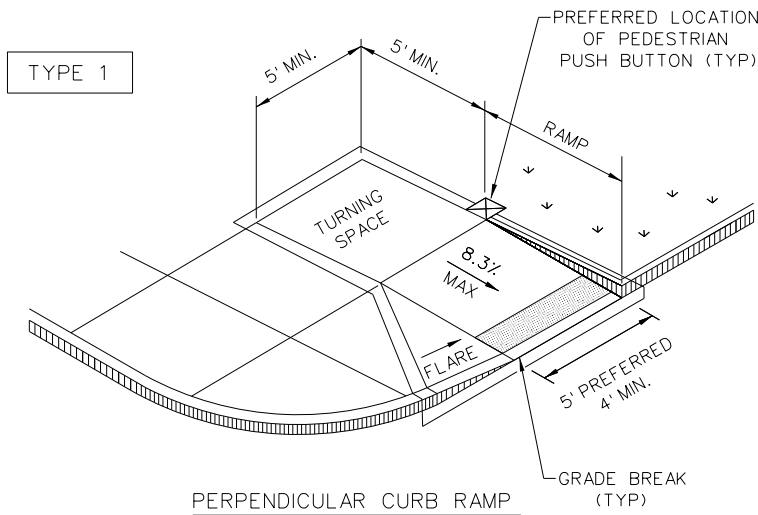
ELECTRICAL DETAILS
BATTERY BOX
GROUND BOXES

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	SAT	BEXAR		32

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DATE: 9/25/2024
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NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.



GUTTER LINE



DETECTABLE WARNING SURFACE



GRADE BREAK



DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.



RAMP LIMITS OF PAYMENT



SHEET 1 OF 4



Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISED 08, 2005	REVISIONS	-	-	-
REVISED 06, 2012	DIST	COUNTY	SHEET NO.	
REVISED 01, 2018	SAT	BEX	5	PED-18(1/4)

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GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicable standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

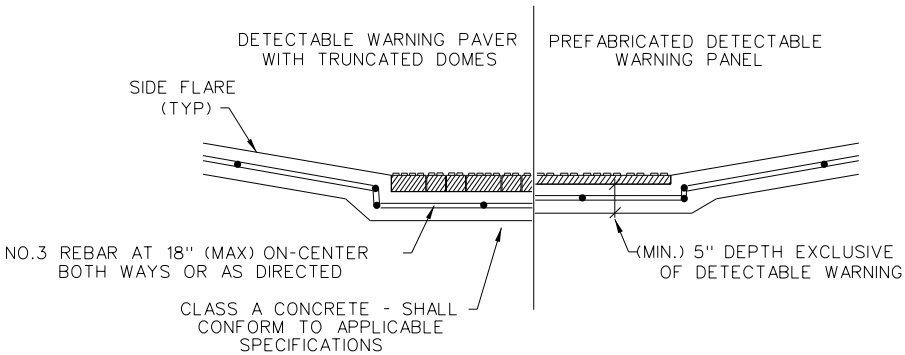
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

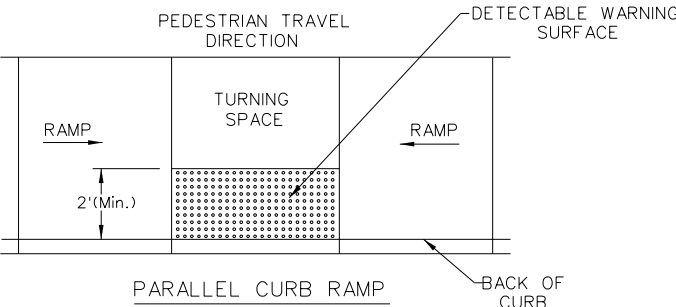
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

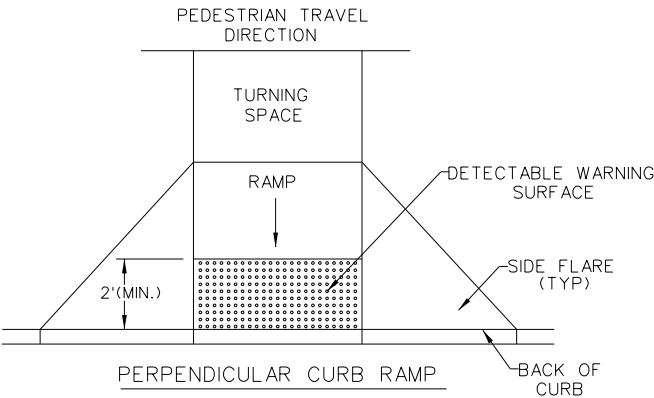


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

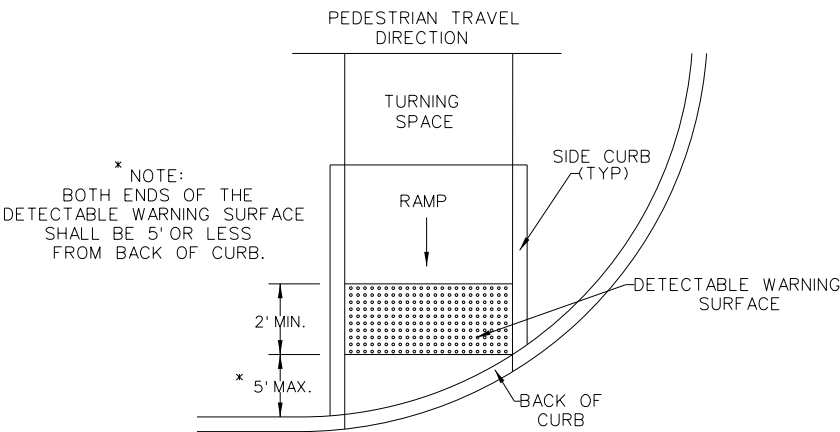
DETECTABLE WARNING SURFACE DETAILS



TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

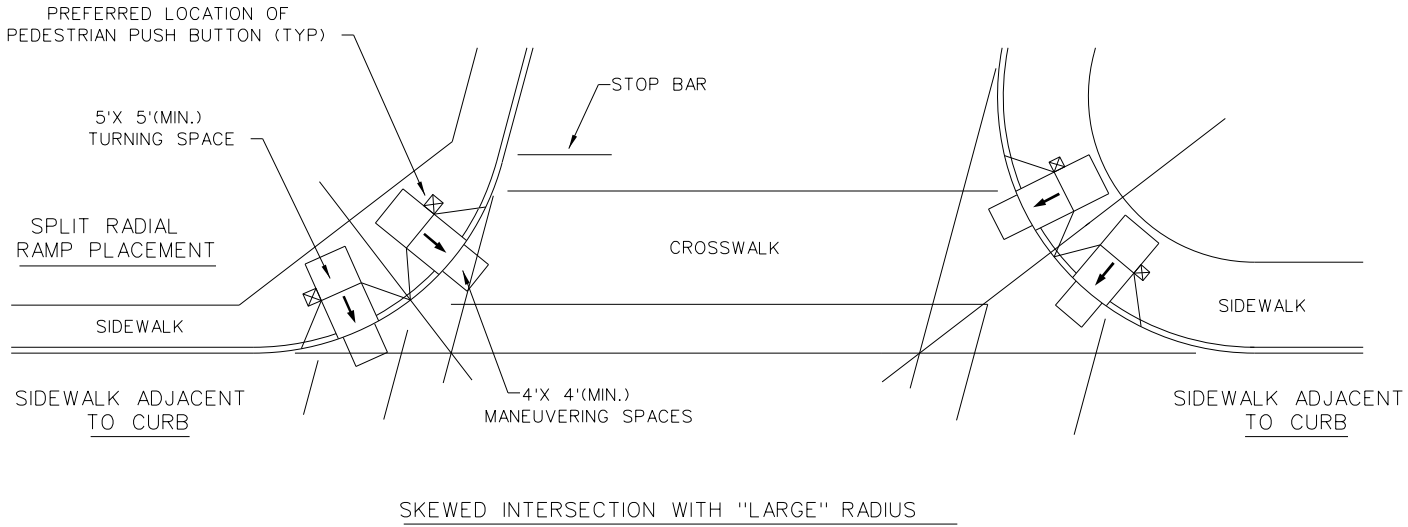
SHEET 2 OF 4

				Design Division Standard	
PEDESTRIAN FACILITIES					
CURB RAMPS					
PED-18					
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	-	-	-	-	
REVISED 08/2005	DIST	COUNTY			SHEET NO.
REVISED 06/2012	SAT	BEXA			\$PED-18(2/4)
REVISED 01/2018					\$

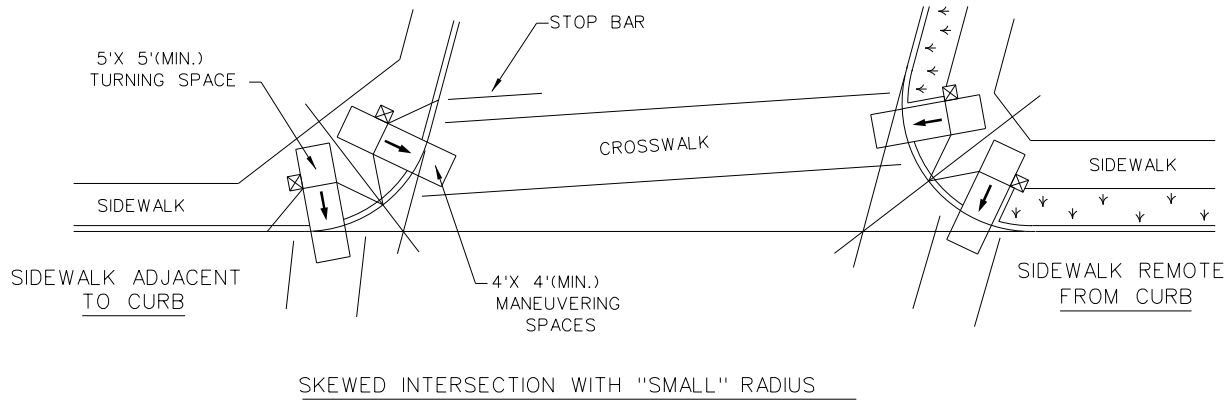
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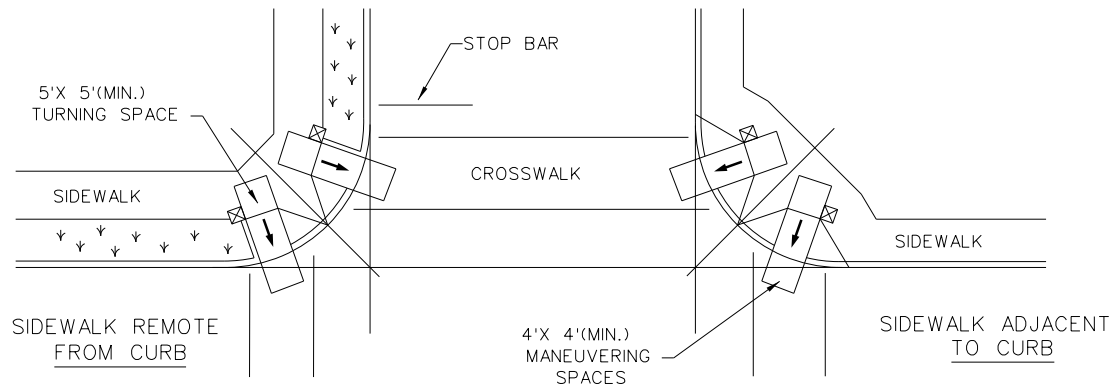
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



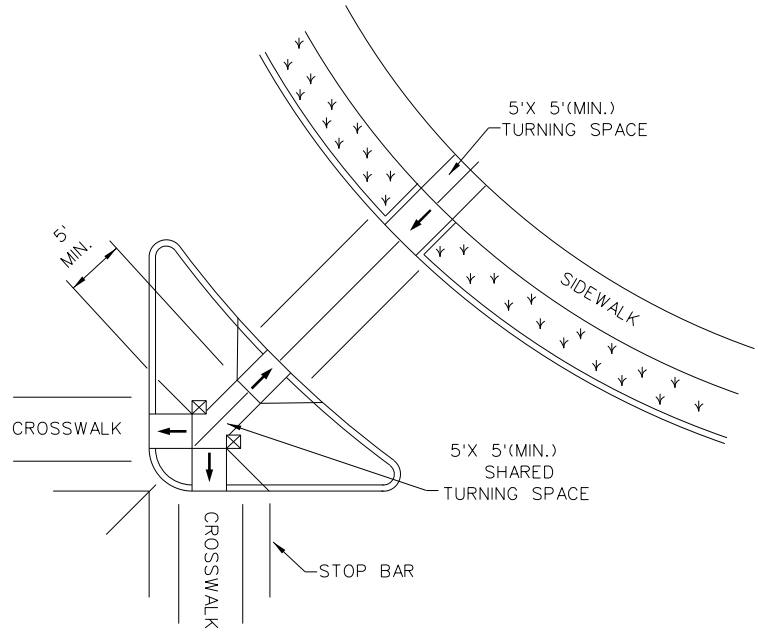
SKewed INTERSECTION WITH "LARGE" RADIUS



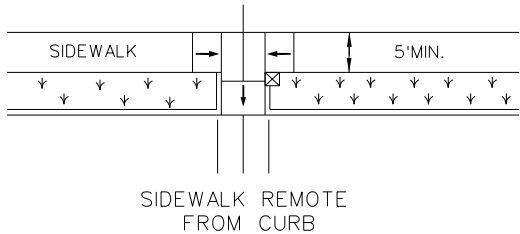
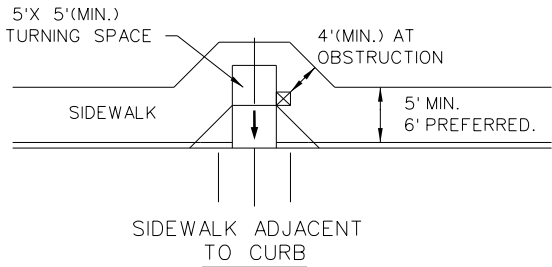
SKewed INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPs

LEGEND:

SHOWS DOWNWARD SLOPE.



DENOTES PREFERRED LOCATION OF PEDESTRIAN
PUSH BUTTON (IF APPLICABLE).



DENOTES PLANTING OR NON-WALKING SURFACE
NOT PART OF PEDESTRIAN CIRCULATION PATH.



SHEET 4 OF 4



Design
Division
Standard

PEDESTRIAN FACILITIES
CURB RAMPS

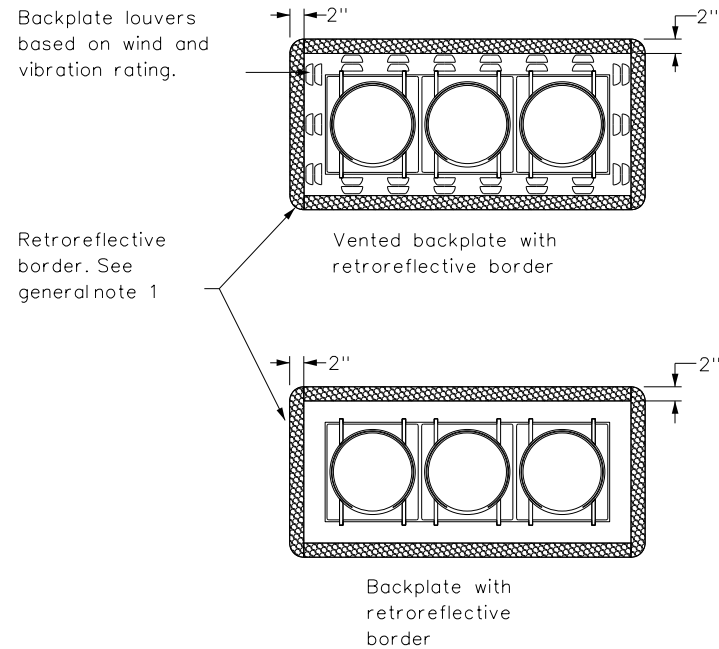
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
REVISED 08/2005	DIST	COUNTY	SHEET NO.	
REVISED 06/2012	SAT	BEXAR	PED-18	4/4
REVISED 01/2018				

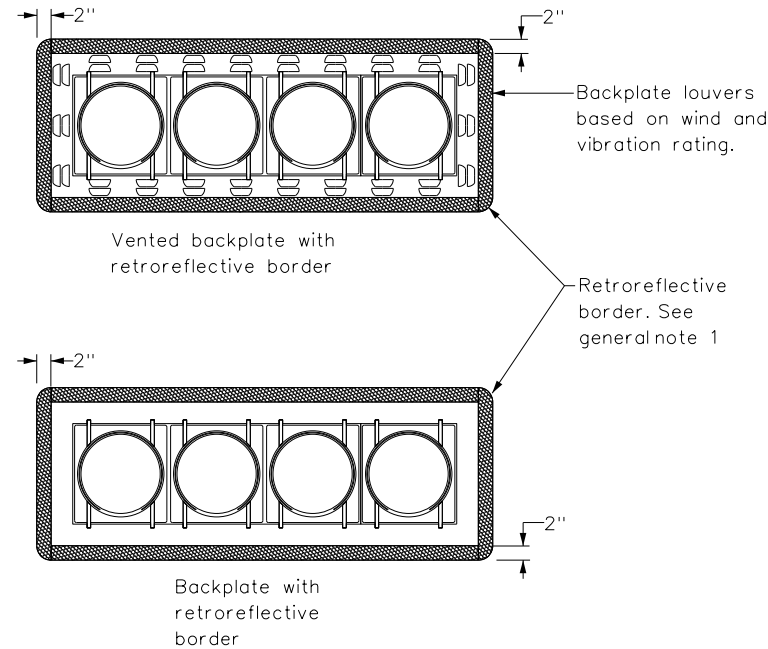
\$ PED-18(4/4) \$

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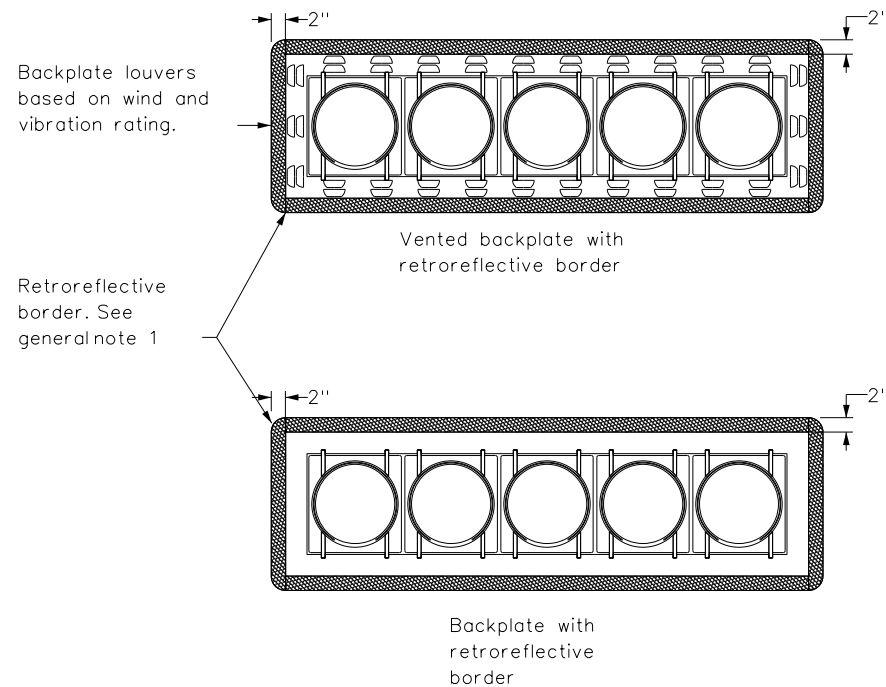
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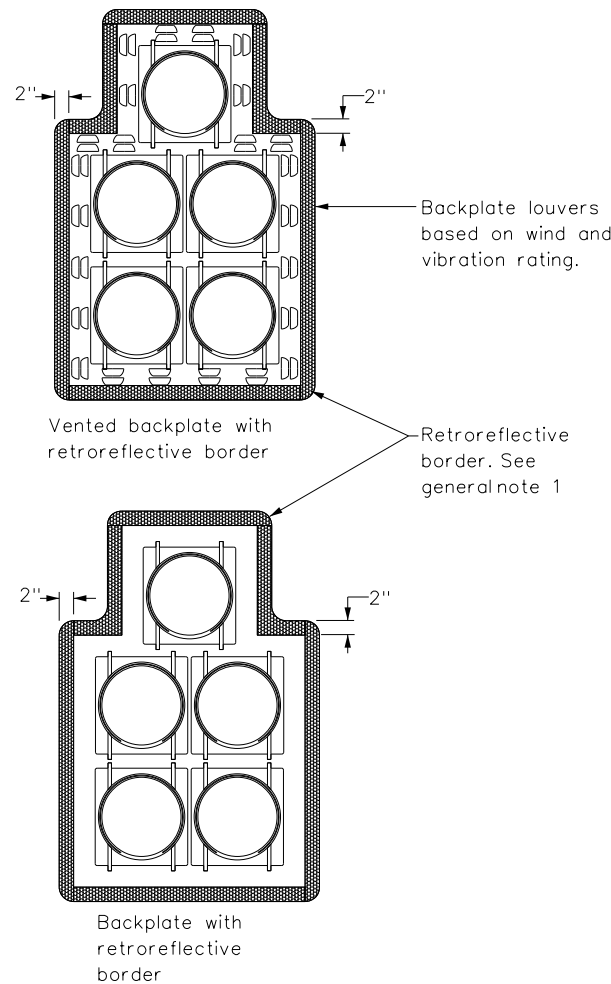
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



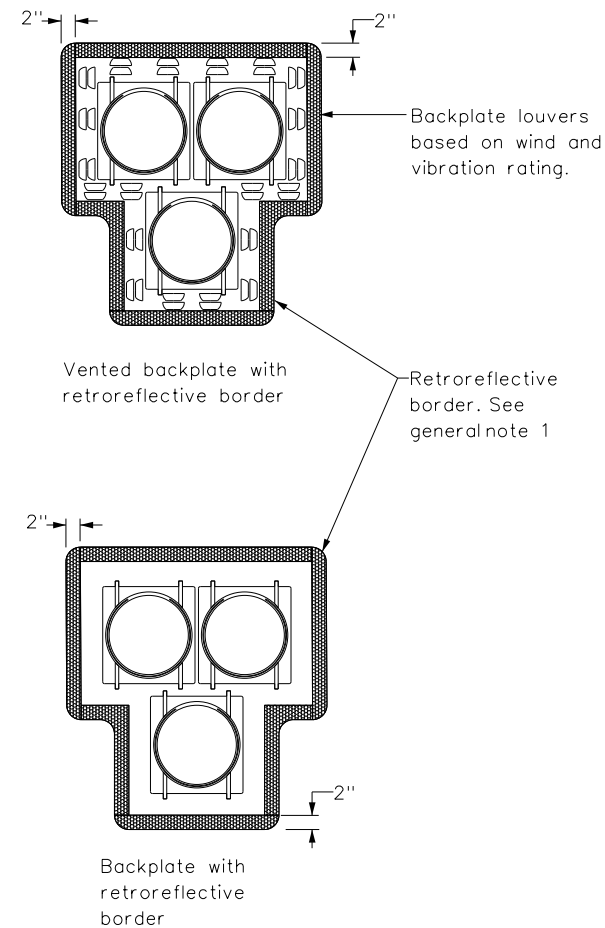
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL




FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B or R_1 retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signalhead and backplate compatibility must be verified by the contractor prior to installation.
3. When using backplates on signalheads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signalheads with backplates, including but not limited to:
 - Pole mounted
 - Overhead mounted
 - Span wire mounted
 - Mast arm mounted
 - Vertical signal heads
 - Horizontal signal heads
 - Clustered signal heads
 - Pedestrian hybrid beacons



Texas Department of Transportation

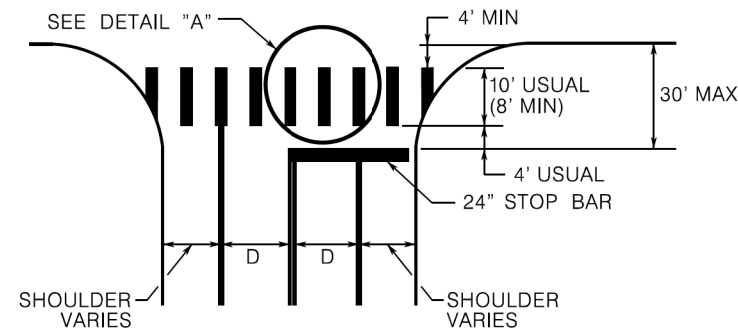
Traffic Safety Division Standard

TRAFFIC SIGNAL
HEAD WITH
BACKPLATE

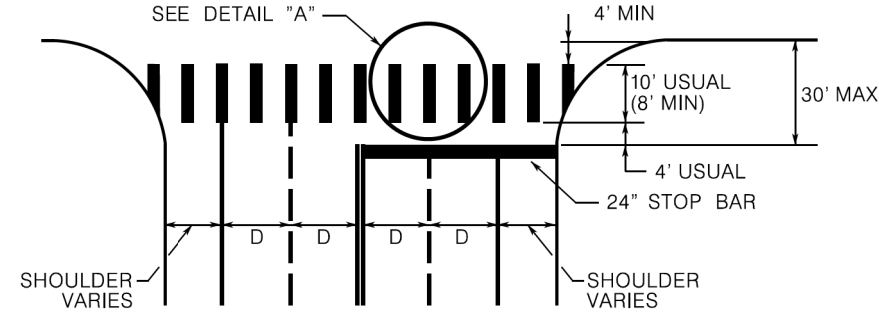
TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		36

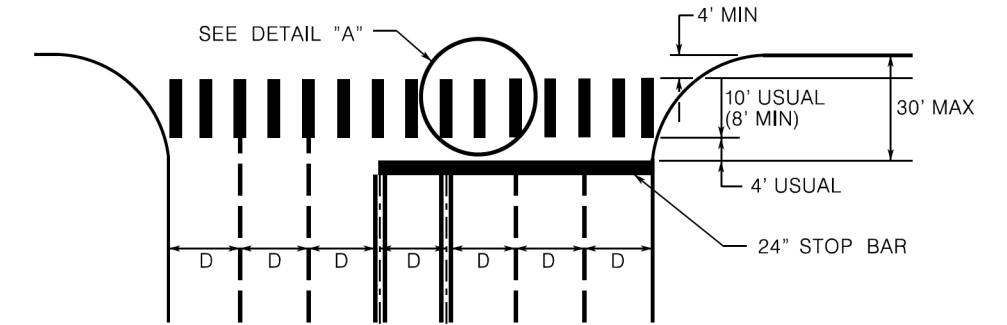
TWO LANES WITH SHOULDERS



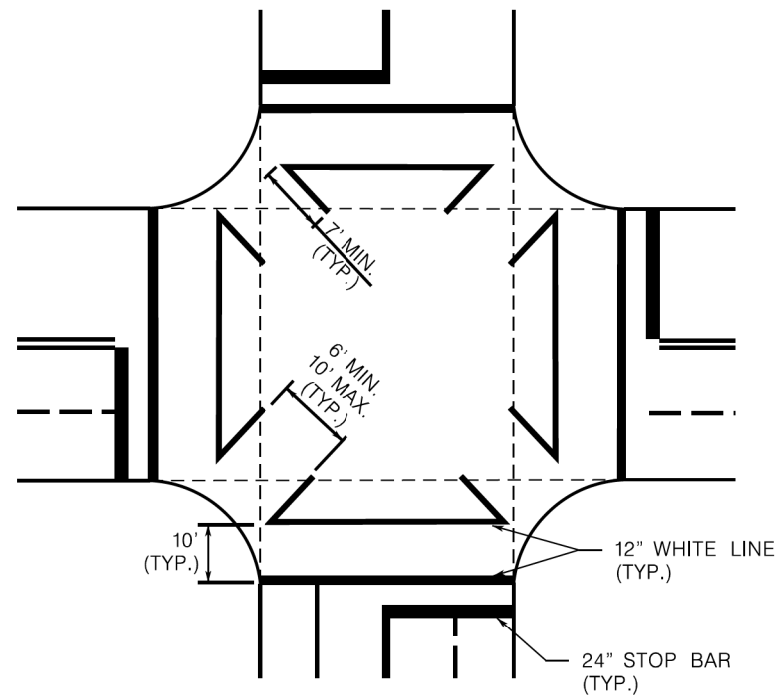
FOUR LANES WITH SHOULDERS



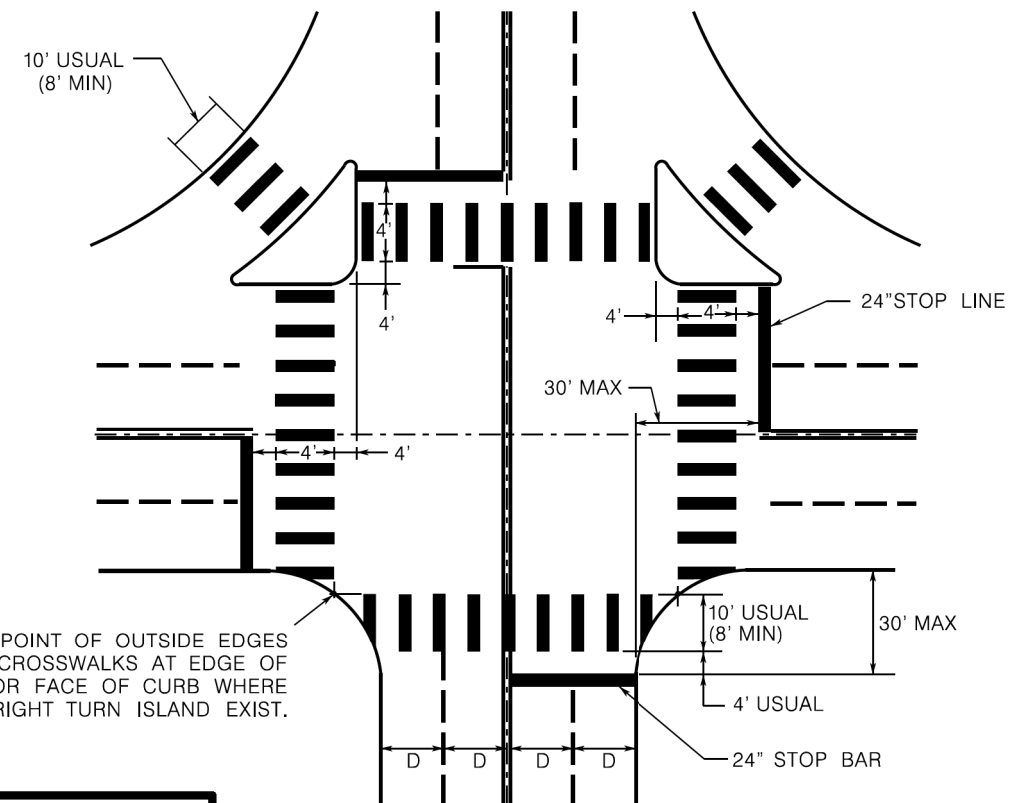
MULTI - LANES



EXCLUSIVE PEDESTRIAN PHASE

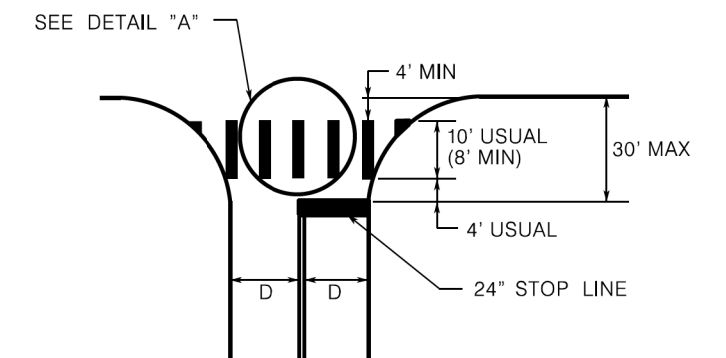


INTERSECTION WITH RIGHT-TURN ISLANDS

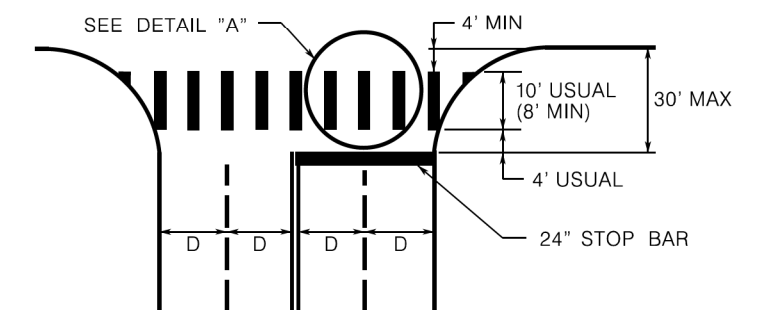


COMMON POINT OF OUTSIDE EDGES OF CROSSWALKS AT EDGE OF PAVEMENT OR FACE OF CURB WHERE NO RIGHT TURN ISLAND EXIST.

TWO LANES



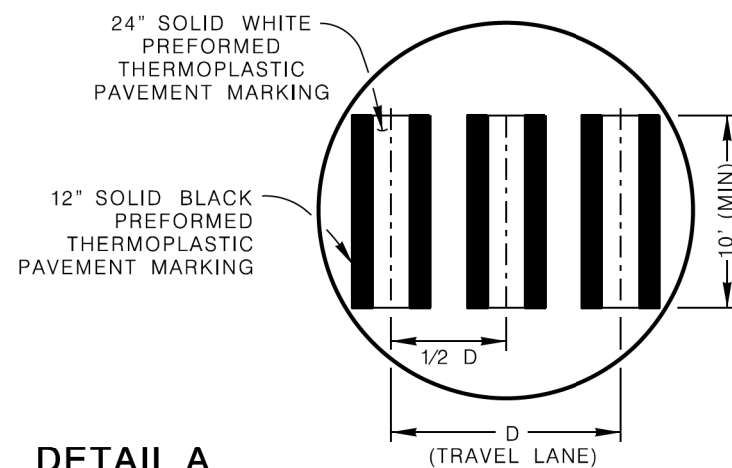
FOUR LANES



HIGH CONTRAST CROSSWALK

NOTES:

- CROSSWALKS AND STOP BARS SHALL BE WHITE.
- "D" IS EQUAL TO THE WIDTH OF TRAVEL LANE.
- PREFORMED THERMOPLASTIC SHALL BE USED FOR ALL CROSSWALK PAVEMENT MARKINGS.
- PREFORMED THERMOPLASTIC MATERIAL SHALL BE SUPPLIED BY A MANUFACTURER LISTED ON TxDOT'S MATERIAL PRODUCER LIST (MPL).



DETAIL A

GENERAL NOTES:

- CROSSWALKS AND STOP BARS SHALL BE WHITE.
- "D" IS EQUAL TO THE WIDTH OF TRAVEL LANE.
- PREFORMED THERMOPLASTIC SHALL BE USED FOR ALL CROSSWALK PAVEMENT MARKINGS.
- PREFORMED THERMOPLASTIC MATERIAL SHALL BE SUPPLIED BY A MANUFACTURER LISTED ON TxDOT'S MATERIAL PRODUCER LIST (MPL).

JULY 2017

CITY OF SAN ANTONIO

TRANSPORTATION & CAPITAL IMPROVEMENTS DEPARTMENT

TRANSPORTATION SERVICES CONSTRUCTION STANDARDS

TYPICAL CROSSWALK DETAILS

100 % SUBMITTAL	PROJECT NO.: 12044-07	DATE: 9/25/2024
DRWN. BY: LAN	RVSD. BY: AF	CHKD. BY: GE, PE
		SHEET NO.: 37

Diagram illustrating a turn bay opening and storage length configuration for a road intersection. The diagram shows a road layout with various markings and dimensions:

- 4" DOUBLE YELLOW WITH TYPE II-A-A REFL. MARKERS AT 20' O.C. (TWO ROWS)**: Markings on the left side of the road.
- CONC. CURB**: Concrete curb on the left side.
- 4" SOLID WHITE EDGE LINE**: Marking on the top edge of the road.
- 8" SOLID WHITE LINE WITH TYPE I-C REFL. MARKERS AT 20' O.C.**: Marking on the right side of the road.
- 1' (MIN.)**: Minimum width dimension for the turn bay opening.
- 80'**: Dimension for the turn bay opening length.
- 4" SOLID WHITE EDGE LINE**: Marking on the bottom edge of the road.
- 10' (MIN.)**: Minimum width dimension for the storage length.
- TURN BAY OPENING**: The area where the vehicle turns.
- STORAGE LENGTH**: The area where the vehicle waits for the turn.
- 4" DOUBLE YELLOW WITH TYPE II-A-A REFL. MARKERS AT 20' O.C. (TWO ROWS)**: Markings on the bottom side of the road.
- MIDDLE OF CORNER RADIUS OR STOP LINE (IF PRESENT)**: Marking on the right side of the road.

MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM OPENING (FT)
40 OR LESS	110'
45 OR MORE	150'

DUAL LEFT (RAISED MEDIAN)

4" WHITE DASHED STRIPES WITH TYPE I-C REFL. MARKERS AT 40' O.C.

CONC. CURB 1' (MIN)

4" SOLID WHITE EDGE LINE

RAISED MEDIAN CURB

6" BROKEN WHITE LINE (2' LINE - 6' O.C.)

SEE DETAIL "A"

4" SOLID YELLOW EDGE LINE 1' (MIN)

VARIES BASED ON LANE CONFIGURATION

ONLY ONLY

CONC. CURB 4" SOLID WHITE EDGE LINE

8" SOLID WHITE LINE WITH TYPE I-C REFL. MARKERS AT 20' O.C.

BAY TAPER

STORAGE LENGTH

MIDDLE OF CORNER RADIUS OR STOP LINE (IF PRESENT)

RADIUS PER PLANS, OR AS DIRECTED BY THE ENGINEER

2' 4' 2'

DETAIL "A"

POSTED SPEED (MPH)	DUAL LT LANES (FT)
25-35	150'
40-45	150'
50-55	250'

POSTED SPEED (MPH)	MINIMUM LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

8" SOLID WHITE LINE WITH TYPE I-C REFL. MARKERS AT 20' O.C.

4" WHITE DASHED STRIPES WITH TYPE I-C REFL. MARKERS AT 40' O.C.

RAISED MEDIAN CURB CONC. CURB

4" SOLID WHITE EDGE LINE

24" WHITE STOP LINE OR CROSSWALK LINE

1' (MIN)

1' (MIN)

1' (MIN)

4" SOLID YELLOW EDGE LINE

4" SOLID WHITE EDGE LINE

1' (MIN)

BAY TAPER

STORAGE LENGTH

MIDDLE OF CORNER RADIUS OR STOP LINE (IF PRESENT)

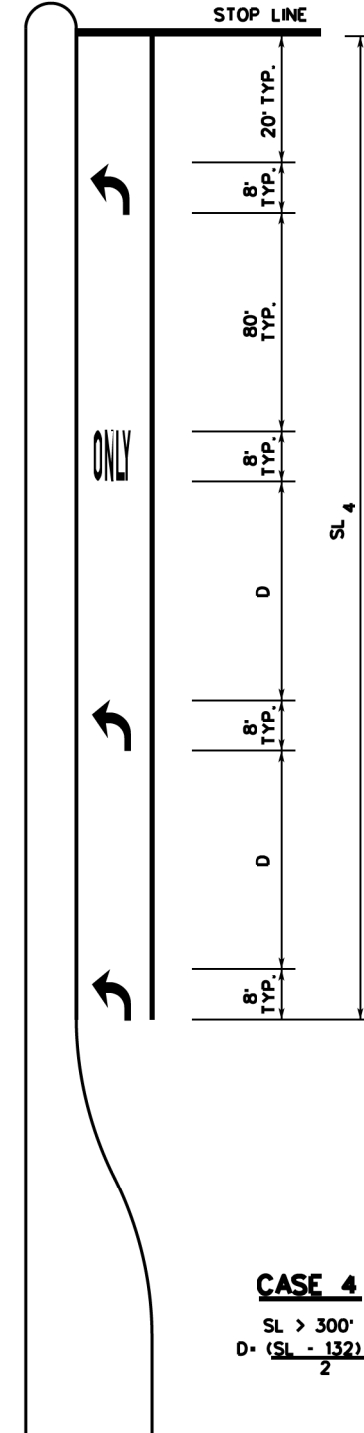
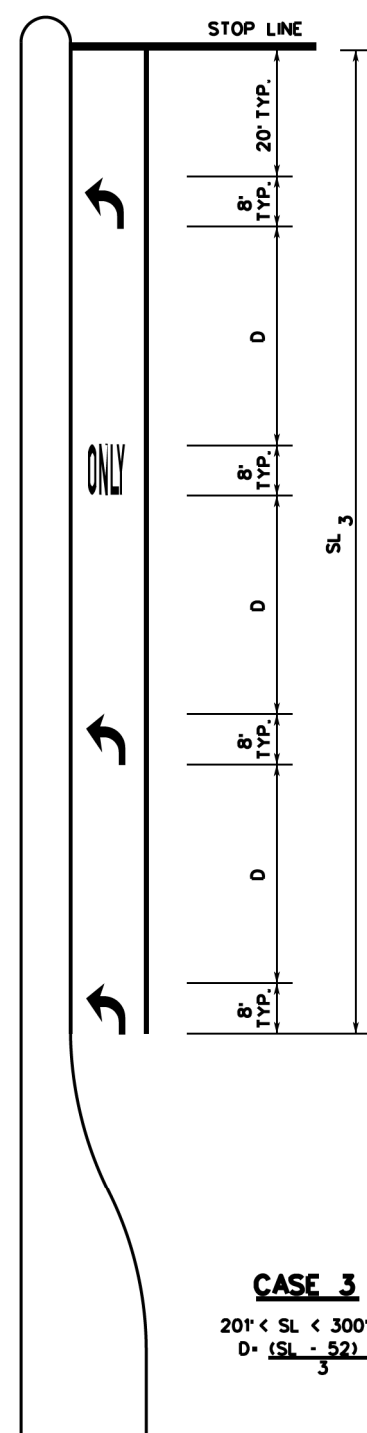
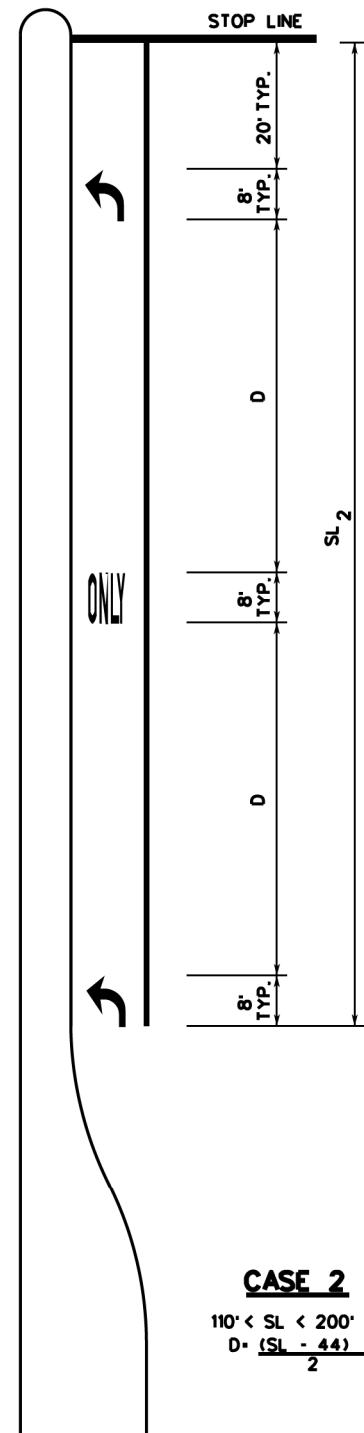
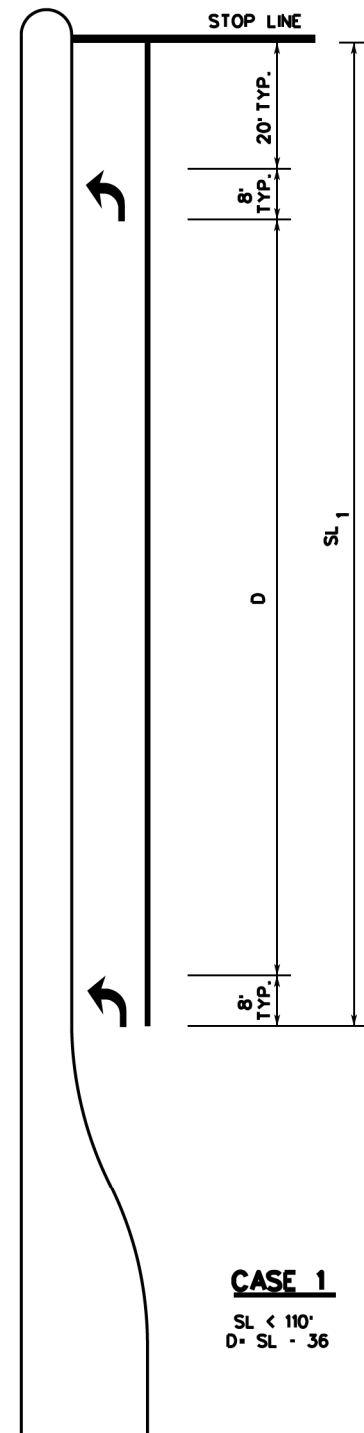
MINIMUM TURN BAY REVERSE CURVE TAPER LENGTHS	
POSTED SPEED (MPH)	SINGLE LT LANE (FT)
25-35	100'
40-45	100'
50-55	150'

MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

- NOTES:**
1. THE POSTED SPEED LIMIT IS TYPICALLY EQUAL TO THE DESIGN SPEED MINUS 5 MPH.
 2. THE DIMENSIONS GIVEN FOR DUAL LEFT (RAISED MEDIAN) IN THE MINIMUM LENGTH TABLES ON THIS SHEET ARE ALSO APPLICABLE FOR DUAL RIGHT-TURN LANES.
 3. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS OR APPROXIMATE CALCULATIONS.
 4. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
 5. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
 6. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.
 7. 4" SOLID WHITE AND YELLOW EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

100% SUBMITTAL	PROJECT NO.: 12044-07	DATE: 9/25/2024
DRWN BY: LAN	DSGN BY: C.R.V.	CHKD BY: M.E.
		SHEET NO.: 38



KEY:

SL - STORAGE LENGTH (FEET)

D - DISTANCE BETWEEN ARROWS AND LEGENDS (FEET)

GENERAL NOTES:

1. THESE DETAILS ALSO APPLY TO RIGHT-TURN LANES.
2. FOR DUAL-TURN LANES, DIMENSIONS SHALL BE THE SAME FOR EACH LANE.
3. SL DIMENSION IS FROM STOP LINE TO END OF TURN LANE, WHICH DOES NOT INCLUDE TAPER LENGTH.
4. PAVEMENT ARROWS AND "ONLY" LEGEND MARKINGS ARE TYPICALLY USED AT SIGNALIZED INTERSECTIONS AND AT UNSIGNALIZED INTERSECTIONS WHERE A DEMONSTRATED NEED EXISTS.
5. MINIMUM SL = 110'. SL MAY BE LESS THAN 110 FEET AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

LEFT-TURN "ONLY" AND ARROW
SPACING WORKSHEET

SHEET 1 OF 16

100% SUBMITTAL PROJECT NO.: 12044-07 DATE: 9/25/2024
 DRWN BY: J.A.N. DSGN. BY: C.R.V. CHKD. BY: M.E. SHEET NO.: 39

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ No Action Required ☒ Required Action

Action No.

- Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
- Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
- Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
- When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
- NOI required: Yes ☒ No ☐

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

- ☒ No Permit Required
- ☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
- ☐ Nationwide Permit 14 - PCN Required
- ☐ Individual 404 Permit Required
- ☐ Other Nationwide Permit Required: NWP* _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

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401 Best Management Practices: (Not applicable if no USACE permit)

Erosion

- ☐ Temporary Vegetation
- ☐ Blankets/Matting
- ☐ Mulch
- ☐ Sodding
- ☐ Interceptor Swale
- ☐ Diversion Dike
- ☐ Erosion Control Compost
- ☐ Mulch Filter Berm and Socks
- ☐ Compost Filter Berm and Socks

Sedimentation

- ☒ Silt Fence
- ☒ Rock Berm
- ☐ Triangular Filter Dike
- ☐ Sand Bag Berm
- ☐ Straw Bale Dike
- ☐ Brush Berms
- ☐ Erosion Control Compost
- ☐ Mulch Filter Berm and Socks
- ☐ Compost Filter Berm and Socks
- ☐ Stone Outlet Sediment Traps
- ☐ Sediment Basins

Post-Construction TSS

- ☐ Vegetative Filter Strips
- ☐ Retention/Irrigation Systems
- ☐ Extended Detention Basin
- ☐ Constructed Wetlands
- ☐ Wet Basin
- ☐ Erosion Control Compost
- ☐ Mulch Filter Berm and Socks
- ☐ Compost Filter Berm and Socks
- ☐ Vegetation Lined Ditches
- ☐ Sand Filter Systems
- ☐ Sedimentation Chambers
- ☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

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IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

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V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

- MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

- See Item 5 in General Notes.

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If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labeling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- Dead or distressed vegetation (not identified as normal)
- Trash piles, drums, canister, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

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Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre-demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridge(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)


☐ No Action Required ☒ Required Action

Action No.

- IN THE EVENT THAT BURIED OBJECTS OR OBVIOUSLY AFFECTED SOILS AND/OR GROUNDWATER ARE ENCOUNTERED, EXCAVATION ACTIVITIES SHALL STOP AND AN ENVIRONMENTAL PROFESSIONAL SHALL BE CALLED TO ASSESS THE SOURCE OF THE HIGHLY AFFECTED AREA. THE ENVIRONMENTAL PROFESSIONAL WILL COLLECT A SAMPLE OF THE OBVIOUSLY AFFECTED SOILS AND/OR GROUNDWATER FOR LABORATORY ANALYSIS, AND DIRECT MANAGEMENT AND STAGING OF THE AFFECTED MEDIA. FOR THIS PROJECT, OBVIOUSLY AFFECTED SOILS WILL BE THOSE WITH SIGNIFICANT STAINING AND/OR PETROLEUM HYDROCARBON OR CHEMICAL ODOR, OR PRESENCE OF MUNICIPAL SOLID WASTE

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3.



Texas Department of Transportation

San Antonio District Standard

ENVIRONMENTAL PERMITS,
ISSUES AND COMMITMENTS

EPIC

FILE: epic 2015-10-09 SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
© TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	-	-	-	-
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		45