Plotted on: 1/25/2023 2:42:42 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_TEMP03.dgn

TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH BACKPLATES		16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R Y G	W W	18
KEY	1	2	W1 THRU W8
QTY	6	1	8

PHASE DIAGRAM

NOT USED Ø1	NOT USED Ø2	NOT USED Ø3	NOT USED Ø4
BUS Ø5	PED Ø6	NOT USED Ø7	PED Ø8

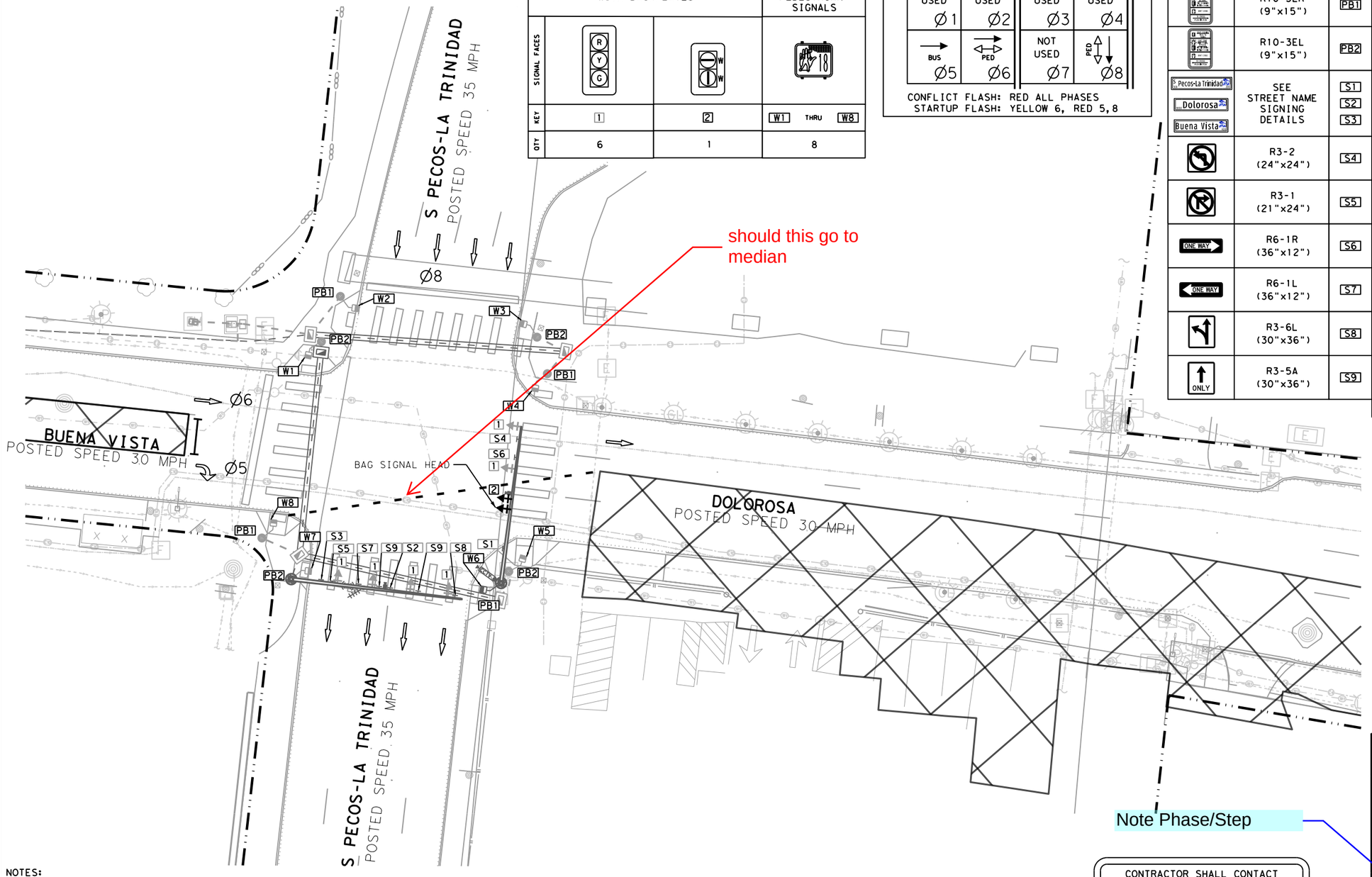
CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 6, RED 5,8

EXISTING SIGNS

LEGEND	TYPE	KEY
	R10-3ER (9"x15")	PB1
	R10-3EL (9"x15")	PB2
S Pecos-La Trinidad / Dolorosa / Buena Vista	SEE STREET NAME SIGNING DETAILS	S1 S2 S3
	R3-2 (24"x24")	S4
	R3-1 (21"x24")	S5
ONE WAY	R6-1R (36"x12")	S6
ONE WAY	R6-1L (36"x12")	S7
	R3-6L (30"x36")	S8
ONLY	R3-5A (30"x36")	S9

LEGEND

- EQUIPMENT ID
- STREET NAME SIGN
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- VIVDS DETECTION
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- EX. WIRELESS POINT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA



Note Phase/Step

NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. 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.
3. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
4. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
5. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4583 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
6. THIS PLAN IS FOR TEMPORARY TRAFFIC SIGNALIZATION AND SHALL COVER THE INSTALLATION OF TEMP SIGNALS AND RELOCATION OF VIVDS. REALIGNMENT OF SIGNAL HEADS ADN VIVDS AS REQUIRED DURIGN CONSTRUCTION SHALL BE AS DIRECTED BY THE ENGINEER AND SHALL BE CONSIDERED AS PART OF THE COST FOR TEMPORARY TRAFFIC SIGNALS.

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

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

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE.NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

DOLOROSA

TEMP TRAFFIC SIGNAL LAYOUT

DOLOROSA AT S PECOS-LA TRINIDAD

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	411

Plotted on: 1/25/2023 2:42:49 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_TEMP06.dgn

TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH BACKPLATES				16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R Y G	R Y G ←	R Y G	W W	10
KEY	1	2	3	4	W1 THRU W8
QTY	5	1	2	1	8

PHASE DIAGRAM

NOT USED Ø1	PED/BIKE Ø2	BUS Ø3	PED PED Ø4
NOT USED Ø5	PED/BIKE Ø6	NOT USED Ø7	NOT USED Ø8

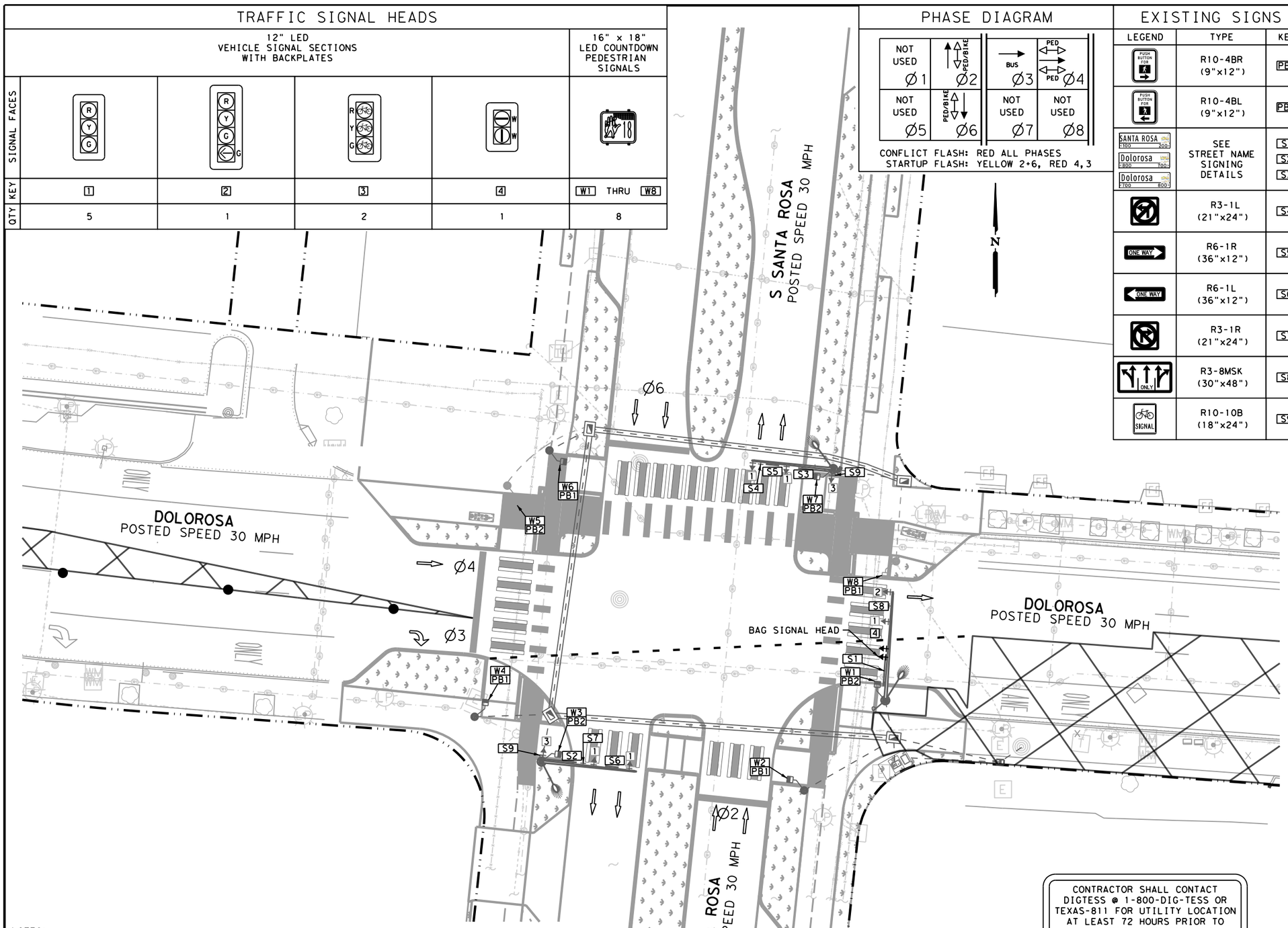
CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4,3

EXISTING SIGNS

LEGEND	TYPE	KEY
PUSH BUTTON FOR ←	R10-4BR (9"x12")	PB1
PUSH BUTTON FOR →	R10-4BL (9"x12")	PB2
SANTA ROSA ONLY 100 200 / Dolorosa ONLY 800 700 / Dolorosa ONLY 700 800	SEE STREET NAME SIGNING DETAILS	S1 S2 S3
	R3-1L (21"x24")	S4
ONE WAY →	R6-1R (36"x12")	S5
ONE WAY ←	R6-1L (36"x12")	S6
	R3-1R (21"x24")	S7
ONLY	R3-8MSK (30"x48")	S8
SIGNAL	R10-10B (18"x24")	S9

LEGEND

- EQUIPMENT ID
- STREET NAME SIGN
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- VIVDS DETECTION
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- EX. WIRELESS POINT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA



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ENGINEER: JUSTIN W. CLARK
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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

TEMP TRAFFIC SIGNAL LAYOUT

DOLOROSA AT S SANTA ROSA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	412

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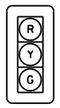
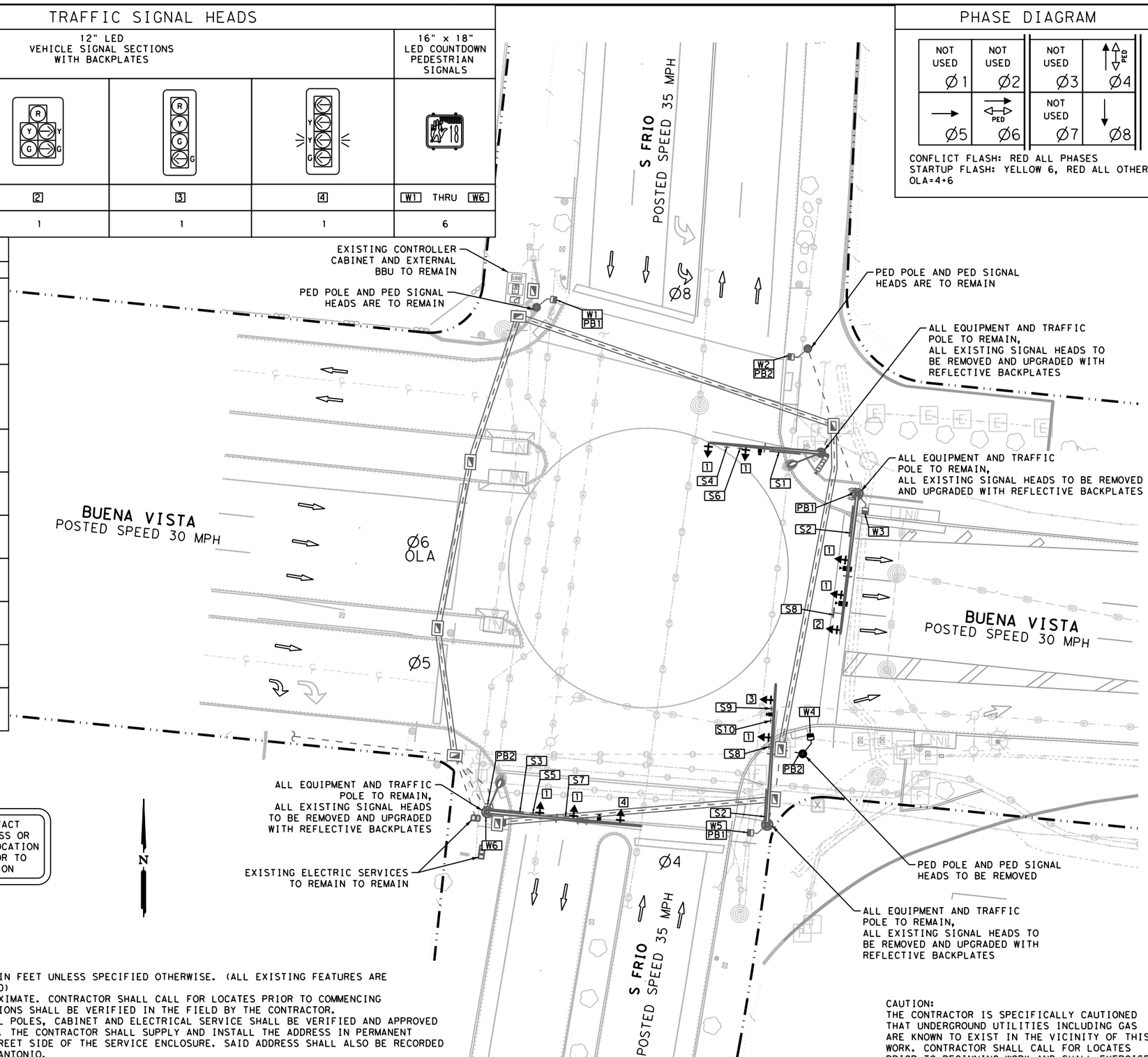
Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_EXIST01.dgn

TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH BACKPLATES				16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES					
KEY	1	2	3	4	W1 THRU W6
QTY	7	1	1	1	6

EXISTING SIGNS

LEGEND	TYPE	KEY
	R10-4BR (9"x12")	PB1
	R10-4BL (9"x12")	PB2
	SEE STREET NAME SIGNING DETAILS	S1 S2 S3
	R3-2 (24"x24")	S4
	R3-1 (24"x24")	S5
	R6-1R (36"x12")	S6
	R6-1L (36"x12")	S7
	R10-11B (36"x36")	S8
	R3-4 (24"x24")	S9
	R3-8MR (36"x30")	S10



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

PHASE DIAGRAM

NOT USED Ø1	NOT USED Ø2	NOT USED Ø3	PED Ø4
Ø5	PED Ø6	NOT USED Ø7	Ø8

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 6, RED ALL OTHERS
OLA=4+6

LEGEND

- EQUIPMENT ID
- STREET NAME SIGN
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- VIVDS DETECTION
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- EX. WIRELESS POINT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- OPTICOM
- COSA CONTROLLER

NOTES:
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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

EXISTING CONDITIONS

BUENA VISTA AT S FRIO

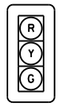
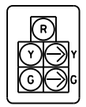
DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	413

Plotted on: 1/25/2023 2:43:14 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\122703_TRAF01.dgn

PROPOSED TRAFFIC SIGNAL HEADS

12" LED
VEHICLE SIGNAL SECTIONS
WITH REFLECTIVE BACKPLATES

SIGNAL FACES					
QTY KEY	1	2	3	4	5
QTY	7	1	1	1	2

PROPOSED SIGNS

LEGEND	TYPE	KEY
	R10-10b (18"x24")	S1
	R10-17T (30"x30")	S2

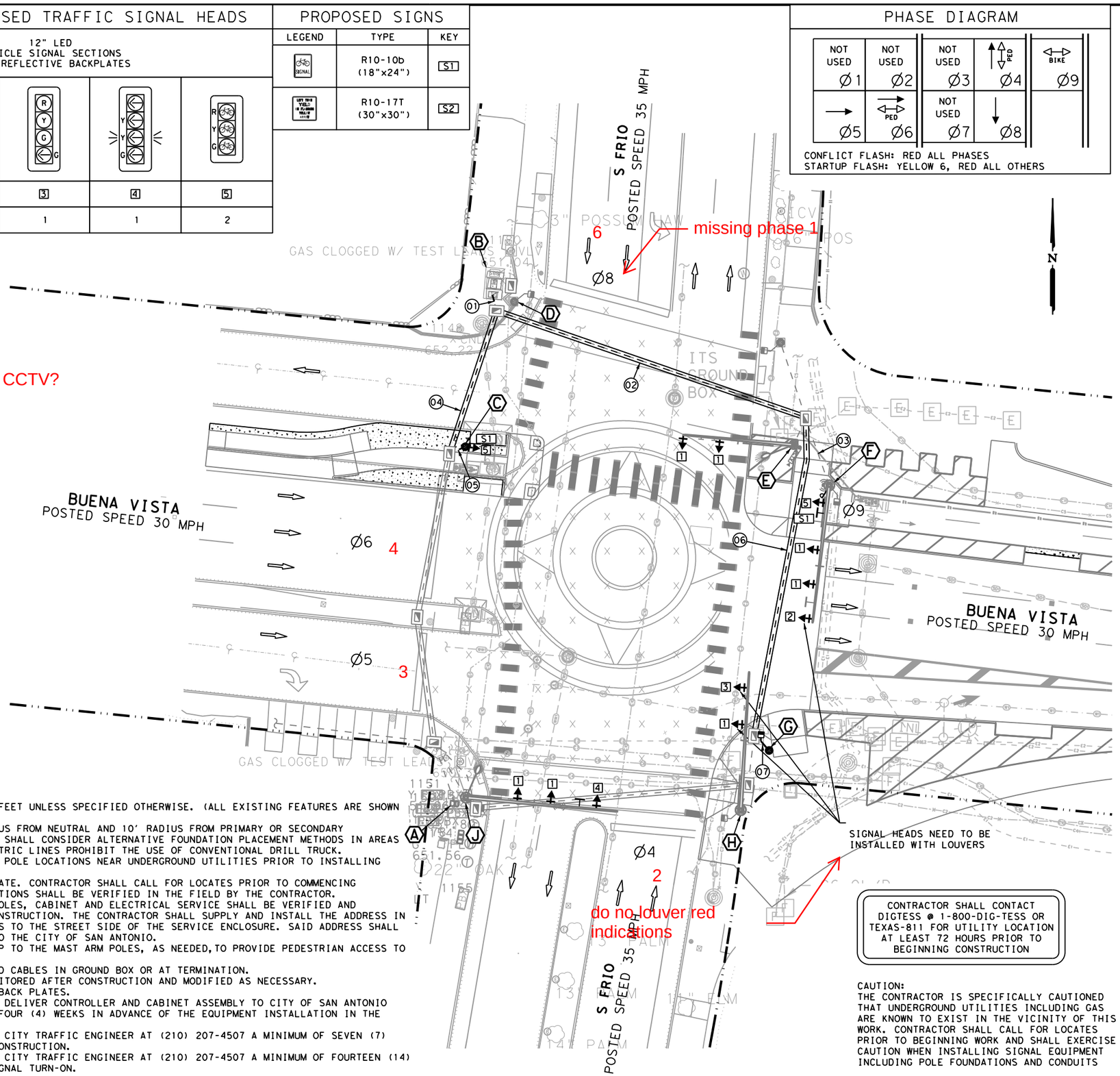
PHASE DIAGRAM

NOT USED Ø1	NOT USED Ø2	NOT USED Ø3	PED Ø4	BIKE Ø9
Ø5	PED Ø6	NOT USED Ø7	Ø8	

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 6, RED ALL OTHERS

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- STREET NAME SIGN
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- WIRELESS ACCESS PNT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- FEDS DETECTION
- COSA CONTROLLER



NOTES:
1. ALL DIMENSIONS SHWON ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. MINIMUM CLEARANCE OF 8' RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY OR SECONDARY ELECTRICAL LINES. CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
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6. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
8. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
9. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
10. CONTRACTOR SHALL FURNISH AND DELIVER CONTROLLER AND CABINET ASSEMBLY TO CITY OF SAN ANTONIO SIGNAL SHOP FOR PROGRAMMING FOUR (4) WEEKS IN ADVANCE OF THE EQUIPMENT INSTALLATION IN THE FIELD.
11. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
12. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF FOURTEEN (14) DAYS PRIOR TO THE TRAFFIC SIGNAL TURN-ON.

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

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

TRAFFIC SIGNAL LAYOUT

BUENA VISTA AT S FRIO

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	414

Plotted on: 1/25/2023 2:43:16 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_CCS01.dgn

CONDUIT AND CONDUCTOR SCHEDULE

RUN NUMBER				01	02	03	04	05	06	07
CONDUIT SIZE (INCHES)				3	3	3	3	3	3	2
NUMBER OF CONDUITS				1	2	1	1	1	2	1
LENGTH OF RUN (FT)				20	95	25	45	20	95	10
TRENCH (T)/BORE (B)/EXISTING (E)/AERIAL(A)				T	B	E	B	T	B	T
CABLE	CIRCUIT									
#8 BARE	BARE BOND GROUND			1	2	1	1	1	2	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	9	2	1	1	1	1		
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	G	1	1				1	1
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	G	1	1				1	1
POWER & ETHERNET	FEDS	POLE	F	1	1	1				

POLE SCHEDULE

POLE				C	F	G
POLE TYPE (SMA/LMA/DMA/PED)				PED	SMA	PED
POLE HEIGHT (FEET)				20	30	10
MAST ARM LENGTH (FEET)				N/A	40	N/A
LUMINAIRE (YES/NO)				N/A	NO	N/A
ILSN (YES/NO)				N/A	NO	N/A
ILSN ARM LENGTH (FEET)				N/A	N/A	N/A
FOUNDATION TYPE				24-A	36-A	SPL
FOUNDATION DEPTH (FEET)				6	EXIST	N/A
CABLE	CIRCUIT					
#8 BARE	BARE BOND GROUND			1	1	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	9	1	1	
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	G			1
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	G			1
POWER & ETHERNET	FEDS	POLE	F		1	

* SEE PEDESTRIAN POLE SPECIAL FOUNDATION FOR DETAILS

EXISTING ELECTRICAL SERVICE DATA

Elec. 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-301	ELEC SERV TY D (120/240)070(NS)AL(E)PS(U)	2"	3/#6	N/A	2P/70	30	100	A(SIGNAL) B(LUM)	1P/50 1P/20	40	6.4

POLE & EQUIPMENT INFORMATION

ID	DESCRIPTION/ATTACHMENTS	NORTHING	EASTING	FND. ELEV
A	EXISTING CPS ENERGY METER WITH TXDOT TYPE D PEDESTAL SERVICE	13704673.3	2126732.7	N/A
B	EXISTING SAN ANTONIO MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY WITH EXTERNAL BATTERY BACKUP CABINET AND MODEL 2070 CONTROLLER WITH MAXTIME SOFTWARE ON COSA BASE-MOUNTFOUNDATION (5'X9')	13704823.5	2126744.0	N/A
C	INSTALL 20 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE BICYCLE SIGNAL HEAD, AND ONE R10-10b SIGN AS INDICATED ON LAYOUT	13704776.4	2126735.7	FLUSH WITH LANDING
E	EXISTING 19 FT SMA-80 ON EXISTING DRILLED SHAFT FOUNDATION WITH 32 FT MAST ARM, ONE CCTV, ONE STREET NAME, EXISTING LUMINIARE, EXISTING 5G ANTENA. SIGN AND TWO VEHICLE SIGNAL HEADS AS ILLUSTRATED.	13704776.5	2126813.8	LEVEL WITH ROADWAY CROWN
F	EXISTING 19 FT SMA-80 ON EXISTING DRILLED SHAFT FOUNDATION WITH 40 FT MAST ARM, ONE WIRELESS ACCS POINT, ONE STREET NAME, AND ONE SIGN. INSTALL FOUR VEHICLE SIGNAL HEADS AS ILLUSTRATED AND ONE R10-10b SIGN AS INDICATED ON LAYOUT.	13704765.2	2126841.2	LEVEL WITH ROADWAY CROWN
G	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE APS PUSH BUTTON, AND ONE R10-3e(L OR R) SIGN AS INDICATED ON LAYOUT	13704688.6	2126823.7	FLUSH WITH LANDING
H	EXISTING 19 FT SMA-80 ON EXISTING DRILLED SHAFT FOUNDATION WITH 40 FT MAST ARM, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE APS PUSH BUTTON, ONE STREET NAME, AND TWO SIGNS. INSTALL TWO VEHICLE SIGNAL HEADS AS ILLUSTRATED ON LAYOUT.	13704671.4	2126815.4	LEVEL WITH ROADWAY CROWN
J	EXISTING 19 FT SMA-80 ON EXISTING DRILLED SHAFT FOUNDATION WITH 44 FT MAST ARM, ONE STREET NAME, EXISTING LUMINIARE. INSTALL INSTALL THREE VEHICLE SIGNAL HEADS AS ILLUSTRATED AND ONE SIGN AS INDICATED ON LAYOUT.	13704675.0	2126736.0	LEVEL WITH ROADWAY CROWN

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

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE.NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

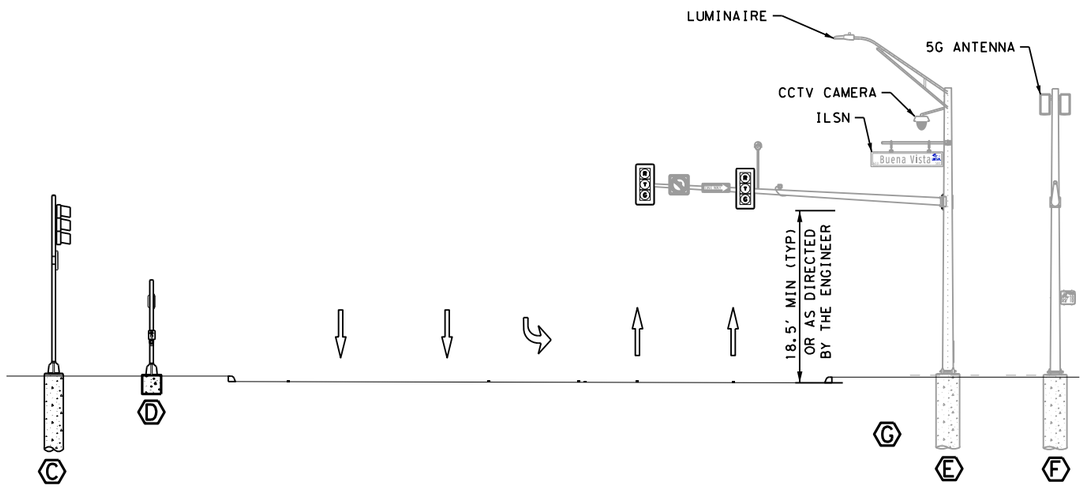
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

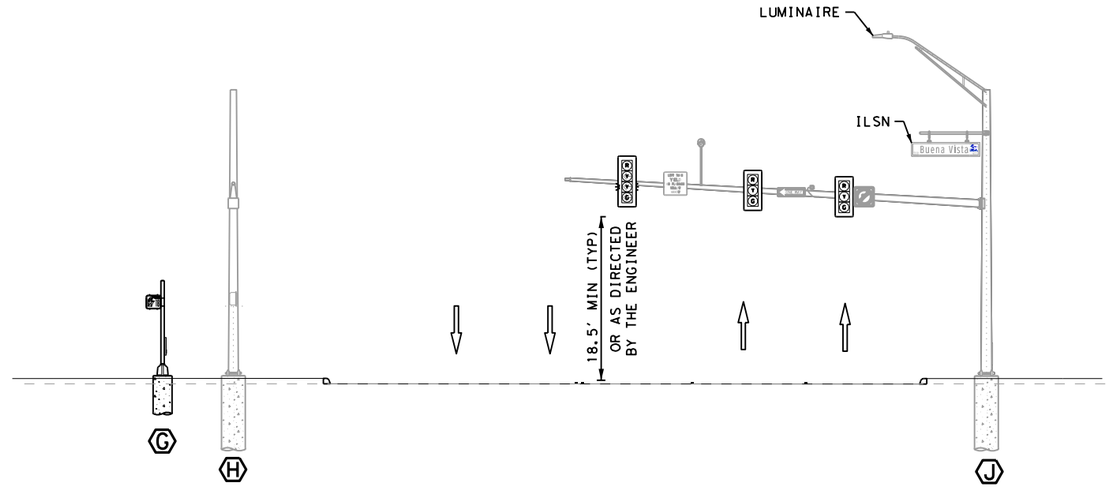
CONDUIT & CONDUCTOR SCHEDULE

BUENA VISTA ST AT S FRIO ST

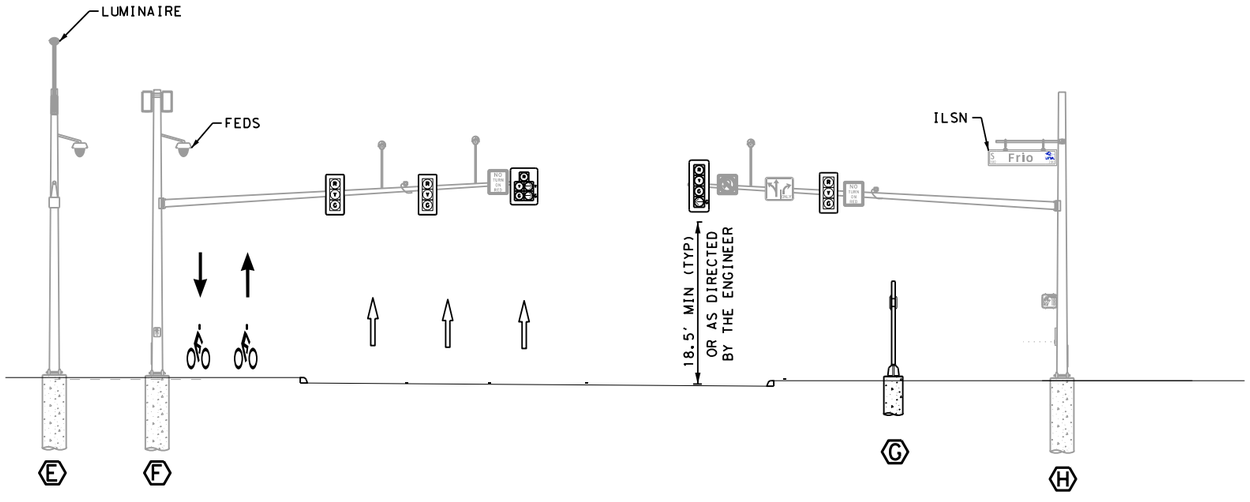
DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	415



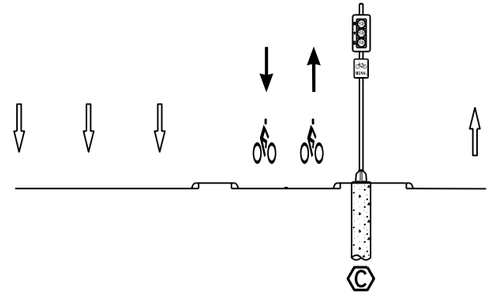
NORTHBOUND FRIO ST
NOT TO SCALE



SOUTHBOUND FRIO ST
NOT TO SCALE



EASTBOUND BUENA VISTA
NOT TO SCALE



WESTBOUND BUENA VISTA
NOT TO SCALE

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
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ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
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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

DOLOROSA

ELEVATION VIEWS

BUENA VISTA ST AT S FRIO ST

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	416

Plotted on: 1/25/2023 2:43:48 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\122703_EXIST02.dgn

TRAFFIC SIGNAL HEADS

	12" LED PEDESTRIAN HYBRID BEACON WITH BACKPLATES	16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R R R Y Y	PED 18
KEY	1	W1 THRU W2
QTY	2	2

PHASE DIAGRAM

NOT USED Ø1	NOT USED Ø2	NOT USED Ø3	NOT USED Ø4
NOT USED Ø5	→ Ø6	NOT USED Ø7	PED ⇕ Ø8

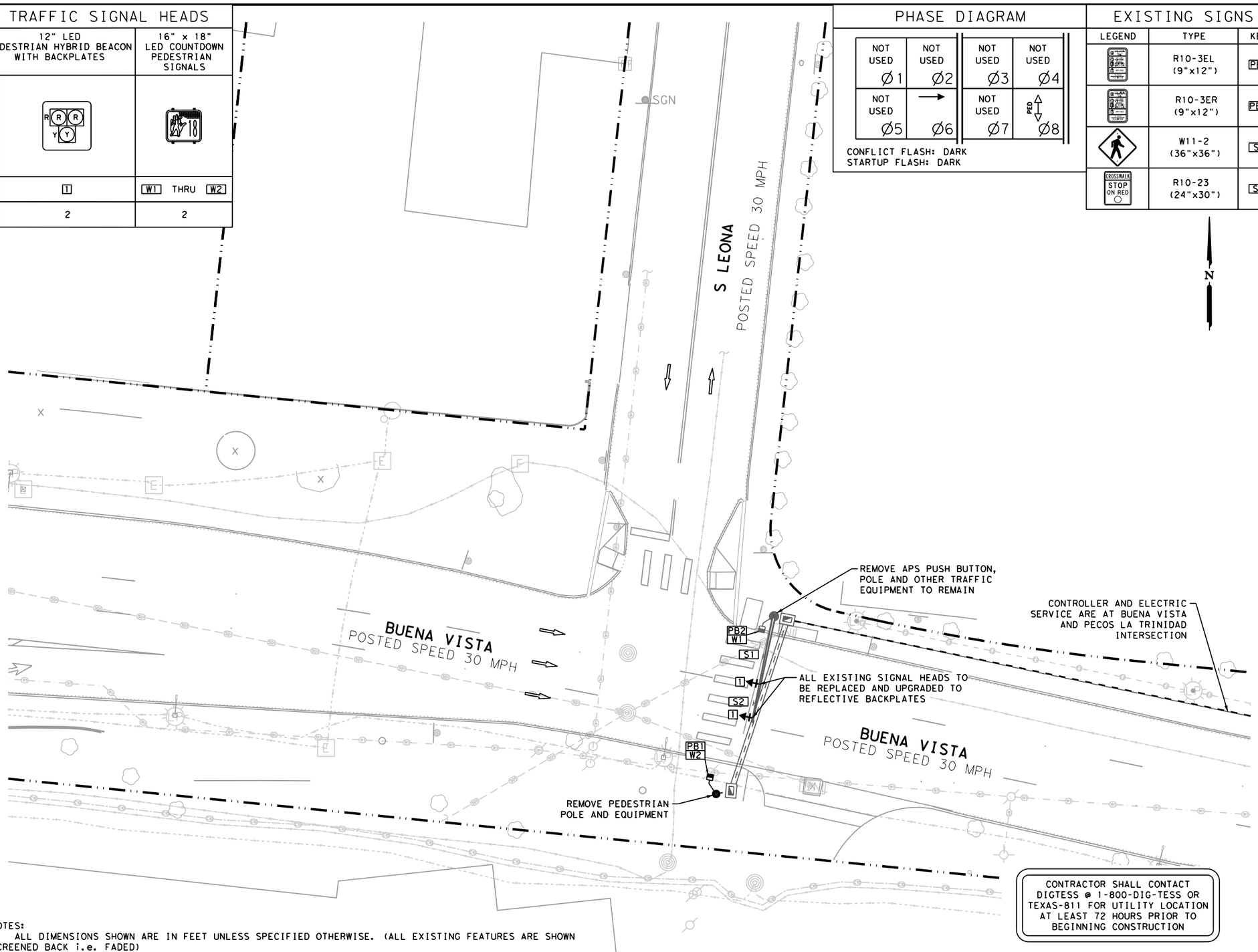
CONFLICT FLASH: DARK
STARTUP FLASH: DARK

EXISTING SIGNS

LEGEND	TYPE	KEY
	R10-3EL (9"x12")	PB1
	R10-3ER (9"x12")	PB2
	W11-2 (36"x36")	S1
CROSSWALK STOP ON RED	R10-23 (24"x30")	S2

LEGEND

- EQUIPMENT ID
- STREET NAME SIGN
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- VIVDS DETECTION
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- EX. WIRELESS POINT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA



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

NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. 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.
3. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
4. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
5. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4583 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.

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

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE.NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

DOLOROSA

EXISTING CONDITIONS

BUENA VISTA AT S LEONA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	417

Plotted on: 1/25/2023 2:43:58 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_TRAF02.dgn

PROPOSED SIGNAL HEADS

	12" LED PEDESTRIAN HYBRID BEACON WITH REFLECTIVE BACKPLATES	16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R R R / Y Y	18
KEY	1	W1
QTY	4	2

PHASE DIAGRAM

NOT USED Ø1	NOT USED Ø2	NOT USED Ø3	NOT USED Ø4
NOT USED Ø5	Ø6	NOT USED Ø7	PED Ø8

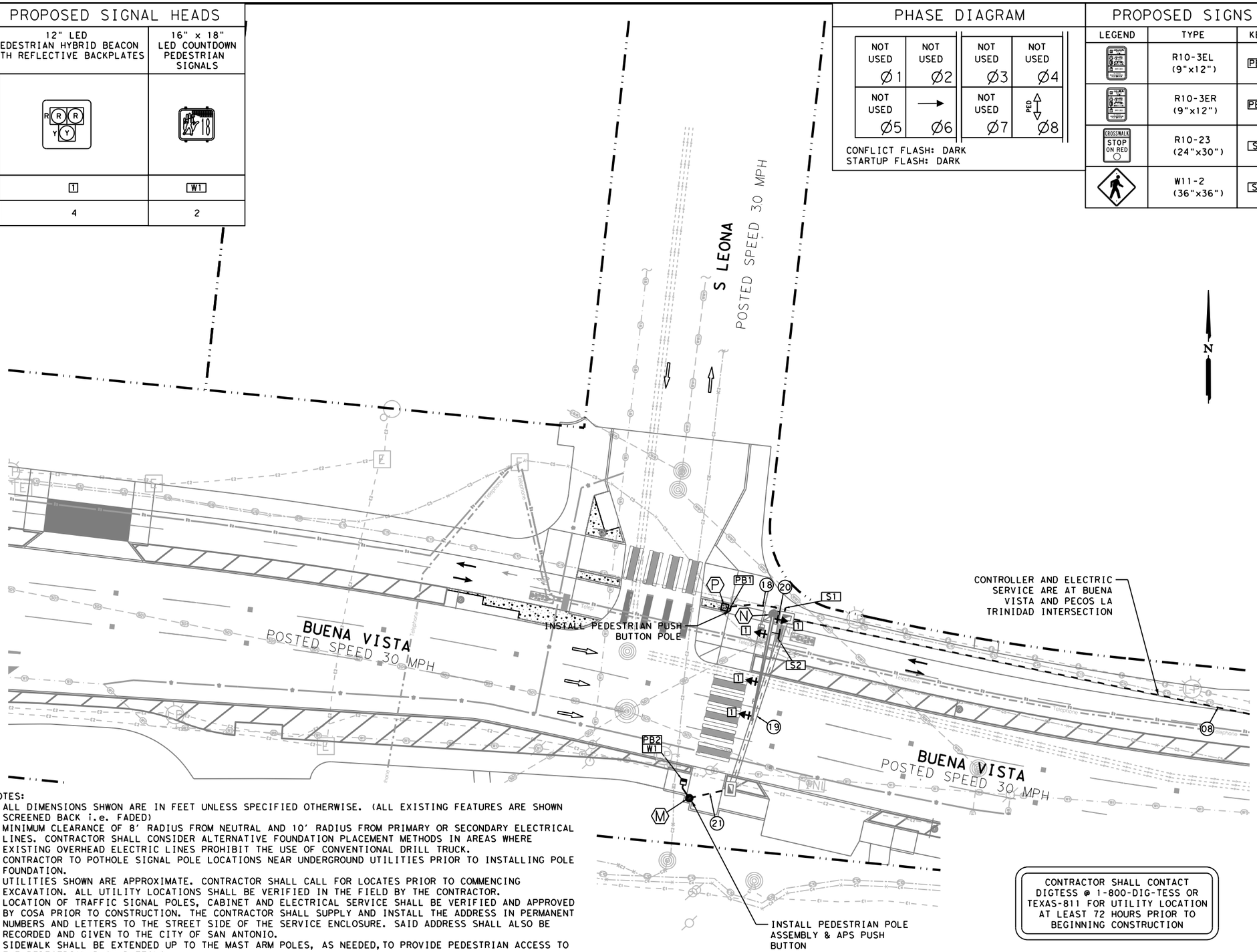
CONFLICT FLASH: DARK
STARTUP FLASH: DARK

PROPOSED SIGNS

LEGEND	TYPE	KEY
	R10-3EL (9"x12")	PB1
	R10-3ER (9"x12")	PB2
CROSSWALK STOP ON RED	R10-23 (24"x30")	S1
	W11-2 (36"x36")	S2

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- STREET NAME SIGN
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- WIRELESS ACCESS PNT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA



NOTES:
1. ALL DIMENSIONS SHWON ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. MINIMUM CLEARANCE OF 8' RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY OR SECONDARY ELECTRICAL LINES. CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
4. 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.
5. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
6. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
8. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
9. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
10. CONTRACTOR SHALL FURNISH AND DELIVER CONTROLLER AND CABINET ASSEMBLY TO CITY OF SAN ANTONIO SIGNAL SHOP FOR PROGRAMMING FOUR (4) WEEKS IN ADVANCE OF THE EQUIPMENT INSTALLATION IN THE FIELD.
11. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.

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

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

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
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ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

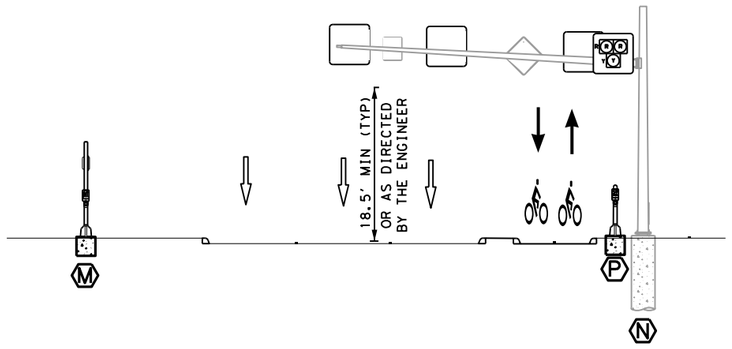
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

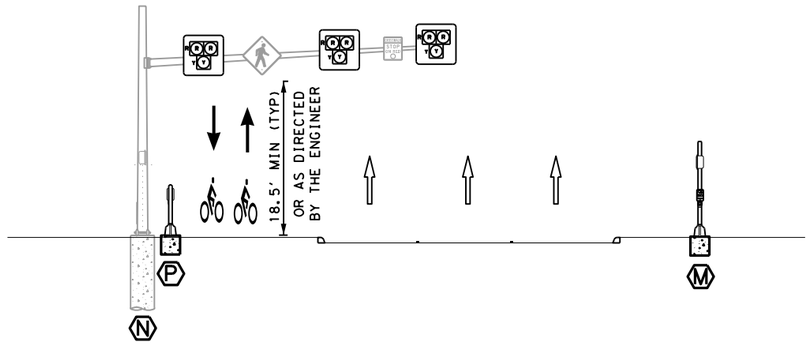
TRAFFIC SIGNAL LAYOUT

BUENA VISTA AT S LEONA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	418



WESTBOUND BUENA VISTA
NOT TO SCALE



EASTBOUND BUENA VISTA
NOT TO SCALE

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
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ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

DOLOROSA

ELEVATION VIEWS

BUENA VISTA ST AT S LEONA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	419

Plotted on: 1/25/2023 2:44:31 PM

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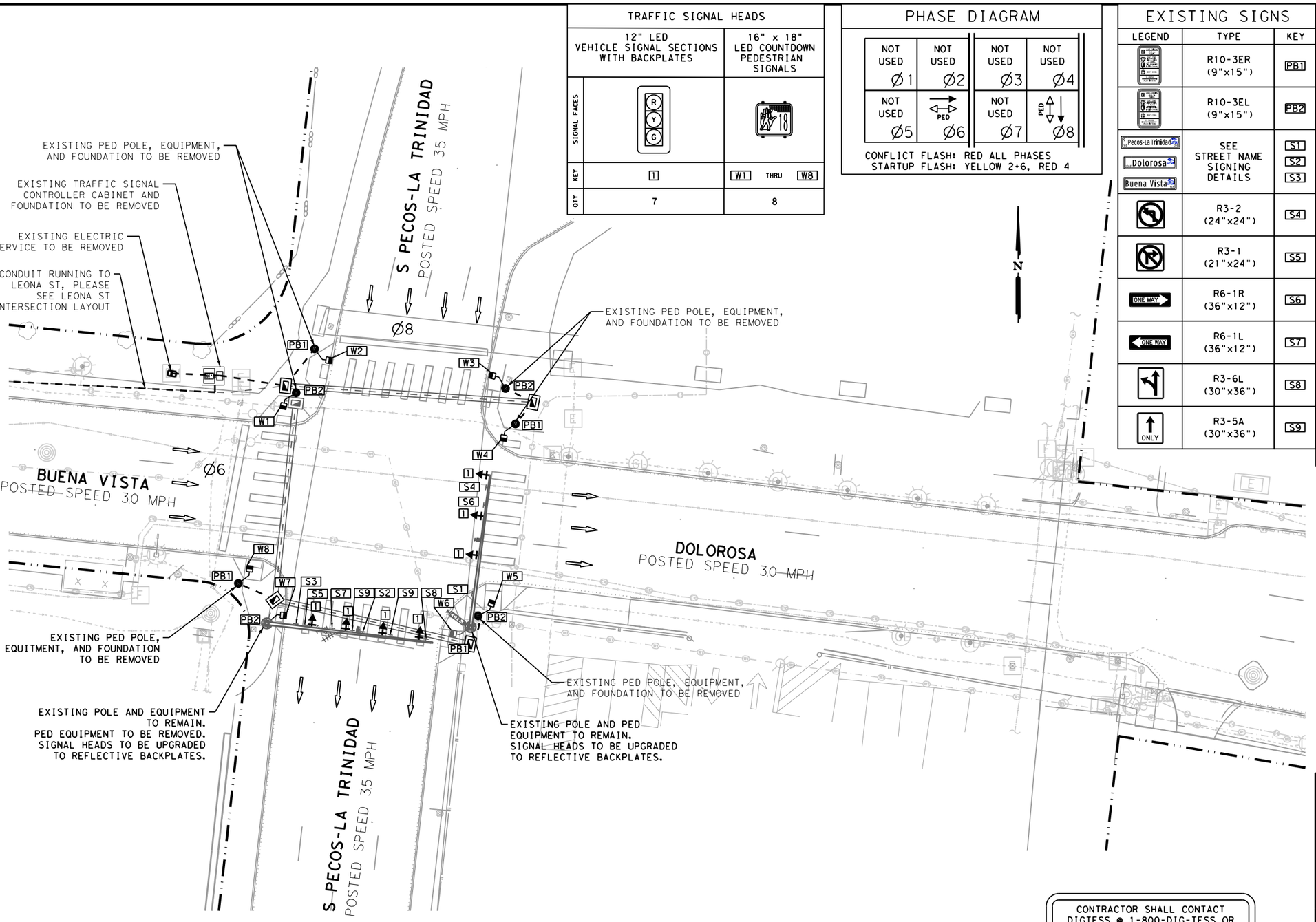


TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH BACKPLATES	16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R Y G	18
KEY	1	W1 THRU W8
QTY	7	8

PHASE DIAGRAM

NOT USED Ø1	NOT USED Ø2	NOT USED Ø3	NOT USED Ø4
NOT USED Ø5	PED Ø6	NOT USED Ø7	PED Ø8

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 4, RED 2

EXISTING SIGNS

LEGEND	TYPE	KEY
	R10-3ER (9"x15")	PB1
	R10-3EL (9"x15")	PB2
S Pecos-La Trinidad / Dolorosa / Buena Vista	SEE STREET NAME SIGNING DETAILS	S1 S2 S3
	R3-2 (24"x24")	S4
	R3-1 (21"x24")	S5
ONE WAY	R6-1R (36"x12")	S6
ONE WAY	R6-1L (36"x12")	S7
	R3-6L (30"x36")	S8
ONLY	R3-5A (30"x36")	S9

LEGEND

- EQUIPMENT ID
- STREET NAME SIGN
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- VIVDS DETECTION
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- EX. WIRELESS POINT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA

NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. 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.
3. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
4. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
5. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4583 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.

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

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

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE.NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

DOLOROSA

EXISTING CONDITIONS

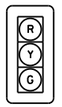
DOLOROSA AT S PECOS-LA TRINIDAD

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	420

Plotted on: 1/25/2023 2:44:42 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_TRAF03.dgn

PROPOSED TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH REFLECTIVE BACKPLATES		16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES			
KEY	1	2	W1 THRU W8
QTY	7	2	8

PROPOSED SIGNS

LEGEND	TYPE	KEY
	R10-3ER (9"x15")	PB1
	R10-3EL (9"x15")	PB2
	R10-10b, (18" x 24")	S1

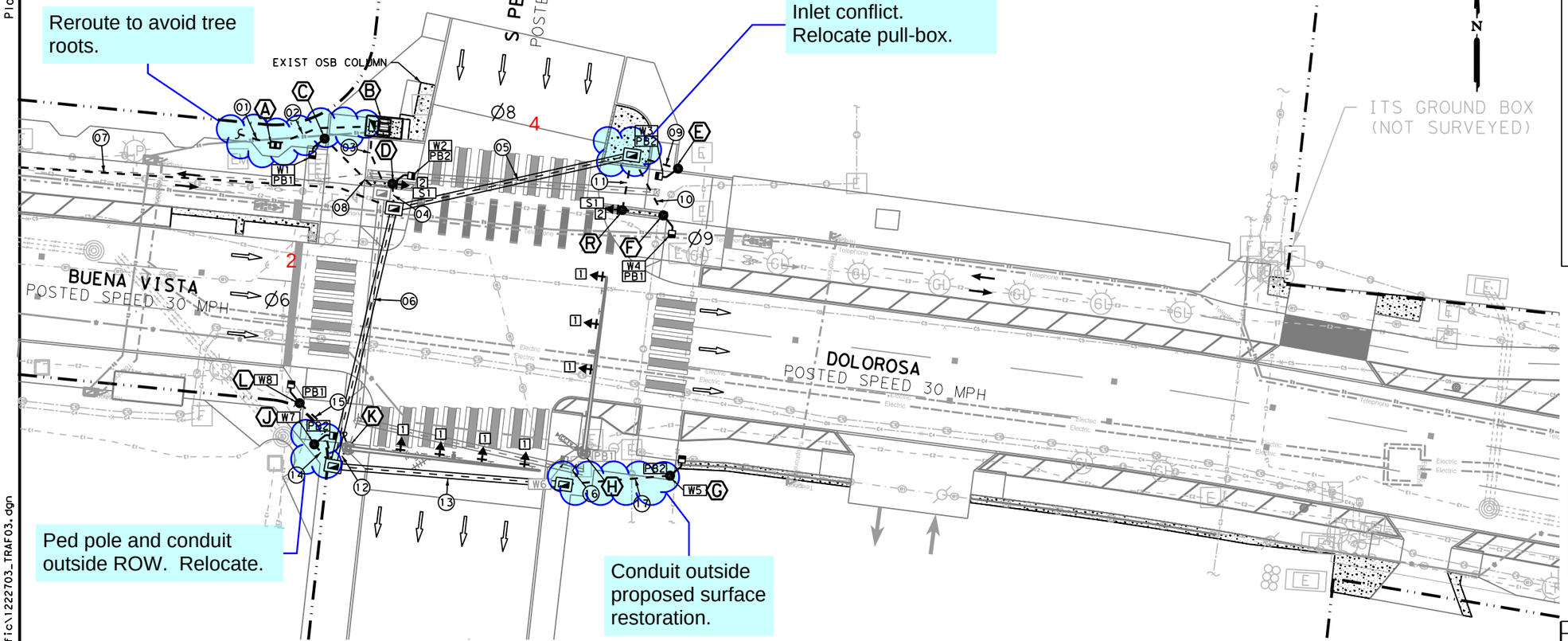
PHASE DIAGRAM

NOT USED Ø1	NOT USED Ø2	NOT USED Ø3	NOT USED Ø4
NOT USED Ø5	PED/BIKE ⇔ PED Ø6	NOT USED Ø7	Ø8

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- STREET NAME SIGN
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- WIRELESS ACCESS PNT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA



NOTES:
1. ALL DIMENSIONS SHWON ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. MINIMUM CLEARANCE OF 8' RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY OR SECONDARY ELECTRICAL LINES. CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
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6. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
8. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
9. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
10. CONTRACTOR SHALL FURNISH AND DELIVER CONTROLLER AND CABINET ASSEMBLY TO CITY OF SAN ANTONIO SIGNAL SHOP FOR PROGRAMMING FOUR (4) WEEKS IN ADVANCE OF THE EQUIPMENT INSTALLATION IN THE FIELD.
11. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
12. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF FOURTEEN (14) DAYS PRIOR TO THE TRAFFIC SIGNAL TURN-ON.

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

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

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

DOLOROSA

TRAFFIC SIGNAL LAYOUT

DOLOROSA AT S PECOS-LA TRINIDAD

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	421

Plotted on: 1/25/2023 2:44:44 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_CCS03.dgn

CONDUIT AND CONDUCTOR SCHEDULE

				RUN NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21
				CONDUIT SIZE (INCHES)	3	3	3	3	3	3	3	2	2	2	3	3	3	2	2	3	2	2	3	3	2
				NUMBER OF CONDUITS	1	1	2	1	2	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1
				LENGTH OF RUN (FT)	100	25	25	10	65	70	290	25	15	20	15	10	60	10	20	10	30	20	55	10	15
				TRENCH (T)/BORE (B)/EXISTING (E)/AERIAL(A)	T	T	T	T	B	B	T	T	T	T	T	T	B	T	T	T	T	T	E	E	T
CABLE	CIRCUIT				NUMBER OF CONDUCTORS																				
#6 XHHW	120 POWER HOT			CABLES PULLED BY CPS ENERGY		1																			
	120 POWER COMMON					1																			
#6 BARE	GROUND (ELECTRIC SERVICE)					1																			
#8 BARE	BARE BOND GROUND						2	1	2	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	6				1		1								1			1					
		ø	8				1		1							1									
		ø	9				2	1	1						1										
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	C				1					1													
		POLE	D				1	1																	
		POLE	E				1		1				1												
		POLE	F				1		1					1											
		POLE	G				1			1							1				1				
		POLE	J				1			1								1							
		POLE	L				1			1									1						
		POLE	M								1												1		1
		POLE	N								1													1	
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	C				1					1													
		POLE	D				1	1																	
		POLE	E				1		1				1												
		POLE	F				1		1					1											
		POLE	G				1			1							1				1				
		POLE	J				1			1								1							
		POLE	L				1			1									1						
		POLE	M								1												1		1
		POLE	P								1											1			
POWER	ANTENNA	POLE	K				1			1						1									
ETHERNET		POLE	K				1			1						1									
ETHERNET	CCTV (PTZ) CAMERA	POLE	H				1			1							1			1					
POWER & ETHERNET	FEDS	POLE	K				1			1						1									
6 COND. POWER & DATA	VIVDS	POLE	H				1			1							1			1					
		POLE	K				1			1						1									

ELECTRICAL SERVICE DATA

Elec. 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-123	ELEC SERV TY D (120/240)070(NS)AL(E)PS(U)	3"	3/#6	N/A	2P/70	30	100	A(SIGNAL) B(LUM)	1P/50 1P/20	40	6.4

DESIGN

INTERIM REVIEW

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ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

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ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
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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

DOLOROSA

CONDUIT & CONDUCTOR SCHEDULE

DOLOROSA ST AT S PECOS-LA TRINIDAD

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	422

POLE SCHEDULE

				POLE	C	D	E	F	G	H	J	K	L	M	N	P	R
				POLE TYPE (SMA/LMA/DMA/PED)	PED	PED	PED	PED	PED	SMA	PED	SMA	PED	PED	SMA	PB	PED
				POLE HEIGHT (FEET)	10	20	10	10	10	19	10	19	10	10	19	5	20
				MAST ARM LENGTH (FEET)	N/A	N/A	N/A	N/A	N/A	44	N/A	48	N/A	N/A	32	N/A	N/A
				LUMINAIRE (YES/NO)	N/A	N/A	N/A	N/A	N/A	NO	N/A	NO	N/A	N/A	NO	N/A	N/A
				ILSN (YES/NO)	N/A	N/A	N/A	N/A	N/A	NO	N/A	NO	N/A	N/A	NO	N/A	N/A
				ILSN ARM LENGTH (FEET)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				FOUNDATION TYPE	SPL	24-A	SPL	SPL	SPL	36-A	SPL	36-A	SPL	SPL	30-A	SPL	24-A
				FOUNDATION DEPTH (FEET)	N/A*	6	N/A*	N/A*	N/A*	EXIST	N/A*	EXIST	N/A*	N/A*	EXIST	N/A*	6
CABLE	CIRCUIT																
#8 BARE	BARE BOND GROUND				1	1	1	1	1	1	1	1	1	1	1	1	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	9			1											1
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	C		1												
		POLE	D			1											
		POLE	E				1										
		POLE	F					1									
		POLE	G						1								
		POLE	J								1						
		POLE	L										1				
		POLE	M											1			
		POLE	N												4		
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	C		1												
		POLE	D			1											
		POLE	E				1										
		POLE	F					1									
		POLE	G						1								
		POLE	J								1						
		POLE	L										1				
		POLE	M											1			
		POLE	P													1	
POWER	ANTENNA	POLE	K									1					
ETHERNET		POLE	K									1					
ETHERNET	CCTV (PTZ) CAMERA	POLE	H							1							
POWER & ETHERNET	FEDS	POLE	K									1					
6 COND. POWER & DATA	VIVDS	POLE	H							1							
		POLE	K									1					

* SEE PEDESTRIAN POLE SPECIAL FOUNDATION FOR DETAILS

do we need vivids

POLE & EQUIPMENT INFORMATION

ID	DESCRIPTION/ATTACHMENTS	NORTHING	EASTING	FND. ELEV
A	PROPOSED CPS ENERGY METER WITH TXDOT TYPE D PEDESTAL SERVICE	13704682.1	2127437.1	N/A
B	INSTALL SAN ANTONIO MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY WITH EXTERNAL BATTERY BACKUP CABINET AND MODEL 2070 CONTROLLER WITH MAXTIME SOFTWARE ON COSA BASE-MOUNTFOUNDATION (5'X9')	13704686.4	2127465.8	N/A
C	'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 R10-3E (L OR R) SIGN AS ILLUSTRATED.	13704683.7	2127449.2	FLUSH WITH LANDING
D	INSTALL 20 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE BICYCLE SIGNAL HEAD, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE R10-10b SIGN AS INDICATED ON LAYOUT	13704672.5	2127466.0	FLUSH WITH LANDING
E	'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 R10-3E (L OR R) SIGN AS ILLUSTRATED.	13704676.2	2127537.2	FLUSH WITH LANDING
F	'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 R10-3E (L OR R) SIGN AS ILLUSTRATED.	13704664.6	2127533.5	FLUSH WITH LANDING
G	'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 R10-3E (L OR R) SIGN AS ILLUSTRATED.	13704599.9	2127535.2	FLUSH WITH LANDING
H	EXISTING 24 FT SMA-80 ON 11 FT DRILLED SHAFT FOUNDATION (30-A) WITH 44 FT MAST ARM, ONE ILSN, ONE CCTV, TWO SIGNS, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, INSTALL THREE VEHICLE SIGNAL HEADS AS ILLUSTRATED.	13704605.6	2127513.8	LEVEL WITH ROADWAY CROWN
J	'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 R10-3E (L OR R) SIGN AS ILLUSTRATED.	13704607.7	2127446.6	FLUSH WITH LANDING
K	EXISTING 24 FT SMA-80 ON 11 FT DRILLED SHAFT FOUNDATION (30-A) WITH 48 FT MAST ARM, ONE ILSN, ONE WIRELESS ACCESS POINT, ONE 5G ANTENNA, SEVEN SIGNS, INSTALL FOUR VEHICLE SIGNAL HEADS AS ILLUSTRATED.	13704606.7	2127455.1	LEVEL WITH ROADWAY CROWN
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 R10-3E (L OR R) SIGN AS ILLUSTRATED.	13704617.9	2127443.0	FLUSH WITH LANDING
M	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE APS PUSH BUTTON, AND ONE R10-3e(L OR R) SIGN AS INDICATED ON LAYOUT	13704660.8	2127154.8	FLUSH WITH LANDING
N	EXISTING 19 FT SMA-80 ON EXISTING DRILLED SHAFT FOUNDATION WITH 32 FT MAST ARM, ONE STREET NAME, INSTALL THREE VEHICLE SIGNAL HEADS AND TWO SIGNS AS ILLUSTRATED.	13704715.2	2127179.8	LEVEL WITH ROADWAY CROWN
P	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE APS PUSH BUTTON, AND ONE R10-3e(L OR R) SIGN AS INDICATED ON LAYOUT	13704717.4	2127164.3	FLUSH WITH LANDING
R	INSTALL 20 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE BICYCLE SIGNAL HEAD, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE R10-10b SIGN AS INDICATED ON LAYOUT	13704665.9	2127523.3	FLUSH WITH LANDING

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

DESIGN

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P.E. SERIAL NO: 118715
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P.E. SERIAL NO: 80472
DATE: 1/25/2023

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PAPE-DAWSON ENGINEERS
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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

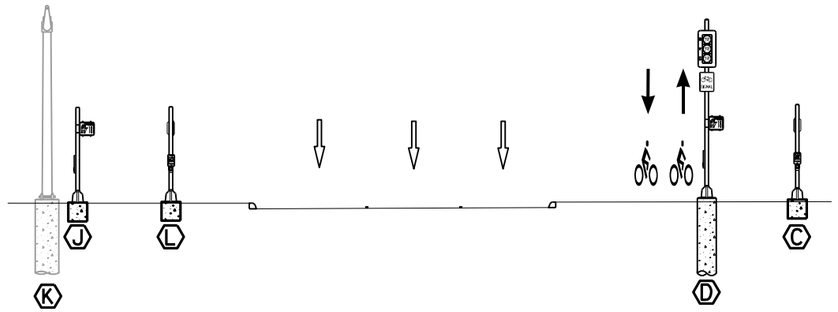
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

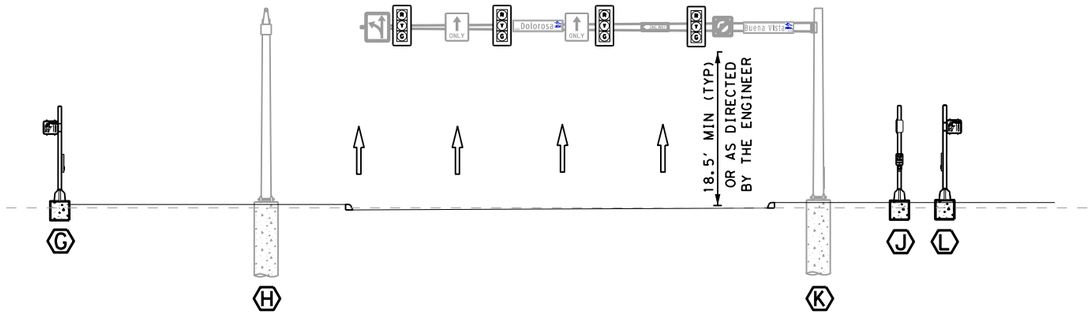
POLE SCHEDULE & ILSN DETAILS

DOLOROSA ST AT S PECOS-LA TRINIDAD

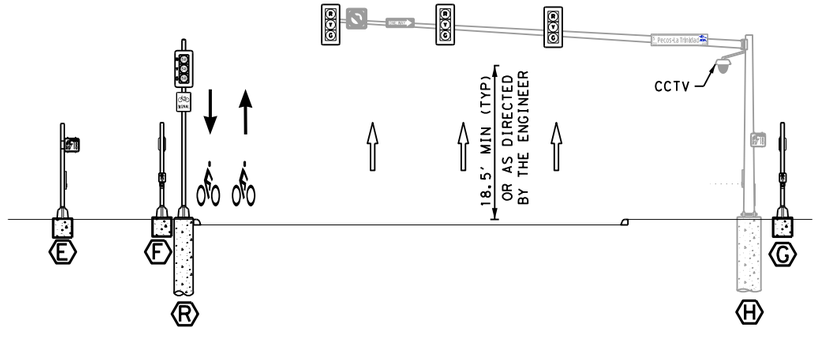
DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	423



WESTBOUND DOLOROSA
NOT TO SCALE



SOUTHBOUND S PECOS LA TRINIDAD
NOT TO SCALE



EASTBOUND DOLOROSA
NOT TO SCALE

DESIGN

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

ELEVATION VIEWS

DOLOROSA ST AT S PECOS-LA TRINIDAD

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	424

Plotted on: 1/25/2023 2:45:21 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\122703_EXIST04.dgn

TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH BACKPLATES	16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R Y G	PED 18
KEY	1	W1 THRU W8
QTY	5	8

EXISTING SIGNS

LEGEND	TYPE	KEY
PUSH BUTTON FOR PED	R10-4BR (9"x12")	PB1
PUSH BUTTON FOR PED	R10-4BL (9"x12")	PB2
DOLOROSA ST 1000 300 / SAN SABA 100 200	SEE STREET NAME SIGNING DETAILS	S1 S2
ONLY	R3-4, (36" x 36")	S3
ONE WAY	R6-1R (54" x 18")	S4

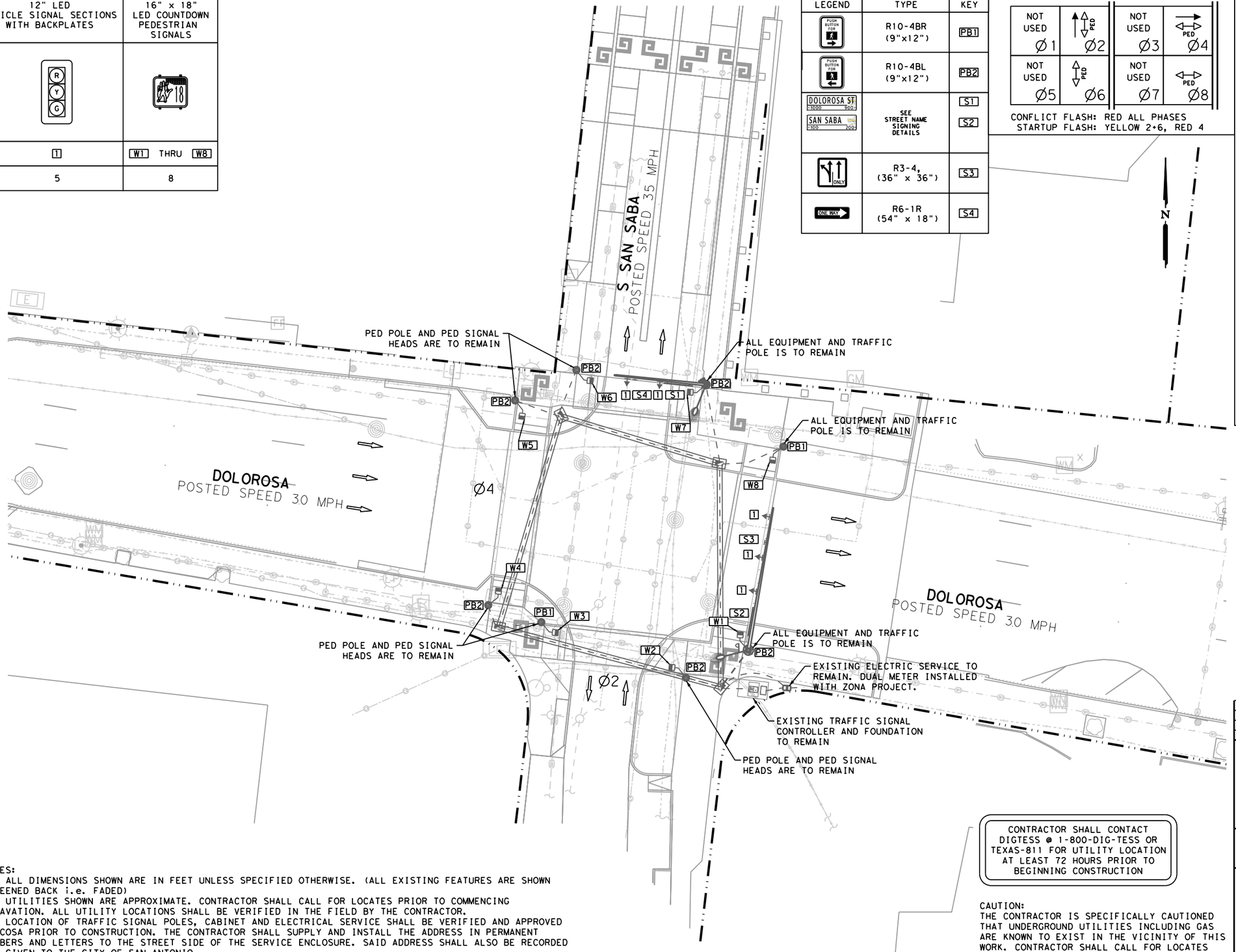
PHASE DIAGRAM

NOT USED Ø1	PED Ø2	NOT USED Ø3	PED Ø4
NOT USED Ø5	PED Ø6	NOT USED Ø7	PED Ø8

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4

LEGEND

- EQUIPMENT ID
- STREET NAME SIGN
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- VIVDS DETECTION
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- EX. WIRELESS POINT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA
- FEDS DETECTION



NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. 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.
3. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
4. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
5. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4583 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.

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

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

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

EXISTING CONDITIONS

DOLOROSA AT S SAN SABA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	425

Plotted on: 1/25/2023 2:45:31 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_TRAF04.dgn

TRAFFIC SIGNAL HEADS

12" LED
VEHICLE SIGNAL SECTIONS
WITH REFLECTIVE BACKPLATES

SIGNAL FACES	
KEY	1
QTY	2

PROPOSED SIGNS

LEGEND	TYPE	KEY
	R10-10b (18"x24")	S1
	R10-11 (24"x30")	S2

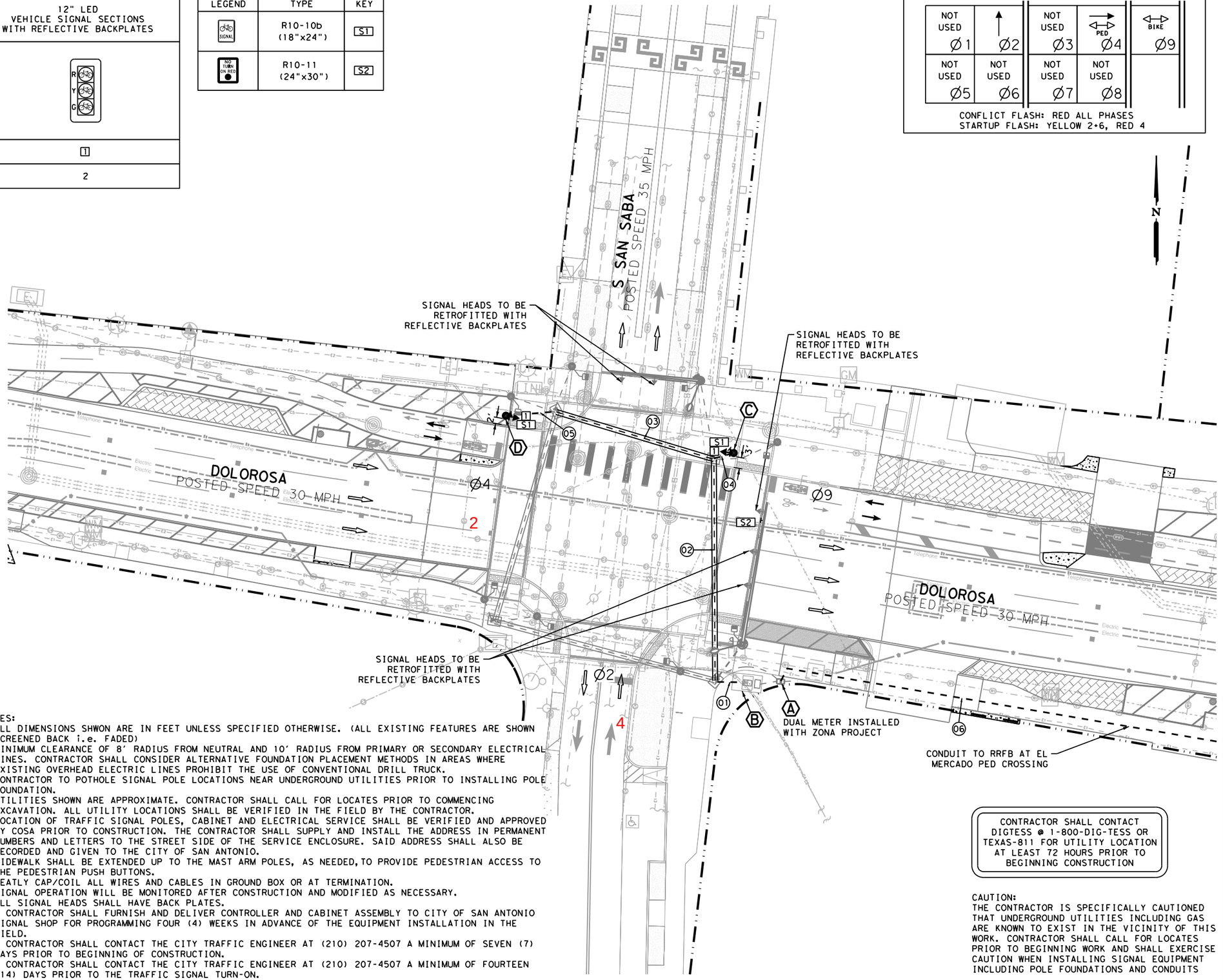
PHASE DIAGRAM

NOT USED Ø1	Ø2	NOT USED Ø3	PED Ø4	BIKE Ø9
NOT USED Ø5	NOT USED Ø6	NOT USED Ø7	NOT USED Ø8	

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- STREET NAME SIGN
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- WIRELESS ACCESS PNT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA
- FEDS DETECTION



NOTES:
1. ALL DIMENSIONS SHWON ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. MINIMUM CLEARANCE OF 8' RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY OR SECONDARY ELECTRICAL LINES. CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
4. 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.
5. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
6. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
8. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
9. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
10. CONTRACTOR SHALL FURNISH AND DELIVER CONTROLLER AND CABINET ASSEMBLY TO CITY OF SAN ANTONIO SIGNAL SHOP FOR PROGRAMMING FOUR (4) WEEKS IN ADVANCE OF THE EQUIPMENT INSTALLATION IN THE FIELD.
11. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
12. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF FOURTEEN (14) DAYS PRIOR TO THE TRAFFIC SIGNAL TURN-ON.

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

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

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

DOLOROSA

TRAFFIC SIGNAL LAYOUT

DOLOROSA AT S SAN SABA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	426

Plotted on: 1/25/2023 2:45:34 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_CCS04.dgn

CONDUIT AND CONDUCTOR SCHEDULE

RUN NUMBER				01	02	03	04	05	06	07	08	09	10	11
CONDUIT SIZE (INCHES)				3	3	3	3	3	3	3	2	2	3	2
NUMBER OF CONDUITS				2	2	2	1	1	2	2	1	1	2	1
LENGTH OF RUN (FT)				10	70	55	10	20	310	45	25	10	25	15
TRENCH (T)/BORE (B)/EXISTING (E)/AERIAL (A)				T	B	B	T	T	T	B	T	T	T	T
CABLE	CIRCUIT													
#8 BARE	BARE BOND GROUND			2	2	2	1	1	2	2	1	1	2	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	9	2	2	1	1	1						
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	E						1				1	
		POLE	G						1	1		1		
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	F						1					1
		POLE	H						1	1	1			

POLE SCHEDULE

POLE				C	D	E	F	G	H
POLE TYPE (SMA/LMA/DMA/PED)				PED	PED	SMA	PB	PED	PB
POLE HEIGHT (FEET)				20	20	19	5	20	5
MAST ARM LENGTH (FEET)				N/A	N/A	28	N/A	N/A	N/A
LUMINAIRE (YES/NO)				N/A	N/A	NO	N/A	N/A	N/A
ILSN (YES/NO)				N/A	N/A	NO	N/A	N/A	N/A
ILSN ARM LENGTH (FEET)				N/A	N/A	N/A	N/A	N/A	N/A
FOUNDATION TYPE				24-A	24-A	30-A	SPL	24-A	SPL
FOUNDATION DEPTH (FEET)				6	6	11	N/A	6	N/A
CABLE	CIRCUIT								
#8 BARE	BARE BOND GROUND			1	1	1	1	1	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	9	1	1				
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	E			3			
		POLE	G					1	
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	F				1		
		POLE	H						1

* SEE PEDESTRIAN POLE SPECIAL FOUNDATION FOR DETAILS

feds cctv

EXISTING ELECTRICAL SERVICE DATA

Elec. 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-TBD	ELEC SERV DWNTN NETWORK (120/208)0200(NS)AL(E)PS(U)	3"	3/#6	N/A	2P/200	30	200	A(SIGNAL) B(LUM) C(CELL)	1P/50 1P/20 1P/200	40	6.4

POLE & EQUIPMENT INFORMATION

ID	DESCRIPTION/ATTACHMENTS	NORTHING	EASTING	FND. ELEV
A	EXISTING CPS DUAL ELECTRIC METER PEDISTAL FOR DOWNTOWN NETWORK	13704528.4	2127970.0	N/A
B	EXISTING SAN ANTONIO MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY WITH EXTERNAL BATTERY BACKUP CABINET AND MODEL 2070 CONTROLLER WITH MAXTIME SOFTWARE ON COSA BASE-MOUNTFOUNDATION (5'X9')	13704528.0	2127959.5	N/A
C	INSTALL 20 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE BICYCLE SIGNAL HEAD, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE R10-10b SIGN AS INDICATED ON LAYOUT	13704598.7	2127955.6	FLUSH WITH LANDING
D	INSTALL 20 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE BICYCLE SIGNAL HEAD, ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, AND ONE R10-10b SIGN AS INDICATED ON LAYOUT	13704610.3	2127885.6	FLUSH WITH LANDING
E	EXISTING 24 FT SMA-80 ON 11 FT DRILLED SHAFT FOUNDATION (30-A) WITH 28 FT MAST ARM, INSTALL ONE W11-2 SIGN, INSTALL RECTANGULAR RAPID FLASHING BEACON, INSTALL TWO VEHICLE SIGNAL HEADS AS ILLUSTRATED.	13704490.1	2128290.5	LEVEL WITH ROADWAY CROWN
F	'INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-25 SIGN AS ILLUSTRATED.	13704485.4	2128271.3	FLUSH WITH LANDING
G	'INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, TWO W16-7PL SIGNS, AND TWO W11-2 SIGNS AS ILLUSTRATED.	13704531.0	2128279.0	FLUSH WITH LANDING
H	'INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-25 SIGN AS ILLUSTRATED.	13704549.2	2128294.3	FLUSH WITH LANDING

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

DESIGN

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P.E. SERIAL NO: 118715
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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

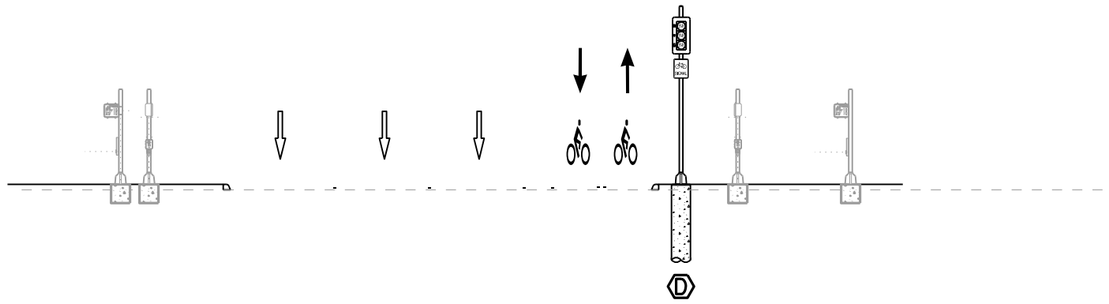
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

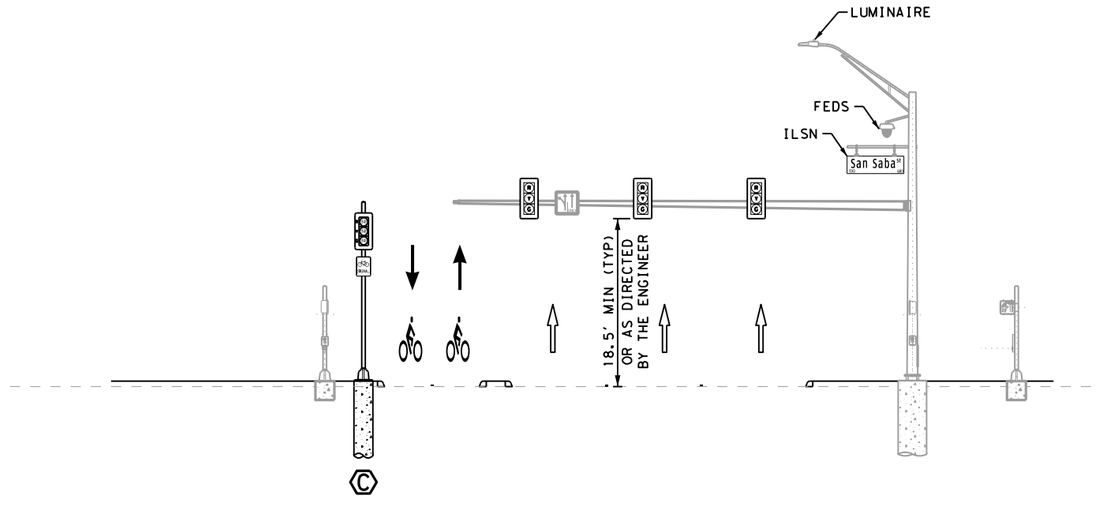
CONDUIT & CONDUCTOR SCHEDULE

DOLOROSA ST AT S SAN SABA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	427



WESTBOUND DOLOROSA
NOT TO SCALE



EASTBOUND DOLOROSA
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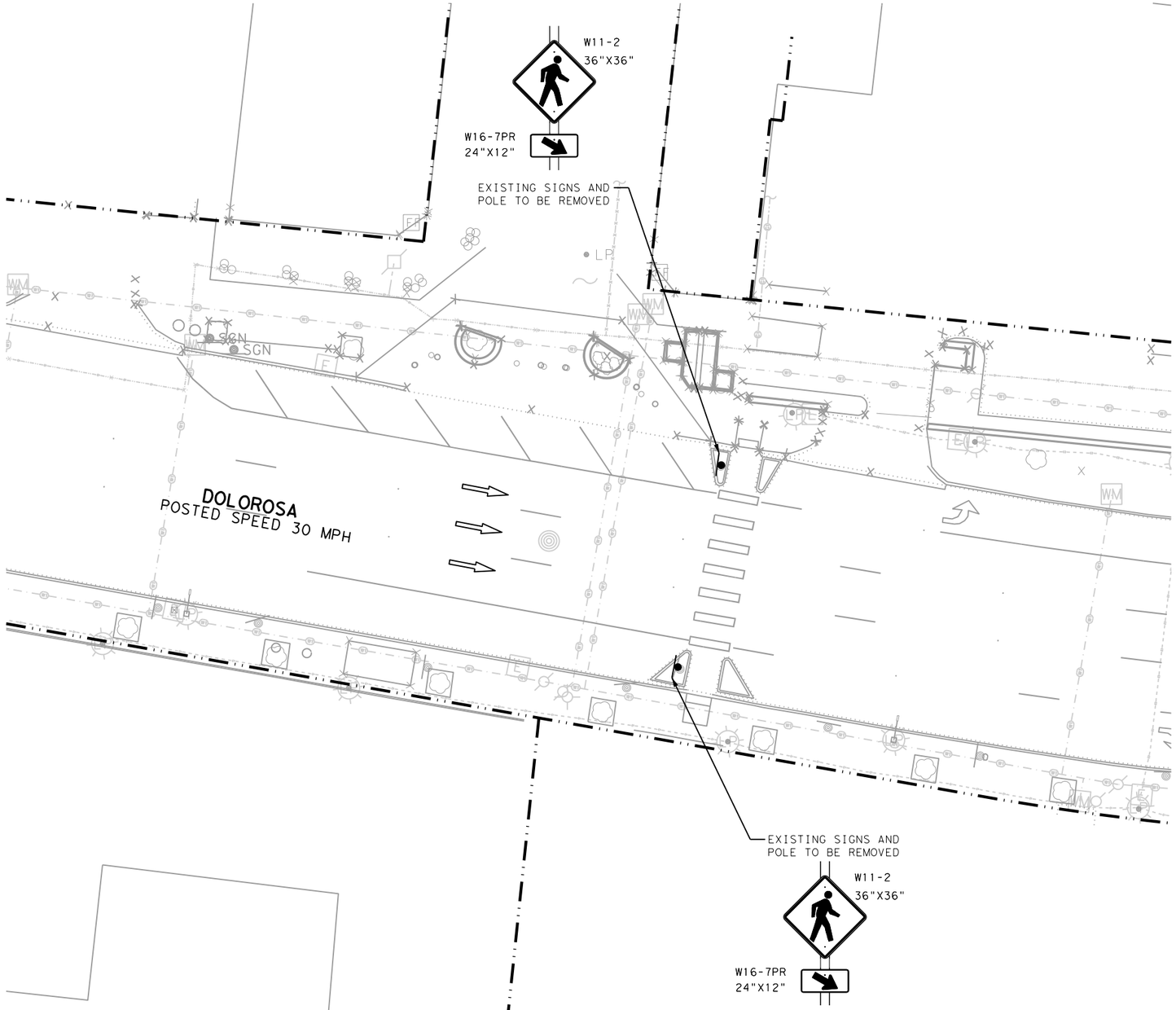
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

ELEVATION VIEWS

DOLOROSA ST AT S SAN SABA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	428



N

LEGEND

- EQUIPMENT ID
- STREET NAME SIGN
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- VIVDS DETECTION
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- EX. WIRELESS POINT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA

NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. 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.
3. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
4. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
5. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4583 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.

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

CAUTION:
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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

EXISTING CONDITIONS

DOLOROSA AT EL MERCADO PED CROSSING

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JC	23-03763	70%	429

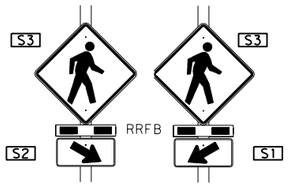
Plotted on: 1/25/2023 2:46:15 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\122703_TRAF05.dgn

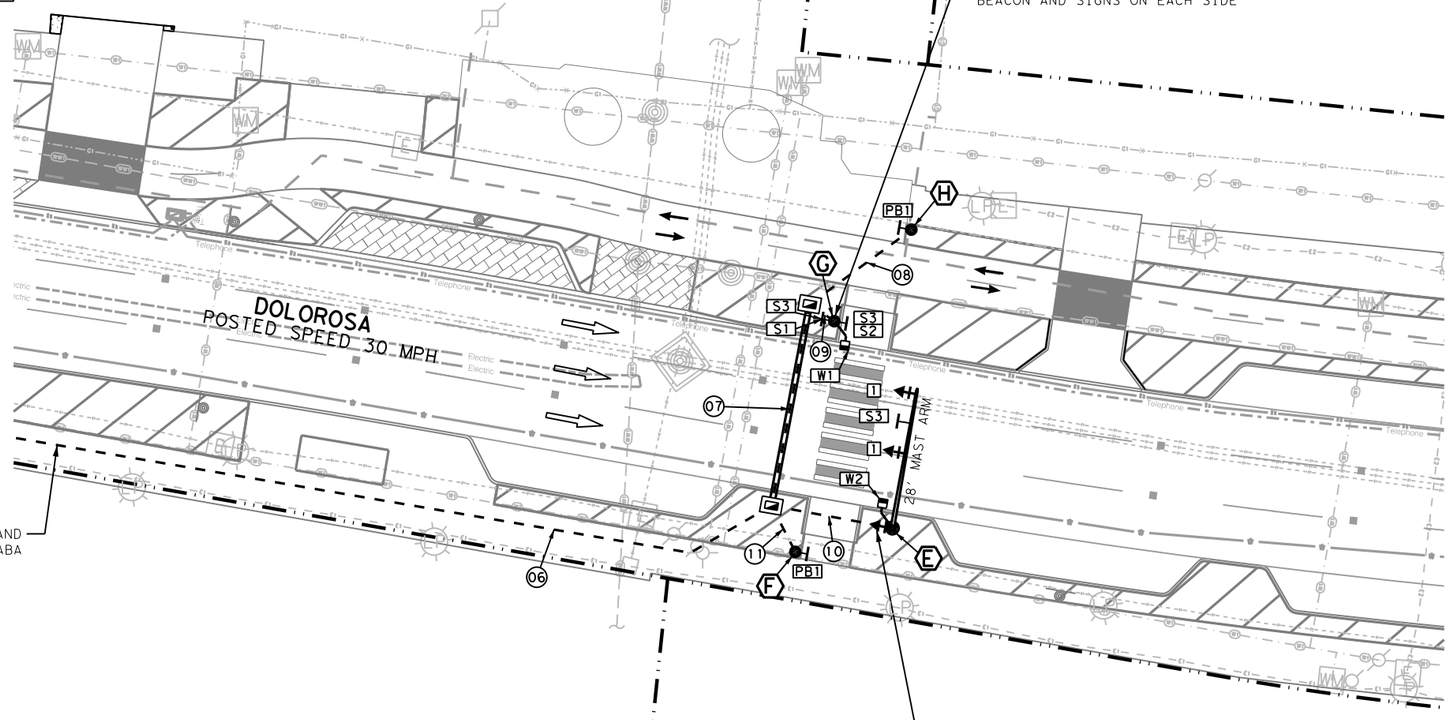
PROPOSED SIGNAL HEADS

12" LED
VEHICLE SIGNAL SECTIONS
WITH REFLECTIVE BACKPLATES

SIGNAL FACES	
KEY	1
QTY	2



INSTALL RECTANGULAR RAPID FLASHING
BEACON AND SIGNS ON EACH SIDE



CONDUIT RUNNING TO CONTROLLER AND
ELECTRIC SERVICE AT SAN SABA

INSTALL RECTANGULAR RAPID FLASHING
BEACON ON SIGNAL POLE

PROPOSED SIGNS

LEGEND	TYPE	KEY
	W16-7PL (24"x12")	S1
	W16-7PR (24"x12")	S2
	W11-2 (36"x36")	S3
	R10-25 (9"x12")	PB1

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- STREET NAME SIGN
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- WIRELESS ACCESS PNT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA
- FEDS DETECTION

NOTES:
1. ALL DIMENSIONS SHWON ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. MINIMUM CLEARANCE OF 8' RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY OR SECONDARY ELECTRICAL LINES. CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
4. 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.
5. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
6. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
8. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
9. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
10. CONTRACTOR SHALL FURNISH AND DELIVER CONTROLLER AND CABINET ASSEMBLY TO CITY OF SAN ANTONIO SIGNAL SHOP FOR PROGRAMMING FOUR (4) WEEKS IN ADVANCE OF THE EQUIPMENT INSTALLATION IN THE FIELD.
11. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.

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

CAUTION:
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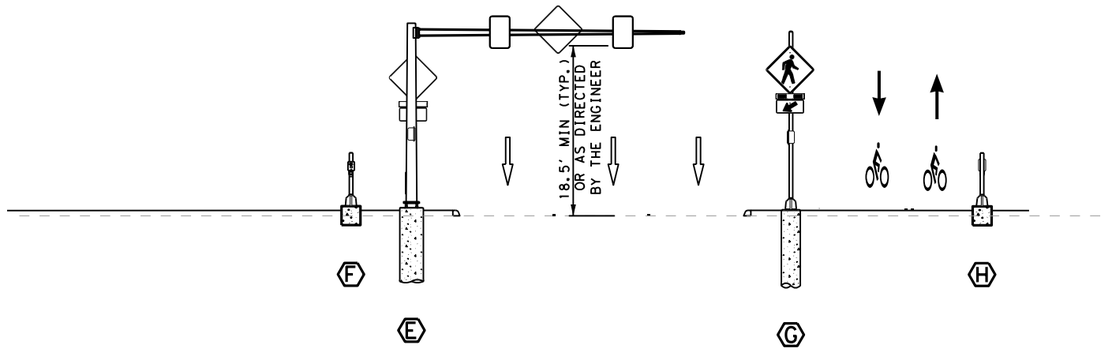
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

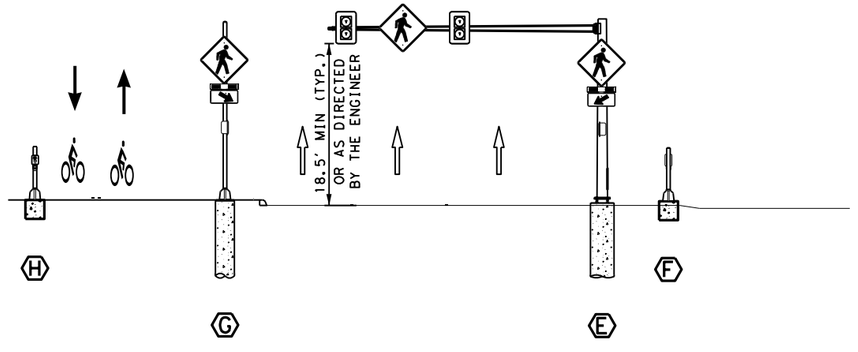
TRAFFIC SIGNAL LAYOUT

DOLOROSA AT EL MERCADO PED CROSSING

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	430



WESTBOUND DOLOROSA
NOT TO SCALE



EASTBOUND DOLOROSA
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

ELEVATION VIEWS

DOLOROSA ST AT EL MERCADO PED CROSSING

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	431

Plotted on: 1/25/2023 2:46:48 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\122703_EXIST06.dgn

TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH BACKPLATES			16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R Y G	R Y G C	R Y G	18
KEY	1	2	3	W1 THRU W8
QTY	6	1	2	8

PHASE DIAGRAM

NOT USED Ø1	Ø2 PED/BIKE	NOT USED Ø3	PED Ø4 PED
NOT USED Ø5	PED/BIKE Ø6	NOT USED Ø7	NOT USED Ø8

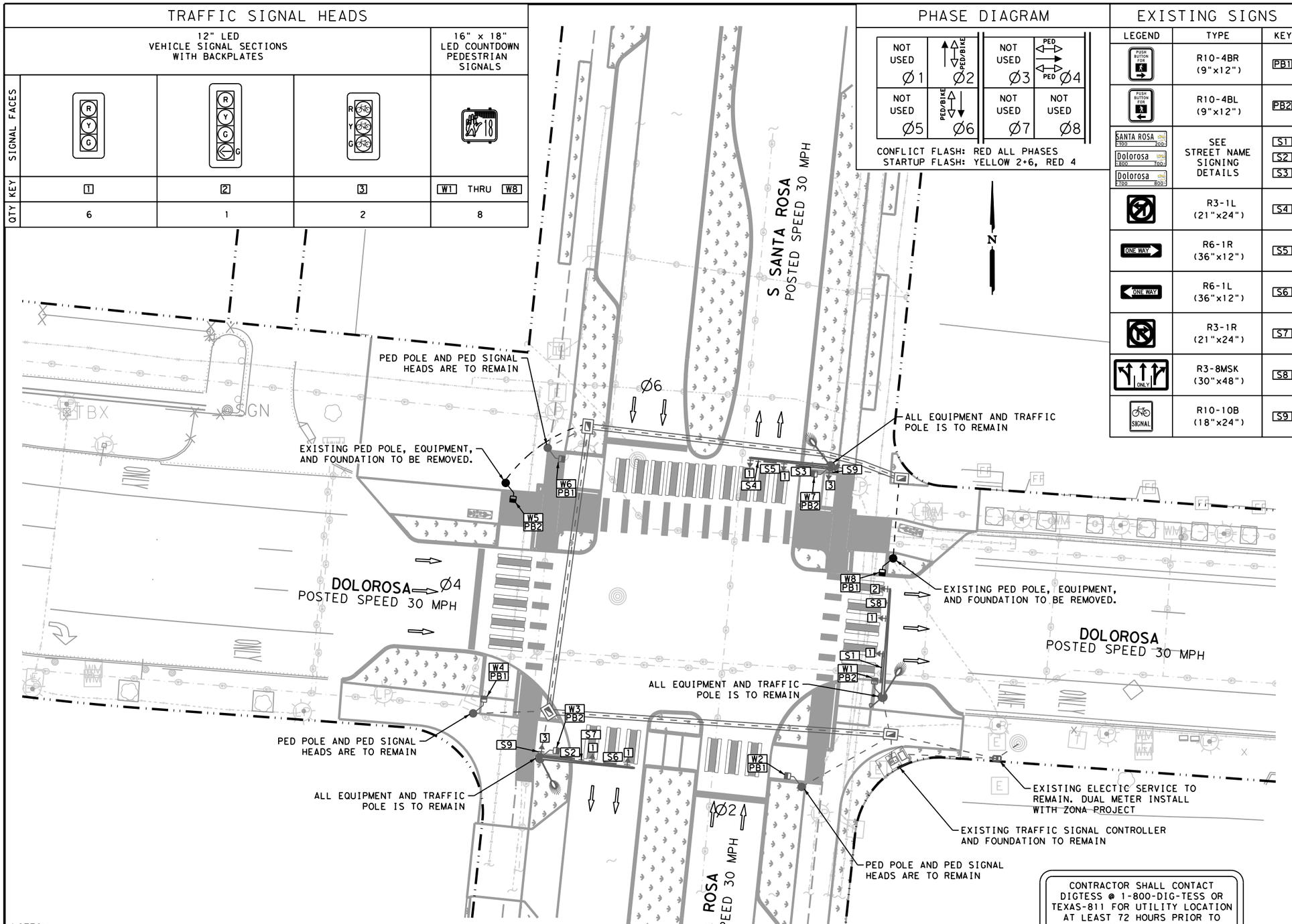
CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4

EXISTING SIGNS

LEGEND	TYPE	KEY
PUSH BUTTON FOR	R10-4BR (9"x12")	PB1
PUSH BUTTON FOR	R10-4BL (9"x12")	PB2
SANTA ROSA / Dolorosa / Dolorosa	SEE STREET NAME SIGNING DETAILS	S1 S2 S3
	R3-1L (21"x24")	S4
ONE WAY	R6-1R (36"x12")	S5
ONE WAY	R6-1L (36"x12")	S6
	R3-1R (21"x24")	S7
ONLY	R3-8MSK (30"x48")	S8
SIGNAL	R10-10B (18"x24")	S9

LEGEND

- EQUIPMENT ID
- STREET NAME SIGN
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- VIVDS DETECTION
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- EX. WIRELESS POINT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA



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DATE: 1/25/2023

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

DOLOROSA

EXISTING CONDITIONS

DOLOROSA AT S SANTA ROSA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	432

Plotted on: 1/25/2023 2:46:58 PM

Design Filename: P:\122x27\03\Design\Civil\Traffic\1222703_TRAF06.dgn

TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH BACKPLATES	LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R Y G	PED 18
KEY	3	W1 THRU W2
QTY.	2	2

PROPOSED SIGNS

LEGEND	TYPE	KEY
SIGNAL	R10-10b (18"x24")	S1
NO TURN ON RED	R10-11 (24"x30")	S2
PUSH BUTTON FOR	R10-4BR (9"x15")	PB1
PUSH BUTTON FOR	R10-4BL (9"x15")	PB2

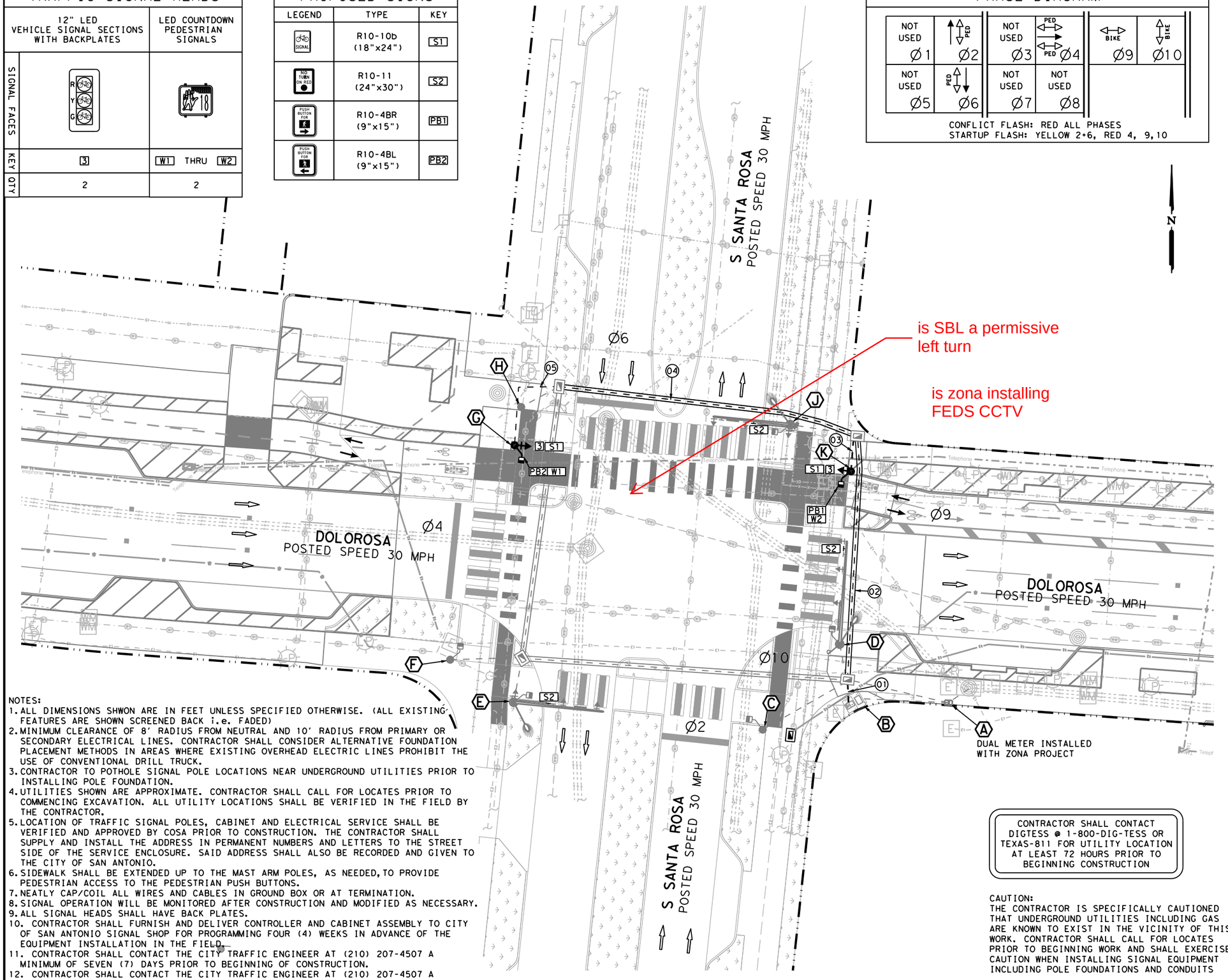
PHASE DIAGRAM

NOT USED Ø1	Ø2 (PED)	NOT USED Ø3	Ø4 (PED)	Ø9 (BIKE)	Ø10 (BIKE)
NOT USED Ø5	Ø6 (PED)	NOT USED Ø7	NOT USED Ø8		

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4, 9,10

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- STREET NAME SIGN
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- WIRELESS ACCESS PNT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA



NOTES:
1. ALL DIMENSIONS SHWON ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. MINIMUM CLEARANCE OF 8' RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY OR SECONDARY ELECTRICAL LINES. CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
4. 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.
5. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
6. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
8. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
9. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
10. CONTRACTOR SHALL FURNISH AND DELIVER CONTROLLER AND CABINET ASSEMBLY TO CITY OF SAN ANTONIO SIGNAL SHOP FOR PROGRAMMING FOUR (4) WEEKS IN ADVANCE OF THE EQUIPMENT INSTALLATION IN THE FIELD.
11. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
12. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF FOURTEEN (14) DAYS PRIOR TO THE TRAFFIC SIGNAL TURN-ON.

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

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DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
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ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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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

DOLOROSA

TRAFFIC SIGNAL LAYOUT

DOLOROSA AT S SANTA ROSA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	433

Plotted on: 1/25/2023 2:47:00 PM

Design Filename: P:\122\27N03\Design\Civil\Traffic\1222703_CCS06.dgn

CONDUIT AND CONDUCTOR SCHEDULE

RUN NUMBER				01	02	03	04	05
CONDUIT SIZE (INCHES)				3	3	3	3	3
NUMBER OF CONDUITS				1	2	1	1	1
LENGTH OF RUN (FT)				10	80	15	95	35
TRENCH (T)/BORE (B)/EXISTING (E)/AERIAL(A)				T	B	T	B	T
CABLE	CIRCUIT							
#8 BARE	BARE BOND GROUND			1	2	1	1	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	9	2	2	1	1	1

POLE SCHEDULE

POLE				G	K
POLE TYPE (SMA/LMA/DMA/PED)				PED	PED
POLE HEIGHT (FEET)				20	20
MAST ARM LENGTH (FEET)				N/A	N/A
LUMINAIRE (YES/NO)				N/A	N/A
ILSN (YES/NO)				N/A	N/A
ILSN ARM LENGTH (FEET)				N/A	N/A
FOUNDATION TYPE				24-A	24-A
FOUNDATION DEPTH (FEET)				6	6
CABLE	CIRCUIT				
#8 BARE	BARE BOND GROUND			1	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	9	1	1

* SEE PEDESTRIAN POLE SPECIAL FOUNDATION FOR DETAILS

EXISTING ELECTRICAL SERVICE DATA

Elec. 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-702	ELEC SERV DWNTN NETWORK (120/208)0200(NS)AL(E)PS(U)	3"	3/#6	N/A	2P/200	30	200	A(SIGNAL) B(LUM) C(CELL)	1P/50 1P/20 1P/200	40	6.4

POLE & EQUIPMENT INFORMATION

ID	DESCRIPTION/ATTACHMENTS	NORTHING	EASTING	FND. ELEV
A	EXISTING CPS DUAL ELECTRIC METER PEDISTAL FOR DOWNTOWN NETWORK	13704437.4	2128677.1	N/A
B	EXISTING SAN ANTONIO MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY WITH EXTERNAL BATTERY BACKUP CABINET AND MODEL 2070 CONTROLLER WITH MAXTIME SOFTWARE ON COSA BASE-MOUNTFOUNDATION (5'X9')	13704436.7	2128646.4	N/A
G	INSTALL 20 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE BICYCLE SIGNAL HEAD, ONE APS PUSH BUTTON, AND ONE R10-3b SIGN AS INDICATED ON LAYOUT	13704517..35	2128542.2	FLUSH WITH LANDING
H	'INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-25 SIGN AS ILLUSTRATED.	13704471.6	2129216.6	FLUSH WITH LANDING
J	'INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, WITH ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT, AND TWO R10-25 SIGN AS ILLUSTRATED.	13704461.6	2129217.1	FLUSH WITH LANDING
K	INSTALL 24 FT SMA-80 ON 11 FT DRILLED SHAFT FOUNDATION (30-A) WITH 28 FT MAST ARM, INSTALL ONE W11-2 SIGN, INSTALL RECTANGULAR RAPID FLASHING BEACON, INSTALL ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, INSTALL TWO VEHICLE SIGNAL HEADS AS ILLUSTRATED.	13704509.2	2128646.7	LEVEL WITH ROADWAY CROWN
L	'INSTALL 10 FT BRUSHED ALUMINUM PEDESTAL POLE ON SPECIAL SHALLOW FOUNDATION, ONE PEDESTRIAN PUSH BUTTON WITH AUDIBLE PEDESTRIAN SIGNAL UNIT AND ONE R10-25 SIGN AS ILLUSTRATED.	13704410.1	2129202.4	FLUSH WITH LANDING

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

DESIGN

INTERIM REVIEW

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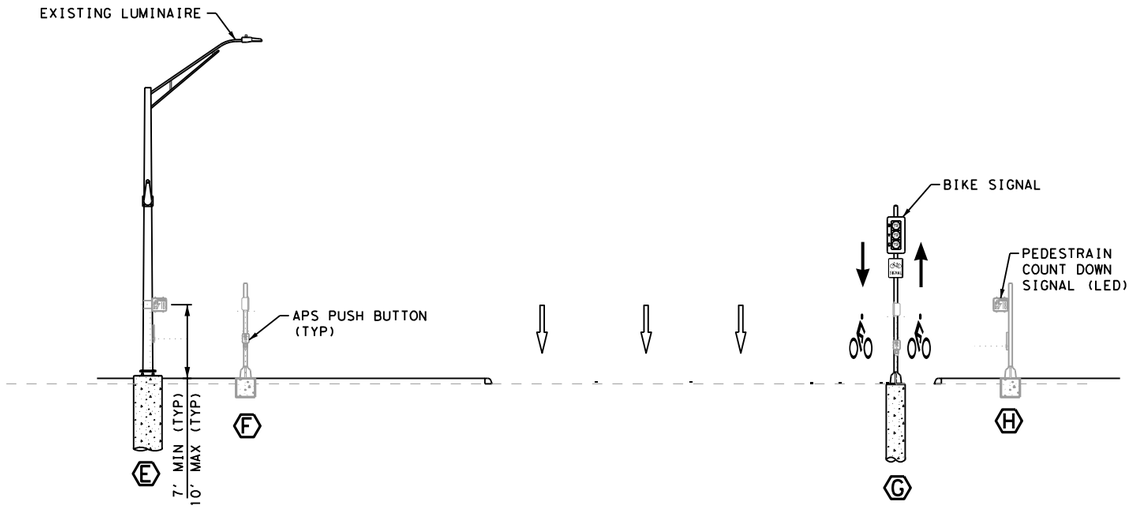
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

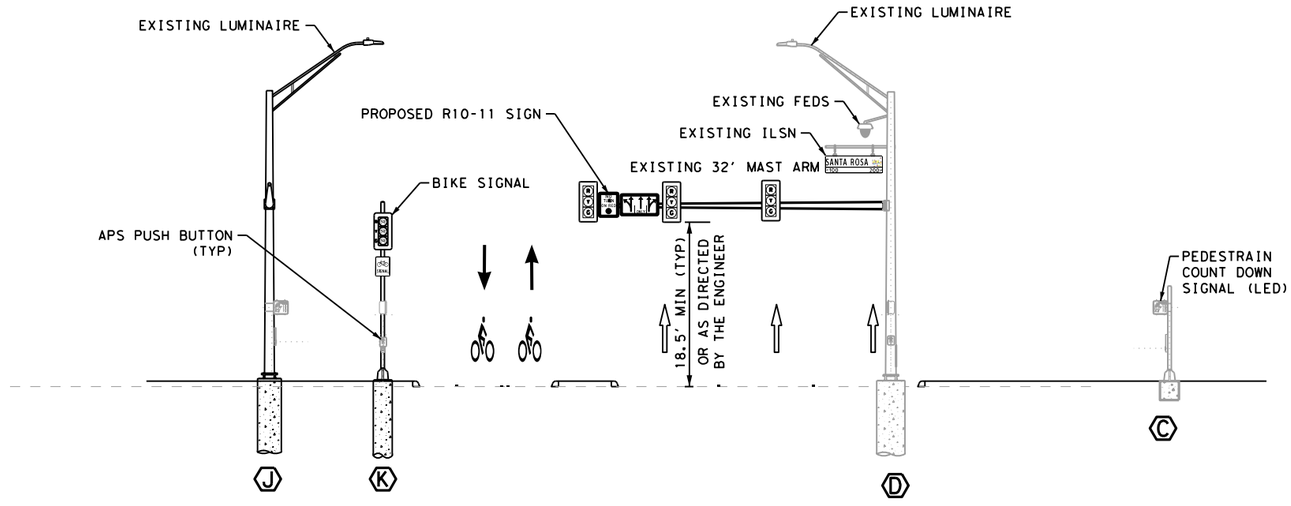
CONDUIT & CONDUCTOR SCHEDULE

DOLOROSA ST AT S SANTA ROSA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	434



WESTBOUND DOLOROSA
NOT TO SCALE



EASTBOUND DOLOROSA
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

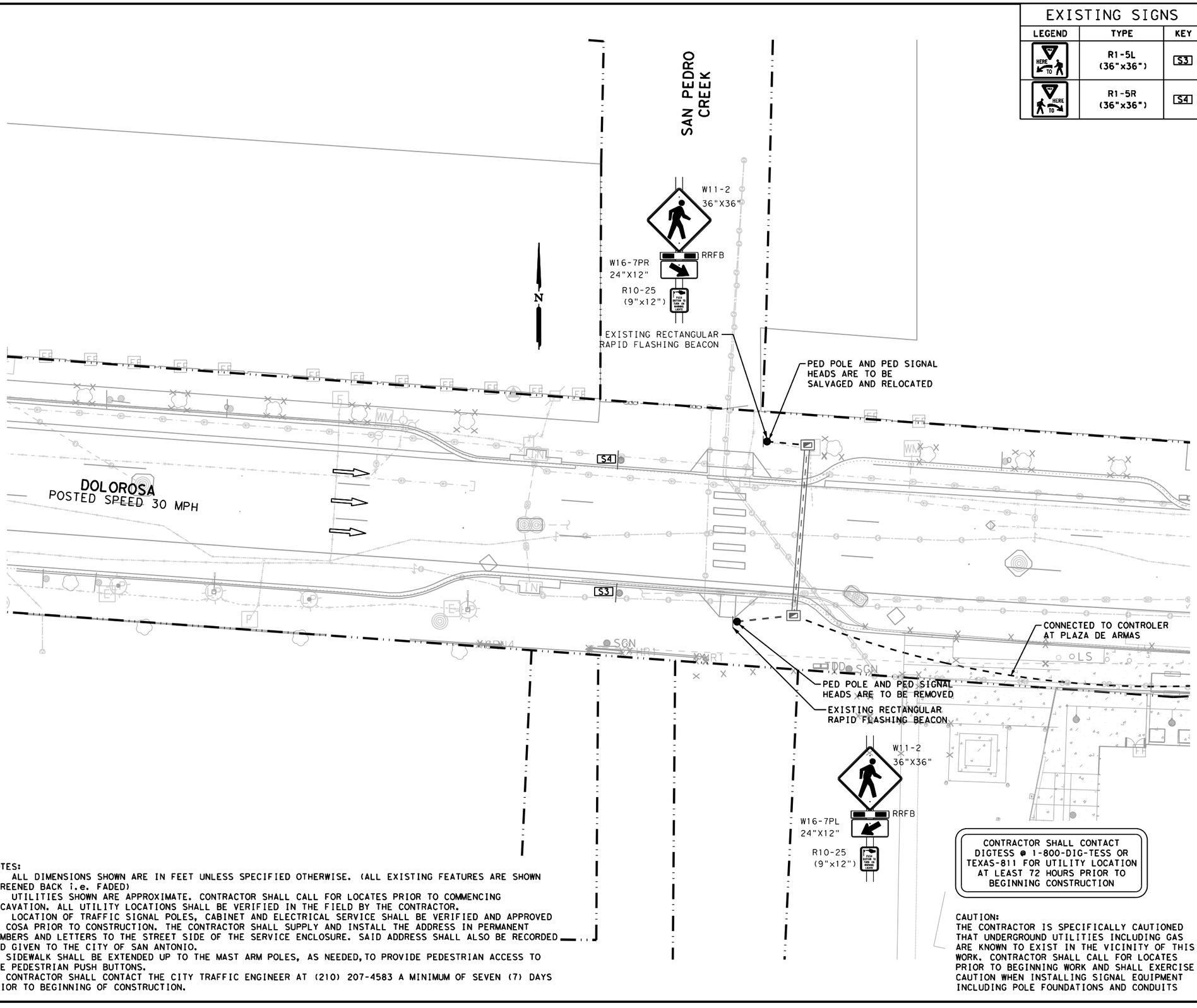
ELEVATION VIEWS

DOLOROSA ST AT S SANTA ROSA

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	435

Plotted on: 1/25/2023 2:47:37 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_EXIST07.dgn



EXISTING SIGNS		
LEGEND	TYPE	KEY
HERE TO	R1-5L (36"x36")	S3
HERE TO	R1-5R (36"x36")	S4

LEGEND	
	EQUIPMENT ID
	STREET NAME SIGN
	SIGNAL POLE
	VEHICLE SIGNAL HEAD
	MAST ARM SIGN
	CCTV
	VIVDS DETECTION
	LUMINAIRE
	PEDESTAL POLE
	PEDESTRIAN SIGNAL
	ELECTRIC SERVICE
	EX. WIRELESS POINT
	CABLE RUN (TRENCH)
	CABLE RUN (BORE)
	GROUND BOX
	GROUND MOUNTED SIGN
	COSA CONTROLLER
	5G ANTENNA

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

EXISTING CONDITIONS

DOLOROSA AT SAN PEDRO CREEK

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	436

Plotted on: 1/25/2023 2:47:47 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\122703_TRAF07.dgn

PROPOSED SIGNAL HEADS

12" LED
VEHICLE SIGNAL SECTIONS
WITH REFLECTIVE BACKPLATES

QTY	KEY	SIGNAL FACES
2	[1]	

PROPOSED SIGNS

LEGEND	TYPE	KEY
	W11-2 (36"x36")	S1
	R10-25 (9"x12")	PB1

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- STREET NAME SIGN
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- DUAL METER ELEC. SERV.
- WIRELESS ACCESS PNT
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- CABLE RUN (BORE)
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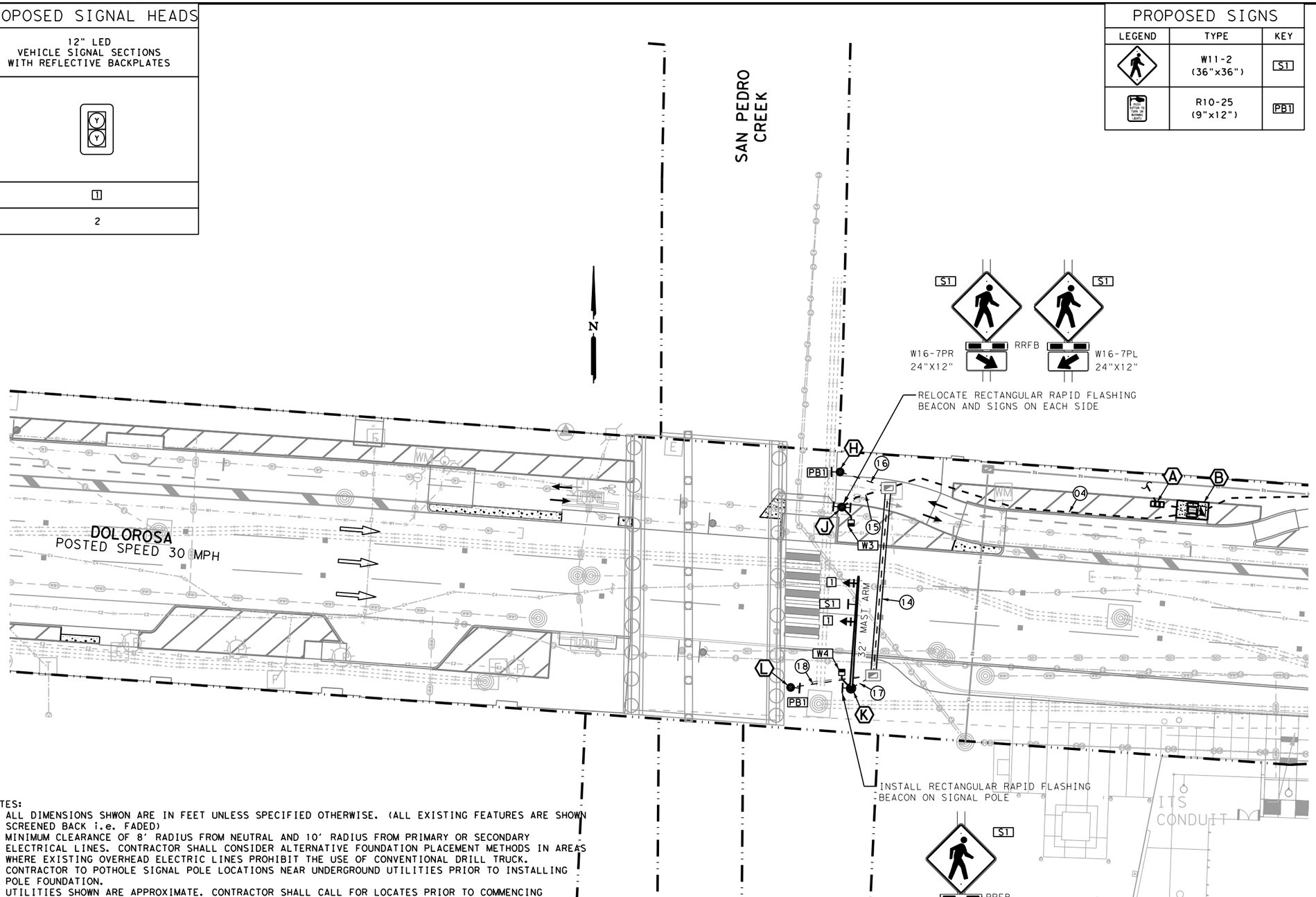

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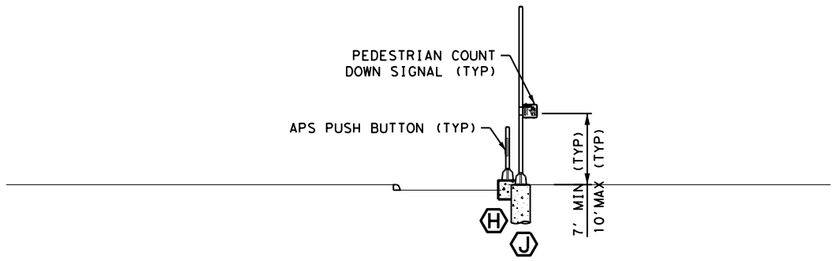
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

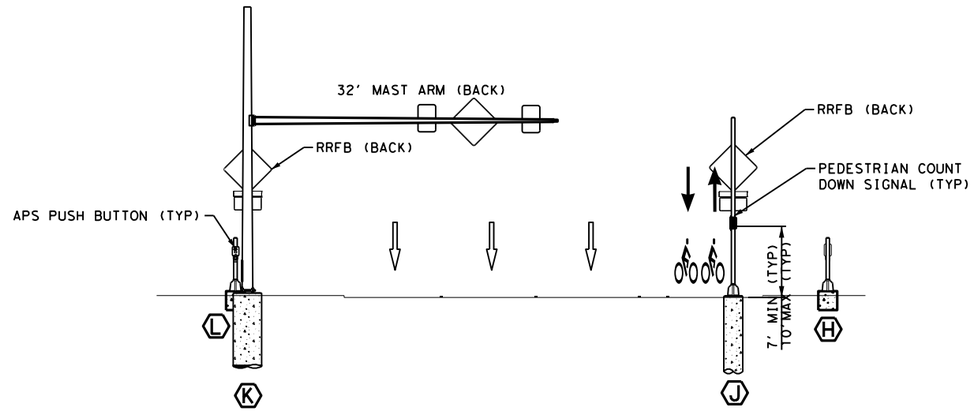
TRAFFIC SIGNAL LAYOUT

DOLOROSA AT SAN PEDRO CREEK

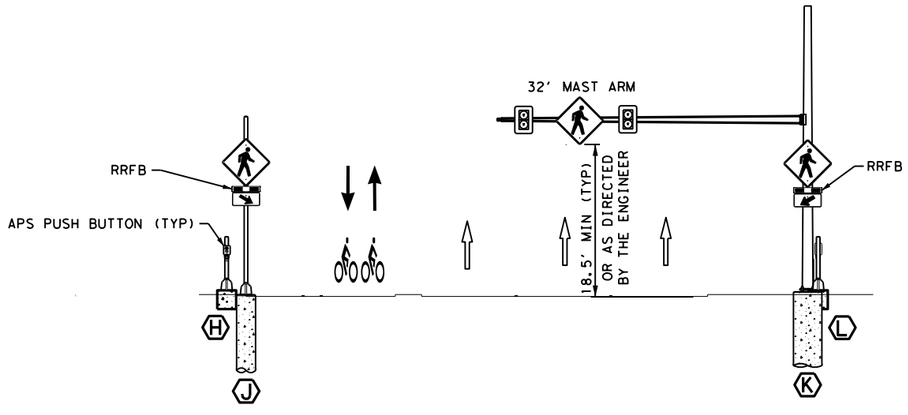
DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	437



NORTHBOUND SAN PEDRO CREEK
RRFB PEDESTRIAN CROSSING
NOT TO SCALE



EASTBOUND DOLOROSA ST
NOT TO SCALE



WESTBOUND DOLOROSA ST
NOT TO SCALE

DESIGN

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

ELEVATION VIEWS

DOLOROSA ST AT SAN PEDRO CREEK

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	438

Plotted on: 1/25/2023 2:48:20 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\122703_EXIST08.dgn

TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH BACKPLATES		16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES	R Y G	R Y G	PED 18
KEY	1	2	W1 THRU W3
QTY	2	1	3

EXISTING SIGNS

LEGEND	TYPE	KEY
Dolorosa XXX / PLAZA DE ARMAS XXX	SEE STREET NAME SIGNING DETAILS	S1 S2
BUSES ONLY	BUSES ONLY (XX"x XX")	S3

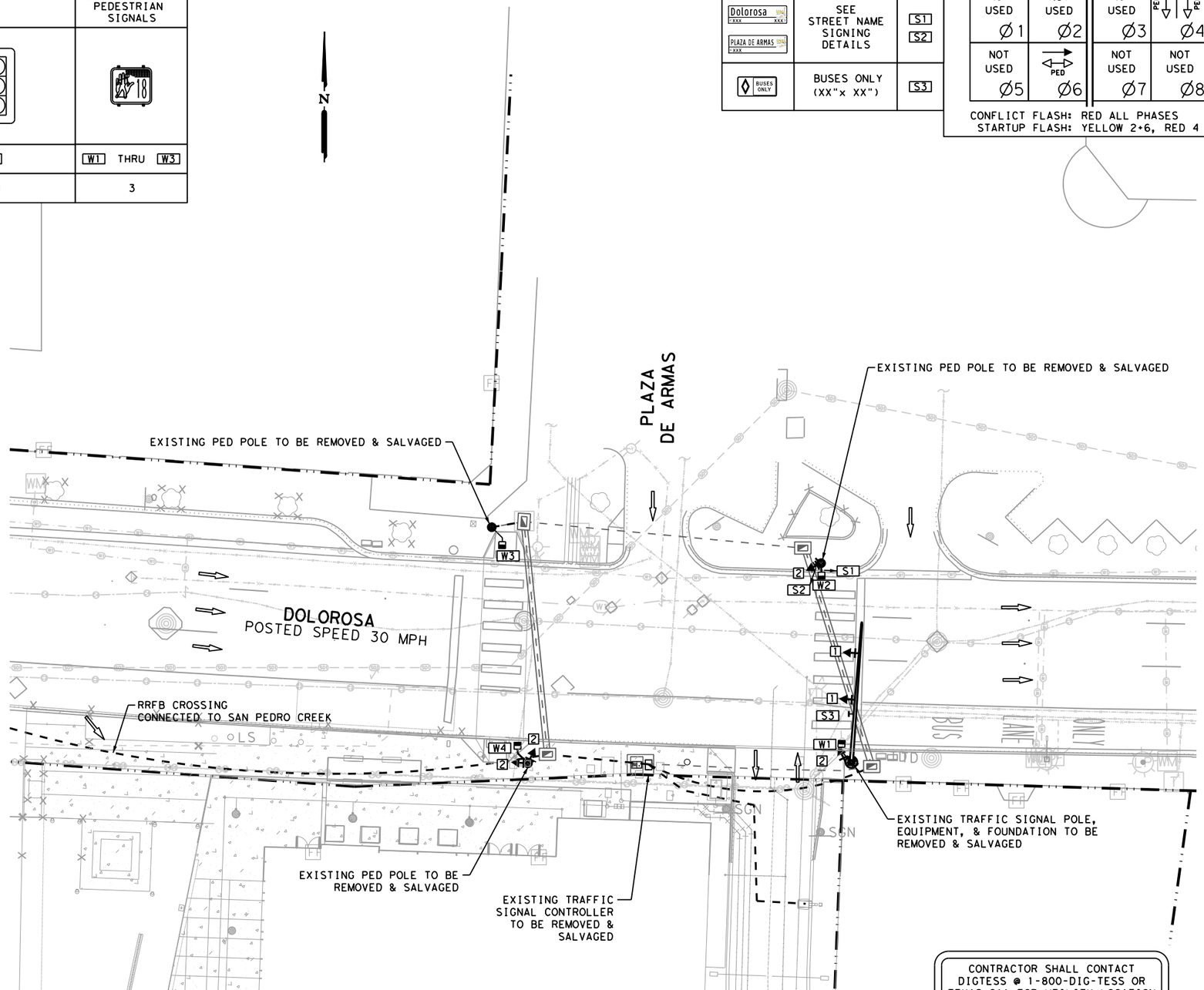
PHASE DIAGRAM

NOT USED Ø1	NOT USED Ø2	NOT USED Ø3 PED	PED Ø4
NOT USED Ø5	PED Ø6	NOT USED Ø7	NOT USED Ø8

CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 2+6, RED 4

LEGEND

- EQUIPMENT ID
- STREET NAME SIGN
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- VIVDS DETECTION
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- EX. WIRELESS POINT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- 5G ANTENNA



NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. 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.
3. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
4. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
5. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4583 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.

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

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

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

DOLOROSA

EXISTING CONDITIONS

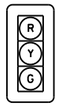
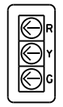
DOLOROSA AT PLAZA DE ARMAS

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	439

Plotted on: 1/25/2023 2:48:30 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_TRAF08.dgn

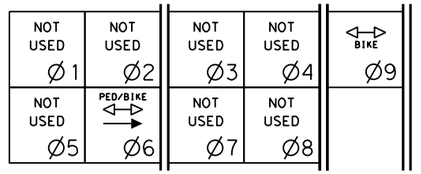
TRAFFIC SIGNAL HEADS

	12" LED VEHICLE SIGNAL SECTIONS WITH BACKPLATES			16" x 18" LED COUNTDOWN PEDESTRIAN SIGNALS
SIGNAL FACES				
KEY	1	2	3	W1 THRU W2
QTY	3	2	2	2

PROPOSED SIGNS

LEGEND	TYPE	KEY
	SEE STREET NAME SIGNING DETAILS	S1 S2
	R10-10b (18"x24")	S3
	R10-11B (24"x30")	S4

PHASE DIAGRAM

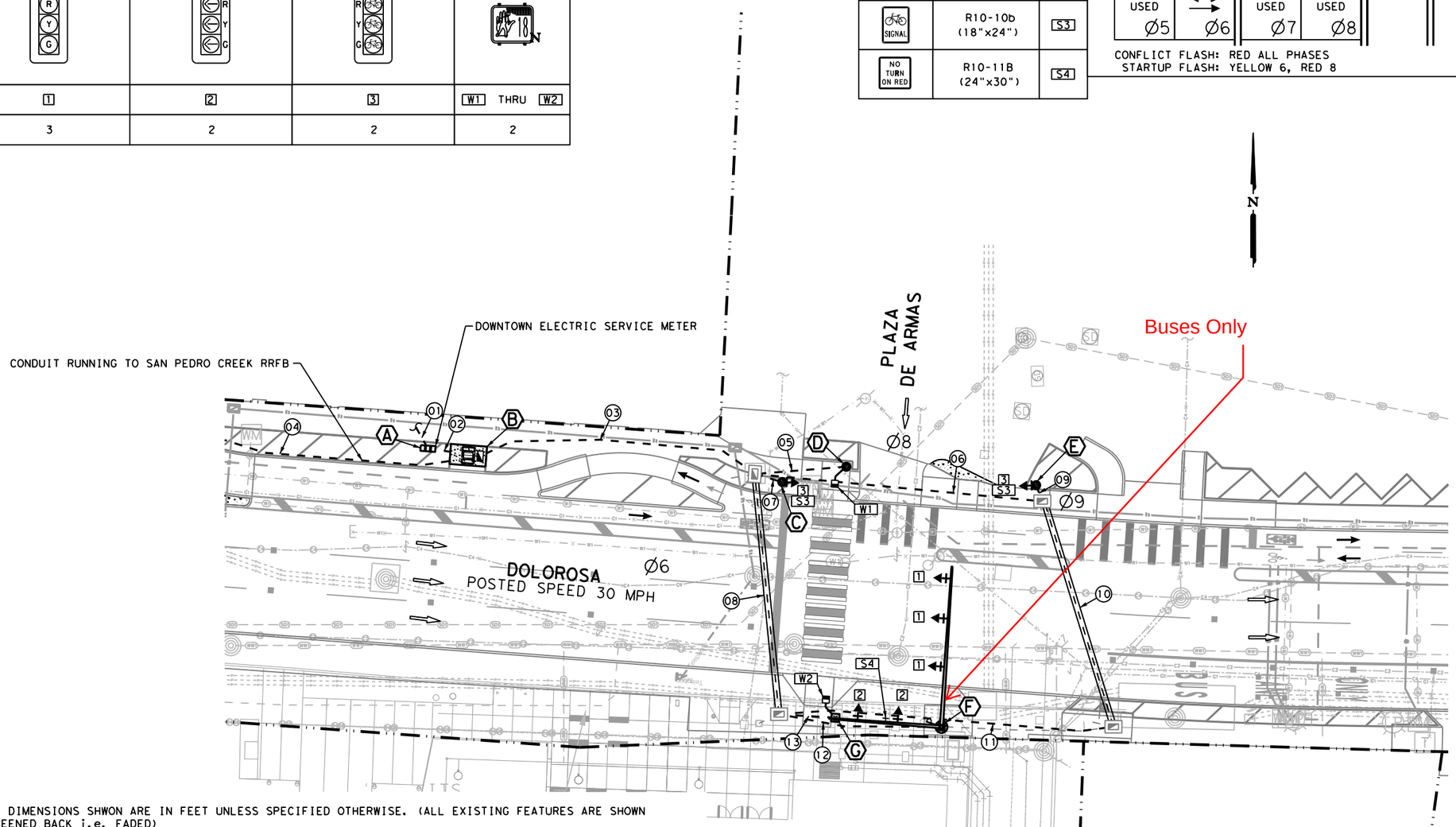


CONFLICT FLASH: RED ALL PHASES
STARTUP FLASH: YELLOW 6, RED 8

LEGEND

- EQUIPMENT ID
- CABLE RUN ID
- SIGNAL POLE
- VEHICLE SIGNAL HEAD
- MAST ARM SIGN
- CCTV
- STREET NAME SIGN
- LUMINAIRE
- PEDESTAL POLE
- PEDESTRIAN SIGNAL
- ELECTRIC SERVICE
- WIRELESS ACCESS PNT
- CABLE RUN (TRENCH)
- CABLE RUN (BORE)
- GROUND BOX
- GROUND MOUNTED SIGN
- COSA CONTROLLER
- DUAL ELECTRIC METER

no logo on ILSN



NOTES:
1. ALL DIMENSIONS SHWON ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED)
2. MINIMUM CLEARANCE OF 8' RADIUS FROM NEUTRAL AND 10' RADIUS FROM PRIMARY OR SECONDARY ELECTRICAL LINES. CONTRACTOR SHALL CONSIDER ALTERNATIVE FOUNDATION PLACEMENT METHODS IN AREAS WHERE EXISTING OVERHEAD ELECTRIC LINES PROHIBIT THE USE OF CONVENTIONAL DRILL TRUCK.
3. CONTRACTOR TO POTHOLE SIGNAL POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
4. 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.
5. LOCATION OF TRAFFIC SIGNAL POLES, CABINET AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY COSA PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE CITY OF SAN ANTONIO.
6. SIDEWALK SHALL BE EXTENDED UP TO THE MAST ARM POLES, AS NEEDED, TO PROVIDE PEDESTRIAN ACCESS TO THE PEDESTRIAN PUSH BUTTONS.
7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
8. SIGNAL OPERATION WILL BE MONITORED AFTER CONSTRUCTION AND MODIFIED AS NECESSARY.
9. ALL SIGNAL HEADS SHALL HAVE BACK PLATES.
10. CONTRACTOR SHALL FURNISH AND DELIVER CONTROLLER AND CABINET ASSEMBLY TO CITY OF SAN ANTONIO SIGNAL SHOP FOR PROGRAMMING FOUR (4) WEEKS IN ADVANCE OF THE EQUIPMENT INSTALLATION IN THE FIELD.
11. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF SEVEN (7) DAYS PRIOR TO BEGINNING OF CONSTRUCTION.
12. CONTRACTOR SHALL CONTACT THE CITY TRAFFIC ENGINEER AT (210) 207-4507 A MINIMUM OF FOURTEEN (14) DAYS PRIOR TO THE TRAFFIC SIGNAL TURN-ON.

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

CAUTION:
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DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE.NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

DOLOROSA

TRAFFIC SIGNAL LAYOUT

DOLOROSA AT PLAZA DE ARMAS

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JC	23-03763	70%	440

Plotted on: 1/25/2023 2:48:32 PM

Design Filename: P:\122\27\03\Design\Civil\Traffic\1222703_CCS08.dgn

CONDUIT AND CONDUCTOR SCHEDULE

				RUN NUMBER	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
				CONDUIT SIZE (INCHES)	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	3	2
				NUMBER OF CONDUITS	1	1	2	2	1	2	1	2	1	2	2	2	1	2	1	1	2	1
				LENGTH OF RUN (FT)	100	10	75	95	45	75	10	65	10	60	85	45	15	55	15	15	10	25
				TRENCH (T)/BORE (B)/EXISTING (E)/AERIAL(A)	T	T	T	T	B	T	T	B	T	B	T	T	T	B	T	T	T	T
CABLE	CIRCUIT				NUMBER OF CONDUCTORS																	
#6 XHHW	120 POWER HOT			CABLES PULLED BY CPS ENERGY		1																
	120 POWER COMMON					1																
#6 BARE	GROUND (ELECTRIC SERVICE)					1																
#8 BARE	BARE BOND GROUND						2	2	1	2	1	2	1	2	2	2	1	2	1	1	2	1
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	6				1					1				1						
		ø	8				1					1				1						
		ø	9				2			1	1		1									
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	D				1		1													
		POLE	G				1					1					1					
		POLE	J					1											1			
		POLE	K					1										1			1	
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	D				1		1													
		POLE	G				1					1					1					
		POLE	H					1												1		
		POLE	L					1										1				1
4 COND. #14 AWG TYPE "A"	ILSN SIGNS	POLE	F				2					1				1						
POWER & ETHERNET	FEDS	POLE	F				1					1				1						

FEDS CCTV

ELECTRICAL SERVICE DATA

Elec. 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-TBD	ELEC SERV DWNTN NETWORK (120/208)0200(NS)AL(E)PS(U)	3"	3/#6	N/A	2P/70	30	200	A(SIGNAL) B(LUM) C(CELL)	1P/50 1P/20 1P/200	40	6.4

POLE & EQUIPMENT INFORMATION

ID	DESCRIPTION/ATTACHMENTS	NORTHING	EASTING	FND. ELEV
A	INSTALL CPS DUAL ELECTRIC METER PEDISTAL FOR DOWNTOWN NETWORK	13704462.4	2129307.3	N.A
B	INSTALL SAN ANTONIO MODEL 332 TRAFFIC SIGNAL CONTROLLER ASSEMBLY WITH MODEL 2070E CONTROLLER ON COSA BASE-MOUNT FOUNDATION (5' X 9')	13704460.7	2129317.3	N.A
C	INSTALL 20 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE BICYCLE SIGNAL HEAD AND ONE R10-10b SIGN AS INDICATED ON LAYOUT	13704454.1	21229395.5	FLUSH WITH LANDING
D	INSTALL 10 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD AND ONE APS PUSH BUTTON	13704457.9	2129411.5	FLUSH WITH LANDING
E	INSTALL 20 FT PEDESTAL POLE ON 6 FT DRILLED SHAFT FND. (24-A) WITH ONE BICYCLE SIGNAL HEAD AND ONE R10-10b SIGN AS INDICATED ON LAYOUT	13704453.3	2129458.9	FLUSH WITH LANDING
F	INSTALL 30 FT DMA-80 ON 15.2 FT DRILLED SHAFT FND. (36-B) WITH 40 FT MAST ARM AND 28 FT CLAMP ON ARM, ONE R10-11B SIGN, ONE FISHEYE CAMERA, AND FIVE VEHICLE SIGNAL HEADS AS INDICATED ON LAYOUT	13704393.1	2129435.3	LEVEL WITH ROADWAY CROWN
G	INSTALL 10 FT PEDESTAL POLE ON SPECIAL FND. (SEE DETAIL) WITH ONE LED COUNTDOWN PEDESTRIAN SIGNAL HEAD, ONE APS PUSH BUTTON,	13704395.3	2129408.8	FLUSH WITH LANDING

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

DESIGN

INTERIM REVIEW

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ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/25/2023

APPROVAL

INTERIM REVIEW

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ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/25/2023

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

DOLOROSA

CONDUIT & CONDUCTOR SCHEDULE

DOLOROSA ST AT PLAZA DE ARMAS

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	441

POLE SCHEDULE

				POLE	C	D	E	F		G	H	J	K	L
				POLE TYPE (SMA/LMA/DMA/PED)	PED	PED	PED	DMA	DMA	PED	PB	PED	SMA	PB
				POLE HEIGHT (FEET)	20	10	20	19	19	10	5	20	19	5
				MAST ARM LENGTH (FEET)	N/A	N/A	N/A	40	28	N/A	N/A	N/A	32	N/A
				LUMINAIRE (YES/NO)	N/A	N/A	N/A	NO	NO	N/A	N/A	N/A	NO	N/A
				ILSN (YES/NO)	N/A	N/A	N/A	YES	YES	N/A	N/A	N/A	NO	N/A
				ILSN ARM LENGTH (FEET)	N/A	N/A	N/A	9	7	N/A	N/A	N/A	N/A	N/A
				FOUNDATION TYPE	24-A	SPL	24-A	36-A	36-A	SPL	SPL	24-A	30-A	SPL
				FOUNDATION DEPTH (FEET)	6	N/A	6	13	13	N/A	N/A	6	11	N/A
CABLE	CIRCUIT													
#8 BARE	BARE BOND GROUND													
9 COND. #14 AWG TYPE "A"	VEHICLE SIGNALS	ø	6					3						
		ø	8						2					
		ø	9	1		1								
9 COND. #14 AWG TYPE "A"	PEDESTRIAN SIGNALS	POLE	D		1									
		POLE	G							1				
		POLE	J									1		
		POLE	K										1	
3 COND. #16 AWG TYPE "A"	PEDESTRIAN APS PUSHBUTTONS	POLE	D		1									
		POLE	G							1				
		POLE	H								1			
		POLE	L											1
4 COND. #14 AWG TYPE "A"	ILSN SIGNS	POLE	F					1	1					
POWER & ETHERNET	FEDS	POLE	F					1						

* SEE PEDESTRIAN POLE SPECIAL FOUNDATION FOR DETAILS

DESIGN

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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

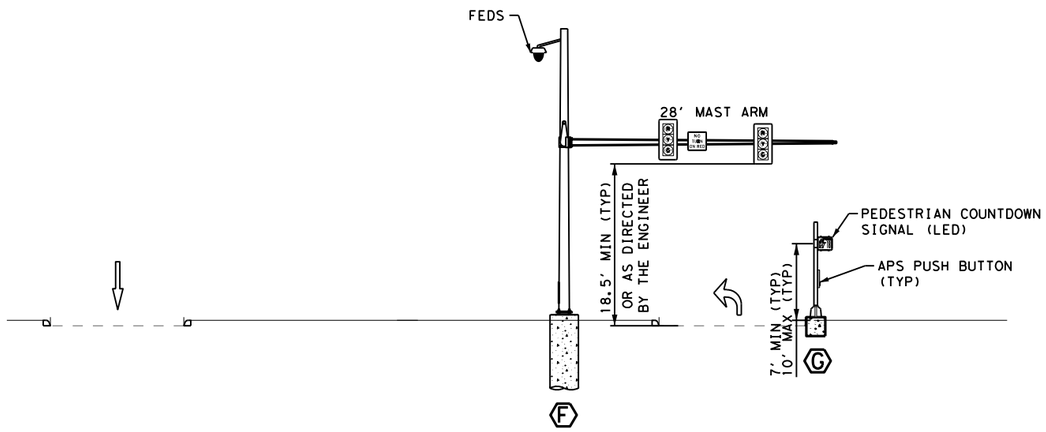
CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

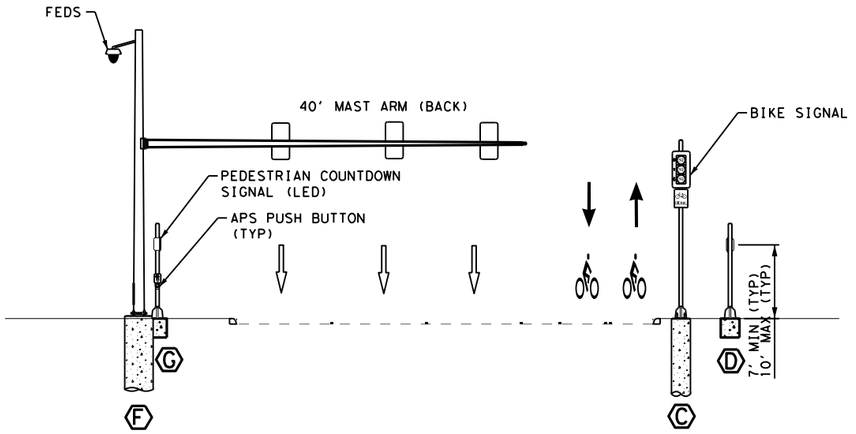
POLE SCHEDULE & ILSN DETAILS

DOLOROSA ST AT PLAZA DE ARMAS

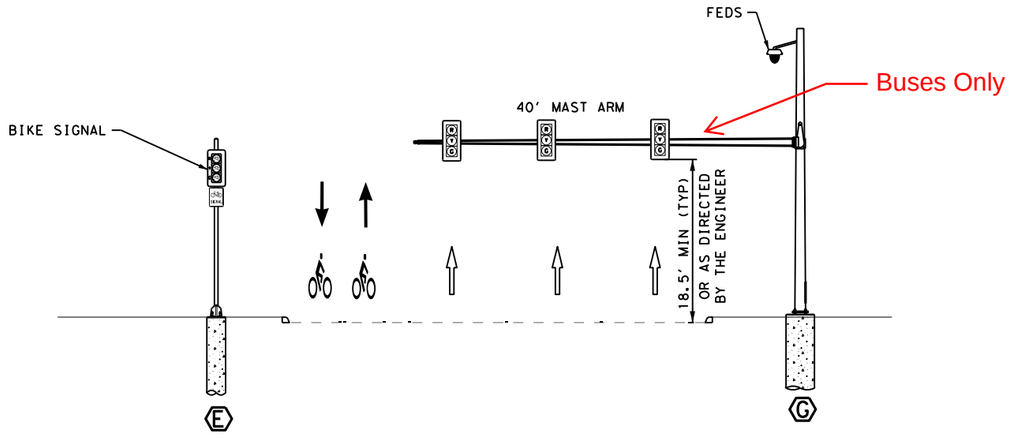
DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	442



Soutbound? → NORTHBOUND PLAZA DE ARMAS
NOT TO SCALE



Westbound? → EASTBOUND DOLOROSA ST
NOT TO SCALE



Eastbound? → WESTBOUND DOLOROSA ST
NOT TO SCALE

DESIGN

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APPROVAL

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ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
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PAPE-DAWSON ENGINEERS
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

ELEVATION VIEWS

DOLOROSA ST AT PLAZA DE ARMAS

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	443

DATE: 1/24/2023 7:31:22 PM
FILE: P:\122\27\03\Design\Civil\Standards\Traffic Signals\ed1-14.dgn

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 ½ 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.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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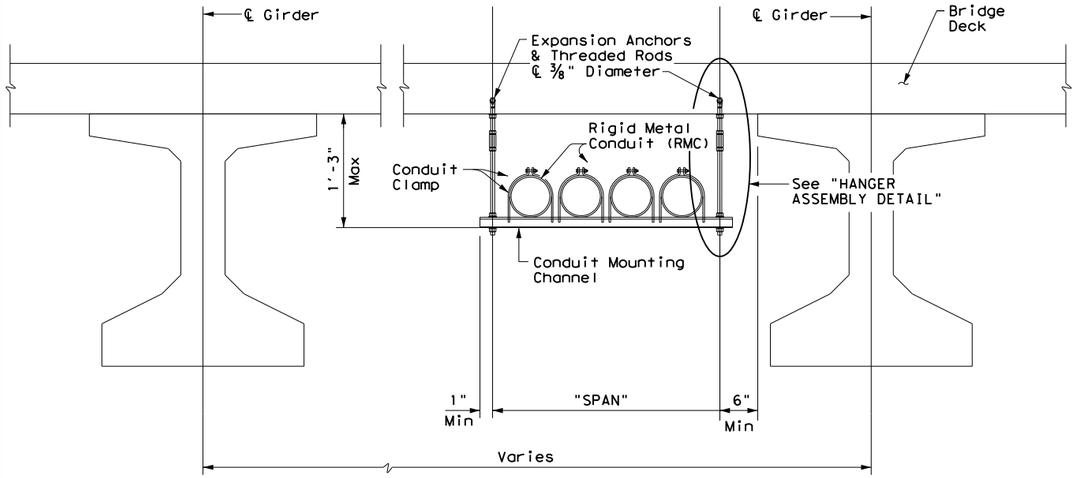
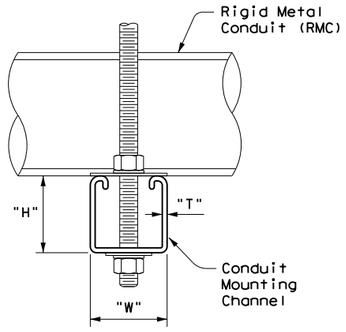
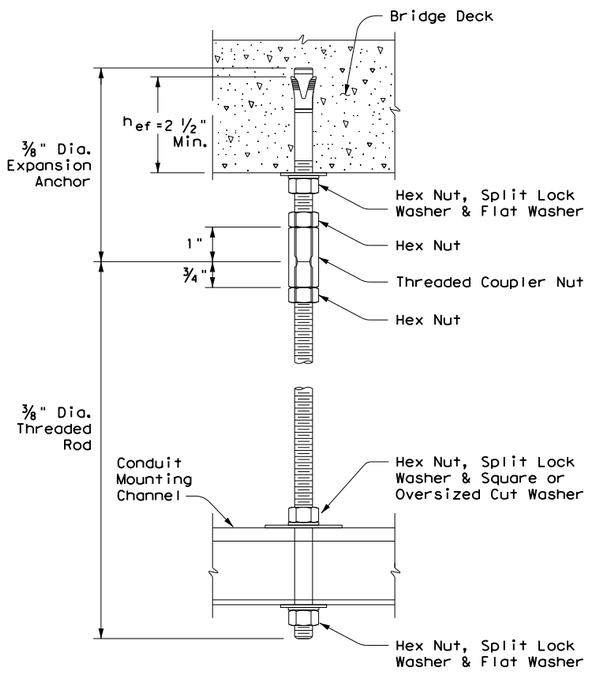


CONDUIT HANGING DETAIL

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.

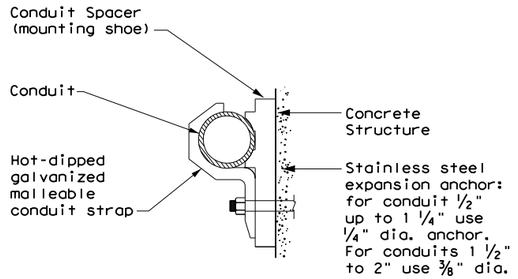
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

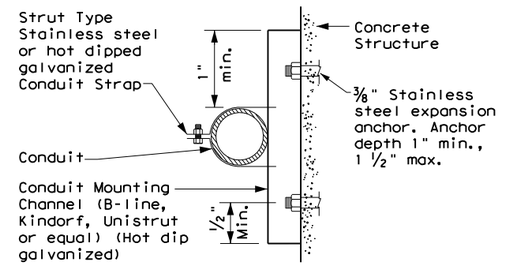




HANGER ASSEMBLY DETAIL

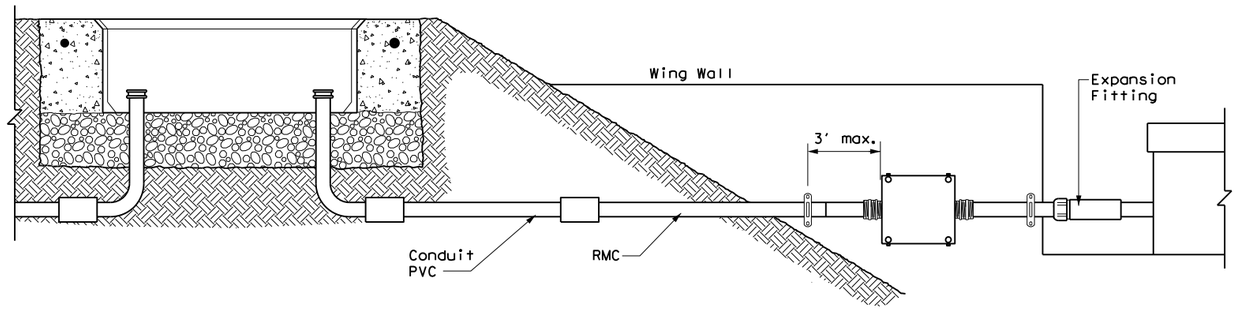
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





CONDUIT MOUNTING OPTIONS

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



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

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, (h_{ef}), as shown. Increase (h_{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 (h_{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.

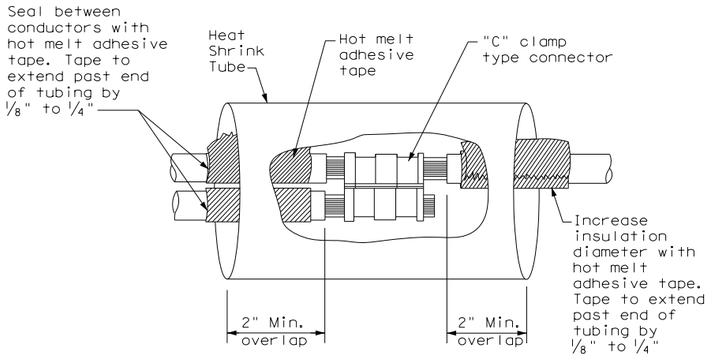
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

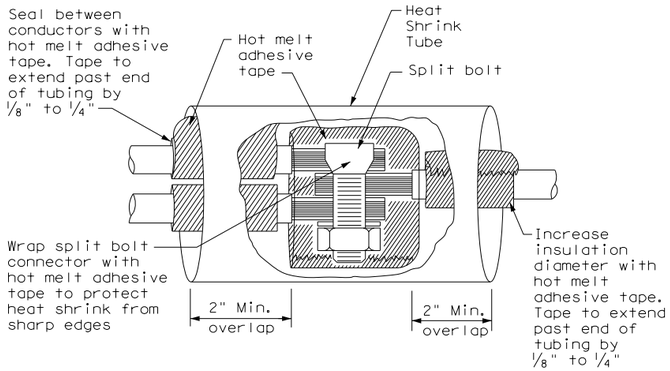
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in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

B. CONSTRUCTION METHODS

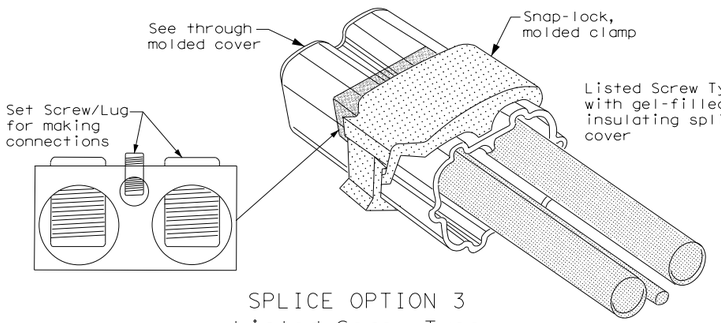
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, 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 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation
Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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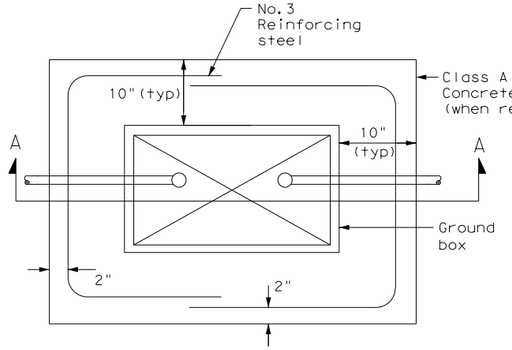
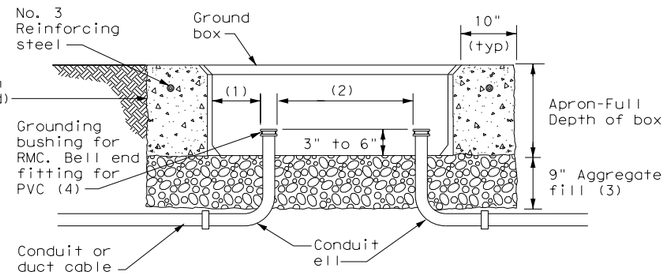


PLAN VIEW



SECTION A - A

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.

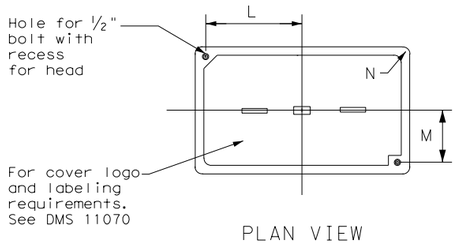
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(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



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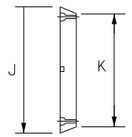

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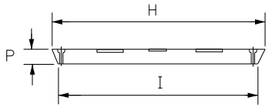

SIDE

GROUND BOX COVER

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.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service 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 electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (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 electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," 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 electrical service 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 electrical enclosures. 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 electrical service equipment until locks are installed.

6. Enclosures with external disconnects 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 steel may be used.

8. Provide wiring and electrical components 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 electrical conductors 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 electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service 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 all rigid metal conduits 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 metal conduit (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 all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare 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 electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project 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 ½ 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 ½ 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 panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit 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 photocell or 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 paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. 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 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	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

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

Schematic Type

Service Voltage V / V

Disconnect Amp Rating
000 indicates main lug only/
Typically Type T

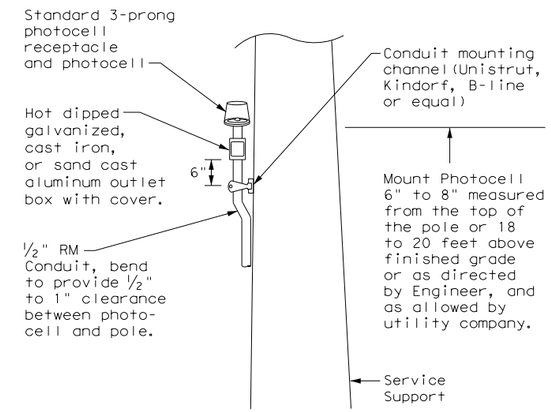
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

Enclosure Type
GS= Galvanized steel("off the shelf")
SS= Stainless steel(Custom Enclosure)See MPL
AL= Aluminum (Custom Enclosure)See MPL

Photocell Mounting Location
(E)= Inside Service/Enclosure Mounted
(T)= Top of pole
(L)= Luminaire mounted
(N)= None/No Photocell or Lighting Contactor Required

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Service on traffic signal pole
PS= Pedestal Service

O= Overhead Service Feed from Utility
U= Underground Service Feed from Utility



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

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS				DOLOROSA
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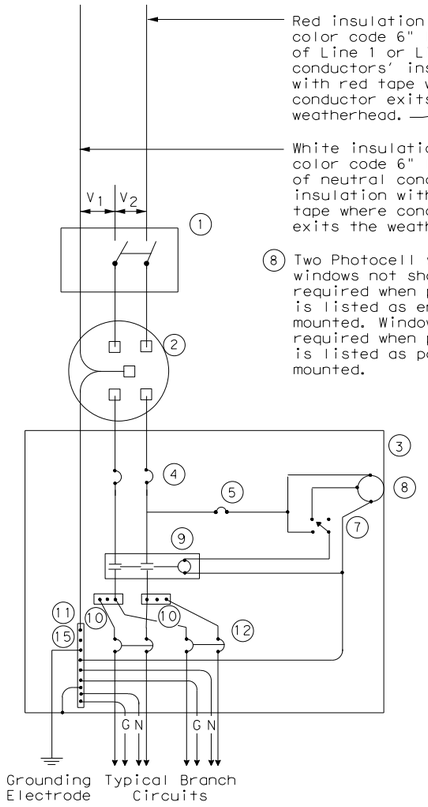
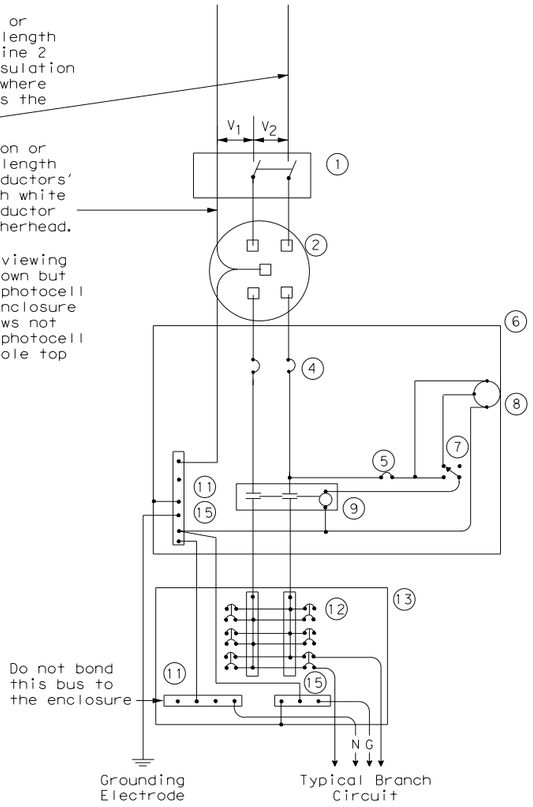
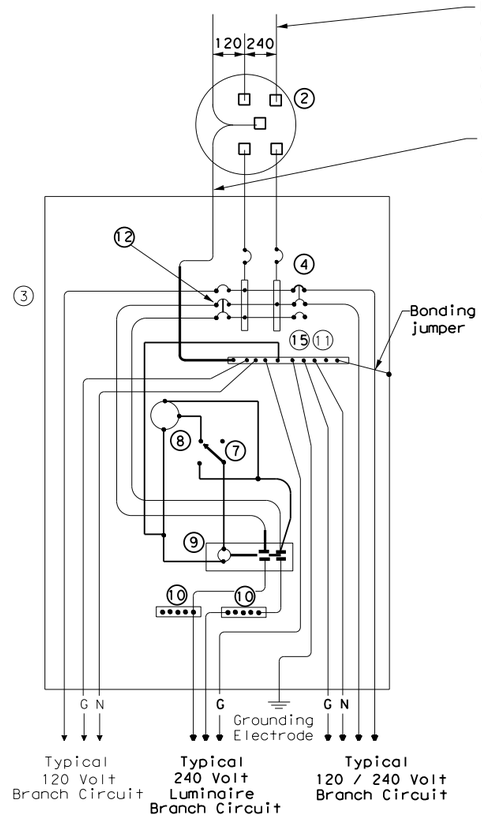
	SAT	BEXAR		448



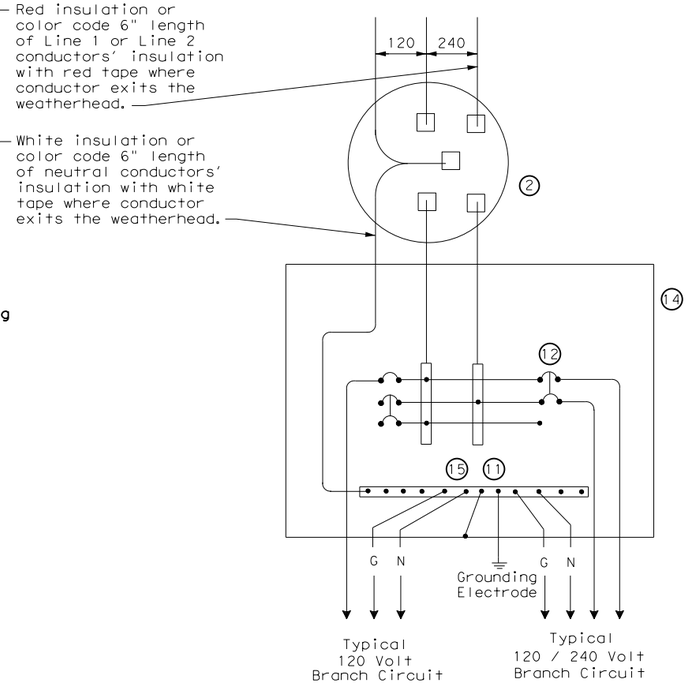
SCHEMATIC TYPE A
THREE WIRE



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

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	SAT	BEXAR		449

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

1. Provide steel pole 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 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ 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 ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ 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.

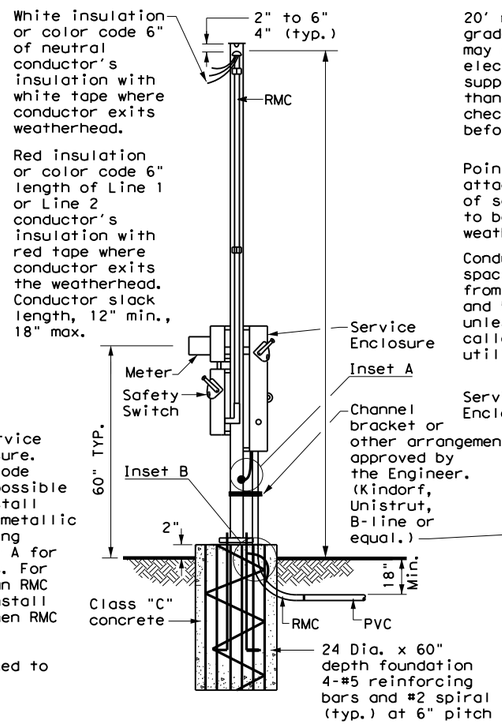
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode 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 steel pole 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 Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

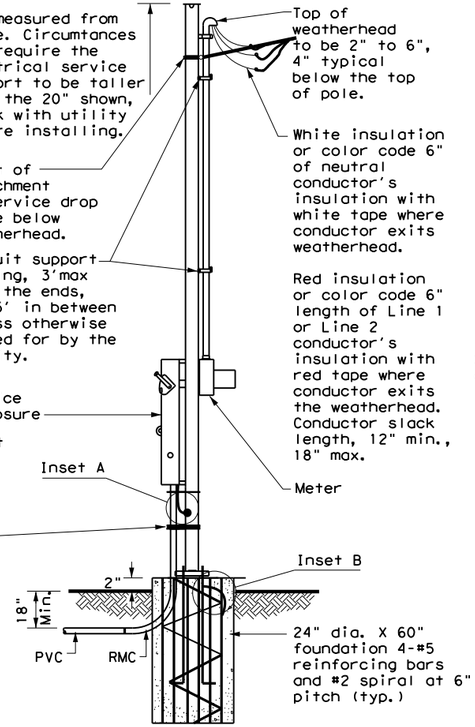
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

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.

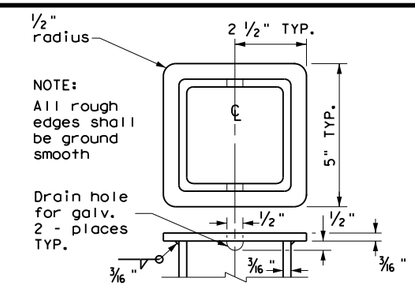


WITH SAFETY SWITCH

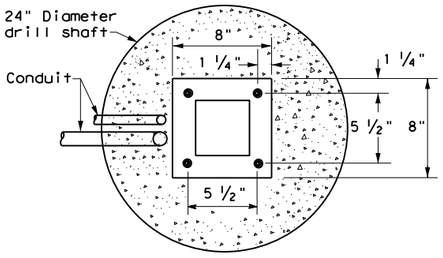


WITHOUT SAFETY SWITCH

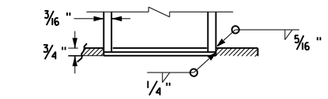
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

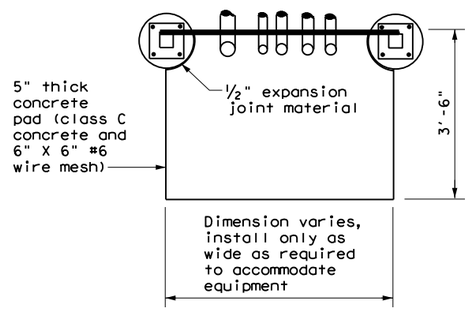


BASE PLATE DETAIL



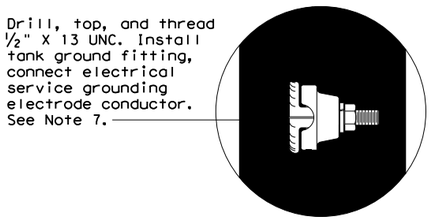
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



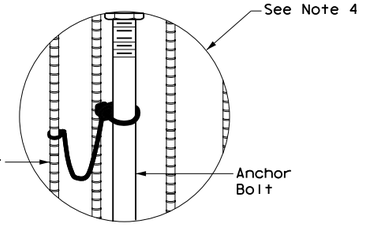
TOP VIEW

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

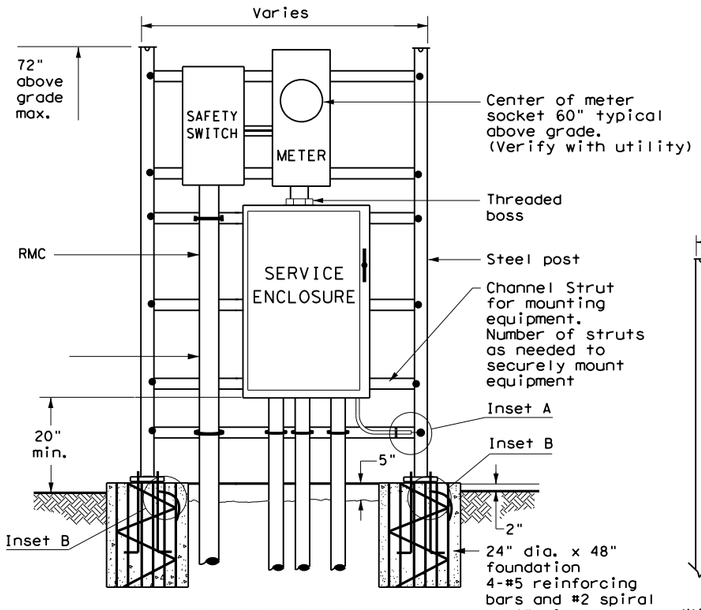


FRONT VIEW

INSET A

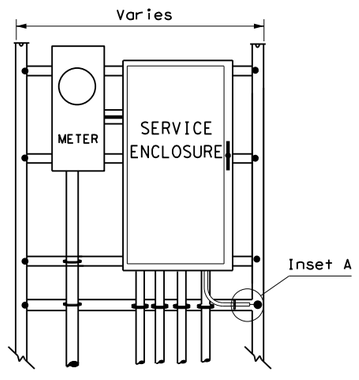


INSET B



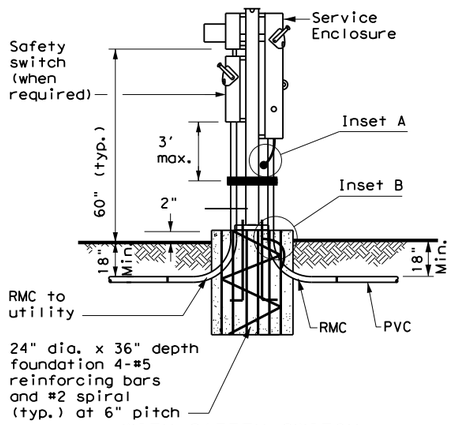
WITH SAFETY SWITCH

FRONT VIEW

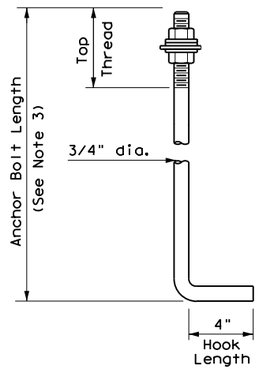


WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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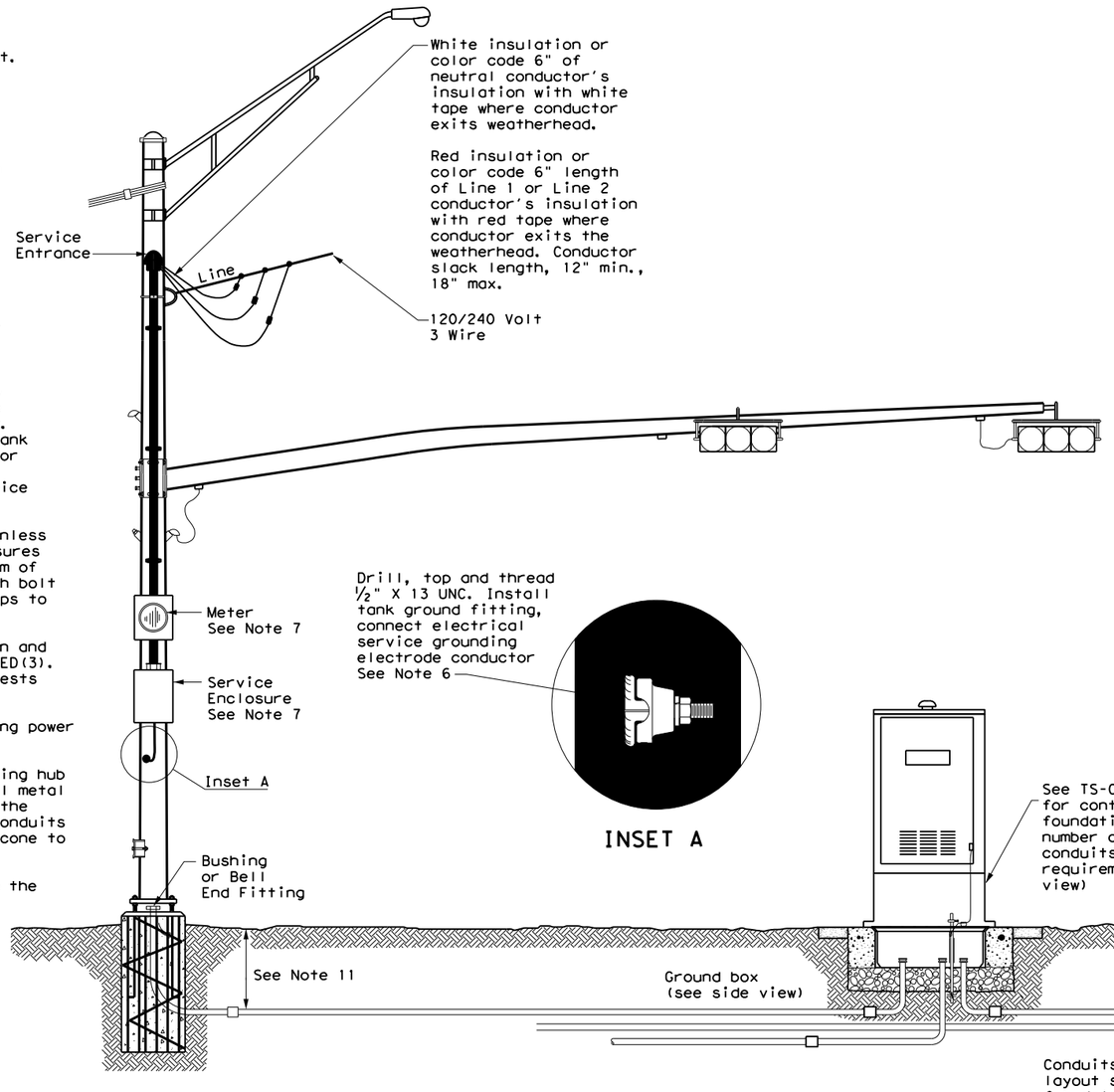
TRAFFIC SIGNAL NOTES

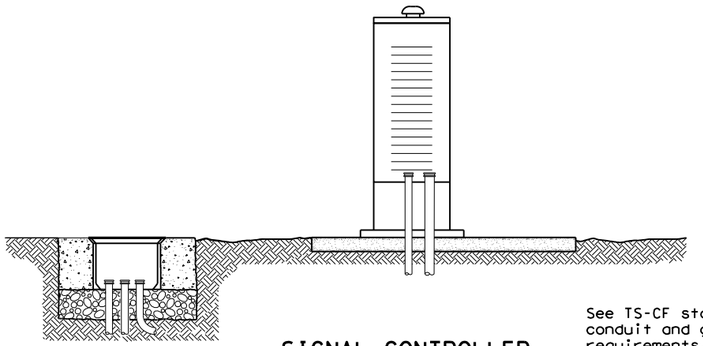
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material 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 ½ 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 ¾ 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 POLE WITH SERVICE

Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

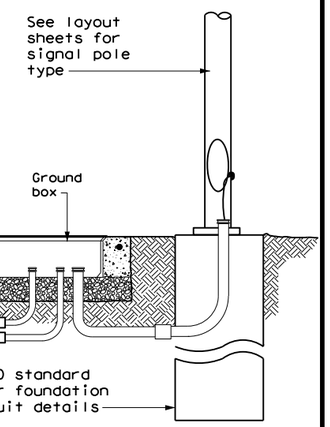
INSET A



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.

SIGNAL CONTROLLER FRONT VIEW



SIGNAL POLE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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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.

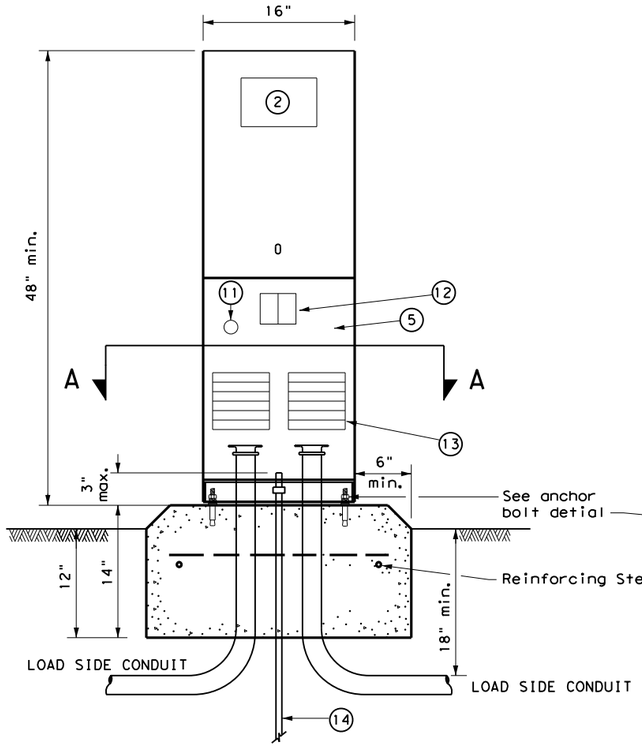
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 ⅛ 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 ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

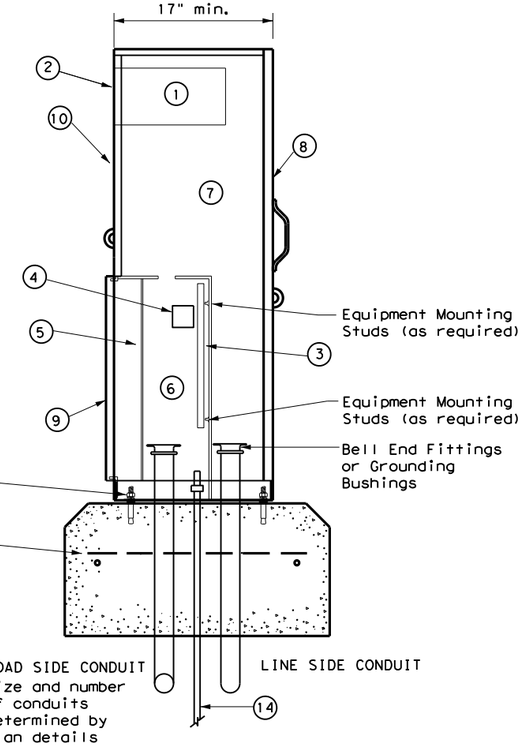
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.

7. Do not use liquidtight 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.

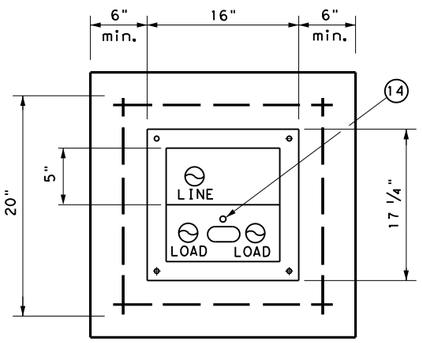


FRONT VIEW

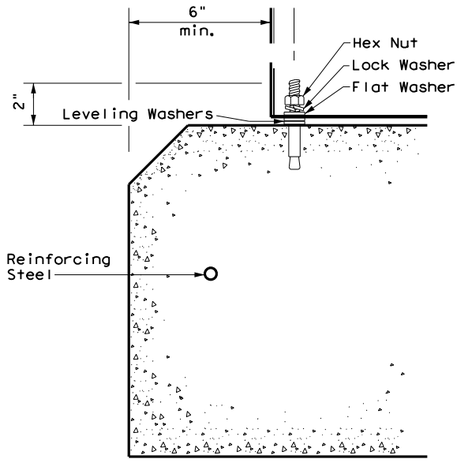


SIDE VIEW

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.



SECTION A-A



ANCHOR BOLT DETAIL

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

FILE: ed9-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				DOLOROSA
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	SAT	BEXAR		452

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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 electrial 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 5/8 in. max. depth and 1 7/8 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 channel sized 1 in. to 3 3/4 in. maximum depth, and 1 1/2 in. to 1 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, 1/4 in. minimum diameter by 1 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 1/2 in. PVC to ground rod - extend 1/2 in. PVC 6 in. underground.

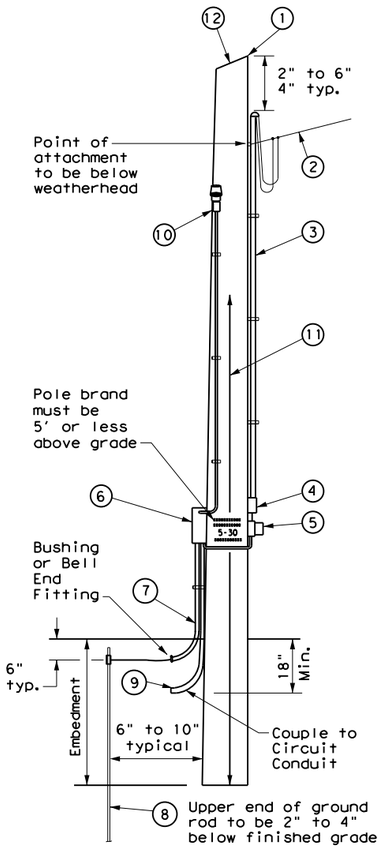
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(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.

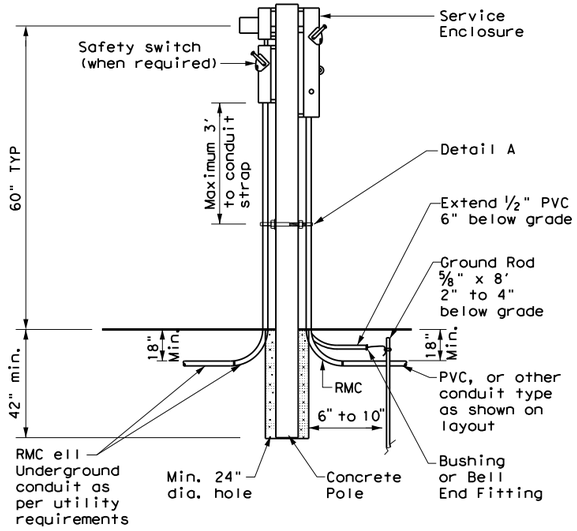


SERVICE SUPPORT TYPE TP (O)

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

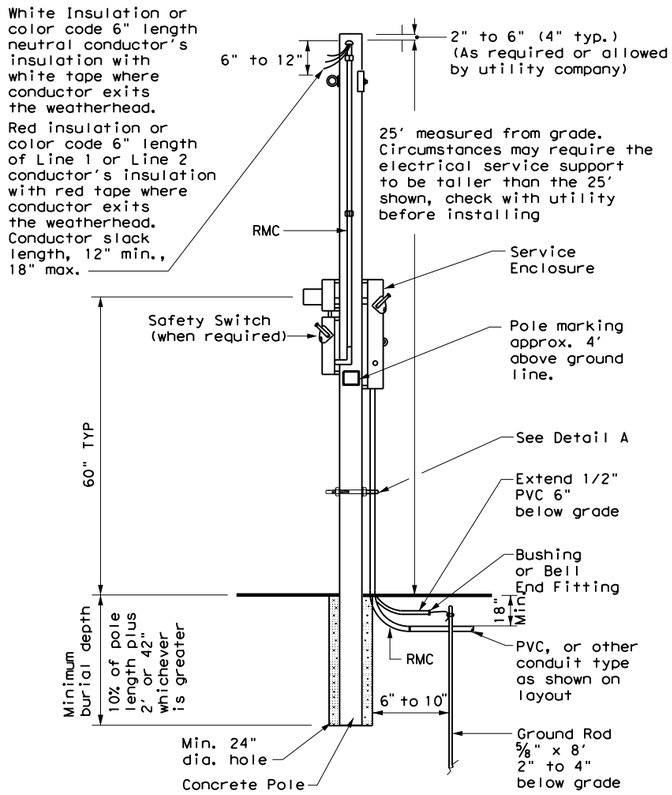
Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

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 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). 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.



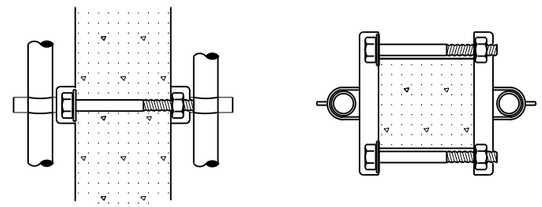
CONCRETE SERVICE SUPPORT

Underground (U)



CONCRETE SERVICE SUPPORT

Overhead (O)



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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	SAT	BEXAR		453

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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.

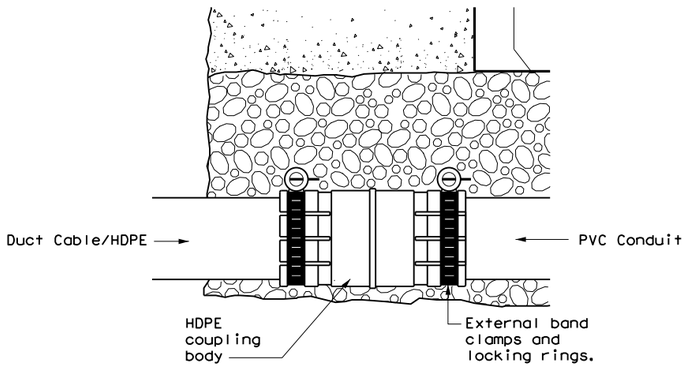
5. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."

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.

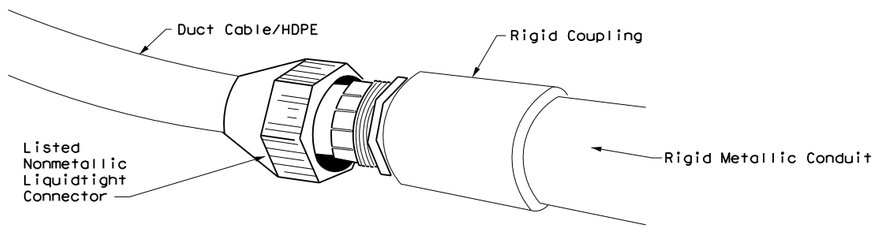
7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.

8. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.

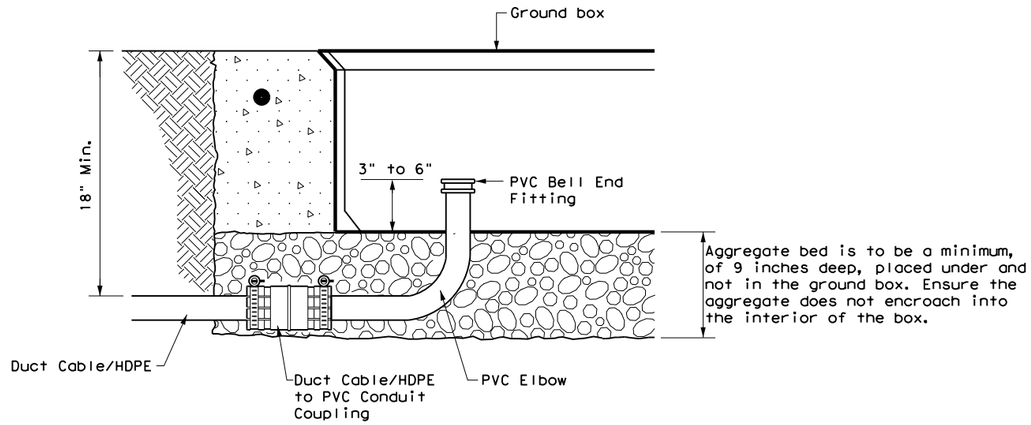
9. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless 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



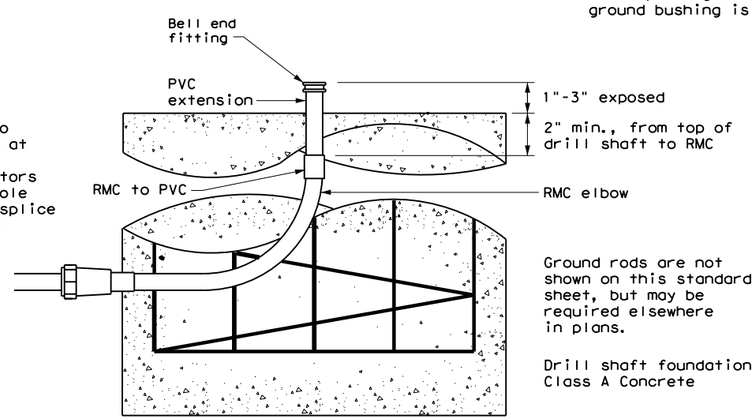
DUCT CABLE/HDPE TO RMC



DUCT CABLE/HDPE AT GROUND BOX

When the upper end of an RMC Ell 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.

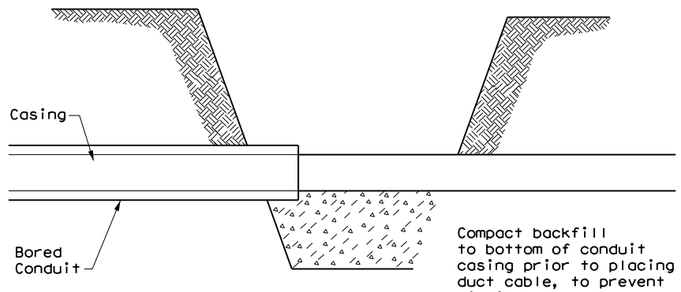
Couple duct to conduit elbow at foundations. Ensure conductors extend into pole base. Do not splice conductors in conduit.



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

Drill shaft foundation Class A Concrete

DUCT CABLE / HDPE AT FOUNDATION



Compact backfill to bottom of conduit casing prior to placing duct cable, to prevent kinking.

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.

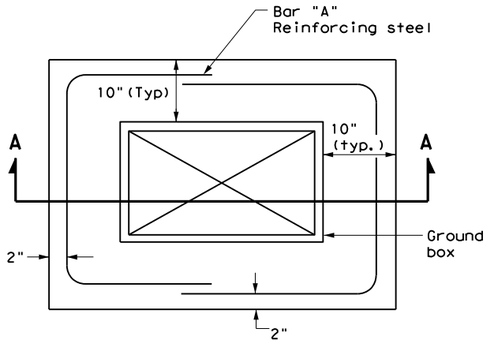
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

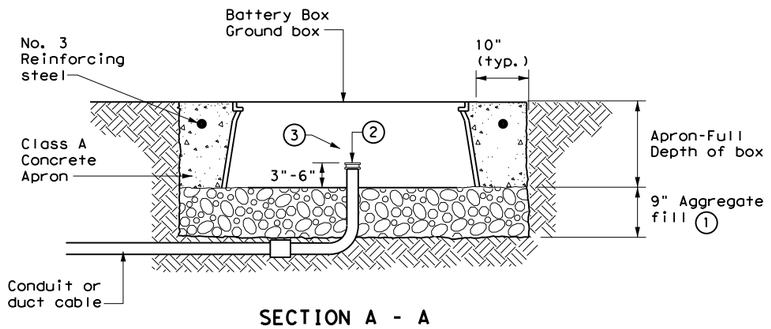
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior 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



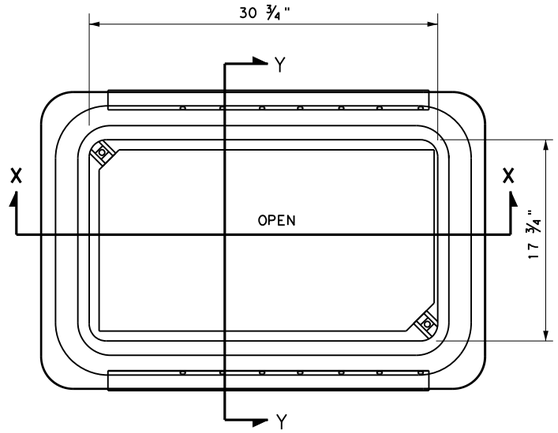
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

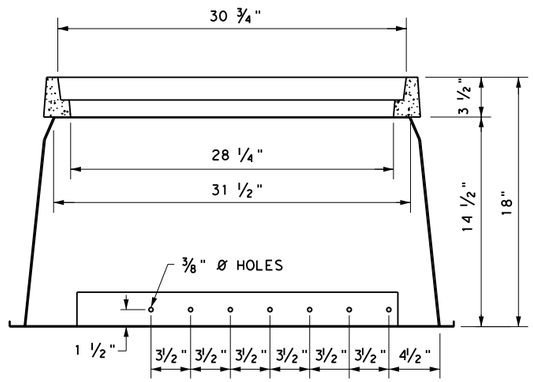
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

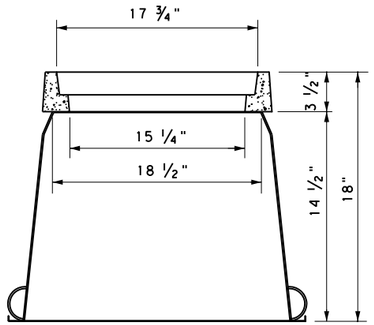
(3) Install all conduits in a neat and workmanlike manner.



BATTERY BOX TOP VIEW



SECTION X-X



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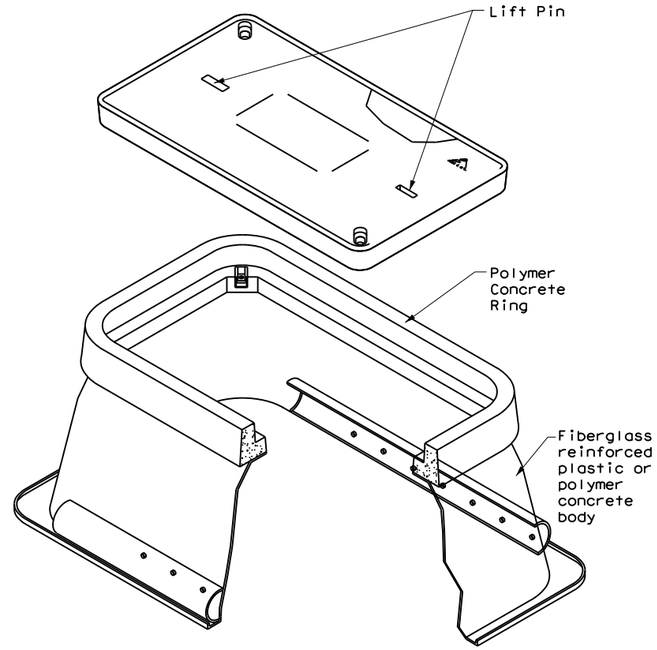

Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS
BATTERY BOX
GROUND BOXES

ED(12)-14

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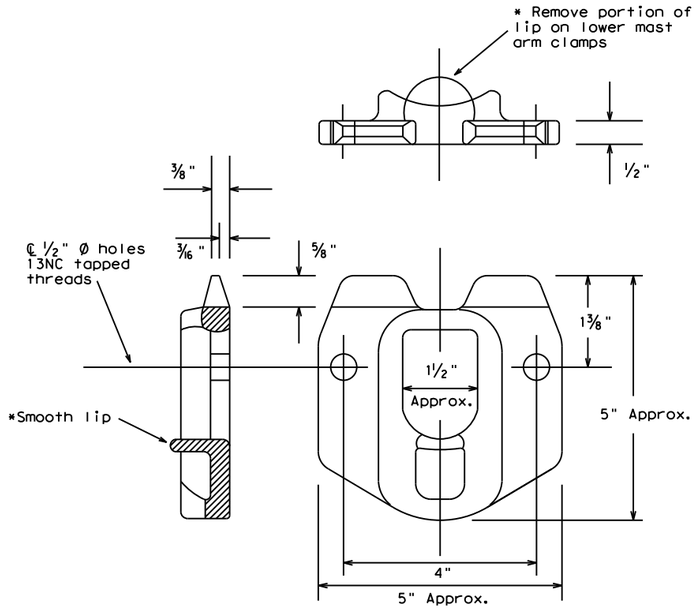


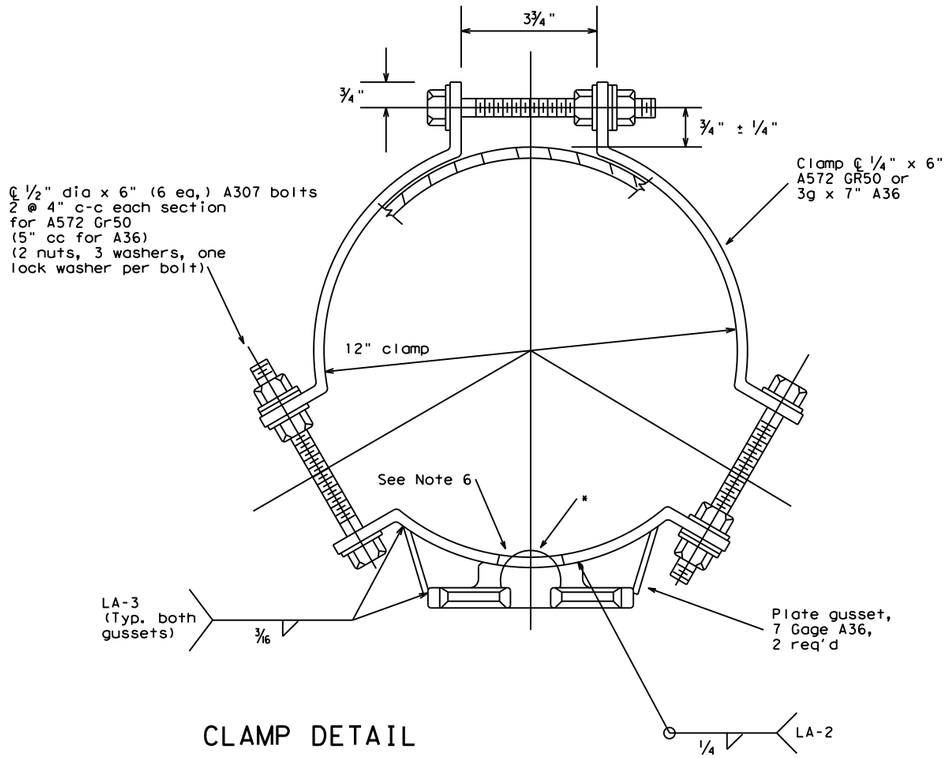
POLE SIMPLEX DETAILS

OTHER MATERIALS:

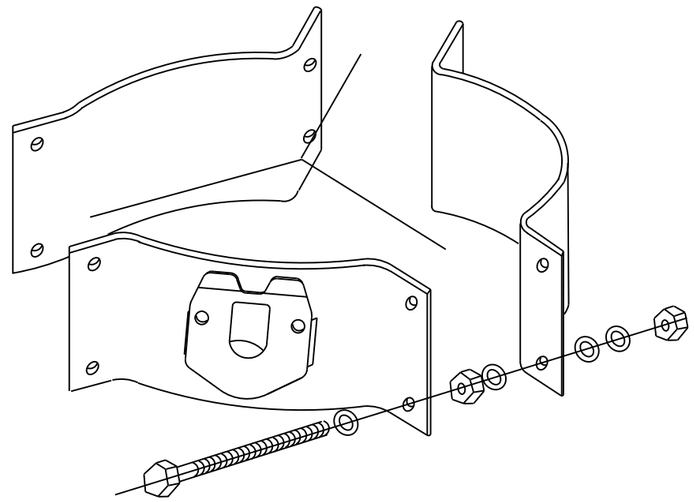
1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.
2. Welded tabs and backplates shall be ASTM A-36 steel or better.
3. Nylon insert locknuts shall conform to ASTM A563.

GENERAL NOTES:

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" 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.
2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the galvanizing process.
3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, ½in. X 1½in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.
4. 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 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.
5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.
6. Approximately 2 in. diameter hole in upper mast arm clamp.



CLAMP DETAIL



PROJECTION

For 8.9 - 12 inch diameter Signal Poles
(Two req'd for each mast arm)

Texas Department of Transportation
Traffic Operations Division

CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

CFA-12

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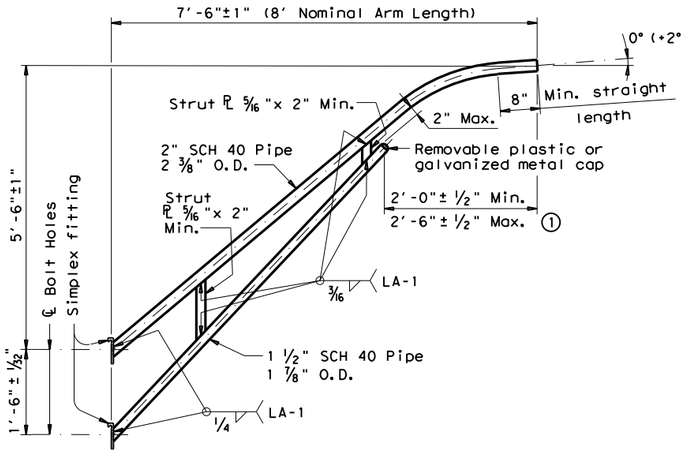
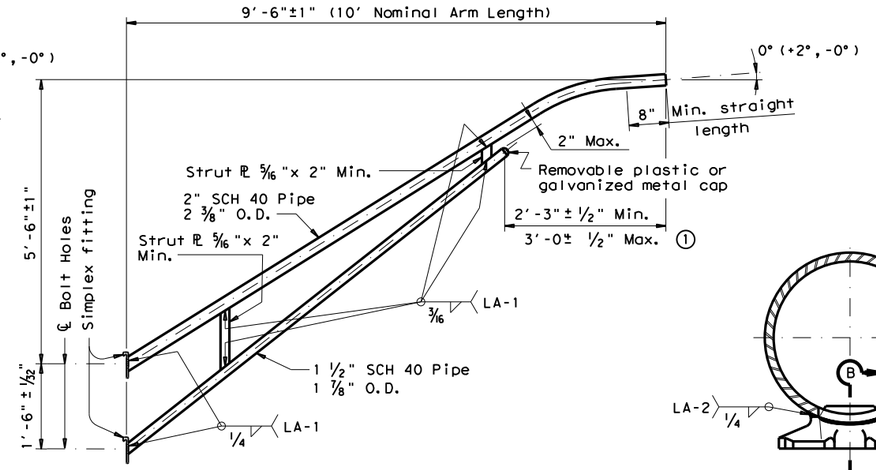
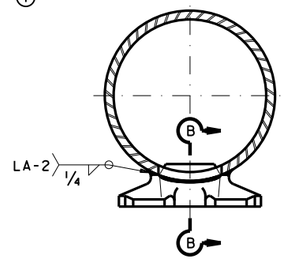


8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT 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.

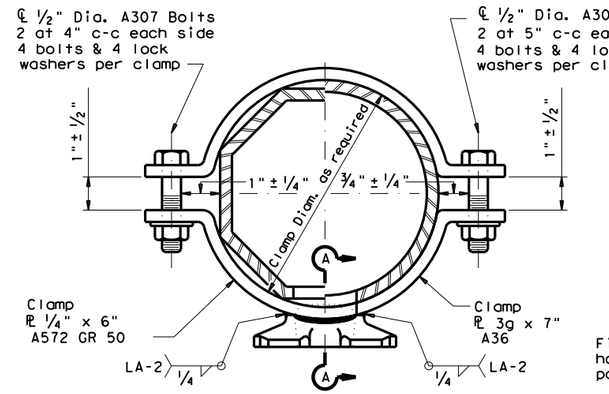
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified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

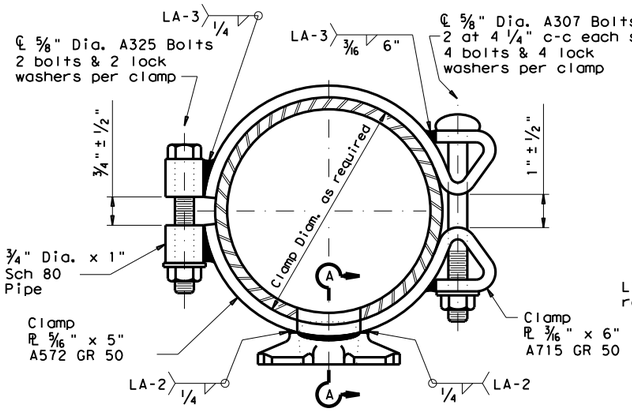
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly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



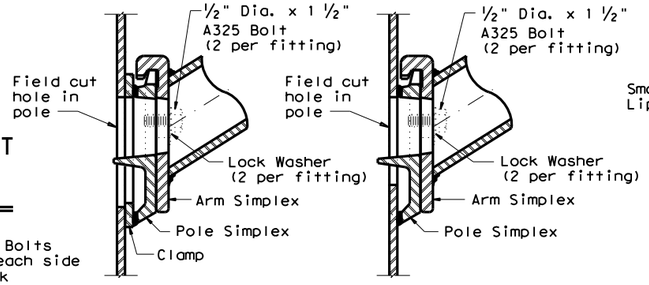
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



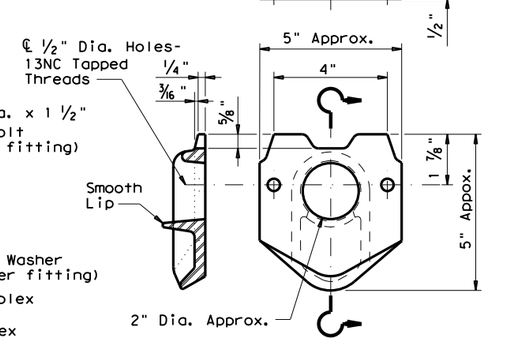
CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)

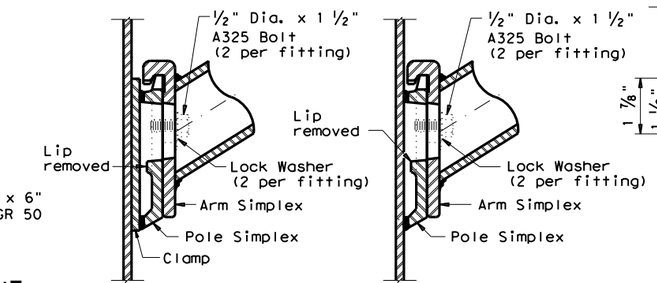


UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING



POLE SIMPLEX DETAIL

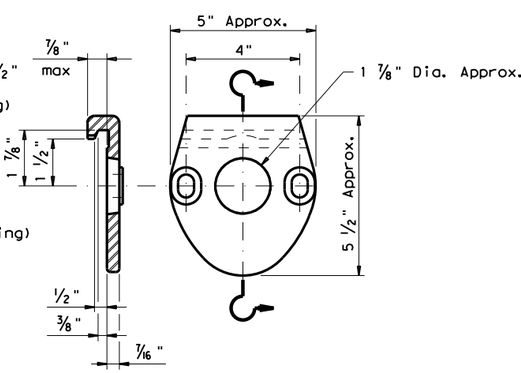


LOWER SIMPLEX FITTING

LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

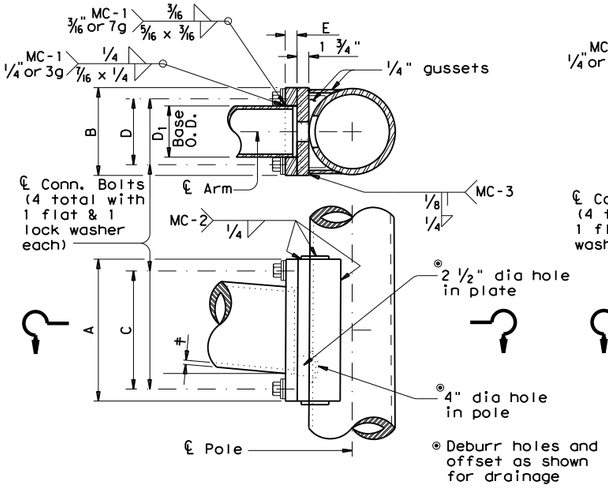
LUM-A-12

DN: LEH	CK: JSY	DW: LTT	CK: TEB

REVISIONS
5-96
1-99
1-12

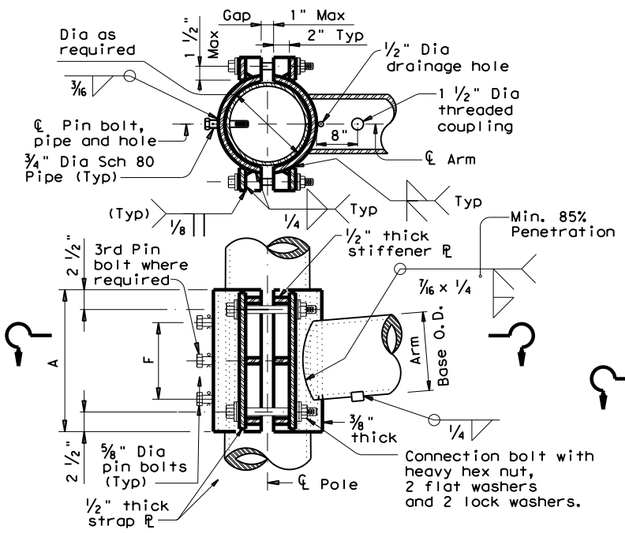
CONT	SECT	JOB	HIGHWAY
			DOLOROSA
DIST	COUNTY		SHEET NO.
SAT	BEXAR		457

ARM SIZE D_1	ARM SIZE ǂ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18	13	15	10	3	1 ½



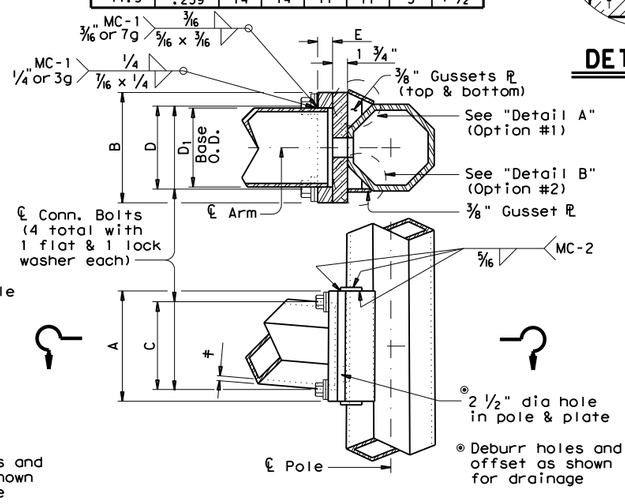
FIXED MOUNT DETAIL 1

ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	⅝
7.5	.179	14	8	4	1	2	⅝
8.0	.179	14	8	4	1	2	⅝
9.0	.179	16	10	4	1	2	⅝
9.5	.179	18	12	4	1 ¼	3	⅝
9.5	.239	18	12	4	1 ¼	3	⅝
10.0	.239	18	12	4	1 ¼	3	⅝



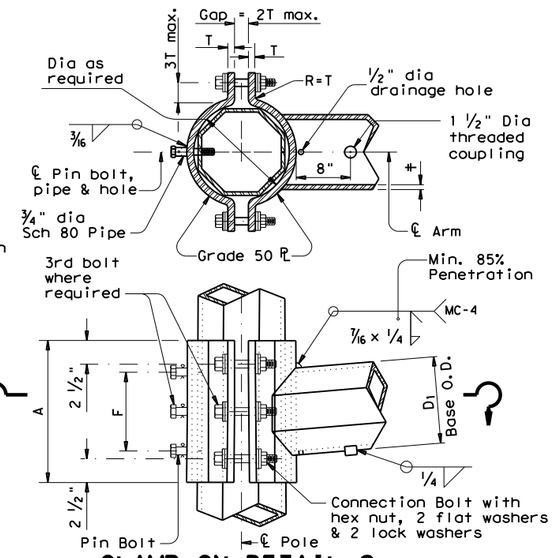
CLAMP-ON DETAIL 1

ARM SIZE D_1	ARM SIZE ǂ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
7.0	.179	11	11	8	8	1 ¾	1 ¼
7.5	.179	11	11	8	8	1 ¾	1 ¼
8.0	.179	11	11	8	8	2	1 ¼
9.0	.179	13	13	10	10	2	1 ¼
10.0	.179	13	13	10	10	2	1 ¼
9.5	.239	13	13	10	10	2	1 ¼
10.0	.239	14	14	11	11	2	1 ½
11.0	.239	14	14	11	11	3	1 ½
11.5	.239	14	14	11	11	3	1 ½

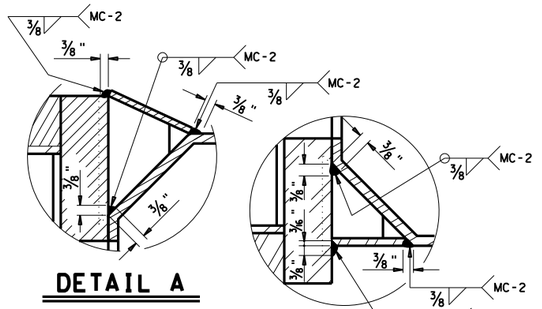


FIXED MOUNT DETAIL 2

ARM SIZE D_1	ARM SIZE ǂ	A	F	T	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	6	¾	4	¾	2	⅝
7.5	.179	14	8	¾	4	¾	2	⅝
8.0	.179	14	8	¾	4	¾	2	⅝
9.0	.179	16	10	⅞	4	1	2	⅝
10.0	.179	18	10	⅞	4	1	2	⅝
9.5	.239	18	10	1	6	1	3	⅝
10.0	.239	18	10	1	6	1	3	⅝

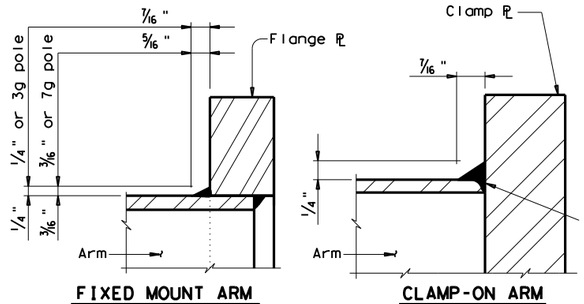


CLAMP-ON DETAIL 2



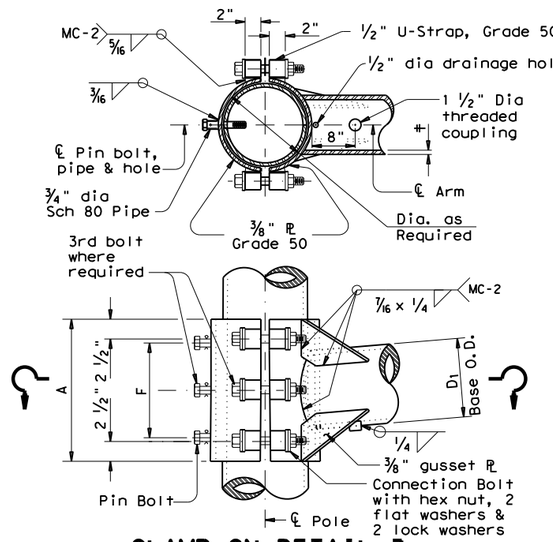
DETAIL A

DETAIL B



ARM BASE WELD DETAILS

ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	⅝
7.5	.179	14	8	4	1	2	⅝
8.0	.179	14	8	4	1	2	⅝
9.0	.179	16	10	4	1	2	⅝
9.5	.179	18	12	6	1	3	⅝
9.5	.239	18	12	6	1	3	⅝
10.0	.239	18	12	6	1	3	⅝



CLAMP-ON DETAIL 3

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

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

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 ¾" dia pipe shall have 3/16" dia holes for a ⅛" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

DN: MS	CK: JSY	DW: MMF	CK: JSY
CONT	SECT	JOB	HIGHWAY
			DOLOROSA
DIST	COUNTY		SHEET NO.
SAT	BEXAR		458

REVISIONS
5-96
5-09
1-12

126A

DATE: 1/24/2023 7:31:33 PM
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DATE: 1/24/2023 7:31:34 PM
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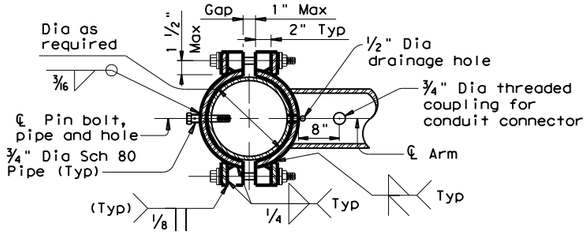
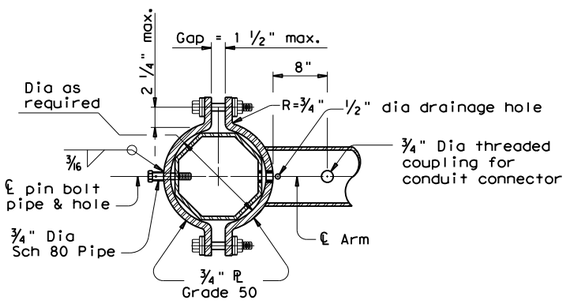
TABLE OF DIMENSIONS
for ILSN Support Arm Clamp-on
Details 1, 2 and 3

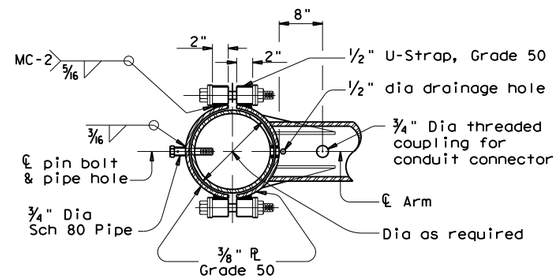
ILSN ARM SIZE	A	F	CONN. BOLTS		PIN BOLTS	
			No.	Dia	No.	Dia
	in.	in.	ea.	in.	ea.	in.
3 in. dia Schedule 40 Pipe	10	4	4	¾	2	⅝



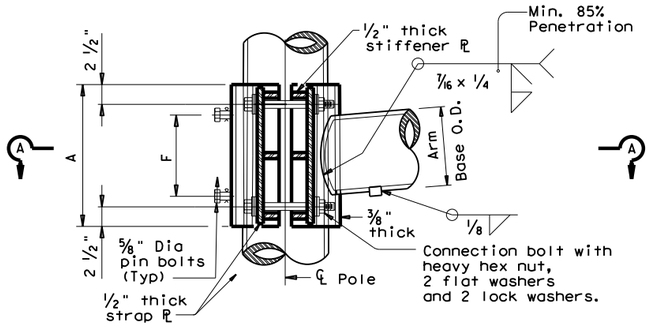
SECTION A-A



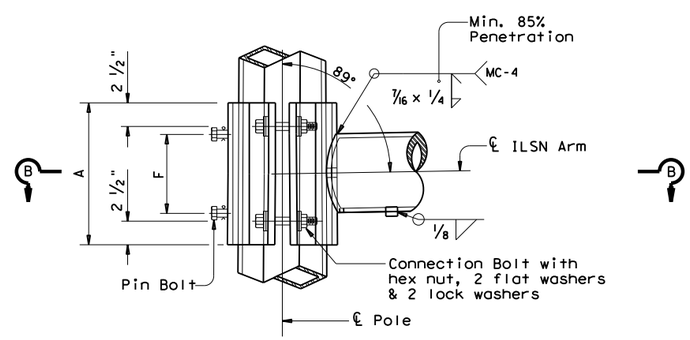
SECTION B-B



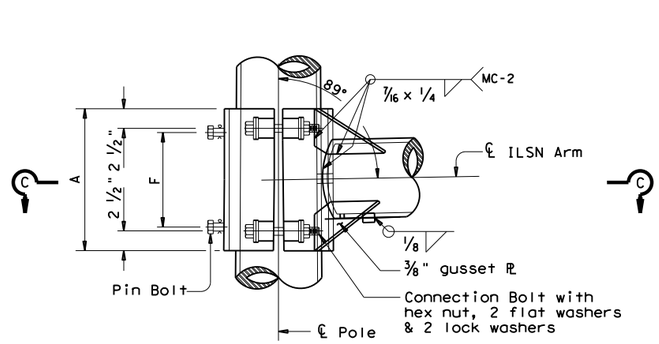
SECTION C-C



ILSN CLAMP-ON DETAIL 1



ILSN CLAMP-ON DETAIL 2



ILSN CLAMP-ON DETAIL 3

GENERAL NOTES:

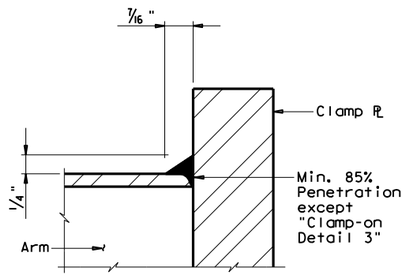
Clamp-on details shall be used for ILSN support arm assemblies. A 1 ½" inch diameter hole shall be cut in the front clamp plate for wiring access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

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.

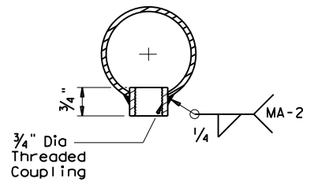
NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 1/16" dia holes for a ⅛" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



CLAMP-ON ARM

ARM BASE WELD DETAILS



ILSN ARM COUPLING DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST-ARM CONNECTIONS

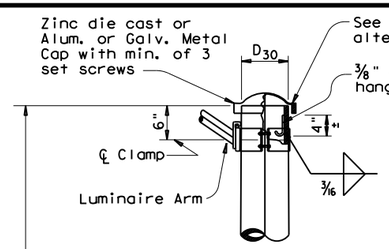
MA-C(ILSN)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

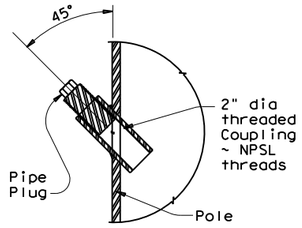
CONT	SECT	JOB	HIGHWAY
			DOLOROSA
DIST	COUNTY		SHEET NO.
SAT	BEXAR		459

126B

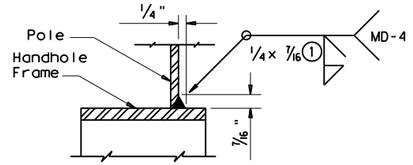


DETAIL A

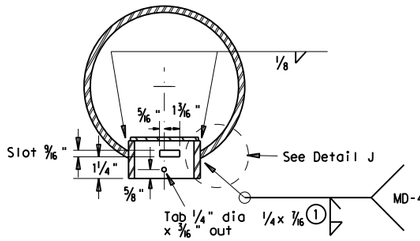
(for pole with luminaire)



POLE COUPLING DETAIL

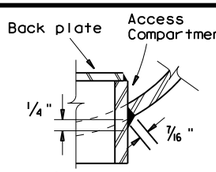


DETAIL G

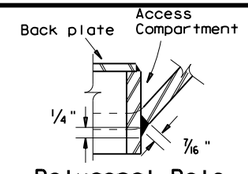


SECTION X-X

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.

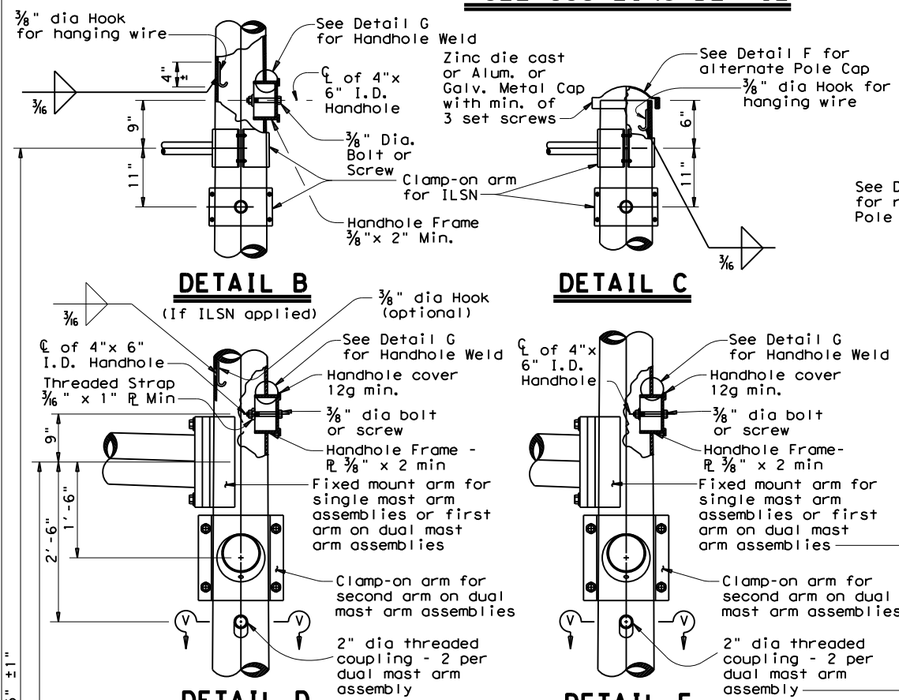


Round Pole



Polygonal Pole

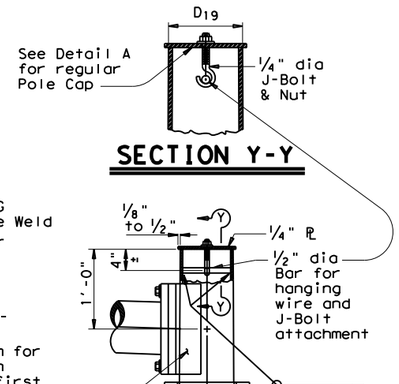
DETAIL J



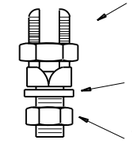
DETAIL B

(If ILSN applied)

DETAIL C



SECTION Y-Y



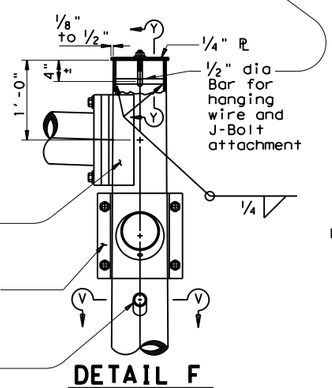
COPPER GROUND CONNECTOR

DETAIL D

(for 30' pole with luminaire and ILSN sign)

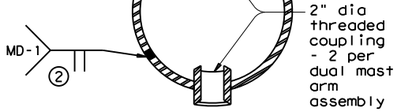
DETAIL E

(for 24' pole with ILSN sign and no luminaire)

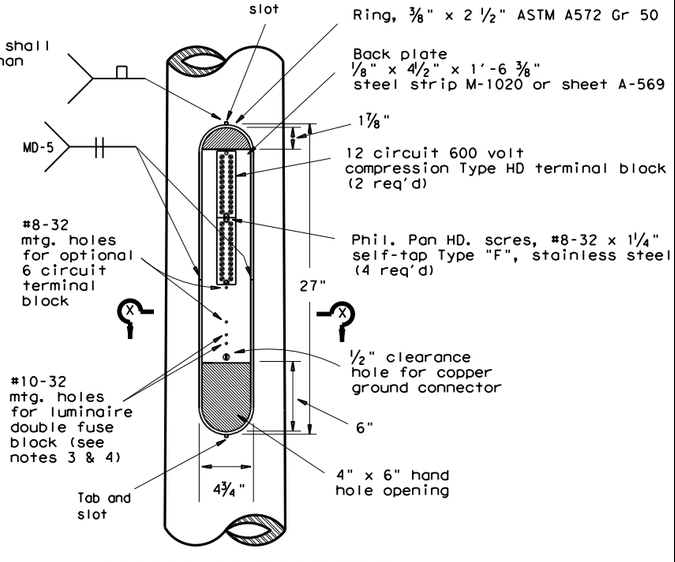


DETAIL F

(for 19' pole with no ILSN sign and no luminaire)



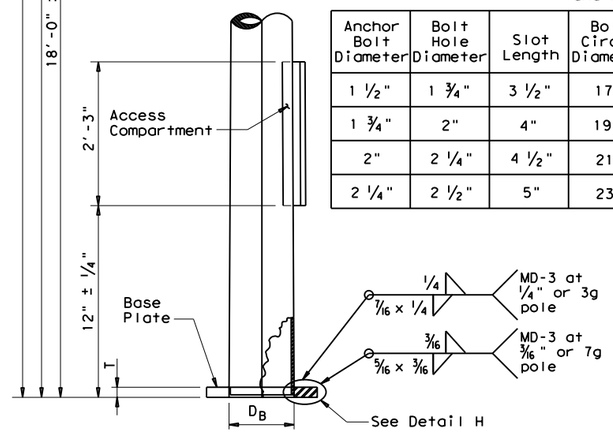
SECTION V-V



ACCESS COMPARTMENT

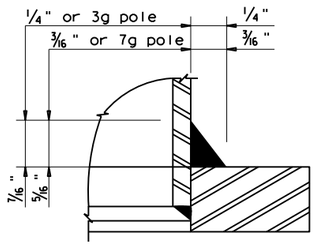
NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray 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 KC22J12T13, or Ilsco 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.

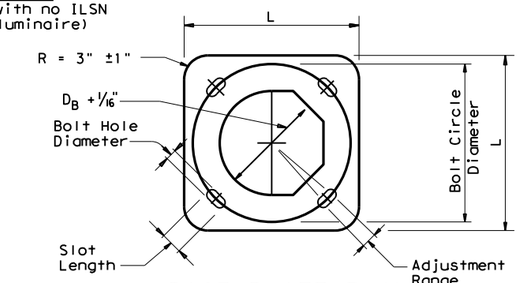


POLE ELEVATION

Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℞ 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°



DETAIL H



BASE PLATE PLAN

(1) 85% Min. penetration

(2) 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

REVISIONS

8-99
1-12

DN: MS	CK: JSY	DW: FDN	CK: CAL

CONT	SECT	JOB	HIGHWAY
			DOLOROSA

DIST	COUNTY	SHEET NO.
SAT	BEXAR	460

DATE: 1/24/2023 7:31:35 PM
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DATE: 1/24/2023 7:31:36 PM
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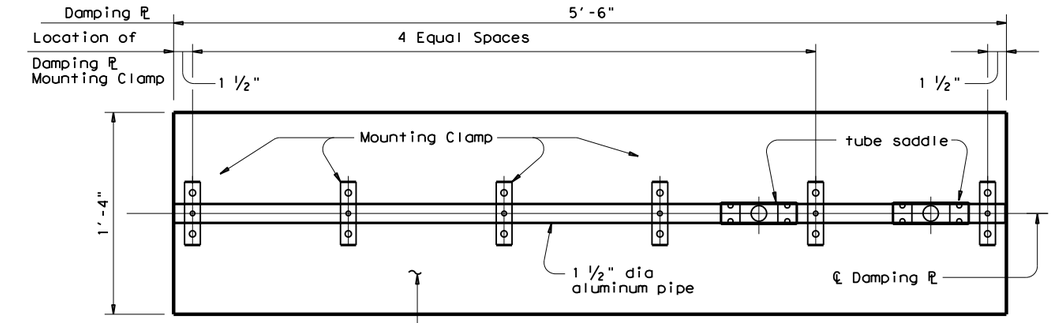
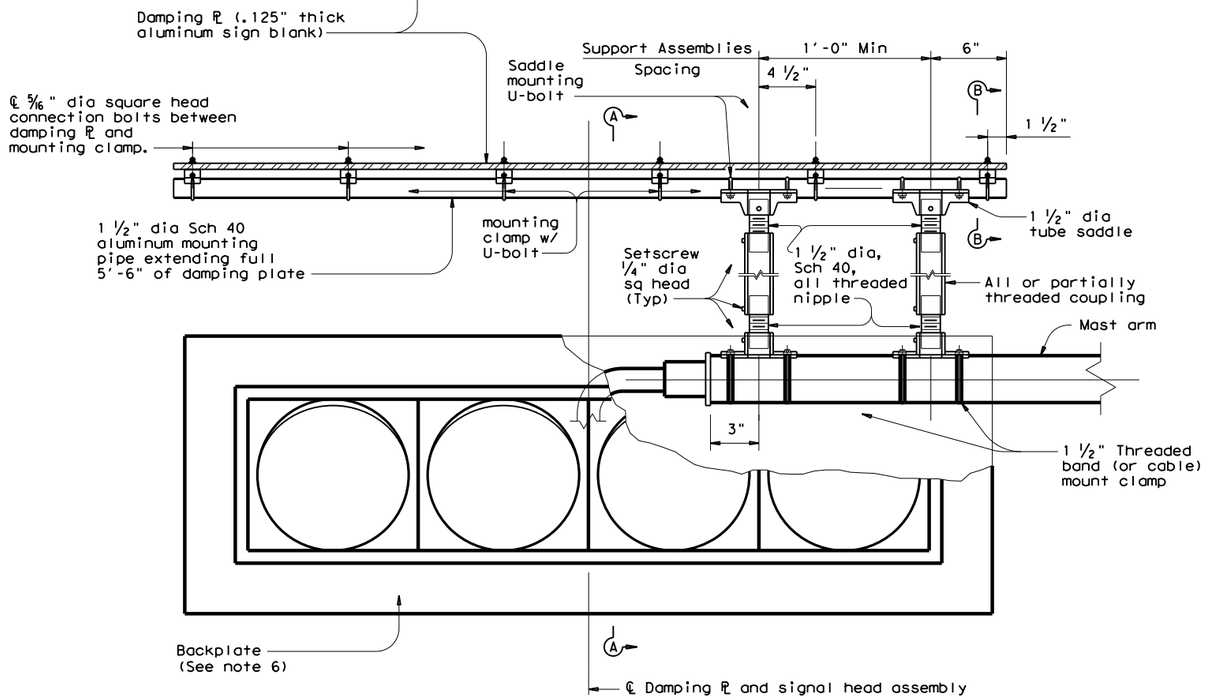


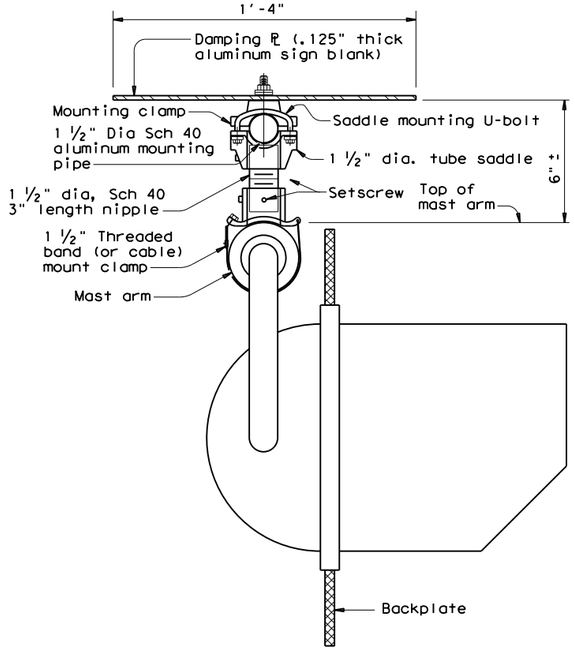
PLAN



ELEVATION

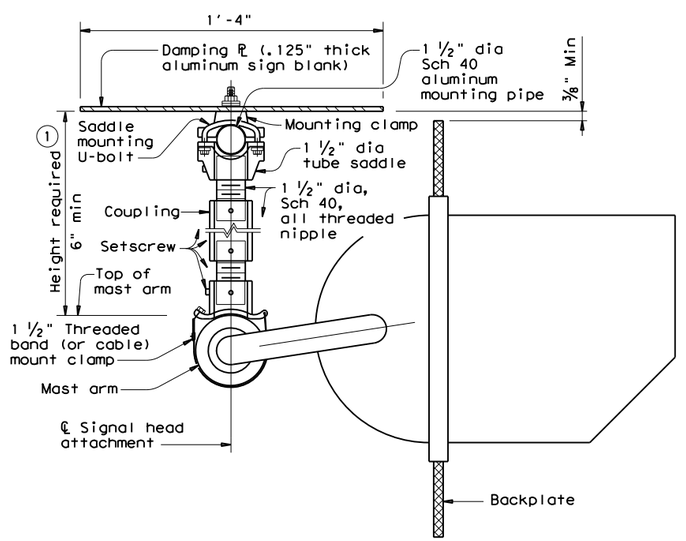
DAMPING PLATE MOUNTING DETAILS

(Showing alternate placement of signal head)



SECTION A-A

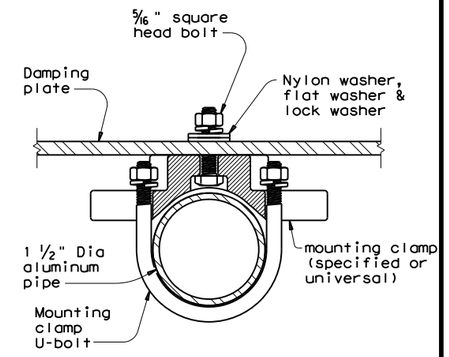
(Showing standard placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)



SECTION A-A

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

① Recommended supporting assemblies to achieve required height for horizontal section heads			
Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 ¾"	3"	-	-
7"-8 ½"	4"	-	-
9"-10 ½"	6"	-	-
11"-15 ½"	-	4"	5"
16"-24"	-	6"	10"



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 signal mast 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_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.

Texas Department of Transportation

Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS

MA-DPD-20

FILE: ma-dpd-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS				DOLOROSA
6-20	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		461

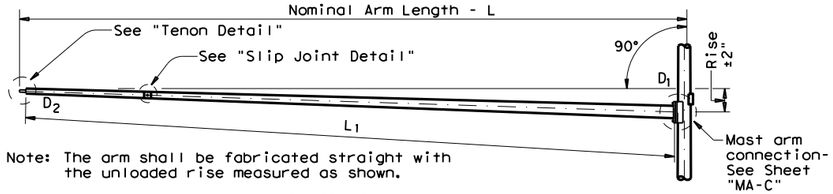
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	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.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

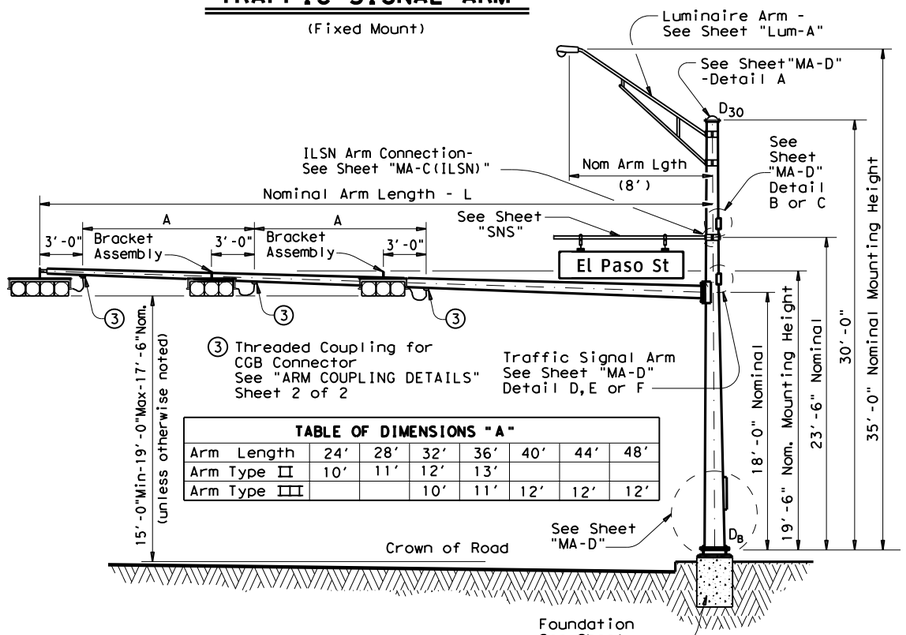


TABLE OF DIMENSIONS "A"

Arm Length	24'	28'	32'	36'	40'	44'	48'
Arm Type II	10'	11'	12'	13'			
Arm Type III			10'	11'	12'	12'	12'

STRUCTURE ASSEMBLY

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	Quantity
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		40S-80		40-80	
44	44L-80		44S-80		44-80	
48	48L-80		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	
44					44III-80	
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

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

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	
1 ¾"	3'-10"	

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.

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

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
			DOLOROSA
DIST	COUNTY		SHEET NO.
SAT	BEXAR		462

122A

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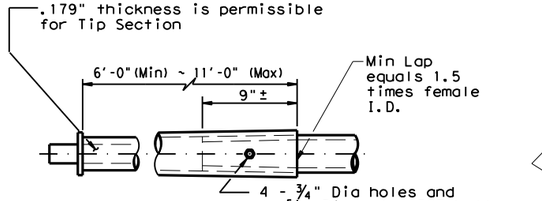
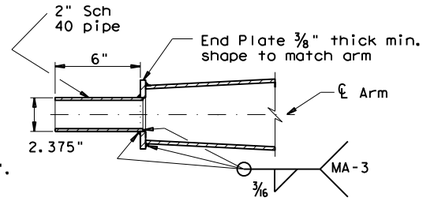


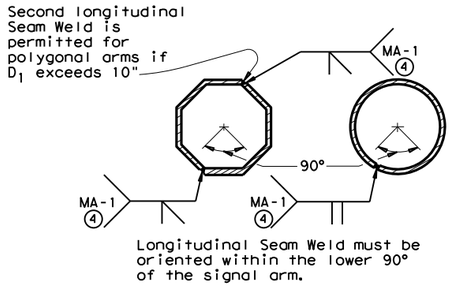
SLIP JOINT DETAIL



TENON DETAIL

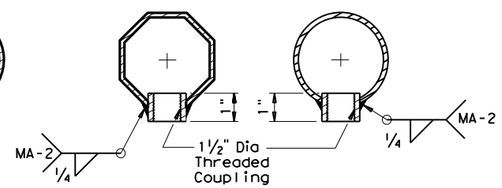
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

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



ARM COUPLING DETAILS

VIBRATION WARNING

Mast 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 backpates. 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.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
			DOLOROSA
DIST	COUNTY		SHEET NO.
SAT	BEXAR		463

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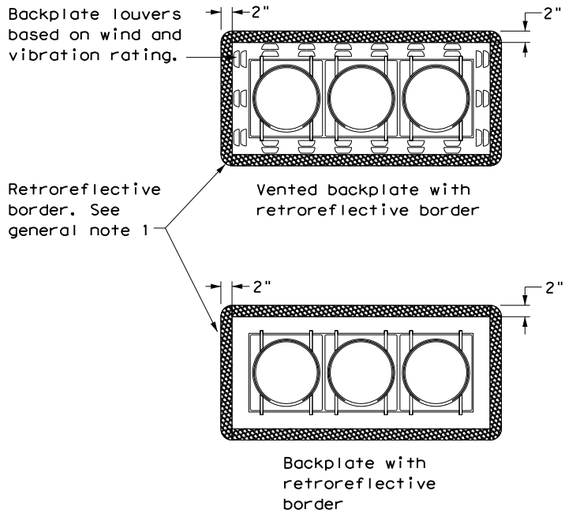
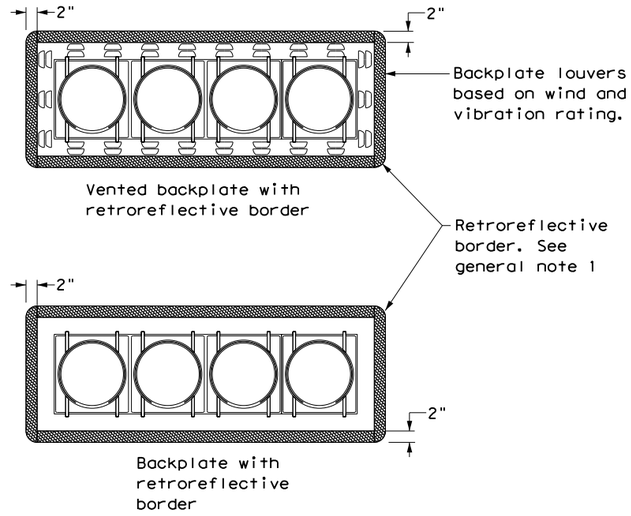
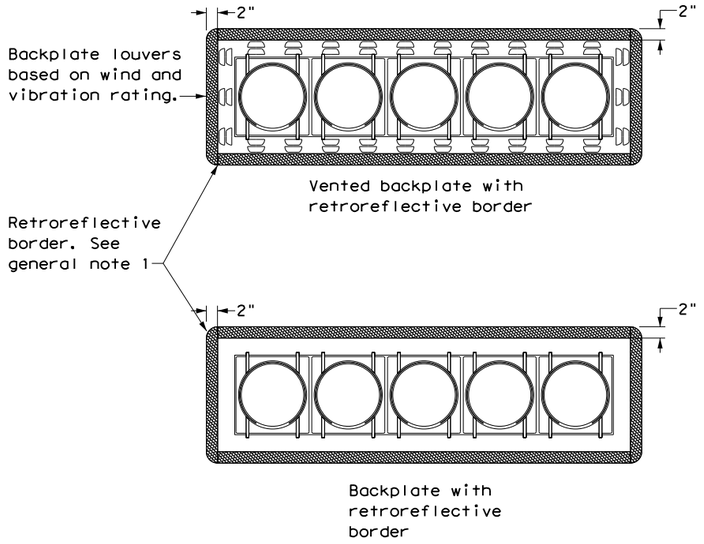


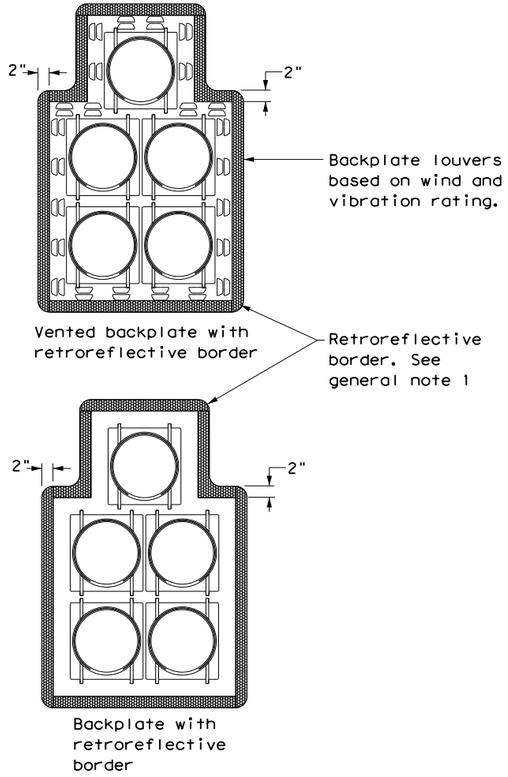
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



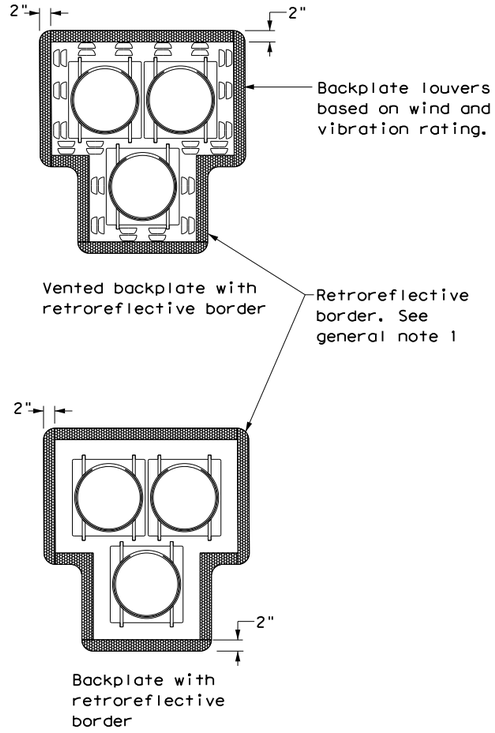
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



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_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, 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 signal heads 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
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REVISIONS				DOLOROSA
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		464

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	Fy (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- #9	#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)

NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

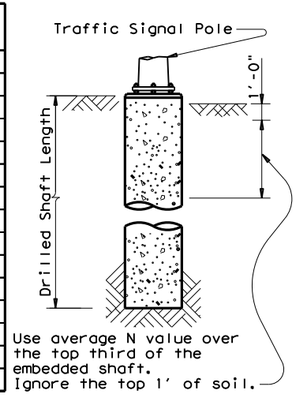
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
TOTAL DRILLED SHAFT LENGTHS								

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'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' 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'	
				40' x24'	40' X 36'
					44' x 36'



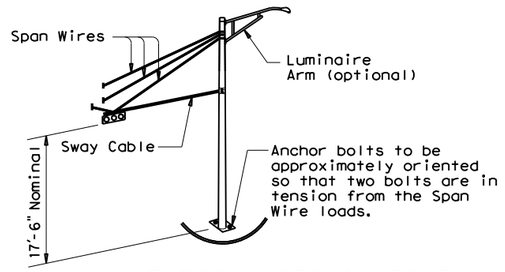
Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

ANCHOR BOLT & TEMPLATE SIZES

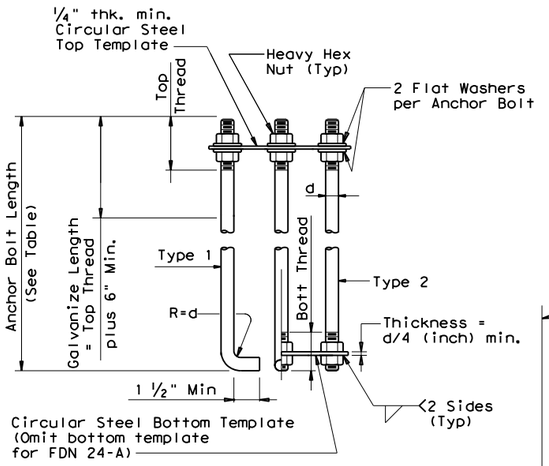
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

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



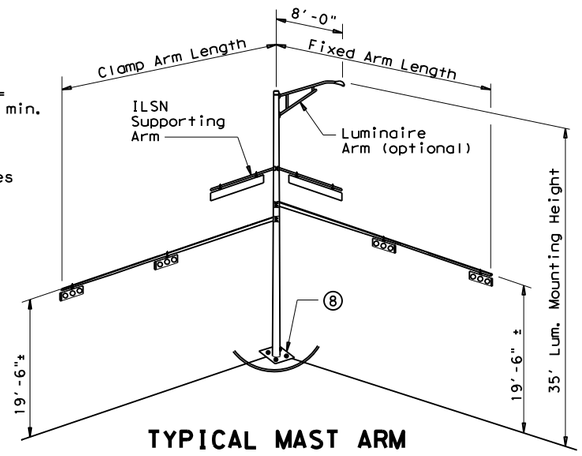
TYPICAL STRAIN POLE ASSEMBLY



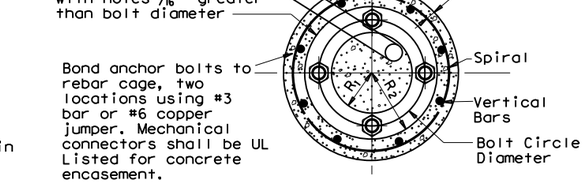
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

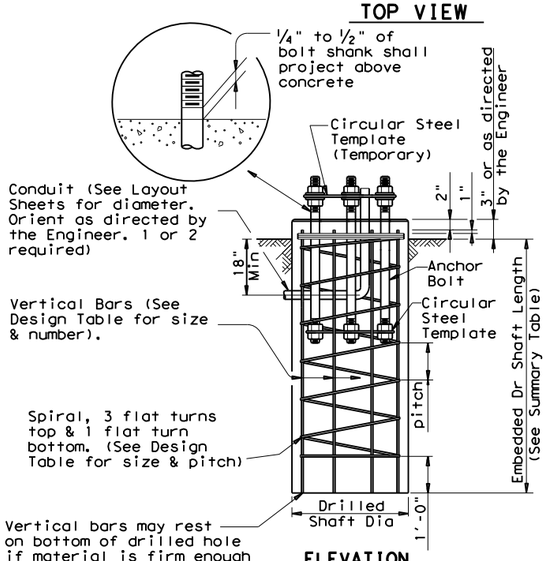
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

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".

Texas Department of Transportation
Traffic Operations Division

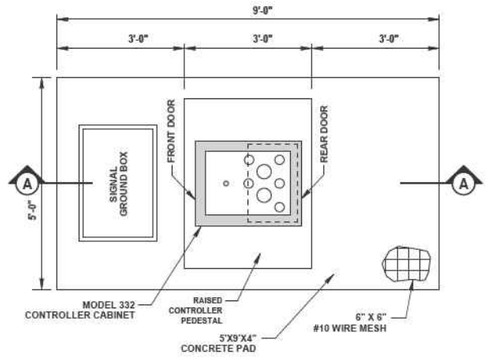
TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

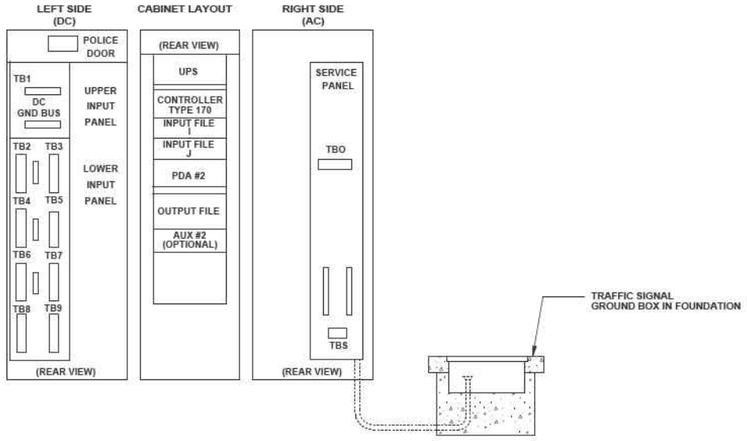
DN: MS	CK: JSY	DW: MAQ/MMF	CK: JSY/TEB
REVISIONS			
5-96			
11-99			
1-12			

CONT	SECT	JOB	HIGHWAY
			DOLOROSA
DIST	COUNTY		SHEET NO.
SAT	BEXAR		465

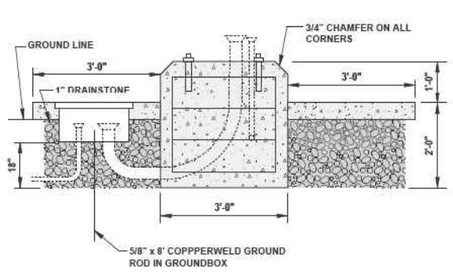
DATE: 1/24/2023 7:31:39 PM
FILE: P:\122\27\03\Design\Civil\Standards\Traffic Signals\ts-fd.dgn



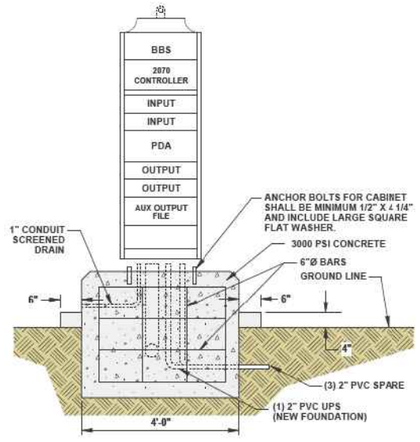
TOP VIEW
(NEW FOUNDATION)



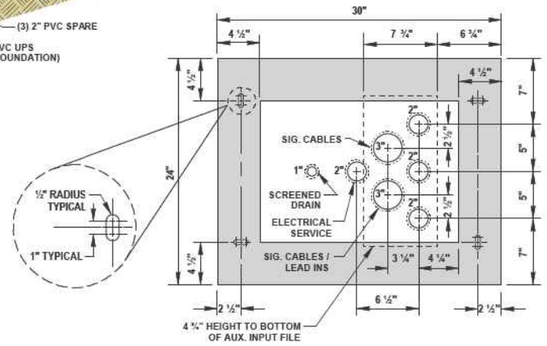
REAR VIEW SCHEMATIC



SECTION A-A



REAR VIEW



BASE PLATE TEMPLATE

NOTES:

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

CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS
Transportation Planning Division

TRAFFIC SIGNAL STANDARD

TYPE 332 CABINET FOUNDATION

TS-CAB-17

STATE OF TEXAS DISTRICT	FEDERAL AID PROJECT NO.			SHEET NO.
	STP 1702 (043) HES, Etc.			79
STATE	DISTRICT	COUNTY		TOTAL SHTS.
TEXAS	SAT	BEXAR		87
CONTROL	SECTION	JOB	HIGHWAY NO.	
1890	01	048, Etc.	FM 1976, Etc.	

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 1/24/2023

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: GILMER D. GASTON
P.E. SERIAL NO: 80472
DATE: 1/24/2023

NOT TO SCALE

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

DOLOROSA

COSA 332 CABINET STANDARD

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
ST	JT	JG	23-03763	70%	466

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.

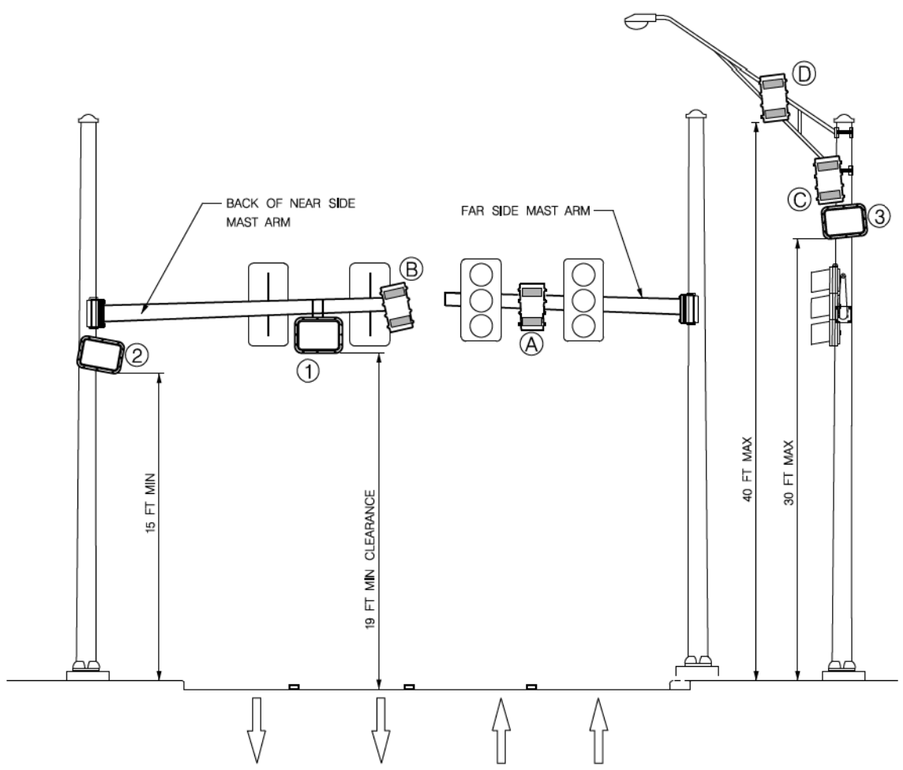
ADVANCE (RADD)

Ⓐ PREFERRED PLACEMENT FOR MAST ARMS. ALIGN RADD WITH CENTER OF TRAVEL LANES.

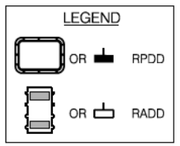
Ⓑ ALTERNATE PLACEMENT FOR MAST ARMS. MOUNT ON BACK SIDE OF OPPOSING MAST ARM.

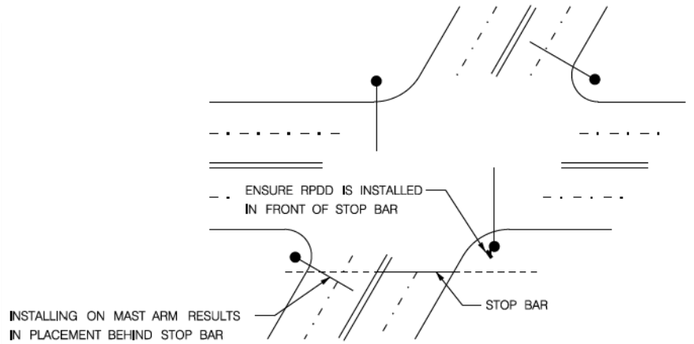
Ⓒ TIMBER OR STRAIN POLE PLACEMENT. MOUNT ON NEAR SIDE POLE.

Ⓓ ALTERNATE TIMBER OR STRAIN POLE PLACEMENT. MOUNT LUMINAIRE ARM ON NEAR SIDE POLE WITH A MAXIMUM 40 FT MOUNTING HEIGHT.

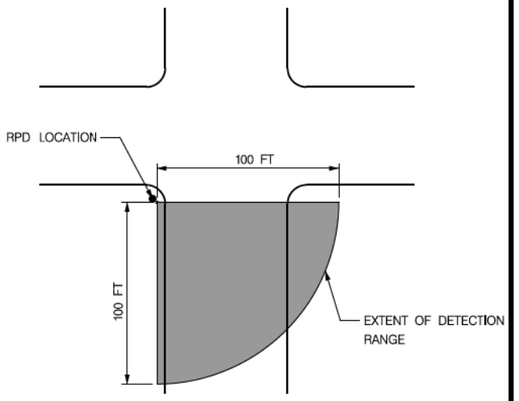


ELEVATION VIEW
NTS

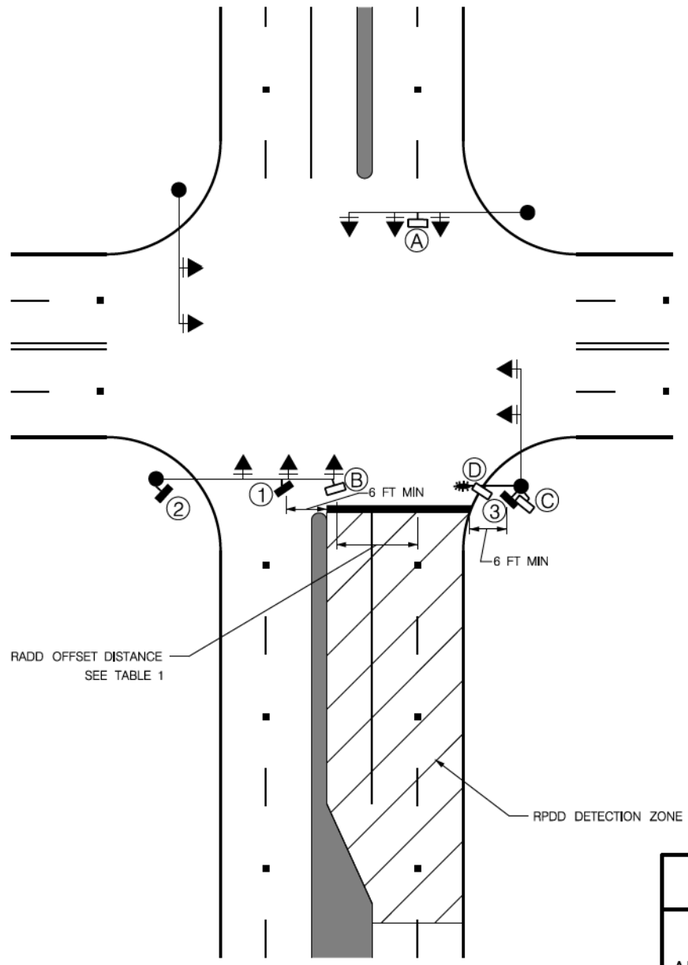




SKEWED INTERSECTION RPDD PLACEMENT
NTS



TYPICAL RPDD DETECTION RANGE
NTS



PLAN VIEW
NTS

NOTES:

1) A MINIMUM 6 FT HORIZONTAL OFFSET MUST BE MAINTAINED BETWEEN THE RPDD AND THE DETECTION ZONE

2) THE RPDD SHALL BE MOUNTED SUCH THAT AT LEAST 20 FT ALONG THE FARTHEST LANE TO BE MONITORED IS WITHIN THE FIELD OF VIEW OF THE RPDD

3) AIM RPDD AT THE CENTER OF THE LANES TO BE MONITORED, APPROXIMATELY 50 FT FROM THE RPDD UNIT

4) MOUNT RPDD SO THAT ITS FIELD OF VIEW IS NOT OCCLUDED BY POLES, SIGNS, OR OTHER STRUCTURES

5) RADD MOUNTING HEIGHT SHALL NOT BE LESS THAN 17 FT OR GREATER THAN 40 FT. RADD MOUNTING LOCATION SHALL HAVE A MAXIMUM 50 FT LATERAL OFFSET FROM CENTER OF TRAVEL LANES TO BE MONITORED

APRIL 2010

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGNAL STANDARDS

RADAR PRESENCE DETECTOR (RPDD) AND RADAR ADVANCE DETECTOR (RADD) PLACEMENT

SHEET 1 OF 1

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: DNM	DSGN. BY: DNM	CHKD. BY: GDG	SHEET NO.: 467 OF 521

Plotted on: 1/20/2023

Design Filename: K:\COSA Dolorosa\TRAFFIC\Dolorosa_SPM_01.dgn

Utilize standard crosswalks for ped crossing at intersections in addition to bike markings

40% included bike box at NB & SB approaches on Frio. Why did this get removed?

Verify stop location; Green surface course at intersections with stop bars dedicated for bikes

W 12" SLD (all bike stop bars)

R9-6 yield to peds; Advanced warnings at crossings with peds

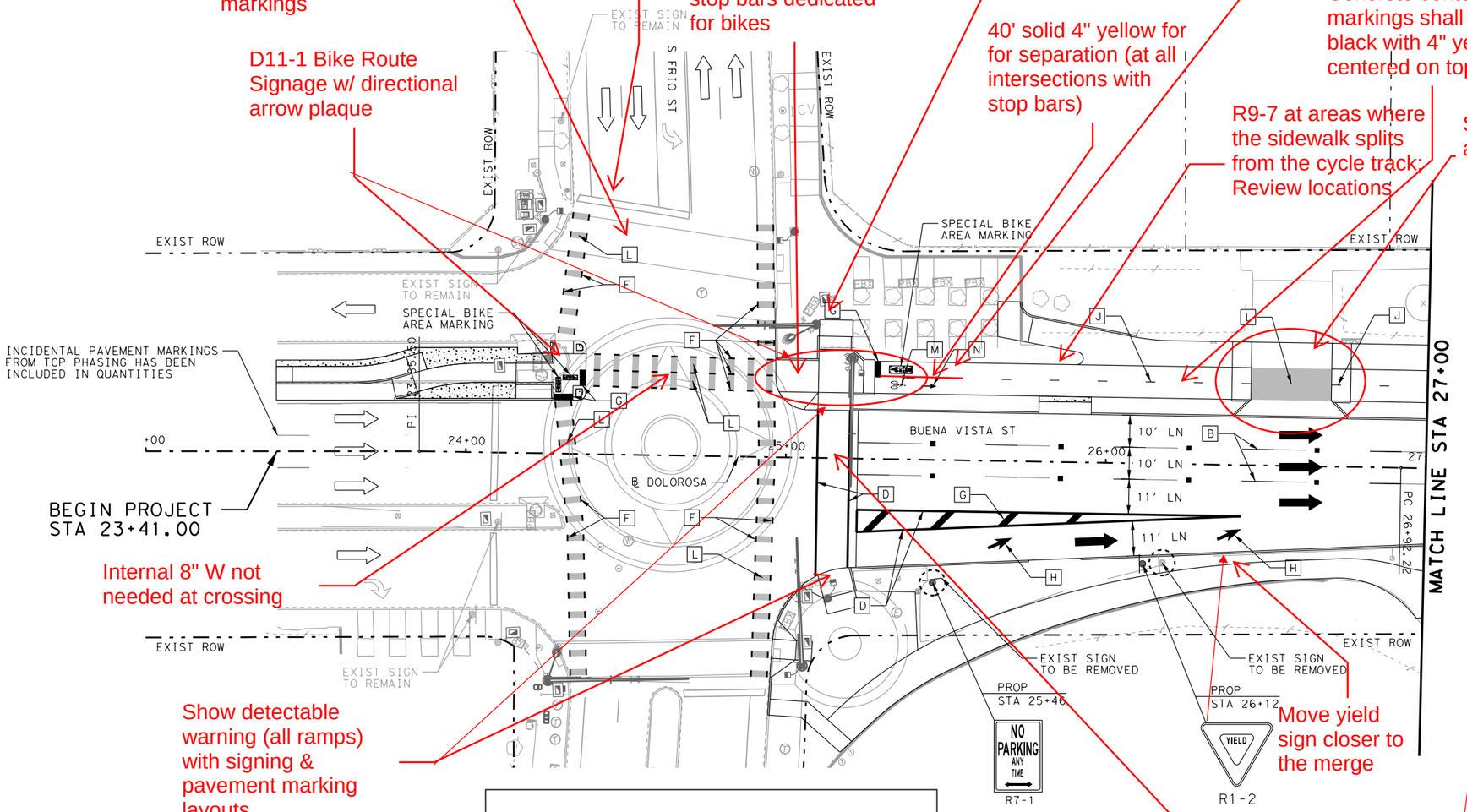
Concrete centerline markings shall be 8" black with 4" yellow centered on top

D11-1 Bike Route Signage w/ directional arrow plaque

40' solid 4" yellow for for separation (at all intersections with stop bars)

R9-7 at areas where the sidewalk splits from the cycle track; Review locations

See Detail "A" (at all driveways)

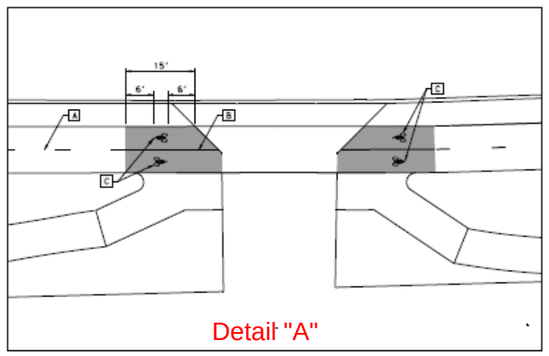


Internal 8" W not needed at crossing

Show detectable warning (all ramps) with signing & pavement marking layouts

Move yield sign closer to the merge

Utilize COSA Typical Crosswalk Details (all ped crosswalks)



Detail "A"

DRIVEWAY STRIPING DETAIL

ITEM	DESCRIPTION	UNIT	QTY
531 SUP 01	SMALL SIGN ASSEMBLY	EA	2
531 SUP 02	REMOVE SMALL SIGN ASSEMBLY	EA	2
531.21	R7-1 NO PARKING ANYTIME (18"X24") (HIGH	EA	1
531.72	R1-2 (YIELD) (18"X18"X18") (HIGH	EA	1
535.1	4 INCH WIDE YELLOW LINE	LF	37
535.2	4 INCH WIDE WHITE LINE	LF	660
535.4	8 INCH WIDE WHITE LINE	LF	584
535.13	STRAIGHT WHITE ARROW	EA	2
535.16	STRAIGHT WHITE ARROW BICYCLE FACILITY	EA	1
535.17	BICYCLE RIDER SYMBOL	EA	1
535.26	4 INCH WIDE BLACK LINE	LF	660
535.27	SPECIAL BIKE WAIT AREA PAVEMENT MARKING	EA	3
535.7	24 INCH WIDE WHITE LINE	LF	44
537.9	PAVEMENT MARKER (TYPE II C-R)	EA	64
6999-6001	GREEN HIGH FRICTION SURFACE TREATMENT	SF	891

LEGEND

SIGN (PROP/EXIST) DEL (D-SW) (WFLX) SRF

- A W 4" SLD
- B W 4" BRK W/ BLK 4" BRK SHDW LANE LINES & TY II-C-R @40'OC
- C W 4" DOT
- D ~~W 8" SLD~~
- E W 8" SLD W/TY II-C-R @20'OC
- F W 8" DOT
- G W ~~24~~ 12" SLD
- H W ARROW
- I W WORD
- J Y 4" BRK
- K Y 4" SLD
- L GREEN BIKE LANE FRICTION SURFACE
- M W BIKE SYMBOL
- N W BIKE ARROW

NOTES:
1. CONTRACTOR TO COORDINATE WITH COSA FOR STRIPING OPERATIONS.
2. ALL CROSSWALKS ARE HIGH CONTRAST WITH BLACK 12" PAVEMENT MARKINGS. SEE COSA TYPICAL CROSSWALK STANDARD FOR DETAILS.
3. SIGNS ARE LOCATED RELATIVE TO THE ROADWAY BASELINE. THE CONTRACTOR MUST LOCATE SIGNS WITHIN THE ROW AND IN ACCORDANCE WITH THE TMUTCD, COSA STANDARDS WITH RESPECT TO OFFSET FROM CURB, RETAINING WALLS AND SIDEWALKS OR AS APPROVED BY THE ENGINEER.
4. VIA IS RESPONSIBLE FOR REMOVAL/REPLACEMENT OF ALL BUS STOP AND RELATED SIGNING.

PRELIMINARY
FOR INTERIM REVIEW ONLY
By: MICHAEL G. RAMIREZ P.E. 133983
DATE 1/20/2023
CAMACHO-HERNANDEZ & ASSOCIATES, LLC
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

0 20 40 60
SCALE: 1" = 40'

REV. NO.	DATE	DESCRIPTION	BY

CAMACHO-HERNANDEZ & ASSOCIATES, LLC
415 EMBASSY OAKS - SUITE 205 SAN ANTONIO, TX. 78216
OFFICE: (210) 341-6200 FAX: (210) 341-6300
FIRM NUMBER: F-8478

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

DOLOROSA

SIGNING & PAVEMENT MARKINGS LAYOUT

BEGIN TO STA 27+00

SHEET 1 OF 5

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
MGR	JH	HR	23-03763	70%	468

Capital First Letter then lower casee

R9-6 yield to peds; Advanced warnings at crossings with peds

Both sidewalk and cycletrack are concrete? See landscape notes regarding different textures between the two

No parking signs along here

Bike stop bars 4' from the curb; Do not block pedestrian walkway

COSA crosswalk standard (all crosswalks)

Specify what signs these are (all remove & relocate exist signs)

If street sign move closer to curb

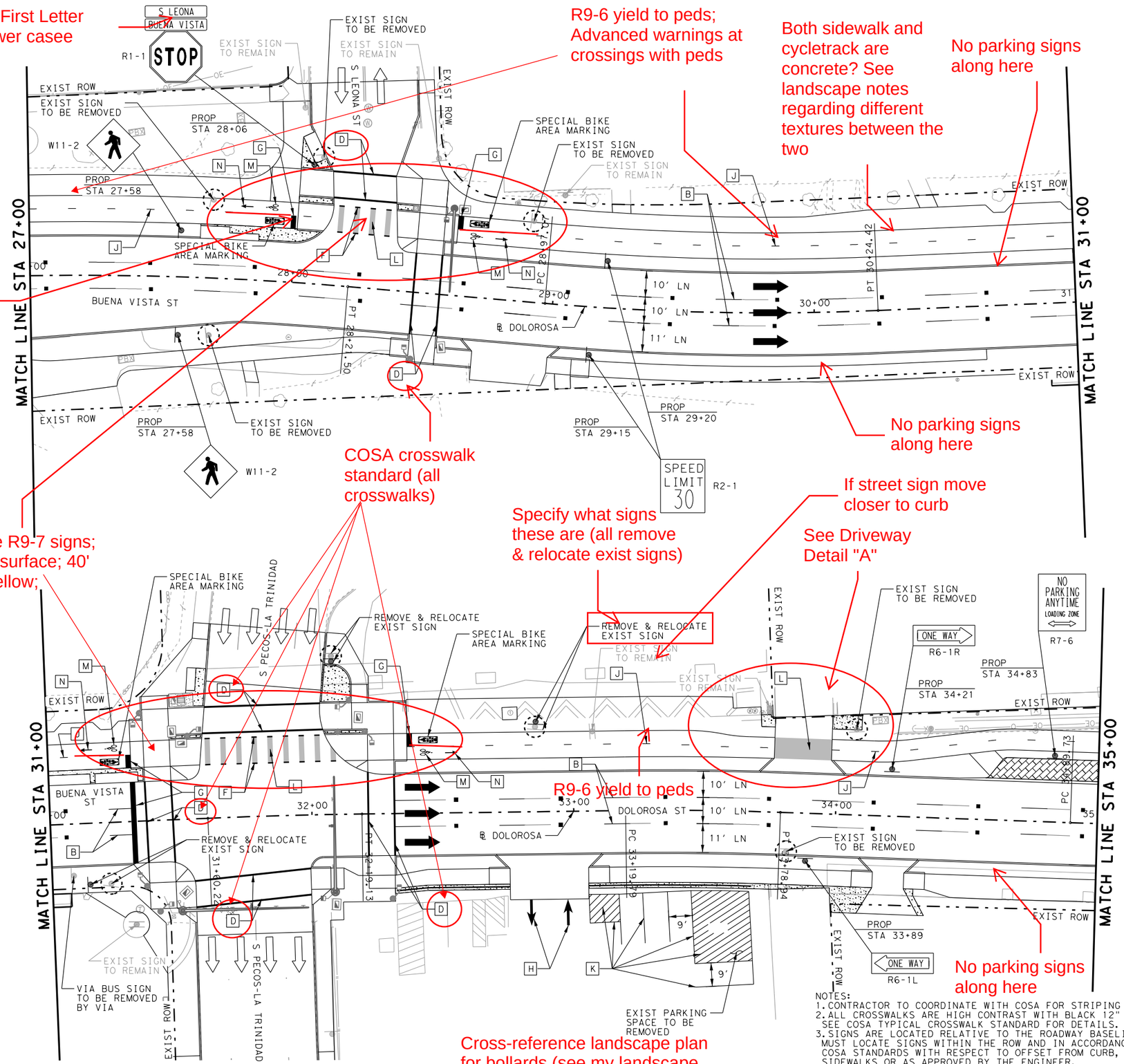
See Driveway Detail "A"

Include R9-7 signs; Green surface; 40' SLD yellow;

R9-6 yield to peds

No parking signs along here

Cross-reference landscape plan for bollards (see my landscape notes pg 317 & 334)



ITEM	DESCRIPTION	UNIT	QTY
531 SUP 01	SMALL SIGN ASSEMBLY	EA	11
531 SUP 02	REMOVE SMALL SIGN ASSEMBLY	EA	9
531.03	R1-1 STOP (30")(HIGH INTENSITY)	EA	1
531.06	R2-1 SPEED LIMIT (24"X30") (HIGH	EA	2
531.19	R6-1 ONE WAY (36"x12") (HIGH INTENSITY)	EA	2
531.22	R7-6 NO PARKING LOADING ZONE (18"X24")	EA	1
531.51	W11-2 PED CROSSING (30"X30")(HIGH	EA	2
531.57	9 INCH (229 MM) STREET NAME, BLOCK NUMBER	EA	2
535.1	4 INCH WIDE YELLOW LINE	LF	747
535.2	4 INCH WIDE WHITE LINE	LF	360
535.4	8 INCH WIDE WHITE LINE	LF	464
535.13	STRAIGHT WHITE ARROW	EA	2
535.16	STRAIGHT WHITE ARROW BICYCLE FACILITY	EA	4
535.17	BICYCLE RIDER SYMBOL	EA	4
535.26	4 INCH WIDE BLACK LINE	LF	340
535.27	SPECIAL BIKE WAIT AREA PAVEMENT MARKING	EA	4
535.7	24 INCH WIDE WHITE LINE	LF	51
537.9	PAVEMENT MARKER (TYPE II C-R)	EA	36
6999-6001	GREEN HIGH FRICTION SURFACE TREATMENT	SF	424

LEGEND

SIGN (PROP/EXIST) DEL (D-SW)(WFLX) SRF

- A W 4" SLD
- B W 4" BRK W/ BLK 4" BRK SHDW LANE LINES & TY II-C-R @40'OC
- C W 4" DOT
- D W 8" SLD
- E W 8" SLD W/TY II-C-R @20'OC
- F W 8" DOT
- G W 24" SLD
- H W ARROW
- I W WORD
- J Y 4" BRK
- K Y 4" SLD
- L GREEN BIKE LANE FRICTION SURFACE
- M W BIKE SYMBOL
- N W BIKE ARROW

NOTES:
1. CONTRACTOR TO COORDINATE WITH COSA FOR STRIPING OPERATIONS.
2. ALL CROSSWALKS ARE HIGH CONTRAST WITH BLACK 12" PAVEMENT MARKINGS. SEE COSA TYPICAL CROSSWALK STANDARD FOR DETAILS.
3. SIGNS ARE LOCATED RELATIVE TO THE ROADWAY BASELINE. THE CONTRACTOR MUST LOCATE SIGNS WITHIN THE ROW AND IN ACCORDANCE WITH THE TMUTCD, COSA STANDARDS WITH RESPECT TO OFFSET FROM CURB, RETAINING WALLS AND SIDEWALKS OR AS APPROVED BY THE ENGINEER.
4. VIA IS RESPONSIBLE FOR REMOVAL/REPLACEMENT OF ALL BUS STOP AND RELATED SIGNING.

PRELIMINARY
FOR INTERIM REVIEW ONLY
By: MICHAEL G. RAMIREZ P.E. 133983
DATE 1/20/2023
CAMACHO-HERNANDEZ & ASSOCIATES, LLC
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

0 20 40 60
SCALE: 1" = 40'

REV. NO.	DATE	DESCRIPTION	BY

CAMACHO-HERNANDEZ & ASSOCIATES, LLC
415 EMBASSY OAKS - SUITE 205 SAN ANTONIO, TX. 78216
OFFICE: (210) 341-6200 FAX: (210) 341-6300
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SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

SIGNING & PAVEMENT MARKINGS LAYOUT

STA 27+00 TO STA 35+00

SHEET 2 OF 5

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
MGR	JH	HR	23-03763	70%	469

Plotted on: 1/20/2023

Design Filename: K:\COSA Dolorosa\TRAFFIC\Dolorosa_SPM_02.dgn

Ref Intersection detail; Include R9-7 signs; Green surface; 40' SLD yellow;

Utilize standard crosswalks for ped crossing at intersections in addition to bike markings

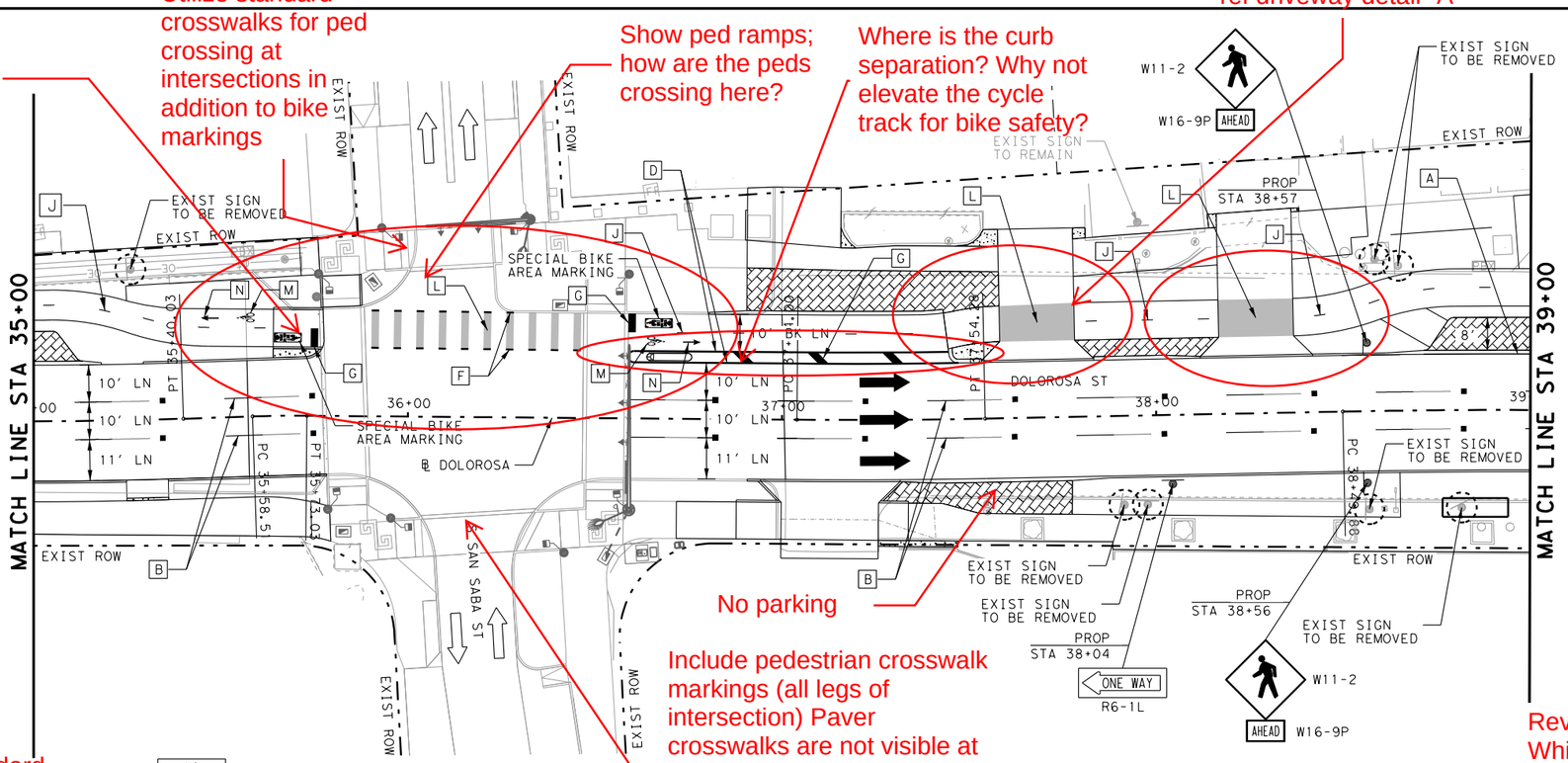
Show ped ramps; how are the peds crossing here?

Where is the curb separation? Why not elevate the cycle track for bike safety?

ref driveway detail "A"

Plotted on: 1/20/2023

ITEM	DESCRIPTION	UNIT	QTY
531 SUP 01	SMALL SIGN ASSEMBLY	EA	5
531 SUP 02	REMOVE SMALL SIGN ASSEMBLY	EA	15
531.19	R6-1 ONE WAY (36"x12") (HIGH INTENSITY)	EA	2
531.22	R7-6 NO PARKING LOADING ZONE (18"X24")	EA	1
531.51	W11-2 PED CROSSING (30"X30") (HIGH	EA	2
531.62	W16-9P AHEAD (36"X20") (HIGH INTENSITY)	EA	2
535.1	4 INCH WIDE YELLOW LINE	LF	127
535.2	4 INCH WIDE WHITE LINE	LF	676
535.4	8 INCH WIDE WHITE LINE	LF	272
535.16	STRAIGHT WHITE ARROW BICYCLE FACILITY	EA	3
535.17	BICYCLE RIDER SYMBOL	EA	3
535.26	4 INCH WIDE BLACK LINE	LF	300
535.27	SPECIAL BIKE WAIT AREA PAVEMENT MARKING	EA	2
535.7	24 INCH WIDE WHITE LINE	LF	23
537.9	PAVEMENT MARKER (TYPE II C-R)	EA	30
658-6083	INSTALL OM ASSM (D-SW) (WFLX) SRF	EA	1
6999-6001	GREEN HIGH FRICTION SURFACE TREATMENT	SF	881



Include pedestrian crosswalk markings (all legs of intersection) Paver crosswalks are not visible at night or rainy days, use standard details; In general brick should not be used in crosswalks (see landscape note pg 322)

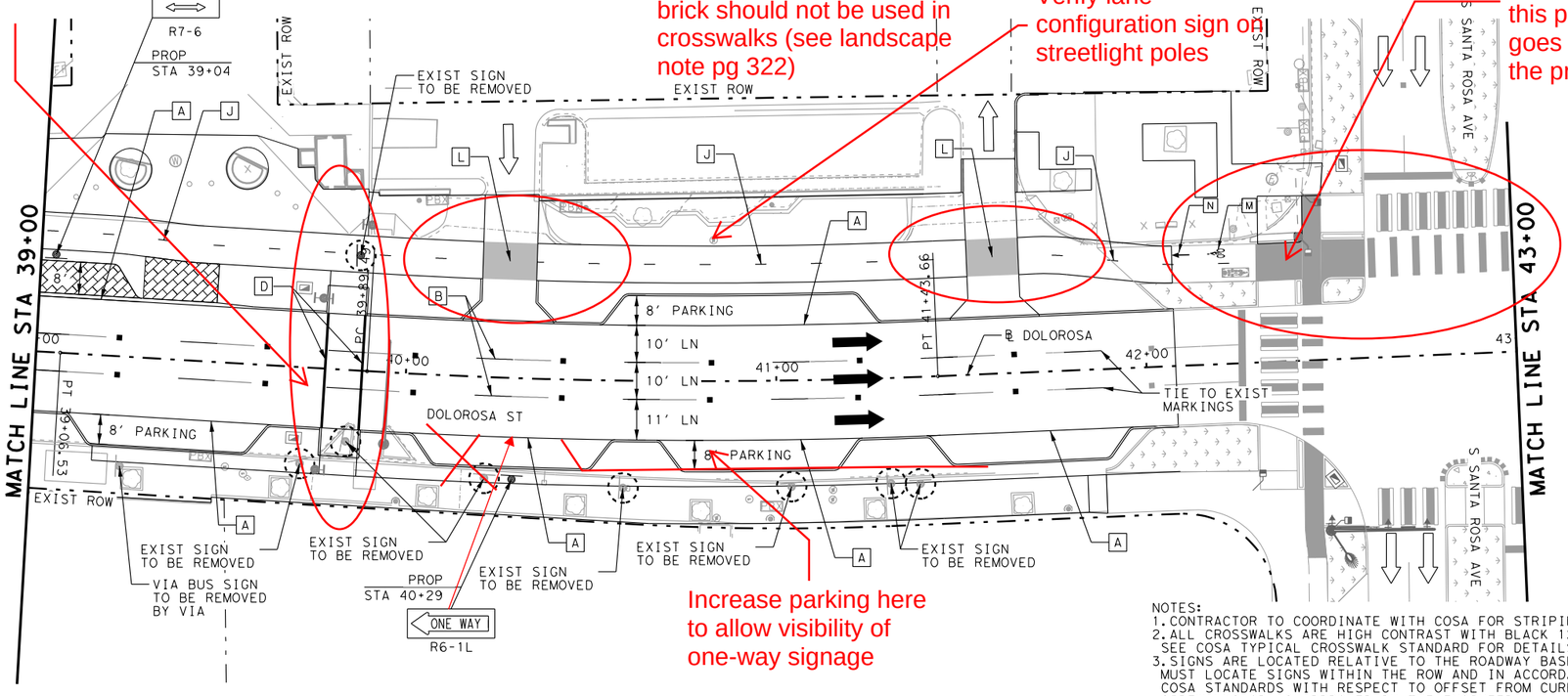
Review how this ties in; Which project is constructed 1st? Include intersection in this project if Dolorosa goes 1st. Reference the project #

LEGEND

- SIGN (PROP/EXIST)
- DEL (D-SW) (WFLX) SRF
- A W 4" SLD
- B W 4" BRK W/ BLK 4" BRK SHDW LANE LINES & TY II-C-R @40'OC
- C W 4" DOT
- D W 8" SLD
- E W 8" SLD W/TY II-C-R @20'OC
- F W 8" DOT
- G W 24" SLD
- H W ARROW
- I W WORD
- J Y 4" BRK
- K Y 4" SLD
- L GREEN BIKE LANE FRICTION SURFACE
- M W BIKE SYMBOL
- N W BIKE ARROW

Use standard crosswalk; Missing stop bar

Verify lane configuration sign on streetlight poles



Increase parking here to allow visibility of one-way signage

NOTES:
1. CONTRACTOR TO COORDINATE WITH COSA FOR STRIPING OPERATIONS.
2. ALL CROSSWALKS ARE HIGH CONTRAST WITH BLACK 12" PAVEMENT MARKINGS. SEE COSA TYPICAL CROSSWALK STANDARD FOR DETAILS.
3. SIGNS ARE LOCATED RELATIVE TO THE ROADWAY BASELINE. THE CONTRACTOR MUST LOCATE SIGNS WITHIN THE ROW AND IN ACCORDANCE WITH THE TMUTCD, COSA STANDARDS WITH RESPECT TO OFFSET FROM CURB, RETAINING WALLS AND SIDEWALKS OR AS APPROVED BY THE ENGINEER.
4. VIA IS RESPONSIBLE FOR REMOVAL/REPLACEMENT OF ALL BUS STOP AND RELATED SIGNING.

PRELIMINARY
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By: MICHAEL G. RAMIREZ P.E. 133983
DATE 1/20/2023
CAMACHO-HERNANDEZ & ASSOCIATES, LLC
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

0 20 40 60
SCALE: 1" = 40'

REV. NO.	DATE	DESCRIPTION	BY

CAMACHO-HERNANDEZ & ASSOCIATES, LLC
415 EMBASSY OAKS - SUITE 205 SAN ANTONIO, TX. 78216
OFFICE: (210) 341-6200 FAX: (210) 341-6300
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

SIGNING & PAVEMENT MARKINGS LAYOUT

STA 35+00 TO STA 43+00

SHEET 3 OF 5

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
MGR	JH	HR	23-03763	70%	470

Design Filename: K:\COSA Dolorosa\TRAFFIC\Dolorosa_SPM_03.dgn

Review tie in to S Santa Rosa plans

Review signs on the poles

See Rwdy comments regarding sidewalk width

clearly show sidewalk and ramps (all sheets)

Utilize standard crosswalk detail

Utilize R9-6 for advance warning (both sides)

Capital First Letter then lower casee

What is this width? provide dimension; Min 4'

Landscape plans do not match roadway layouts; cross-reference; Do not recommend planters

Provide physical separation; why not elevate cycle track for bike safety?

Callout VIA shelters (these sheets) to see ped generators

These will likely get beat up and need replacement; Need input from street maintenance regarding replacement, street sweeping, drainage ect.

How will peds cross here? Why add new ped crossing so close to intersection? Is there a ped generator?

crosswalk not needed

What sign is this? Ensure visibility of one way sign

ensure visibility

R4-7

R9-6

R9-7

Sign in the middle of the ramp? Adjust accordingly min 20' to 50' distance as defined by the TMUTCD

Utilize standard crosswalk detail

Why is there two ramps? Is the long one needed? Adjust accordingly

Advance Bus Only sign

Maybe start bus lane here? for advance warning before signal?

ITEM	DESCRIPTION	UNIT	QTY
531 SUP 01	SMALL SIGN ASSEMBLY	EA	9
531 SUP 02	REMOVE SMALL SIGN ASSEMBLY	EA	16
531.03	R1-1 STOP (30") (HIGH INTENSITY)	EA	1
531.05	R1-5 STOP HERE TO PEDESTRIANS (30"X30")	EA	2
531.18	R5-1 DO NOT ENTER (30"X30") (HIGH	EA	2
531.51	W11-2 PED CROSSING (30"X30") (HIGH	EA	2
531.57	9 INCH (229 MM) STREET NAME, BLOCK NUMBER	EA	2
531.62	W16-9P AHEAD (36"X20") (HIGH INTENSITY)	EA	2
531.68	R3-17 (BIKE LANE) (30"X24") (HIGH	EA	2
535.1	4 INCH WIDE YELLOW LINE	LF	136
535.2	4 INCH WIDE WHITE LINE	LF	517
535.4	8 INCH WIDE WHITE LINE	LF	1281
535.16	STRAIGHT WHITE ARROW BICYCLE FACILITY	EA	6
535.17	BICYCLE RIDER SYMBOL	EA	6
535.26	4 INCH WIDE BLACK LINE	LF	360
535.27	SPECIAL BIKE WAIT AREA PAVEMENT MARKING	EA	1
535.7	24 INCH WIDE WHITE LINE	LF	129
535.28	12 INCH WIDE BLACK LINE	LF	80
537.9	PAVEMENT MARKER (TYPE II C-R)	EA	34
658-6083	INSTALL OM ASSM (D-SW) (WFLX) SRF	EA	27
6999-6001	GREEN HIGH FRICTION SURFACE TREATMENT	SF	160

LEGEND

/EXIST) DEL (D-SW) (WFLX) SRF

- [D] ... BLK 4" BRK SHDW LANE LINES & TY II-C-R @40'OC
- [C] W 4" DOT
- [D] W 8" SLD
- [E] W 8" SLD W/TY II-C-R @20'OC
- [F] W 8" DOT
- [G] W 24" SLD
- [H] W ARROW
- [I] W WORD
- [J] Y 4" BRK
- [K] Y 4" SLD
- [L] GREEN BIKE LANE FRICTION SURFACE
- [M] W BIKE SYMBOL
- [N] W BIKE ARROW

PRELIMINARY
FOR INTERIM REVIEW ONLY
By: MICHAEL G. RAMIREZ P.E. 133983
DATE 1/20/2023
CAMACHO-HERNANDEZ & ASSOCIATES, LLC
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

0 20 40 60
SCALE: 1" = 40'

REV. NO.	DATE	DESCRIPTION	BY

CAMACHO-HERNANDEZ & ASSOCIATES, LLC
415 EMBASSY OAKS - SUITE 205 SAN ANTONIO, TX. 78216
OFFICE: (210) 341-6200 FAX: (210) 341-6300
FIRM NUMBER: F-8478

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

DOLOROSA

SIGNING & PAVEMENT MARKINGS LAYOUT

STA 43+00 TO STA 51+00

SHEET 4 OF 5

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
MGR	JH	HR	23-03763	70%	471

NOTES:
1. CONTRACTOR TO COORDINATE WITH COSA FO... INGS.
2. ALL CROSSWALKS ARE HIGH CONTRAST WITH... SEE COSA TYPICAL CROSSWALK STANDARD FO...
3. SIGNS ARE LOCATED RELATIVE TO THE RO... RACTOR MUST LOCATE SIGNS WITHIN THE ROW AND ... UTCD, COSA STANDARDS WITH RESPECT TO OFFSET ... LS AND SIDEWALKS OR AS APPROVED BY THE ENGINE...
4. VIA IS RESPONSIBLE FOR REMOVAL/REPLAC... D RELATED SIGNING.

Plotted on: 1/20/2023

Design Filename: K:\COSA Dolorosa\TRAFFIC\Dolorosa_SPM_04.dgn

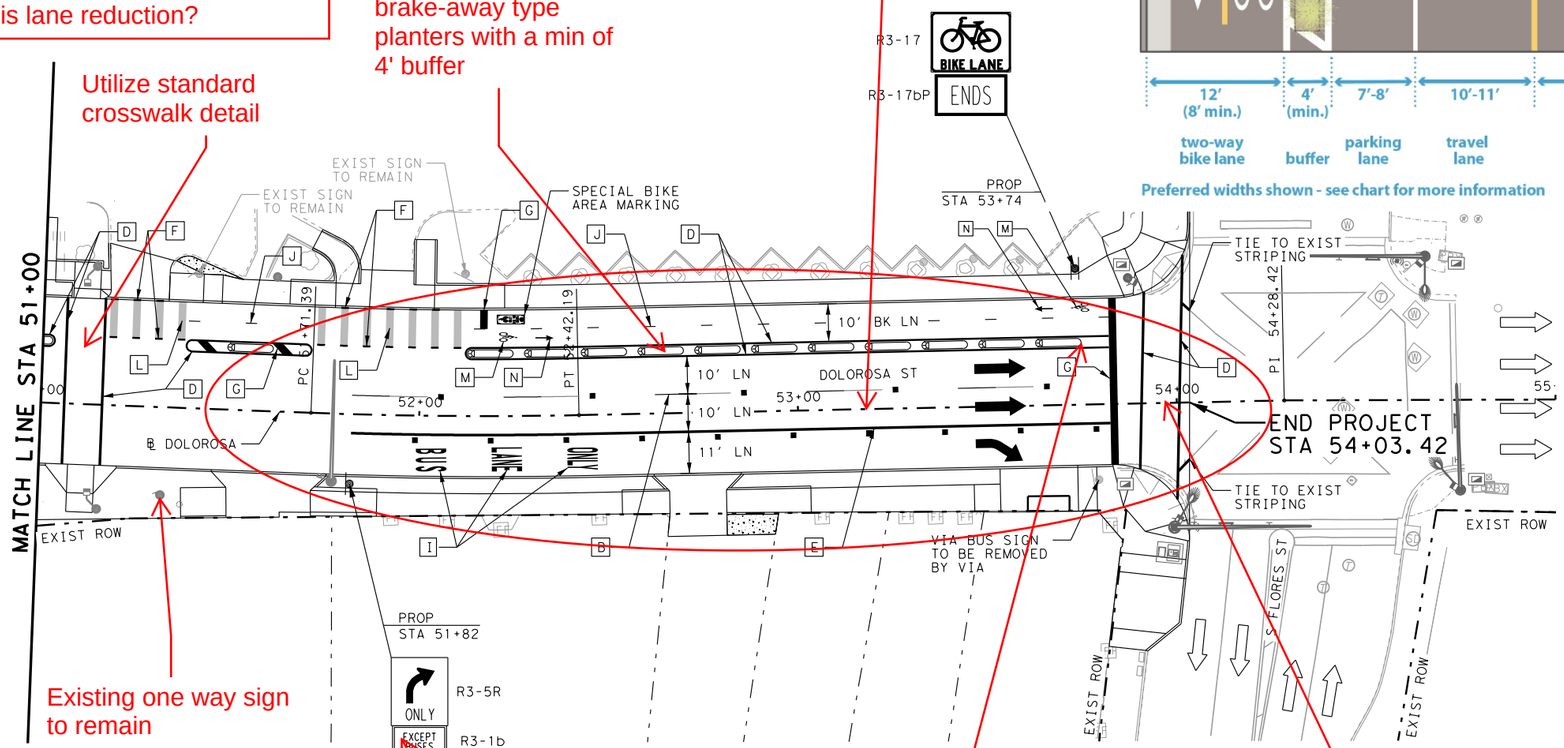
Review volumes for the Dolorosa & Market cycle-track project. The corridor is currently a one-way 4-lane road with one of the four lanes utilized as a dedicated bus and right turn lane. For a portion of this project and Market, the proposed section will convert the northern lane to a two-way cycle track therefore reducing one full lane of capacity. A capacity study would be needed to understand the impacts of this new lane configuration. Given the Market project is LAM funded, is TxDot in support of this lane reduction?

Are these concrete medians or planters? or both? Do not recommend permanent planters as planters create a blunt object to hit with no give; would need brake-away type planters with a min of 4' buffer

Will reduction of lanes a create bottleneck and right trap lane after signal? Review volumes;

2012 Pape-Dawson capacity study analyzed Market and Flores at LOS D. It mentions without the removal of the exclusive ped phase, the intersection would operate at LOS F with the Build condition. Recommend updating study. However to make up for the ped phase wider sidewalks was recommended approx 12'.

Utilize standard crosswalk detail



Existing one way sign to remain

Provide more advance warning

Type 3 object markers should be installed on or near the end of each planter

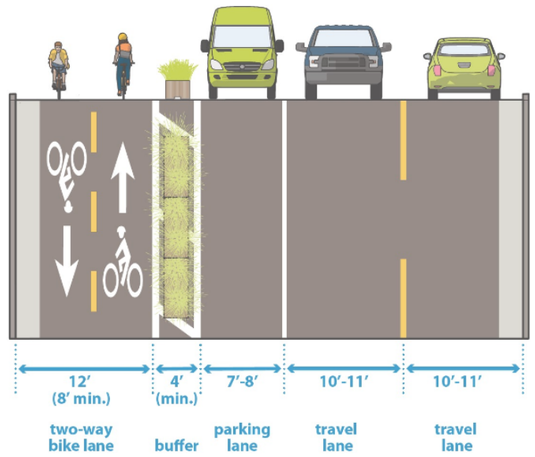
Utilize standard crosswalk detail

Review parking for loading areas to ensure business have access for loading

Ensure pavement markings on signal layouts match signing and pavement markings; Currently they do not match

Crossreference landscape plans for bollard placement; Include bollards at intersections to prevent vehicles from entering

2-Way Planter Protected Bike Lanes



Preferred widths shown - see chart for more information

ITEM	DESCRIPTION	UNIT	QTY
531 SUP 01	SMALL SIGN ASSEMBLY	EA	2
531.07	R3-1b EXCEPT BUSES (24"x24") (HIGH	EA	1
531.11	R3-5 RIGHT ONLY (30"X36") (HIGH INTENSITY)	EA	1
531.68	R3-17 (BIKE LANE) (30"X24") (HIGH	EA	1
531.7	R3-17b (ENDS) (30"X12") (HIGH INTENSITY)	EA	1
535.1	4 INCH WIDE YELLOW LINE	LF	50
535.2	4 INCH WIDE WHITE LINE	LF	50
535.4	8 INCH WIDE WHITE LINE	LF	864
535.12	WHITE WORD	EA	3
535.16	STRAIGHT WHITE ARROW BICYCLE FACILITY	EA	1
535.17	BICYCLE RIDER SYMBOL	EA	1
535.26	4 INCH WIDE BLACK LINE	LF	50
535.27	SPECIAL BIKE WAIT AREA PAVEMENT MARKING	EA	1
535.7	24 INCH WIDE WHITE LINE	LF	57
537.9	PAVEMENT MARKER (TYPE II C-R)	EA	15
658-6083	INSTALL OM ASSM (D-SW) (WFLX) SRF	EA	12
6999-6001	GREEN HIGH FRICTION SURFACE TREATMENT	SF	220

LEGEND

SIGN (PROP/EXIST) — DEL (D-SW) (WFLX) SRF

- A W 4" SLD
- B W 4" BRK W/ BLK 4" BRK SHDW LANE LINES & TY II-C-R @40'OC
- C W 4" DOT
- D W 8" SLD
- E W 8" SLD W/TY II-C-R @20'OC
- F W 8" DOT
- G W 24" SLD
- H W ARROW
- I W WORD
- J Y 4" BRK
- K Y 4" SLD
- L GREEN BIKE LANE FRICTION SURFACE
- M W BIKE SYMBOL
- N W BIKE ARROW

NOTES:
1. CONTRACTOR TO COORDINATE WITH COSA FOR STRIPING OPERATIONS.
2. ALL CROSSWALKS ARE HIGH CONTRAST WITH BLACK 12" PAVEMENT MARKINGS. SEE COSA TYPICAL CROSSWALK STANDARD FOR DETAILS.
3. SIGNS ARE LOCATED RELATIVE TO THE ROADWAY BASELINE. THE CONTRACTOR MUST LOCATE SIGNS WITHIN THE ROW AND IN ACCORDANCE WITH THE TMUTCD, COSA STANDARDS WITH RESPECT TO OFFSET FROM CURB, RETAINING WALLS AND SIDEWALKS OR AS APPROVED BY THE ENGINEER.
4. VIA IS RESPONSIBLE FOR REMOVAL/REPLACEMENT OF ALL BUS STOP AND RELATED SIGNING.

PRELIMINARY
FOR INTERIM REVIEW ONLY
By: MICHAEL G. RAMIREZ P.E. 133983
DATE 1/20/2023
CAMACHO-HERNANDEZ & ASSOCIATES, LLC
NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

0 20 40 60
SCALE: 1" = 40'

REV. NO.	DATE	DESCRIPTION	BY

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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

SIGNING & PAVEMENT MARKINGS LAYOUT

STA 51+00 TO END

SHEET 5 OF 5

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
MGR	JH	HR	23-03763	70%	472

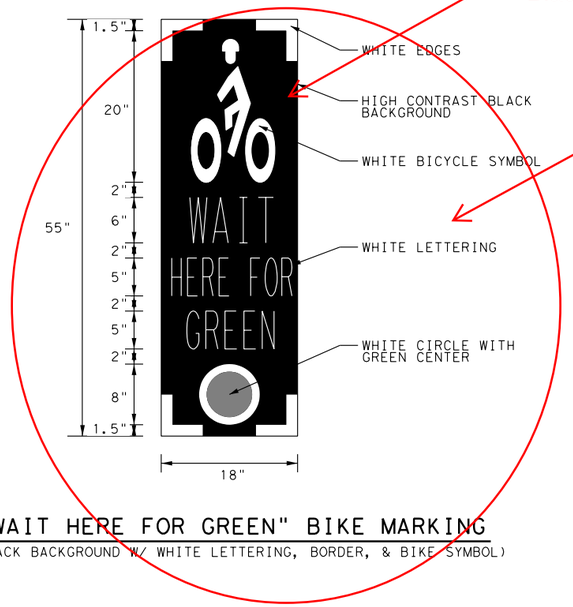
Plotted on: 1/20/2023

Design Filename: K:\COSA Dolorosa\TRAFFIC\Dolorosa_SP

Plotted on: 1/20/2023

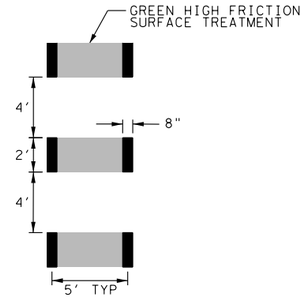
Black background?

Please provide reference of where this Bike Marking was generated



"WAIT HERE FOR GREEN" BIKE MARKING

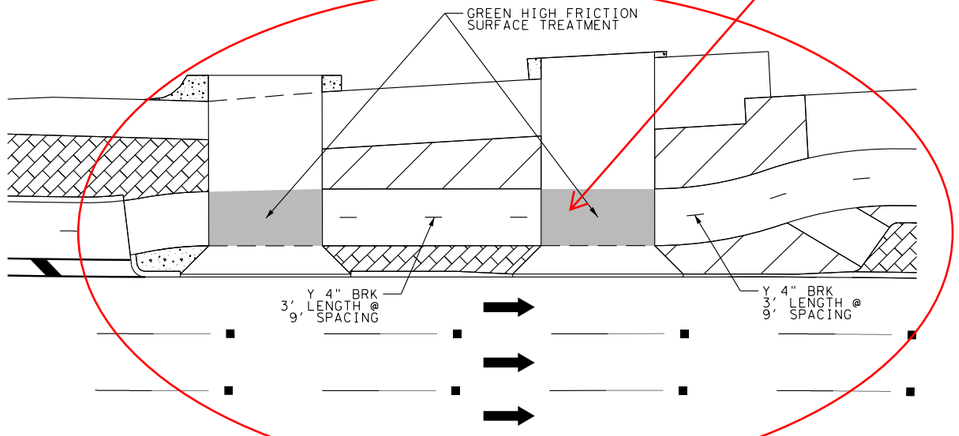
(BLACK BACKGROUND W/ WHITE LETTERING, BORDER, & BIKE SYMBOL)



GREEN DASHED BICYCLE LANE DETAIL

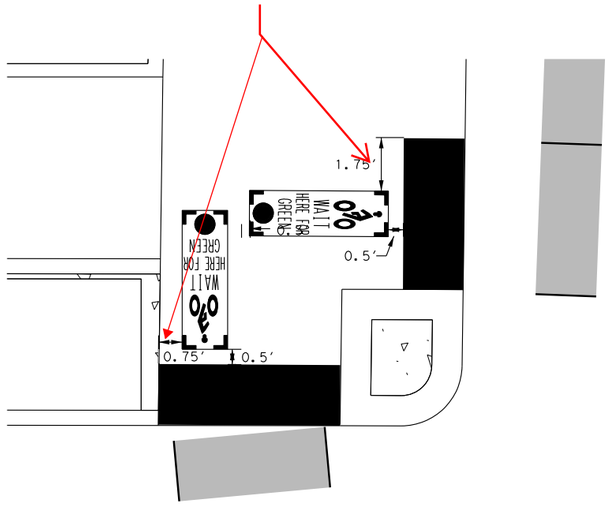
Provide typical intersection detail

Revise per provided detail



BIKE PATH/DRIVEWAY MARKINGS

Spacing not consistent; Please provide standard detail for all intersections



MARKING DETAIL A

NORTHWEST INTERSECTION OF FRIO & BUENA VISTA

PRELIMINARY

FOR INTERIM REVIEW ONLY

By: MICHAEL G. RAMIREZ P.E. 133983

DATE 1/20/2023

CAMACHO-HERNANDEZ & ASSOCIATES, LLC

NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

CAMACHO-HERNANDEZ & ASSOCIATES, LLC
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CITY OF SAN ANTONIO
PUBLIC WORKS DEPARTMENT

DOLOROSA

PAVEMENT MARKING DETAILS

SHEET 1 OF 1

DESIGN	CHECKED	DRAWN	PROJECT NO.	SUBMITTAL	SHEET NO.
MGR	JH	HR	23-03763	70%	473

Design Filename: K:\COSA Dolorosa\TRAFFIC\Dolorosa_SPM_DETAIL.dgn

GENERAL NOTES

1.) THE EXISTING SIGNS LOCATED ON THE JOBSITE ARE THE PROPERTY OF THE CITY OF SAN ANTONIO. THROUGHOUT THE PERIOD OF THE CONTRACT, THE CONTRACTOR SHALL PROTECT THESE SIGNS SUCH THAT THEY ARE NOT DAMAGED IN THE COURSE OF CONSTRUCTION ACTIVITY. SUCH PROTECTION SHALL INCLUDE THE PERIOD AFTER SIGNS ARE REMOVED FROM INSTALLATION AND STORED BY THE CONTRACTOR OR DELIVERED TO TRAFFIC OPERATIONS. THE ASSISTANT TRAFFIC SUPERINTENDENT (207-7765) MUST BE NOTIFIED 48 HOURS IN ADVANCE PRIOR TO DELIVERY.

2.) AFTER SIGNS ARE REMOVED FROM INSTALLATION AND ARE BEING STORED BY THE CONTRACTOR, THE CONTRACTOR SHALL CONTACT THE TRAFFIC OPERATIONS SECTION OF THE PUBLIC WORKS DEPARTMENT (207-7765) AND ARRANGE FOR A CONVENIENT TIME TO DELIVER CITY SIGNS AND POLES.

3.) PRIOR TO THE START OF CONSTRUCTION, ALL EXISTING SIGNS WITHIN THE AREA OF CONSTRUCTION WILL BE INVENTORIED AND DOCUMENTED JOINTLY BY THE TRAFFIC ENGINEERING (207-7720) CONSTRUCTION INSPECTION AND THE CONTRACTOR. THIS DOCUMENT WILL BE JOINTLY SIGNED BY BOTH PARTIES REFLECTING THE SIGN TYPE, SIGN SIZE, SIGN CONDITION, SIGN LOCATION, REFLECTIVITY ADEQUACY, ETC. THE CONTRACTOR IS HELD ACCOUNTABLE FOR THESE SIGNS THROUGHOUT THE PROJECT AND AT THE PROJECTS COMPLETION.

4.) ALL GROUND MOUNTED SIGNS SHALL USE HIGH INTENSITY REFLECTIVE SHEETING.

5.) ALL OVERHEAD SIGNS SHALL USE DIAMOND GRADE REFLECTIVE SHEETING.

6.) ALL BLANKS TO BE ALUMINUM ALLOY NO. 5052-H38.

7.) "T" DENOTES THICKNESS OF SIGN BLANKS.

8.) ALL HOLES SHALL BE 3 / 8" DIAMETER DRILLED OR PUNCHED AS SHOWN ON EACH BLANK DETAIL AND SHALL BE FREE OF BURRS AND / OR ROUGH EDGES.

9.) SIGN BLANK CORNERS TO BE ROUNDED AS SHOWN ON EACH DETAIL.

10.) ALL SIGN BLANK TO BE ETCHED, DEGREASED, AND HAVE AN ALODINE FINISH PRIOR TO APPLICATION OF LEGENDS.

11.) ALL DETAILS ARE NOT TO SCALE.

12.) ALL DIMENSIONS ARE IN INCHES.

13.) ALL SIGNS SHALL BE MANUFACTURED AND INSTALLED IN CONFORMANCE TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND STANDARD HIGHWAY SIGNS (FHWA) LATEST EDITION.

14.) REINSTALLATION OF PREVIOUSLY EXISTING SIGNS, WHERE REQUIRED BY THE CITY TRAFFIC ENGINEER, SHALL BE AT THE CONTRACTOR'S EXPENSE.

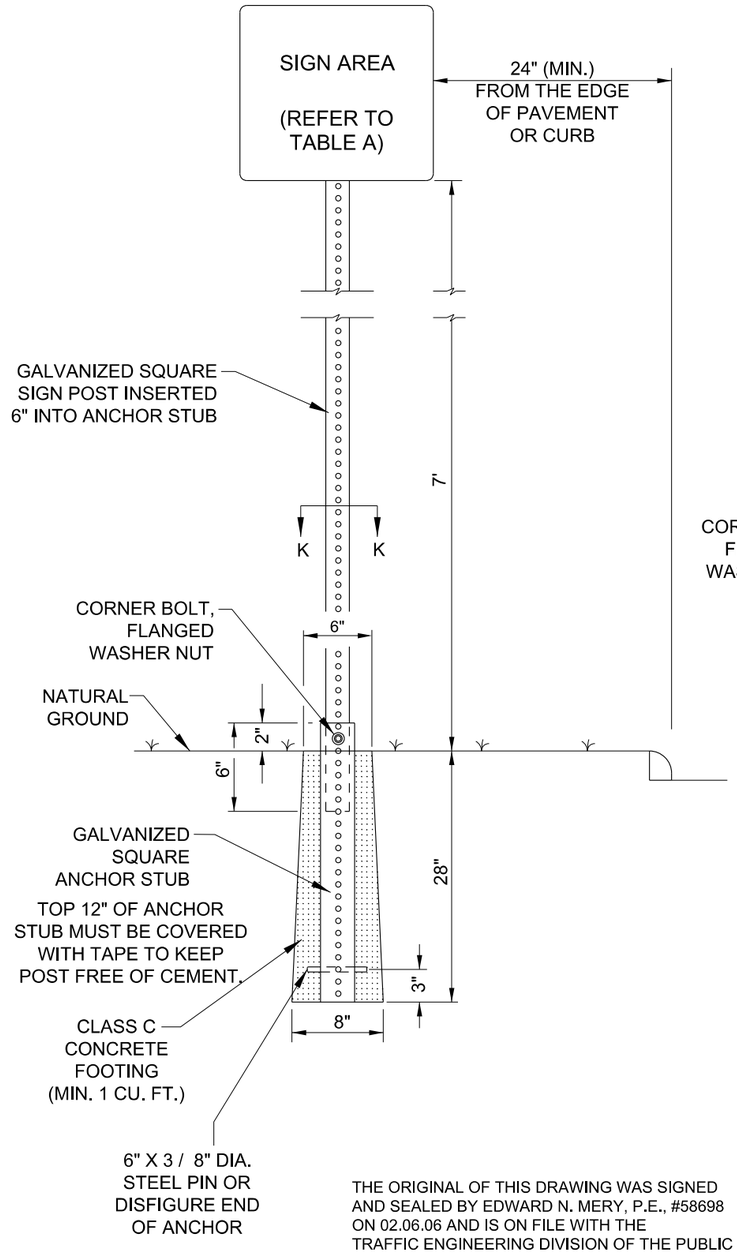
TYPICAL GROUND SIGN INSTALLATION

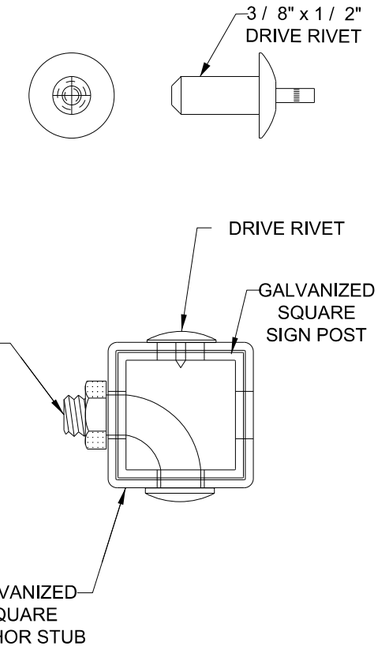
METAL TUBING	SIGN AREA	
	_ < 10 SQ. FT.	> 10 SQ. FT.
GALVANIZED SQUARE SIGN POST (PERFORATED)	1-3 / 4" x 1-3 / 4" (14 GAUGE)	2" x 2" (12 GAUGE)
GALVANIZED SQUARE ANCHOR STUB (PERFORATED)	2" X 2" (14 GAUGE)	2-1 / 4" x 2-1 / 4" (14 GAUGE)

TABLE A

TYPE "U" MOUNT

PERFORATED SQUARE METAL TUBING (DRIVEABLE)





VIEW K-K

THE ORIGINAL OF THIS DRAWING WAS SIGNED AND SEALED BY EDWARD N. MERY, P.E., #58698 ON 02.06.06 AND IS ON FILE WITH THE TRAFFIC ENGINEERING DIVISION OF THE PUBLIC WORKS DEPARTMENT, CITY OF SAN ANTONIO.

FEBRUARY 2006

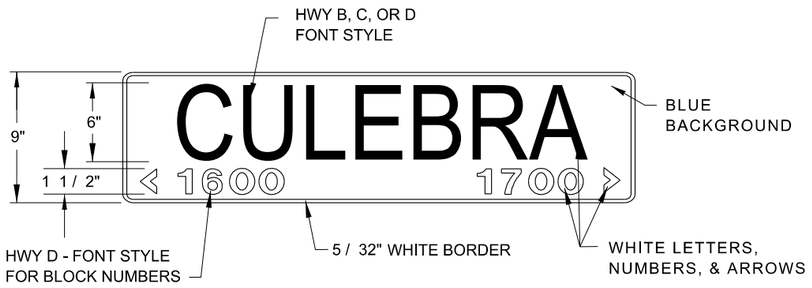
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGN STANDARDS

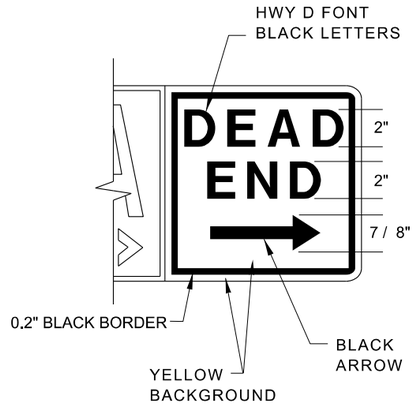
GENERAL NOTES AND GROUND SIGN MOUNTING

SHEET 1 OF 4

70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F. / E.N.M.	SHEET NO.: 474 OF 521



9" D3 - STREET NAME SIGN



NEW 9" D3 W / DEAD END OR NO OUTLET SIGNAGE

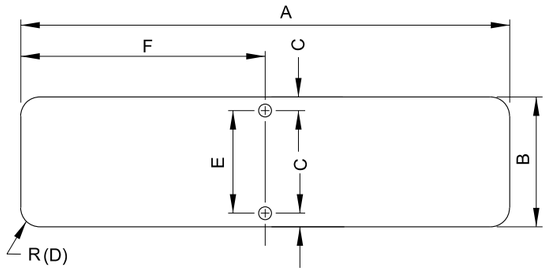
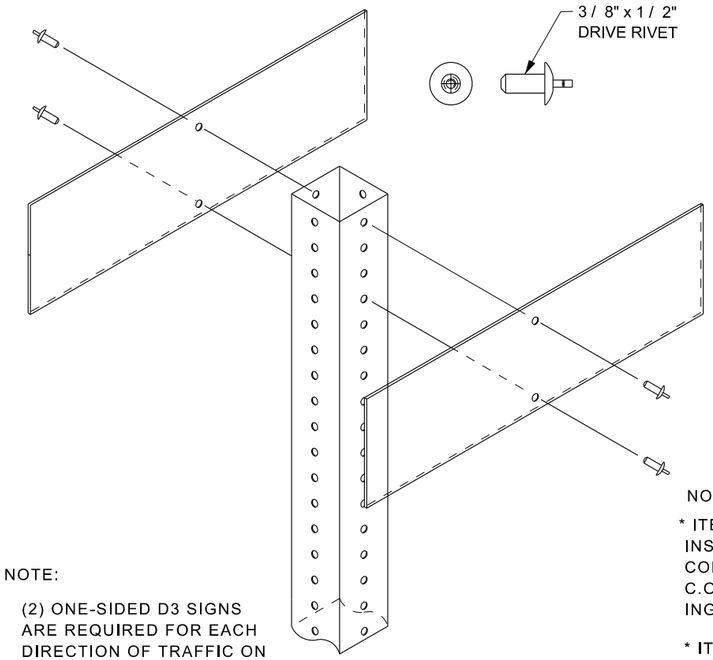


TABLE - D3 SIGNS

A	B	C	D	E	F	T
24"	9"	1 / 2"	3 / 4"	8"	12"	0.125"
30"	9"	1 / 2"	3 / 4"	8"	15"	0.125"
36"	9"	1 / 2"	3 / 4"	8"	18"	0.125"
42"	9"	1 / 2"	3 / 4"	8"	21"	0.125"
48"	9"	1 / 2"	3 / 4"	8"	24"	0.125"
54"	9"	1 / 2"	3 / 4"	8"	27"	0.125"

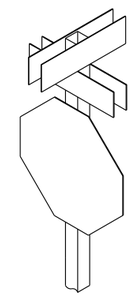
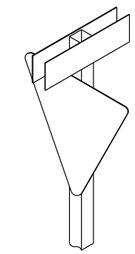
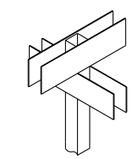
NOTE: A 30" LONG OR GREATER PLATE SHALL BE USED WHEN A "DEAD END" OR "NO OUTLET" SUPPLEMENT IS REQUIRED.



NOTE:

(2) ONE-SIDED D3 SIGNS ARE REQUIRED FOR EACH DIRECTION OF TRAFFIC ON EACH POLE.

D3 SIGN TO POLE INSTALLATION

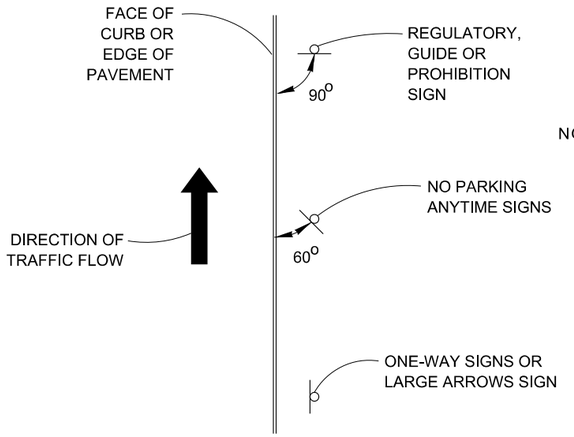
STREET SIGN ASSEMBLY EXAMPLES	PAY ITEMS			
	ITEM	UNIT	DESCRIPTION	QUANTITY
STOP SIGN WITH 2 STREET NAMES 	531.3	EA.	R1-1 STOP	1
	531.57-P	EA.	9-IN STREET NAME PLATE (4 PLATES)	2
YIELD SIGN WITH 1 STREET NAME 	531.4	EA.	R1-2 YIELD	1
	531.57-P	EA.	9-IN STREET NAME PLATE (2 PLATES)	1
2 STREET SIGNS 	531.57	EA.	9-IN STREET NAME SIGN (2 PLATES)	1
	531.57-P	EA.	9-IN STREET NAME PLATE (2 PLATES)	1

NOTE:

* ITEM 531.57 "9-INCH STREET NAME" SIGN (1-EA.) INCLUDES THE INSTALLATION OF (2) ONE-SIDED D3 SIGNS. THIS SHALL BE FULL COMPENSATION FOR MATERIALS AND LABOR AS DESCRIBED IN C.O.S.A. STANDARD SPECIFICATIONS AND GROUND SIGN MOUNTING STANDARD DETAIL.

* ITEM 531.57-P "9-INCH STREET NAME PLATE" (1-EA.) INCLUDES THE INSTALLATION OF (2) ONE-SIDED D3 SIGNS ON TOP OF EXISTING SIGN (I.E., STOP SIGN OR YIELD SIGN), EXTRA LENGTH POLE AND APPURTENANCES REQUIRED TO MEET SPECIFICATIONS.

HEIGHT	9" (228 mm)
LENGTH	24" (600 MM) MIN. 54 (1350 MM) MAX. 6" (150 MM) INCREMENTS OF LENGTH
THICKNESS	0.125" (3MM)
SUBSTRATE	ALUMINUM ALLOY, 5052-H38 (ASTM B-209) GOLD CHROMATE FINISH
SIGN FACE MATERIALS	BLUE FILM OVER HIGH INTENSITY FP-85, SECTION 718 AND L-S-300C
LEGENDS AND SYMBOLS	SERIES D (USUAL) SERIES C OR B FOR MAXIMUM LENGTH SIGN BLANK, IF NECESSARY
COLOR	WHITE LEGEND ON BLUE BACKGROUND
LETTER TRACKING	10%



TYPICAL GROUND MOUNTED SIGN PLACEMENT

THE ORIGINAL OF THIS DRAWING WAS SIGNED AND SEALED BY EDWARD N. MERY, P.E., #58698 ON 02.06.06 AND IS ON FILE WITH THE TRAFFIC ENGINEERING DIVISION OF THE PUBLIC WORKS DEPARTMENT, CITY OF SAN ANTONIO.

JULY 2010

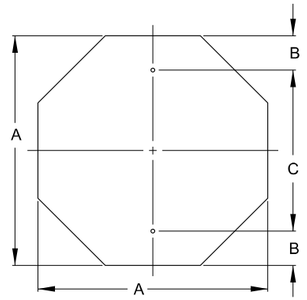
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGN STANDARDS

D3 STREET NAME SIGN AND SIGN MOUNTING

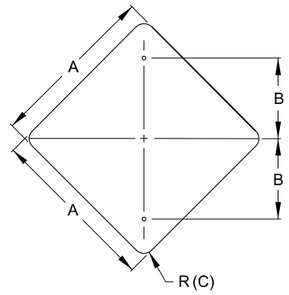
SHEET 2 OF 4

40 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F./ E.N.M.	SHEET NO.: 475 OF 521



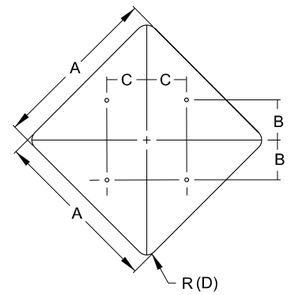
OCTAGONAL

A	B	C	T
24	3	18	0.080
30	3	24	0.080
36	3	30	0.100



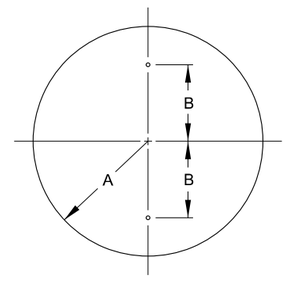
DIAMOND (A)

A	B	C	T
18	9	1 1 / 2	0.080
24	12	1 1 / 2	0.080
30	15	1 7 / 8	0.080
36	18	2 1 / 4	0.100



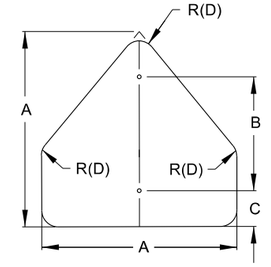
DIAMOND (B)

A	B	C	D	T
48	15	15	3	0.100



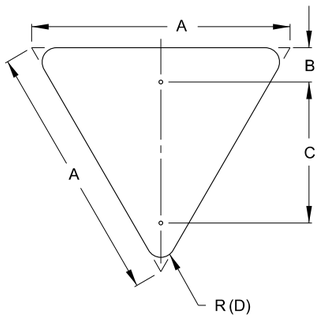
CIRCLE

A	B	T
18	15	0.100



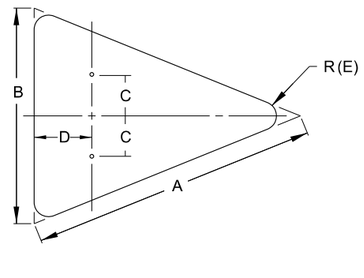
PENTAGON (SCHOOL)

A	B	C	D	T
36	24	3	2 1 / 4	0.100



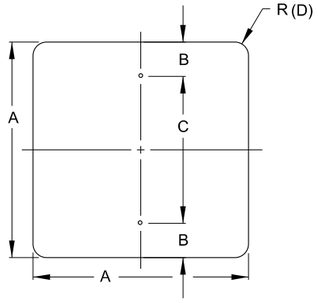
EQUILATERAL TRIANGLE

A	B	C	D	T
36	2	24	2	0.100



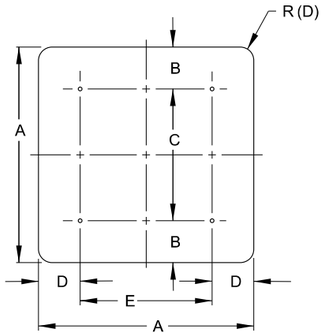
ISOSCELES TRIANGLE

A	B	C	D	E	T
40	30	7 1 / 2	12	1 7 / 8	0.100
48	36	9	15	2 1 / 4	0.100



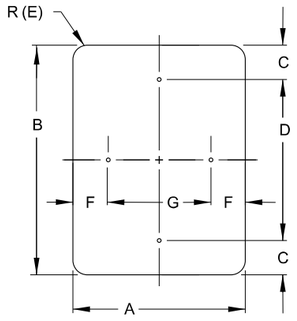
SQUARE (A)

A	B	C	D	T
18	1 1 / 2	15	1 1 / 2	0.080
24	3	18	1 1 / 2	0.080
30	3	24	1 7 / 8	0.080



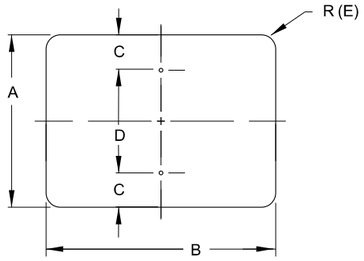
SQUARE (B)

A	B	C	D	E	F	T
48	6	36	9	30	3	0.100



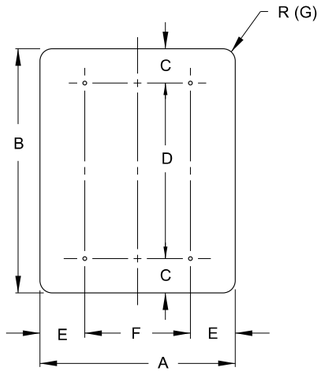
VERTICAL / HORIZONTAL RECTANGLE

A	B	C	D	E	F	G	T
12	18	1 1 / 2	15	1 1 / 2	1 1 / 2	9	0.080
12	36	3	30	1 1 / 2	1 1 / 2	9	0.080
18	24	1 1 / 2	21	1 1 / 2	1 1 / 2	15	0.080
24	30	3	24	1 1 / 2	3	18	0.080
24	36	3	30	1 1 / 2	3	18	0.080
24	48	6	36	1 7 / 8	3	18	0.080
30	36	3	30	1 7 / 8	3	24	0.080



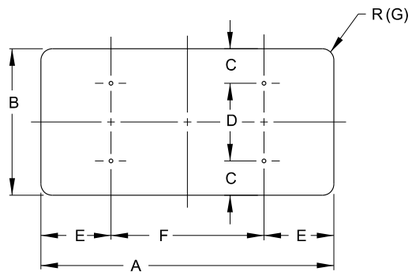
HORIZONTAL RECTANGLE

A	B	C	D	E	T
6	12	1	4	1 / 4	0.080
6	18	1	4	1 / 4	0.080
20	36	1 1 / 2	17	1 1 / 2	0.080



VERTICAL RECTANGLE

A	B	C	D	E	F	G	T
5	7 3 / 4	1 / 2	6 3 / 4	1 / 2	4	1 / 4	0.100
48	60	6	48	9	30	3	0.100



HORIZONTAL RECTANGLE

A	B	C	D	E	F	G	T
48	24	2	20	2	44	1 7 / 8	0.100
48	36	3	30	3	42	2 1 / 4	0.100
60	24	2	20	2	56	1 1 / 2	0.100
60	36	3	30	3	54	2 1 / 4	0.100
48	30	3	24	3	42	1 7 / 8	0.100
60	30	3	24	3	54	1 7 / 8	0.100

THE ORIGINAL OF THIS DRAWING WAS SIGNED AND SEALED BY EDWARD N. MERY, P.E., #58698 ON 02.06.06 AND IS ON FILE WITH THE TRAFFIC ENGINEERING DIVISION OF THE PUBLIC WORKS DEPARTMENT, CITY OF SAN ANTONIO.

FEBRUARY 2006

CITY OF SAN ANTONIO

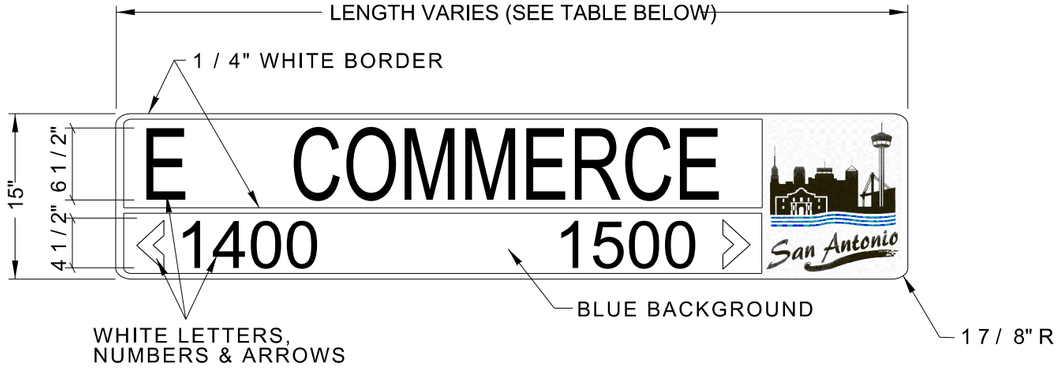
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGN STANDARDS

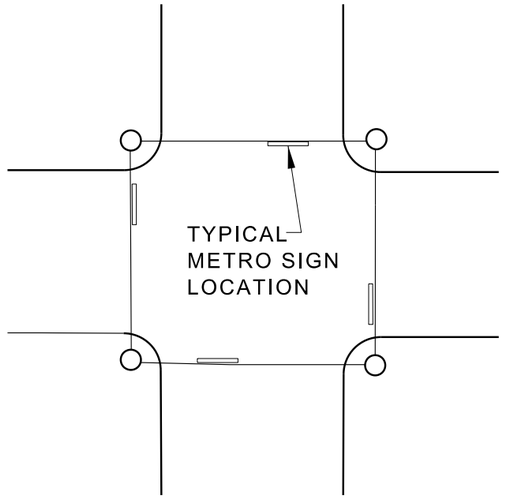
GROUND MOUNTED SIGN SIZES

SHEET 3 OF 4

70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F. / E.N.M.	SHEET NO.: 476 OF 521

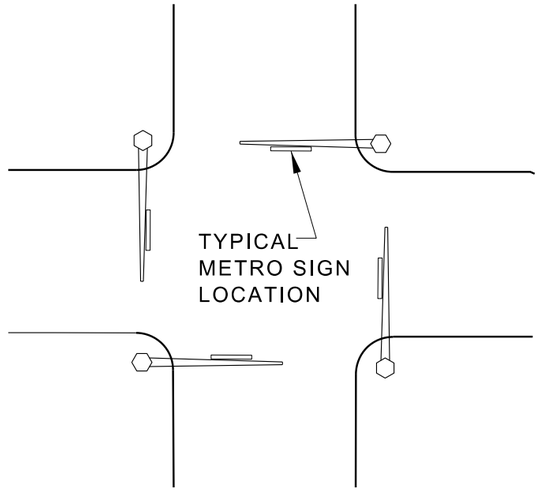


15" METRO - STREET NAME SIGNS



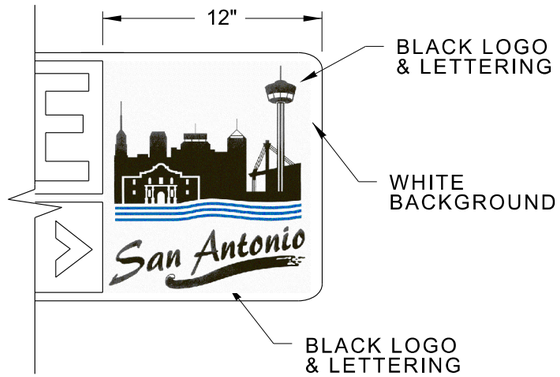
SPAN WIRE INSTALLATION

TYPICAL METRO SIGN PLACEMENT



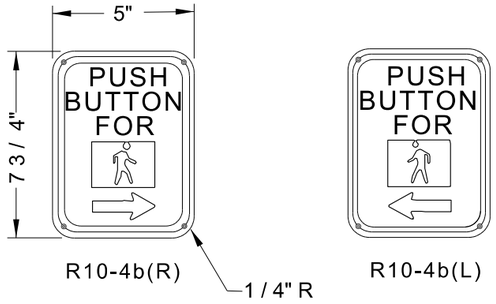
MAST ARM INSTALLATION

15" METRO w/ CITY SKY LINE



HEIGHT	15" (381 MM)
LENGTH	48" (1200 MM) MIN. 72" (1800 MM) MAX.** 1' (300 MM) INCREMENTS OF LENGTH
THICKNESS	0.125" (3 MM)
SUBSTRATE	ALUMINUM ALLOY, 5052-H38 (ASTM B-209) GOLD CHROMATE FINISH
SIGN FACE MATERIALS	BLUE FILM OVER DIAMOND GRADE FP-85, SECTION 718 AND L-S-300C
LEGENDS AND SYMBOLS	SERIES D (USUAL) SERIES C OR B FOR MAXIMUM LENGTH SIGN BLANK, IF NECESSARY
COLOR	WHITE LEGEND ON BLUE BACKGROUND
LETTER TRACKING	17% (USUAL) 10% (MIN.)

** SIGN PLATE LONGER THAN 72" MUST BE APPROVED BY THE CITY TRAFFIC ENGINEER



PEDESTRIAN PUSHBUTTON SIGNS

R10-10 *(30" X 36")

R3-5L *(30" X 36")

R10-9 *(30" X 24")

R10-12 *(30" X 36")

LEFT TURN SIGNS

* DIAMOND GRADE SHEETING 5052-H38 ALUMINUM SUBSTRATE

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FEBRUARY 2006

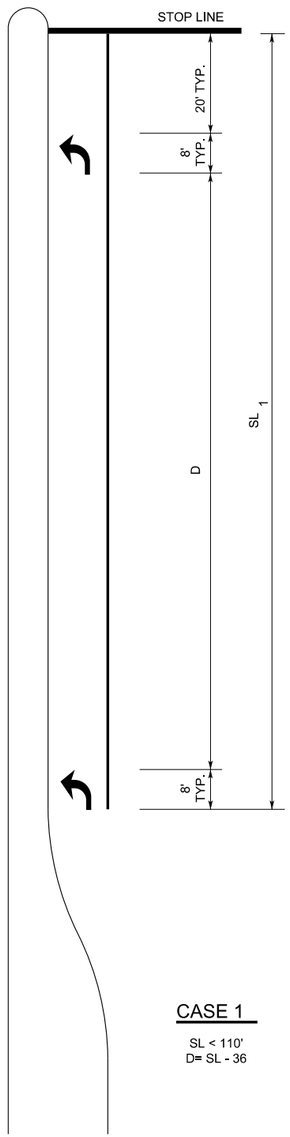
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC SIGN STANDARDS

METRO STREET NAME SIGN AND SIGN PLACEMENT

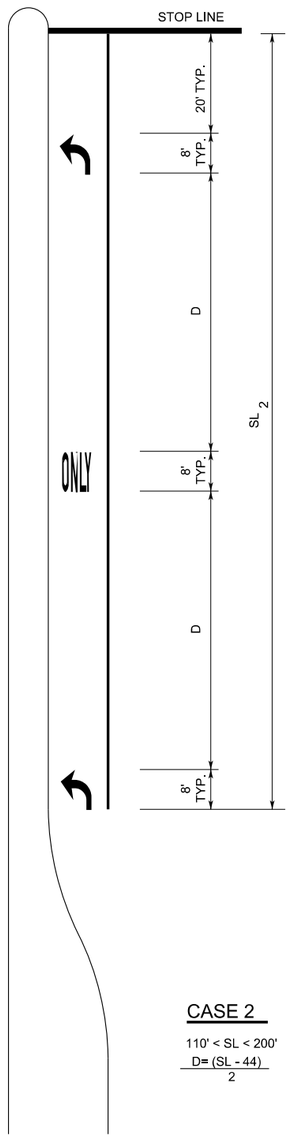
SHEET 4 OF 4

70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F. / E.N.M.	SHEET NO.: 477 OF 521



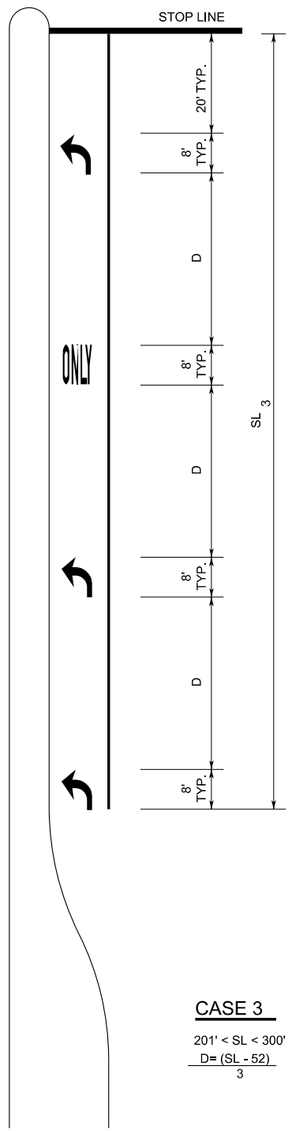
CASE 1

SL < 110'
D= SL - 36



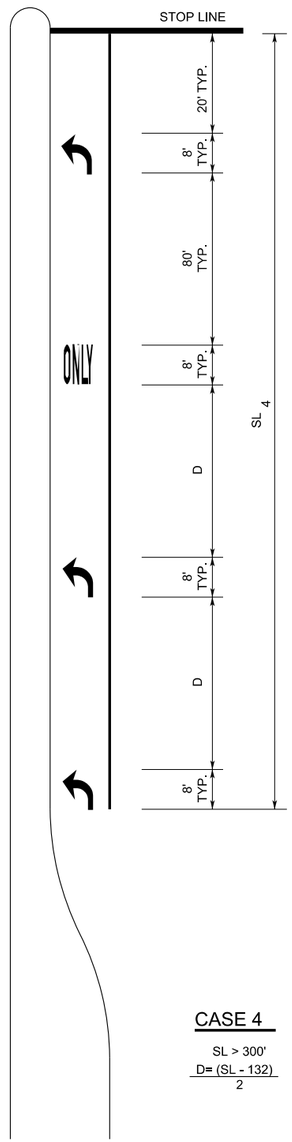
CASE 2

110' < SL < 200'
D= (SL - 44) / 2



CASE 3

201' < SL < 300'
D= (SL - 52) / 3



CASE 4

SL > 300'
D= (SL - 132) / 2

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

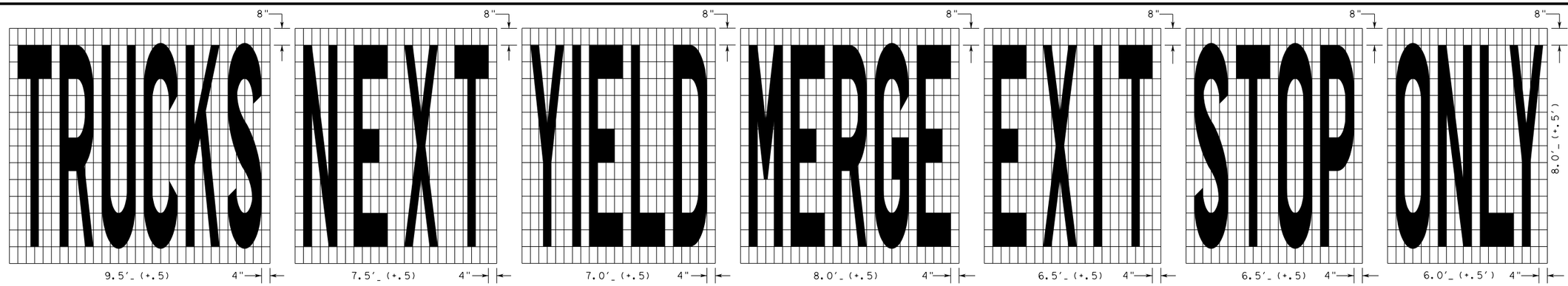
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET

SHEET 1 OF 16

70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 478 OF 521



SEPTEMBER 2009

CITY OF SAN ANTONIO

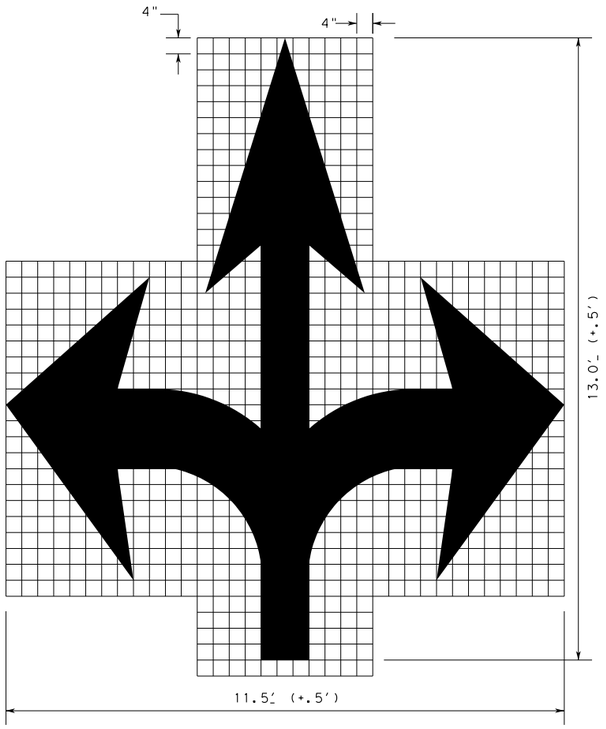
DEPARTMENT OF PUBLIC WORKS

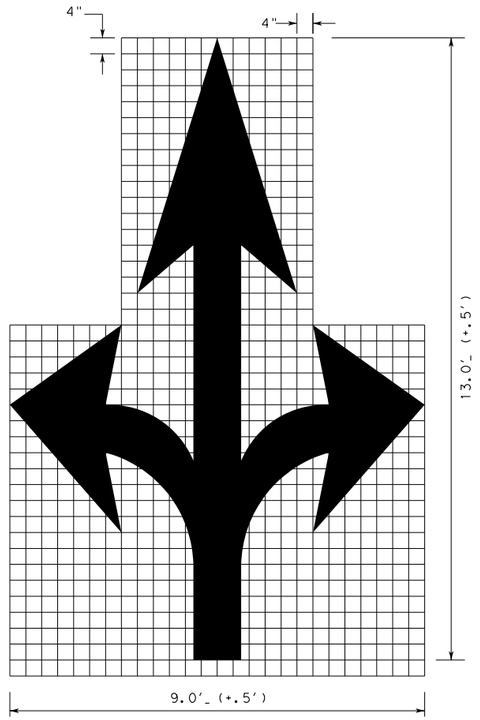
TRAFFIC ENGINEERING STANDARDS

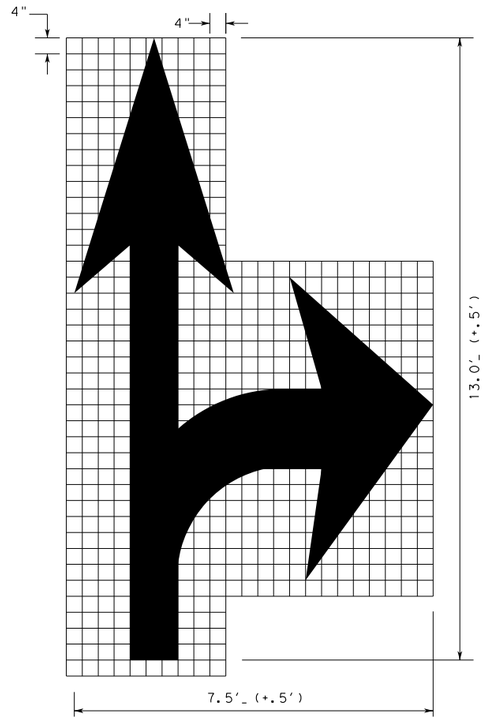
STANDARD PAVEMENT MARKINGS (WORDS)

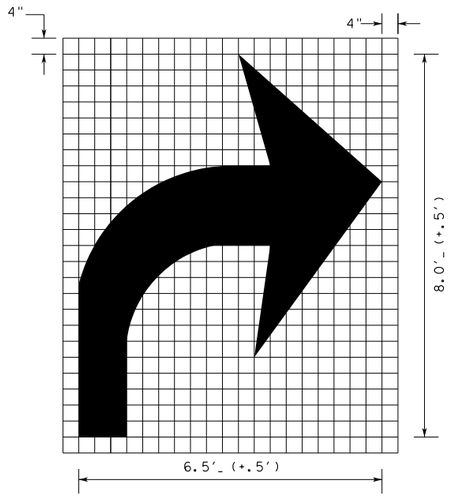
SHEET 2 OF 16

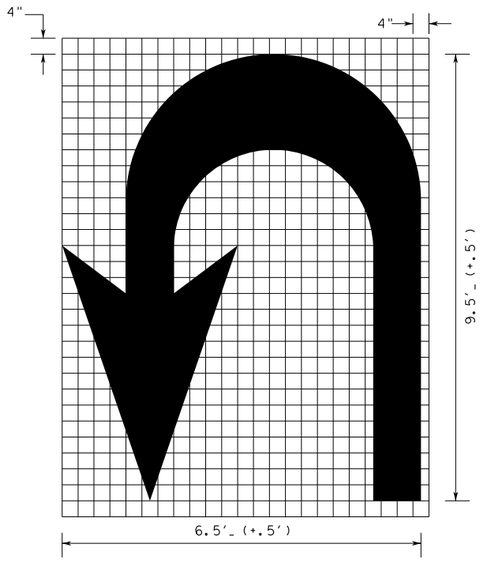
70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 479 OF 521

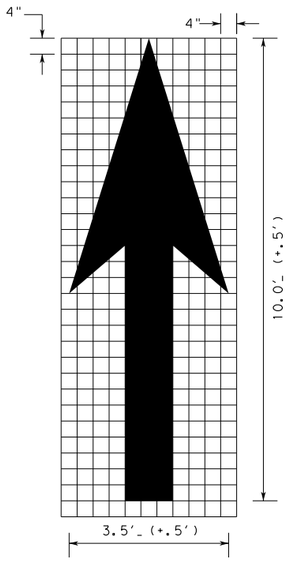


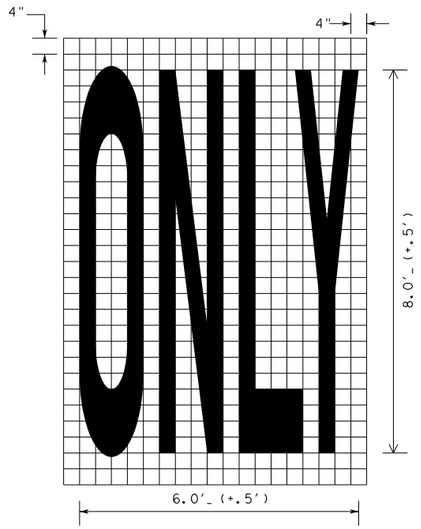












NOTES:

1. MINIMUM 8 FOOT WHITE MARKINGS SHALL BE USED, UNLESS OTHERWISE NOTED. IF MESSAGE CONSISTS OF MORE THAN ONE WORD, IT SHOULD BE PLACED WITH FIRST WORD NEAREST THE DRIVER.

2. THESE DETAILS ARE STANDARD SIZE FOR NORMAL INSTALLATION; SIZES MAY BE REDUCED APPROXIMATELY ONE-THIRD DEPENDING ON CONDITIONS.

3. THE LONGITUDINAL SPACE BETWEEN MARKINGS SHOULD BE 30 FEET.

4. MARKINGS CONSIDERED APPROPRIATE FOR USE WHEN WARRANTED INCLUDE THE FOLLOWING:

   A. REGULATORY
      STOP
      RIGHT (LEFT) TURN ONLY
      25 MPH
      SYMBOL ARROWS
   B. WARNING
      STOP AHEAD
      SIGNAL AHEAD
      SCHOOL
      SCHOOL X-ING
      PED X-ING
      R X R (SEE RCPM DETAIL)
      OTHER WORDS OR SYMBOLS MAY BE NECESSARY UNDER CERTAIN CONDITIONS

5. UNCONTROLLED USE OF PAVEMENT MARKINGS CAN RESULT IN DRIVER CONFUSION. WORD AND SYMBOL MARKINGS SHOULD BE NO MORE THAN THREE LINES.

6. THE WORD "STOP" SHALL NOT BE USED ON THE PAVEMENT UNLESS ACCOMPANIED BY A STOP LINE AND STOP SIGN. THE WORD "STOP" SHALL NOT BE PLACED ON THE PAVEMENT IN ADVANCE TO A STOP LINE, UNLESS EVERY VEHICLE IS REQUIRED TO STOP AT ALL TIMES.

7. PAVEMENT MARKINGS SHOULD GENERALLY BE NO MORE THAN ONE LANE IN WIDTH, WITH SCHOOL MESSAGES BEING THE EXCEPTION. FOR DETAILS OF SCHOOL AND SCHOOL CROSSING PAVEMENT MARKINGS, REFER TO PART VII OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

8. SPACING BETWEEN LETTERS SHOULD BE APPROXIMATELY 4 INCHES. THE WIDTH OF LETTERS MAY VARY DEPENDING ON THE WIDTH OF THE TRAVEL LANES.

9. LANE-USE ARROW MARKINGS MAY BE USED TO CONVEY EITHER GUIDANCE OR MANDATORY MESSAGES. ARROWS USED TO CONVEY A MANDATORY MOVEMENT MUST BE ACCOMPANIED BY STANDARD SIGNS AND THE PAVEMENT MARKING WORD "ONLY".

10. PAVEMENT MARKINGS ARE TO BE LOCATED AS SPECIFIED ELSEWHERE IN THE PLANS.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

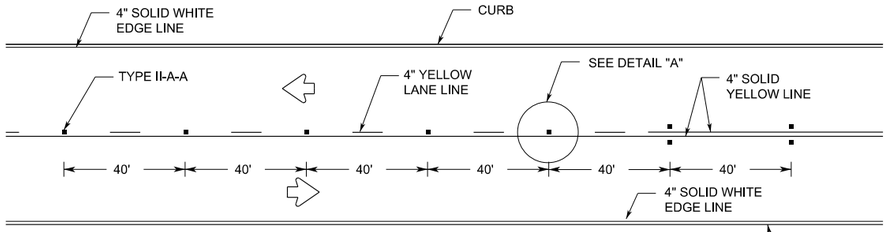
TRAFFIC ENGINEERING STANDARDS

STANDARD PAVEMENT MARKINGS (ARROWS)

SHEET 3 OF 16

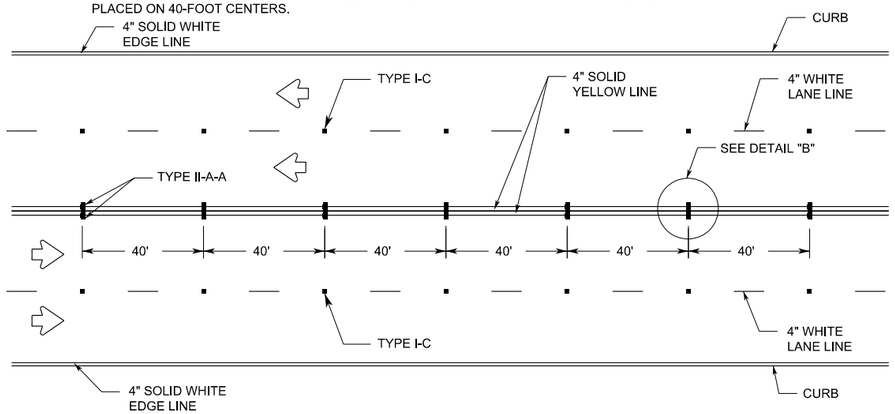
70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 480 OF 521

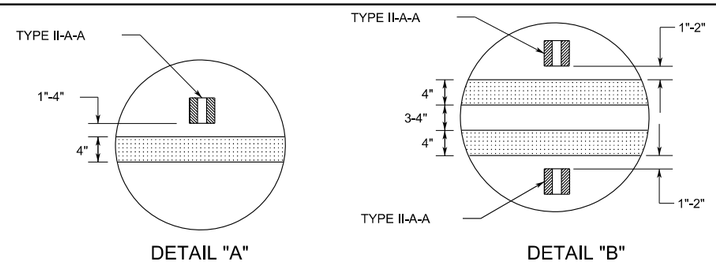
CENTERLINE & EDGE FOR ALL TWO LANE STREETS WITH PASSING ZONE



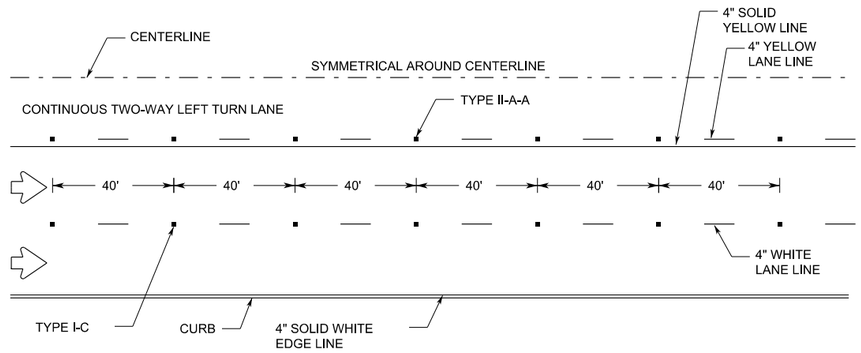
CENTERLINE, LANE LINES & EDGE LINES FOR FOUR LANE TWO-WAY STREETS

RAISED PAVEMENT MARKER TYPE I-C, CLEAR FACE TOWARD NORMAL TRAFFIC, SHALL BE PLACED ON 40-FOOT CENTERS.





CENTERLINE, LANE LINES, & EDGE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES & EDGE LINES FOR ONE-WAY MULTILANE STREET

RAISED PAVEMENT MARKERS TYPE II-C-R SHALL HAVE CLEAR FACE TOWARD NORMAL TRAFFIC AND RED FACE TOWARD WRONG-WAY TRAFFIC.

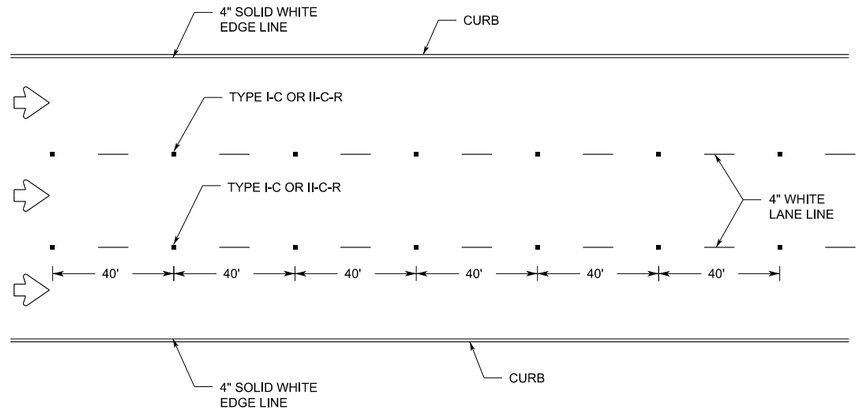


TABLE 1 - TYPICAL LENGTH (L)

* POSTED SPEED	FORMULA
45>	$L = \frac{WS^2}{60}$
≥45	L= WS

* 85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT. CROSSHATCHING LENGTH SHOULD BE ROUNDED UP TO NEAREST 5 FOOT INCREMENT.

L= LENGTH OF CROSSHATCHING (FT)
W= WIDTH OF OFFSET (FT)
S= POSTED SPEED (MPH)

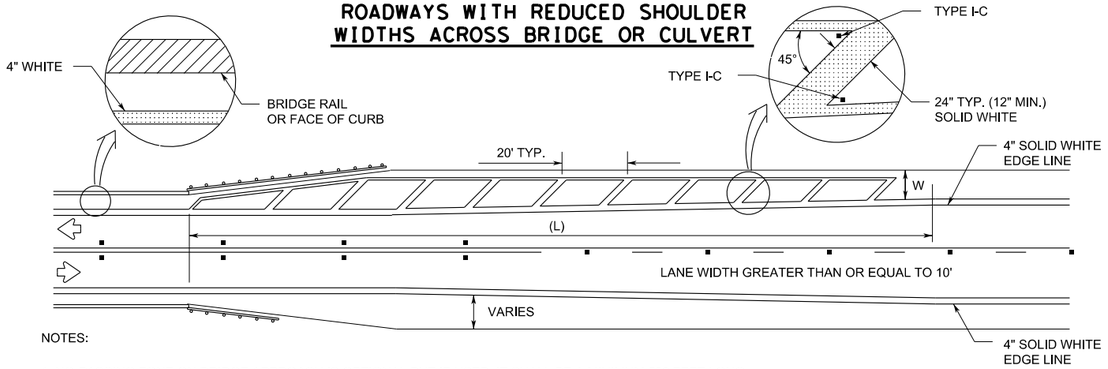
EXAMPLES:
AN 8 FOOT SHOULDER IN ADVANCE OF A BRIDGE REDUCES TO 4 FEET ON A 70 MPH ROADWAY. THE LENGTH OF THE CROSS-HATCHING SHOULD BE:
L=8X70=560 FT
A 4 FOOT SHOULDER IN ADVANCE OF A BRIDGE REDUCES TO 2 FEET ON A 40 MPH ROADWAY. THE LENGTH OF THE CROSS-HATCHING SHOULD BE:
L= 4(40) ? 60= 106.67 FT ROUNDED TO 110 FT

YIELD LINES

GENERAL NOTES:

1. EDGELINE ADJACENT TO CURB AND GUTTER IS NOT REQUIRED IN ALL CASES, HOWEVER SHALL BE PLACED AS DIRECTED BY CITY TRAFFIC ENGINEER.
2. THE TRAVELED WAY INCLUDES ONLY THAT PORTION OF THE ROADWAY USED FOR VEHICULAR TRAVEL AND NOT THE PARKING LANES, SIDEWALKS, BERMS AND SHOULDERS. THE TRAVELED WAYS SHALL BE MEASURED FROM THE INSIDE OF EDGELINE TO INSIDE OF EDGELINE OF A TWO LANE ROADWAY.
3. ALL RAISED PAVEMENT MARKERS PLACED IN BROKEN LINES SHALL BE PLACED IN LINE WITH AND MIDWAY BETWEEN THE STRIPES.
4. ON CONCRETE PAVEMENTS THE RAISED PAVEMENT MARKERS SHOULD BE PLACED TO ONE SIDE OF THE LONGITUDINAL JOINTS.
5. ALL PAVEMENT MARKING MATERIAL SHALL MEET THE REQUIRED MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
6. 4" SOLID WHITE EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

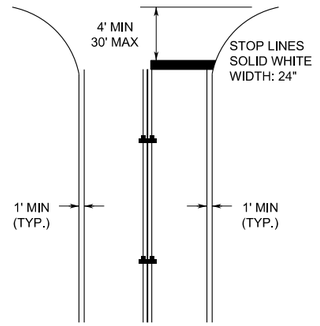
ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT



NOTES:

1. NO-PASSING ZONE ON BRIDGE APPROACH IS OPTIONAL BUT IF USED, IT SHALL BE A MINIMUM 500 FEET LONG.
2. FOR CROSSHATCHING LENGTH (L) SEE TABLE 1.
3. THE WIDTH OF THE OFFSET (W) AND THE REQUIRED CROSSHATCHING WIDTH IS THE FULL SHOULDER WIDTH IN ADVANCE OF THE BRIDGE.
4. THE CROSSHATCHING SHOULD BE REQUIRED IF THE SHOULDER WIDTH IN ADVANCE OF THE BRIDGE IS 4 FOOT OR WIDER AND ANY REDUCTION IN SHOULDER WIDTH ACROSS THE BRIDGE OCCURS.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE



SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

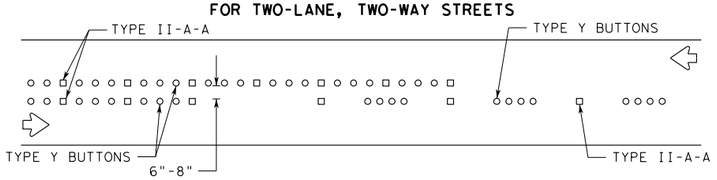
TRAFFIC ENGINEERING STANDARDS
STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE 1
SHEET 4 0F 16

70% % SUBMITTAL	PROJECT NO.: 23-03763		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 481 OF 521

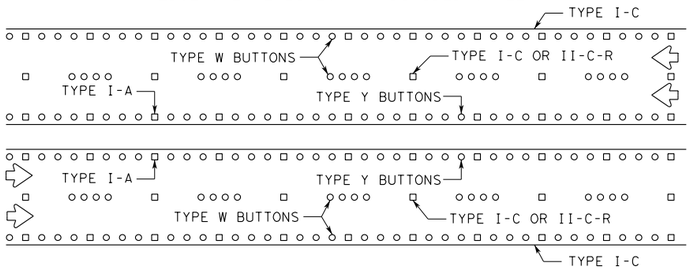
RAISED PAVEMENT MARKING PLACEMENT PATTERNS

PLACED W/ REFLECTION PAVEMENT MARKERS (OPTIONAL)

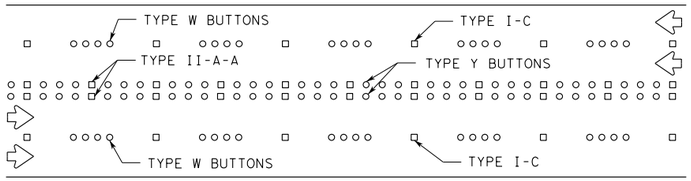
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY STREETS



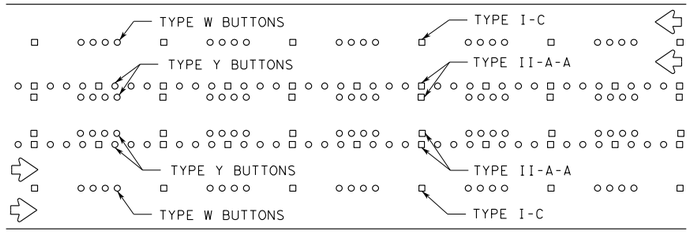
EDGE & LANE LINES FOR DIVIDED STREET



LANE & CENTER LINES FOR MULTILANE UNDIVIDED STREETS



TWO-WAY LEFT TURN LANE

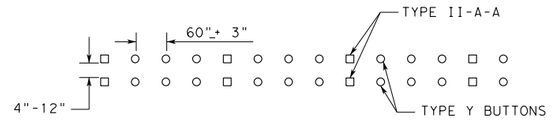


RAISED PAVEMENT MARKINGS PLACEMENT DETAILS

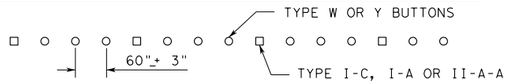
PLACED W/ REFLECTION PAVEMENT MARKERS (OPTIONAL)

SOLID LINES

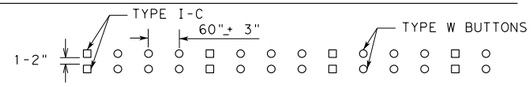
DOUBLE NO-PASSING LINE — RAISED PAVEMENT MARKERS



EDGE LINE OR SINGLE NO-PASSING LINE — RAISED PAVEMENT MARKERS

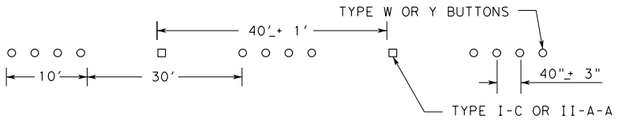


WIDE LINE — RAISED PAVEMENT MARKERS



(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

BROKEN LINE — RAISED PAVEMENT MARKERS

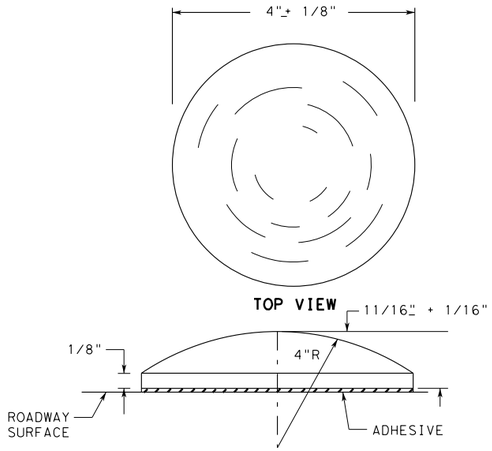


(FOR CENTER LINE OR LANE LINE.)

TRAFFIC BUTTONS

(NON-REFLECTORIZED)

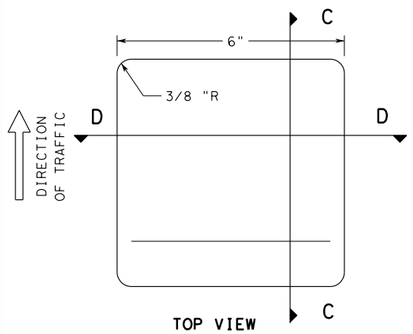
NOTE: MINIMUM AREA OF MARKERS SHALL BE NOT LESS THAN 12.5 SQUARE INCHES.

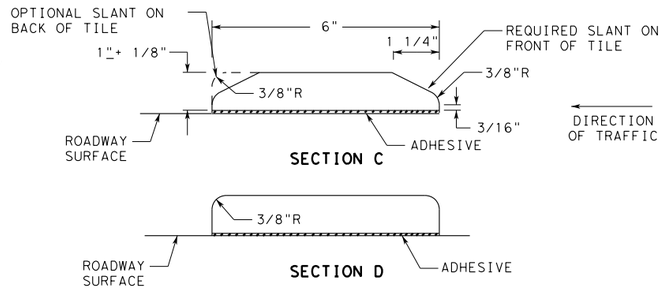


JIGGLE BAR TILES

(NON-REFLECTORIZED)

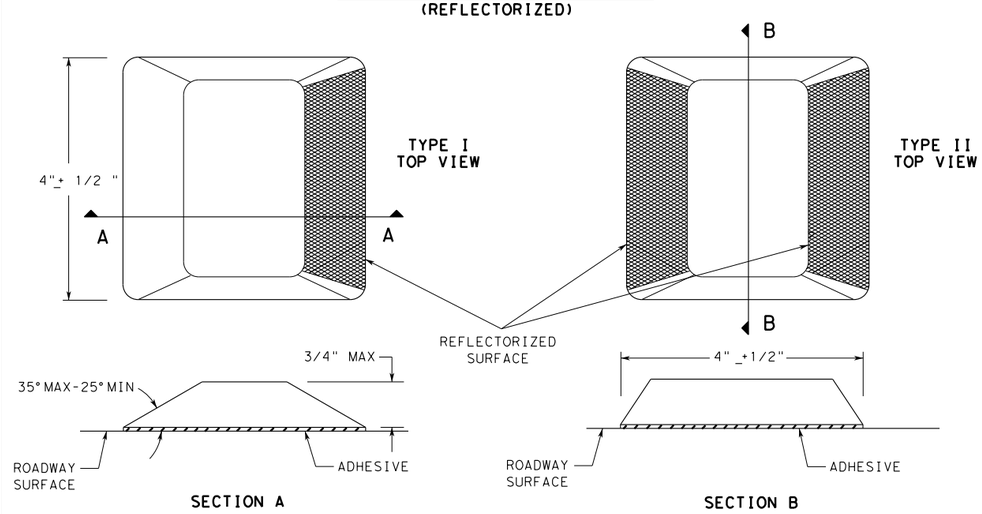
"JIGGLE BARS" CONSIST OF A NUMBER OF JIGGLE BAR TILES PLACED IN A LINEAR CONFIGURATION.





RAISED PAVEMENT MARKERS

(REFLECTORIZED)



NOTES:

1. RAISED PAVEMENT MARKERS (RPMs) MAY CONSIST OF TRAFFIC BUTTONS, PAVEMENT MARKERS AND/OR JIGGLE BAR TILES. PAVEMENT SURFACE SHALL BE PREPARED AND CLEANED SUBJECT TO APPROVAL OF THE CITY TRAFFIC ENGINEER BEFORE ADHESIVE AND RPMs ARE PLACED.
2. JIGGLE BARS SHALL BE ORIENTED PERPENDICULAR TO ROADWAY. JIGGLE BARS SHALL ALSO BE PLACED AT SUCH OTHER LOCATIONS AS SHOWN IN PLANS OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER.
3. MARKERS, BUTTONS AND JIGGLE BAR TILES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY AND NOT INTENDED TO SPECIFY ANY PARTICULAR PRODUCT. ALL PAVEMENT MARKERS PROVIDED SHALL BE OF THE SAME MANUFACTURER.
4. ALL DIMENSIONS ARE +/- 1/8" UNLESS OTHERWISE NOTED.
5. ALL PAVEMENT MARKING MATERIALS SHALL MEET MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
6. TRAFFIC BUTTONS AND JIGGLE BAR TILES ARE TO BE USED ONLY FOR TEMPORARY TRAFFIC CONTROL OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

0 150 300 450

SCALE: 1" = 300

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CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

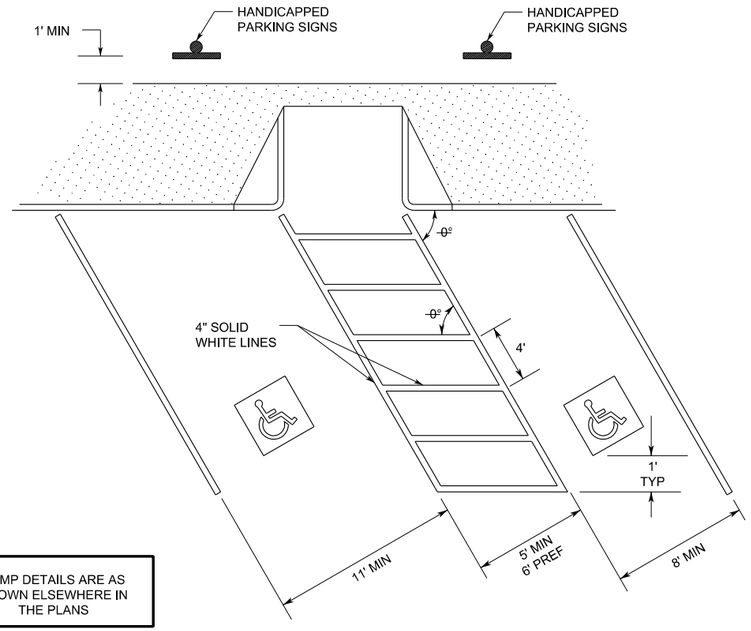
TRAFFIC ENGINEERING STANDARDS

RAISED PAVEMENT MARKERS, REFLECTIVE PAVEMENT MARKERS, TRAFFIC BUTTONS & JIGGLE BAR TILES 2

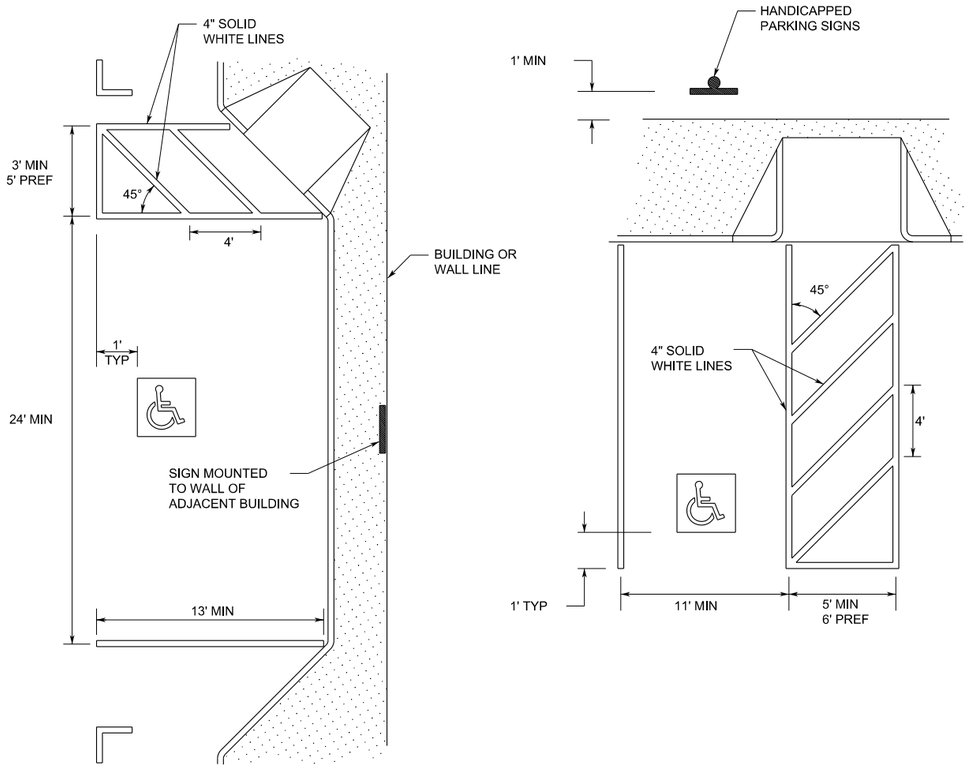
SHEET 5 OF 16

70% % SUBMITTAL	PROJECT NO.: 23-03763		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 482 OF 521

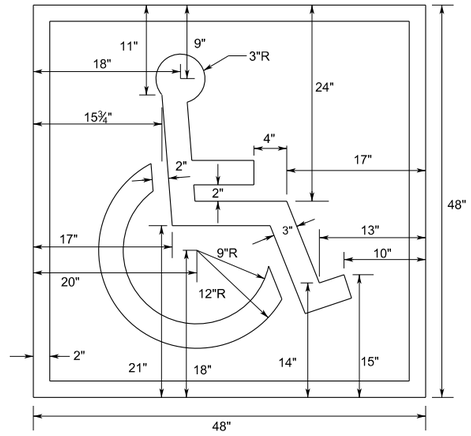
TYPICAL ACCESSIBLE PARKING SPACE DIMENSIONS



RAMP DETAILS ARE AS SHOWN ELSEWHERE IN THE PLANS

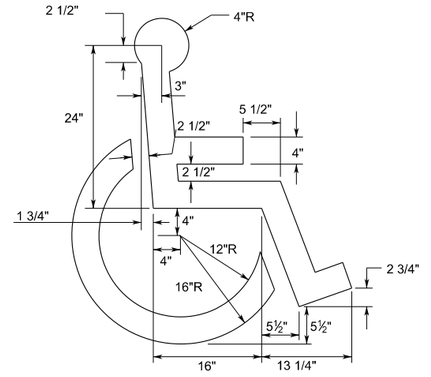


PAVEMENT MARKINGS



WITH BACKGROUND

SYMBOL & BORDER: WHITE
BACKGROUND: BLUE



SYMBOL ONLY

SYMBOL: BLUE OR WHITE

NOTES:

1. ALL PARKING SPACE LIMIT LINES SHALL BE 4" SOLID WHITE LINES.

2. AISLE MARKINGS SHOWN ARE EXAMPLES ONLY. OTHER METHODS TO INDICATE A NO PARKING AREA ARE ACCEPTABLE. AISLE MARKINGS SHALL BE WHITE.

3. DIMENSIONS OF LIMIT LINES, AISLE MARKINGS, AND SYMBOL (WITH OR WITHOUT BACKGROUND) MAY VARY + 10%.

4. PAVEMENT MARKING SYMBOLS (WITH BACKGROUND):

   A) ARE REQUIRED UNLESS STATED ELSEWHERE IN THE PLANS,
   B) SHOULD BE PLACED TOWARD THE FAR END OF THE PARKING SPACES SO AS TO BE VISIBLE TO MOTORISTS IN THE TRAVEL LANE,
   C) MAY BE PAINTED OR PREFABRICATED MATERIAL, AND
   D) SHALL BE 30"x30" MINIMUM.

5. WITH APPROVAL OF THE CITY TRAFFIC ENGINEER, PREFABRICATED PAVEMENT MARKING SYMBOLS WITH BACKGROUND OF OTHER DIMENSIONS EXCEEDING THE 30"x30" MINIMUM MAY BE USED. ALTERNATIVE DESIGNS SHALL INCLUDE A PROPORTION SIZED SYMBOL OF ACCESSIBILITY, AND SHALL CONFORM TO THE ILLUSTRATED COLORS FOR BACKGROUND, SYMBOL AND BORDER.

6. ALL SLOPE IN AND AROUND EXPECTED WHEEL CHAIR PATH SHALL NOT EXCEED 2% X-SLOPES.

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CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

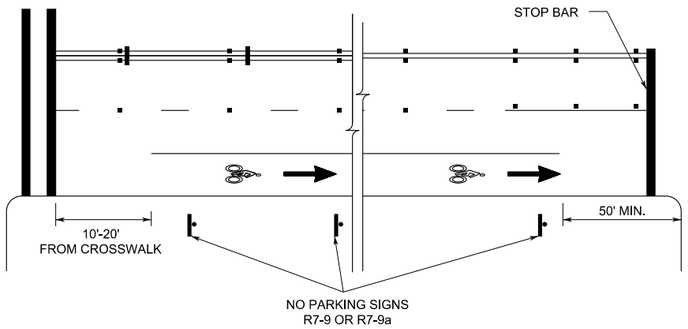
TRAFFIC ENGINEERING STANDARDS

PAVEMENT MARKINGS FOR ACCESSIBLE PARKING

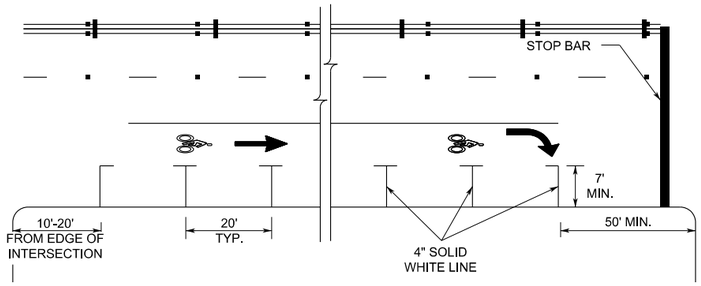
SHEET 6 OF 16

70% % SUBMITTAL	PROJECT NO.: 23-03763		DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 483 OF 521

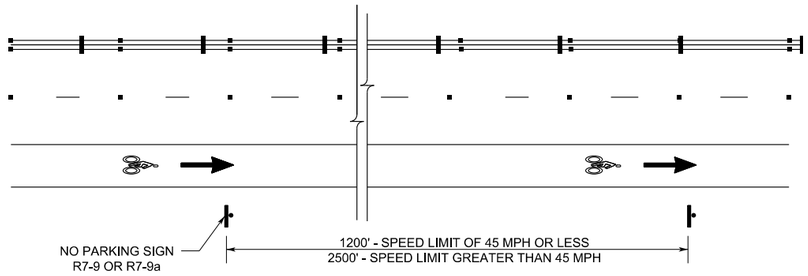
NO PARKING ALONG BICYCLE LANE

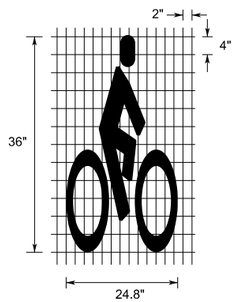


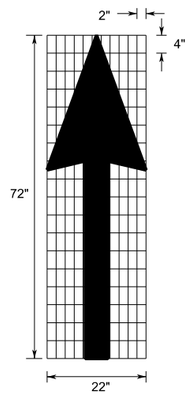
PARKING ALONG BICYCLE LANE

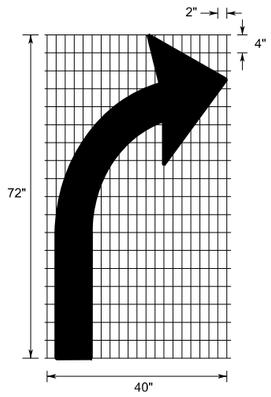


ROADWAYS WITH FEW INTERSECTIONS

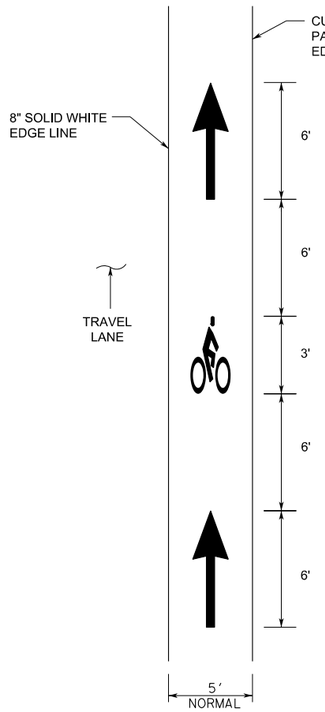






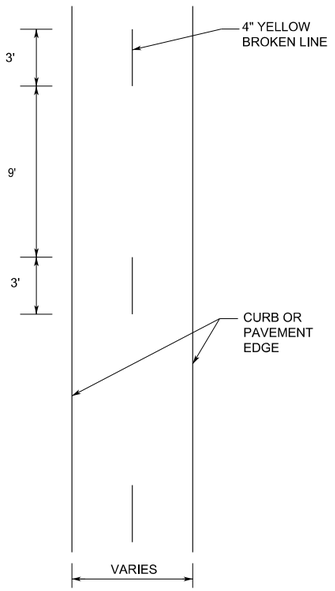


ADJACENT TO TRAVEL LANE

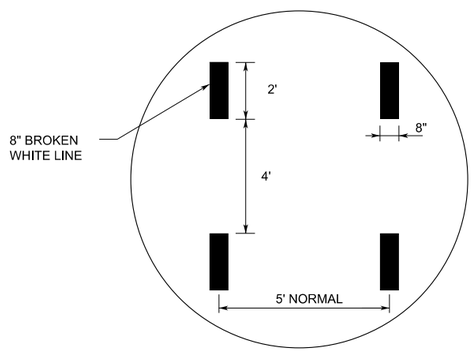


SHARED USE PATH

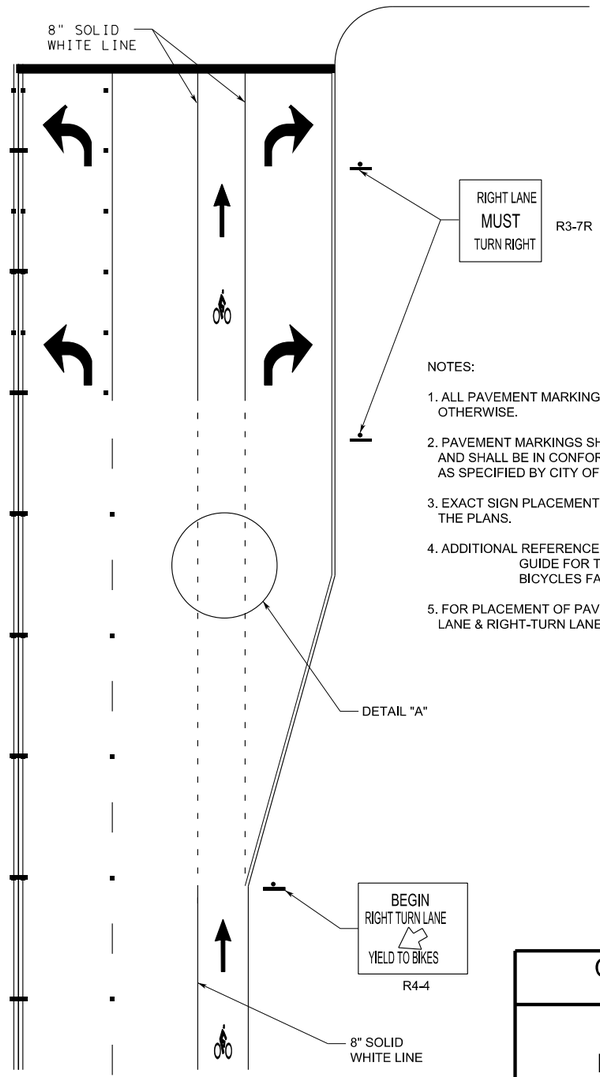
(SEPERATE FROM ROADWAY WITH NO MOTORIZED TRAFFIC)



DETAIL "A"



RIGHT-TURN LANE AT INTERSECTION



NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE WHITE EXCEPT WHEN NOTED OTHERWISE.
2. PAVEMENT MARKINGS SHALL BE OF THE MATERIALS SPECIFIED AND SHALL BE IN CONFORMANCE WITH MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
3. EXACT SIGN PLACEMENT AND DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.
4. ADDITIONAL REFERENCES: TMUTCD
   GUIDE FOR THE DEVELOPMENT OF
   BICYCLES FACILITIES, AASHTO, 1991.
5. FOR PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET.

SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

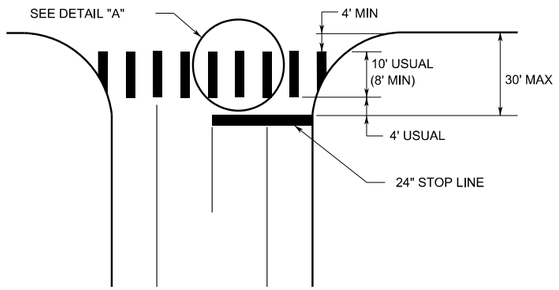
TRAFFIC ENGINEERING STANDARDS

BICYCLE LANE PAVEMENT MARKINGS

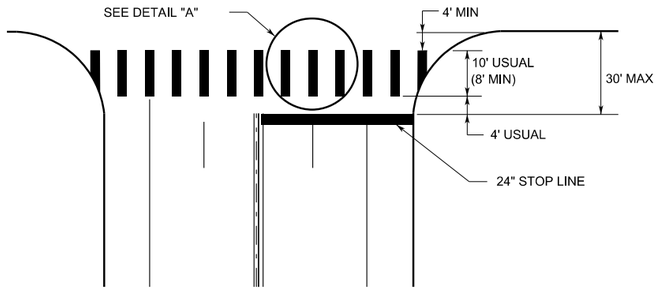
SHEET 8 OF 16

70% % SUBMITTAL	PROJECT NO.: 23-03763		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 484 OF 521

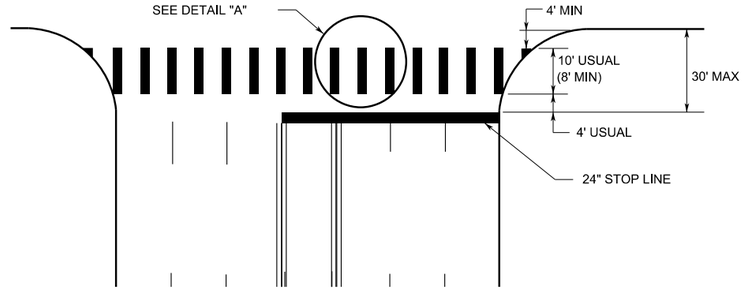
TWO LANES WITH SHOULDERS



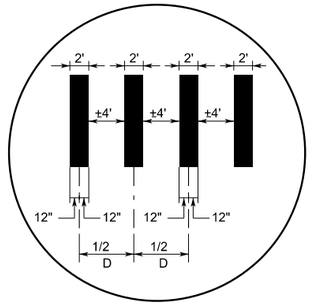
FOUR LANES WITH SHOULDERS



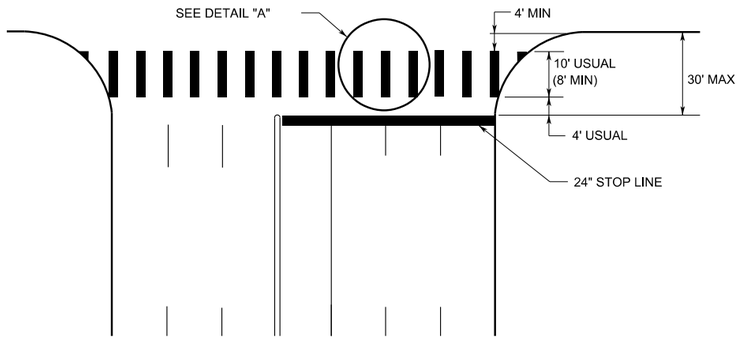
MULTI - LANES



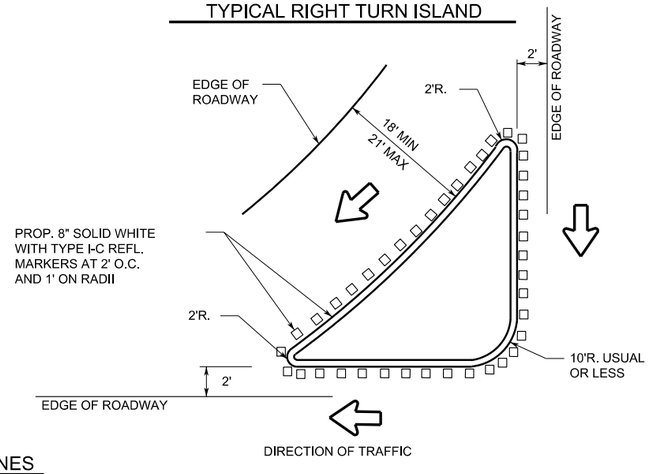
DETAIL "A"



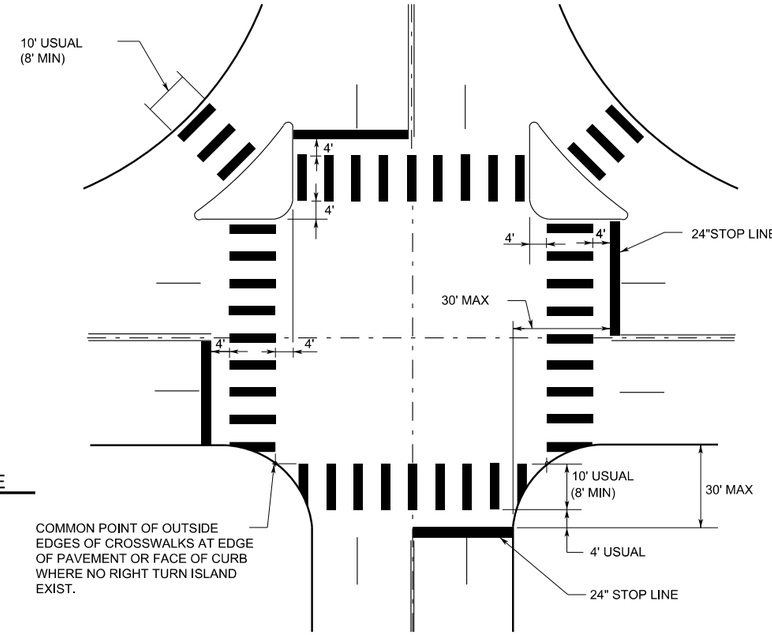
MULTI - LANE WITH MEDIAN



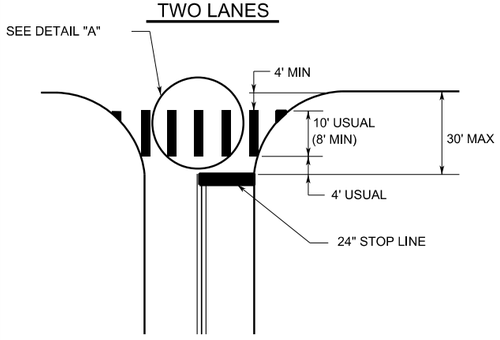
TYPICAL RIGHT TURN ISLAND



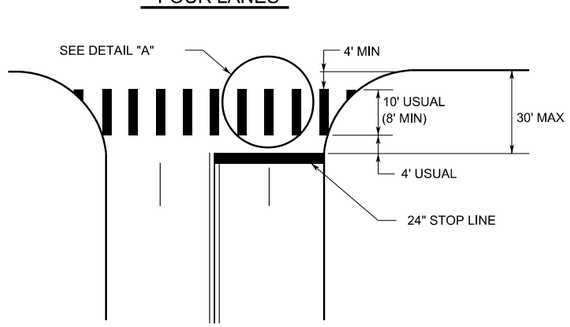
INTERSECTION WITH RIGHT - TURN ISLANDS



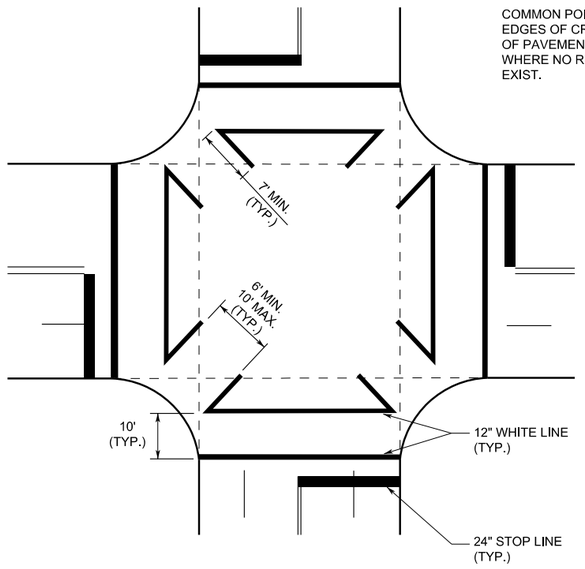
TWO LANES



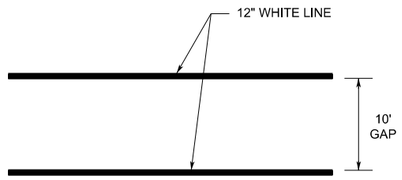
FOUR LANES



EXCLUSIVE PEDESTRIAN PHASE

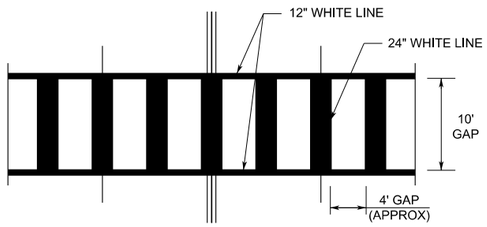


CENTRAL BUSINESS DISTRICT CROSSWALK DETAIL



HIGH VISIBILITY CROSSWALK DETAIL

TYPICALLY USED AT SIGNALIZED AND NON-SIGNALIZED MID-BLOCK CROSSINGS FOR COLLECTOR AND ARTERIAL ROADWAYS AND AT LOCATIONS REQUIRING EXTRA EMPHASIS.



NOTES:

1. CROSSWALKS AND STOP LINES SHALL BE WHITE.
2. "D" IS EQUAL TO ONE HALF THE WIDTH OF TRAVEL LANE.

SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

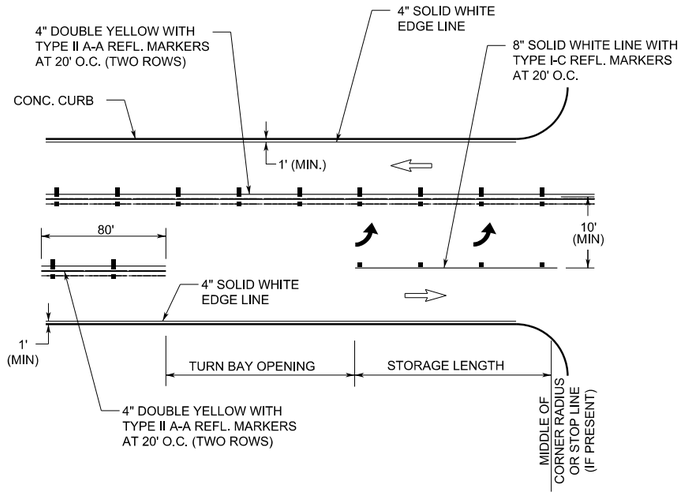
TRAFFIC ENGINEERING STANDARDS

TYPICAL CROSSWALK DETAILS

SHEET 9 OF 16

70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 485 OF 521

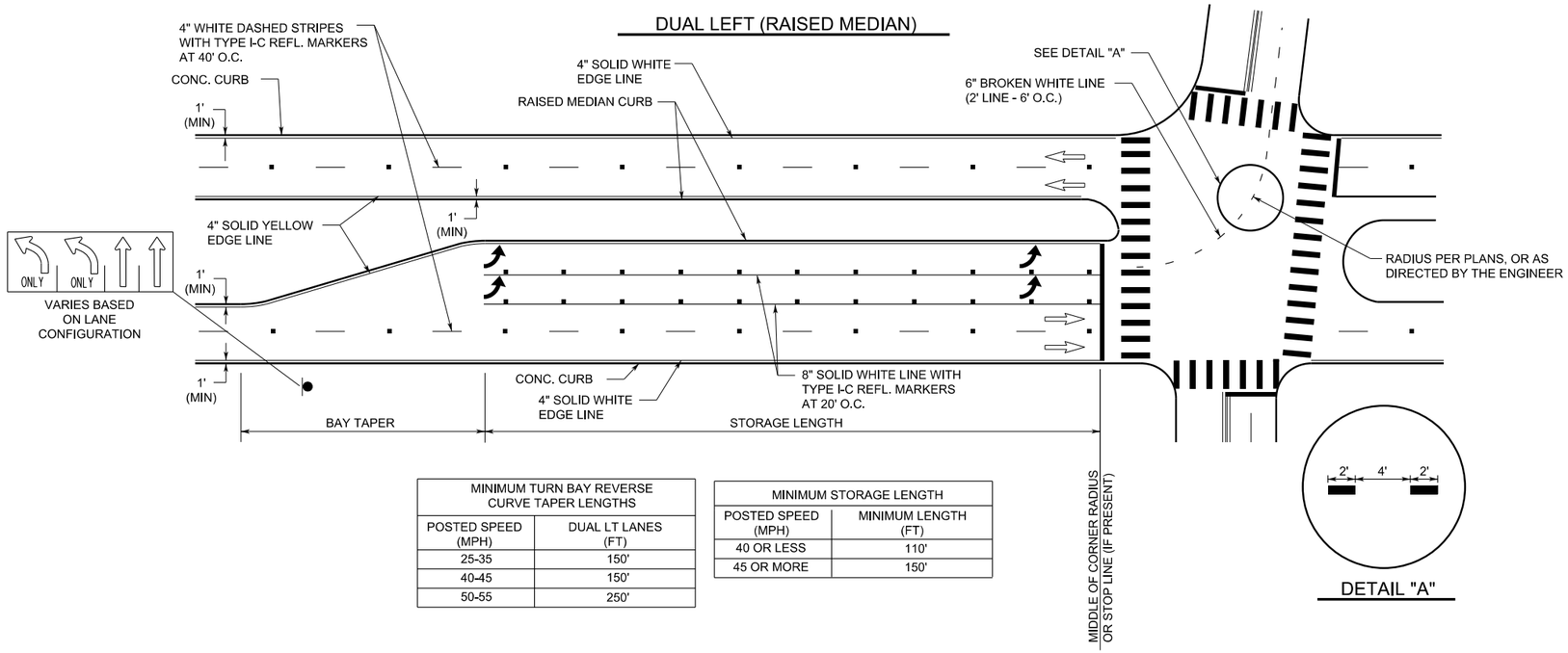
LEFT-TURN LANE



MINIMUM TURN BAY OPENINGS	
POSTED SPEED (MPH)	MINIMUM OPENING (FT)
25-35	60'
≥ 40	100'

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

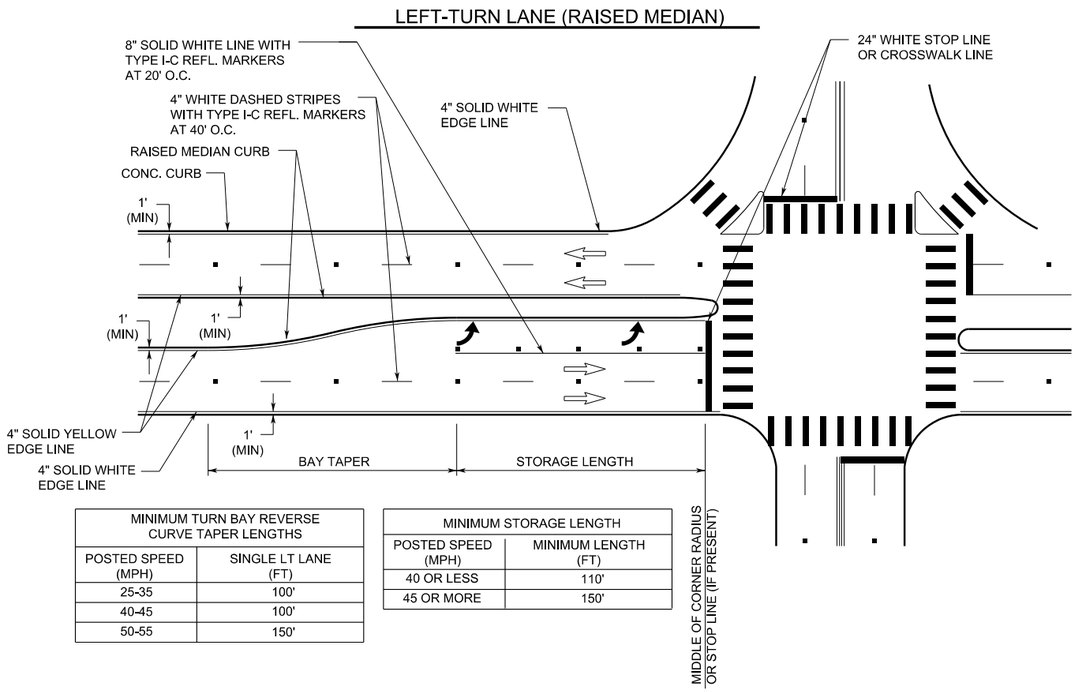
DUAL LEFT (RAISED MEDIAN)



MINIMUM TURN BAY REVERSE CURVE TAPER LENGTHS	
POSTED SPEED (MPH)	DUAL LT LANES (FT)
25-35	150'
40-45	150'
50-55	250'

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

LEFT-TURN LANE (RAISED MEDIAN)



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'

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.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

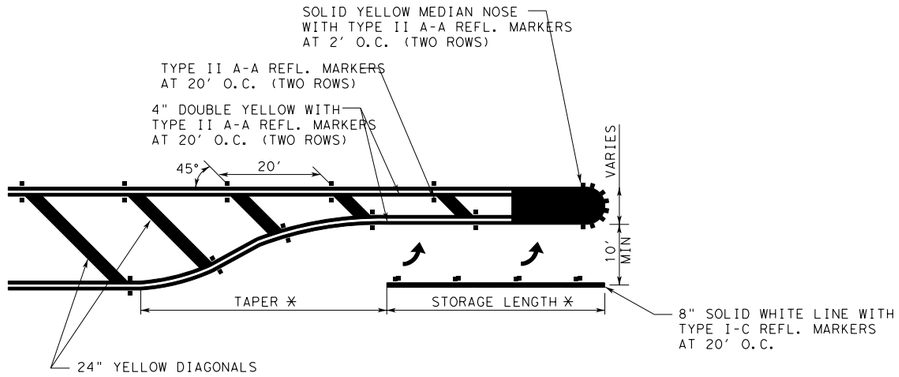
LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 1

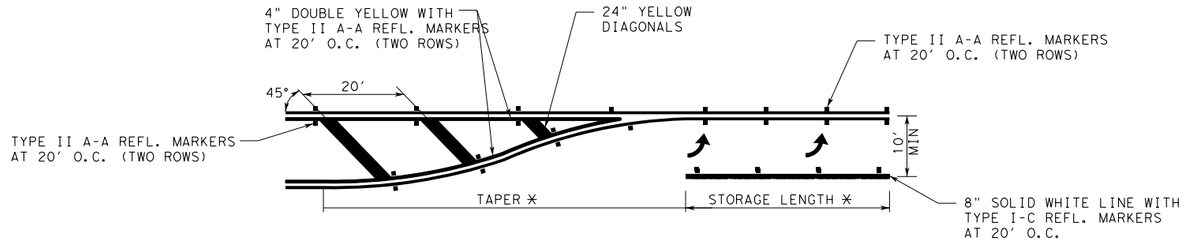
SHEET 10 OF 16

70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 486 OF 521

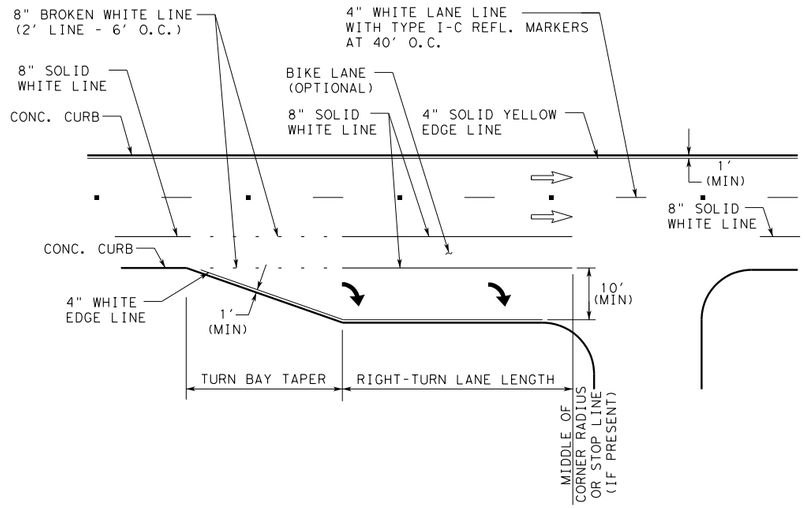
PAINTED MEDIAN LEFT TURN BAY DETAILS

✳ – USE MINIMUM TURN BAY REVERSE CURVE TAPER LENGTH AND MINIMUM STORAGE LENGTH TABLES FOR "LEFT-TURN LANE (RAISED MEDIAN)" ON SHEET 10 OF 16.





UNSIGNALIZED RIGHT-TURN LANE



MINIMUM TURN BAY TAPER LENGTH	
POSTED SPEED (MPH)	LENGTH (FT)
30 OR LESS	90′
35 OR MORE	120′

MINIMUM RIGHT-TURN LANE LENGTH	
POSTED SPEED (MPH)	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.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

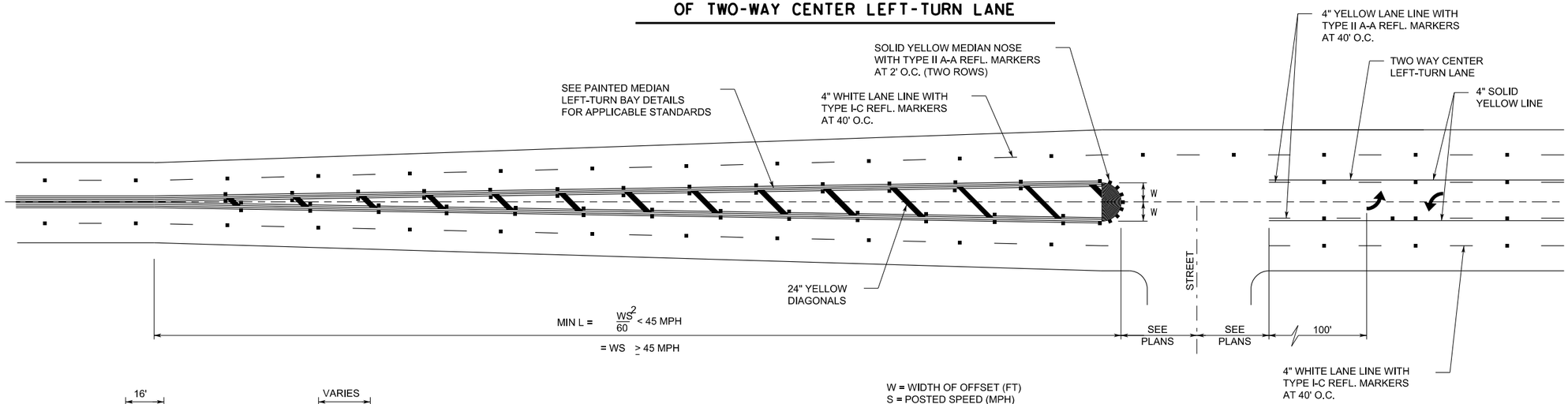
TRAFFIC ENGINEERING STANDARDS

LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 2

SHEET 11 OF 16

70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 487 OF 521

TYPICAL TRANSITION AT BEGINNING AND END OF TWO-WAY CENTER LEFT-TURN LANE



W = WIDTH OF OFFSET (FT)
S = POSTED SPEED (MPH)
L = LENGTH OF CROSSHATCHING (FT)

LEGEND

TYPICAL DETAIL

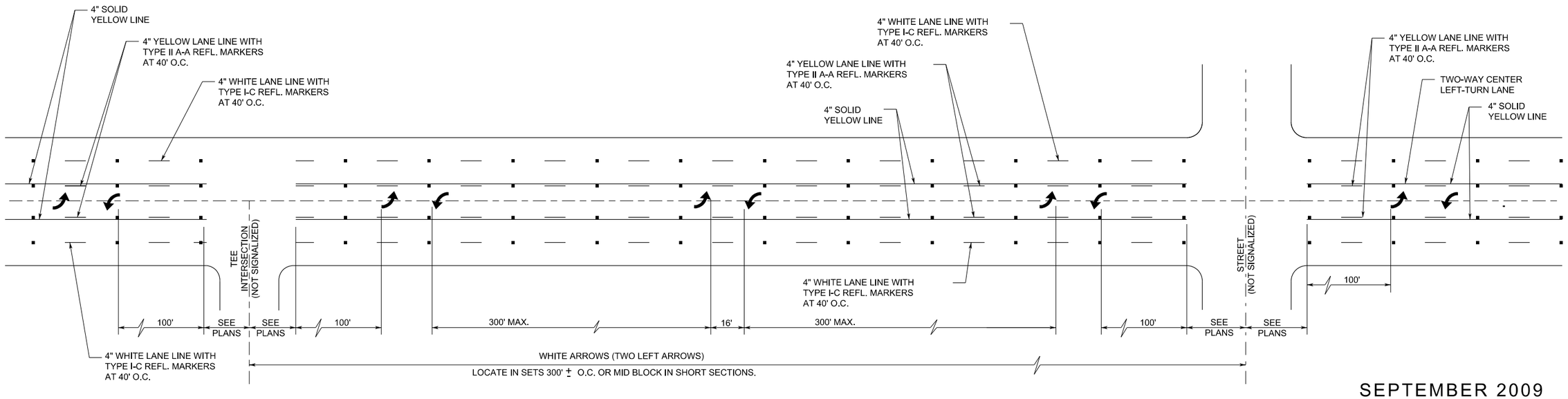
(PLACE LEGENDS IN ACCORDANCE TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET)

NOTE:
1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.

2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.

3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

TWO-WAY LEFT-TURN LANE DETAILS NON-SIGNALIZED INTERSECTIONS



SEPTEMBER 2009

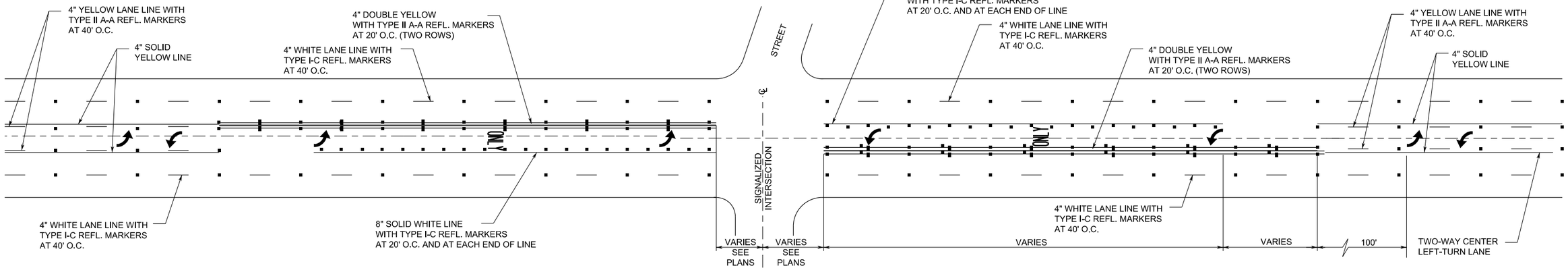
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
TWO-WAY LEFT-TURN LANE DETAILS 1
SHEET 12 OF 16

70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 488 OF 521

TYPICAL TWO-WAY LEFT-TURN LANE DETAILS

SIGNALIZED INTERSECTION



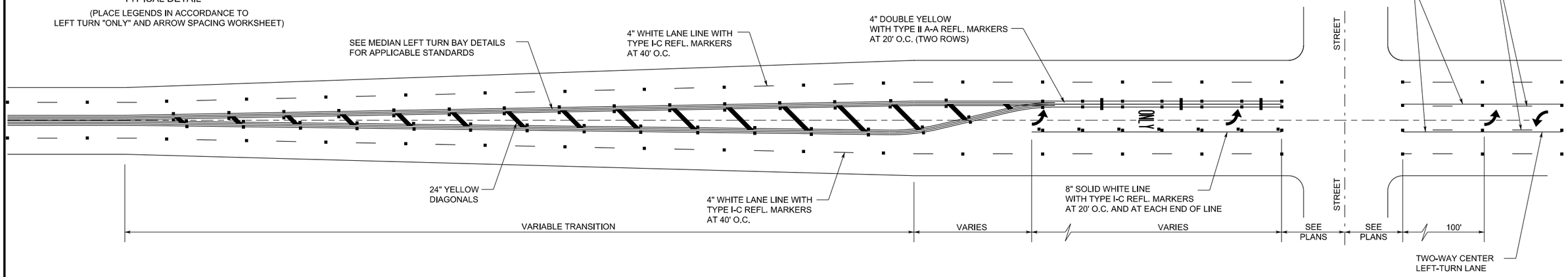
LEGEND

TYPICAL DETAIL

(PLACE LEGENDS IN ACCORDANCE TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET)

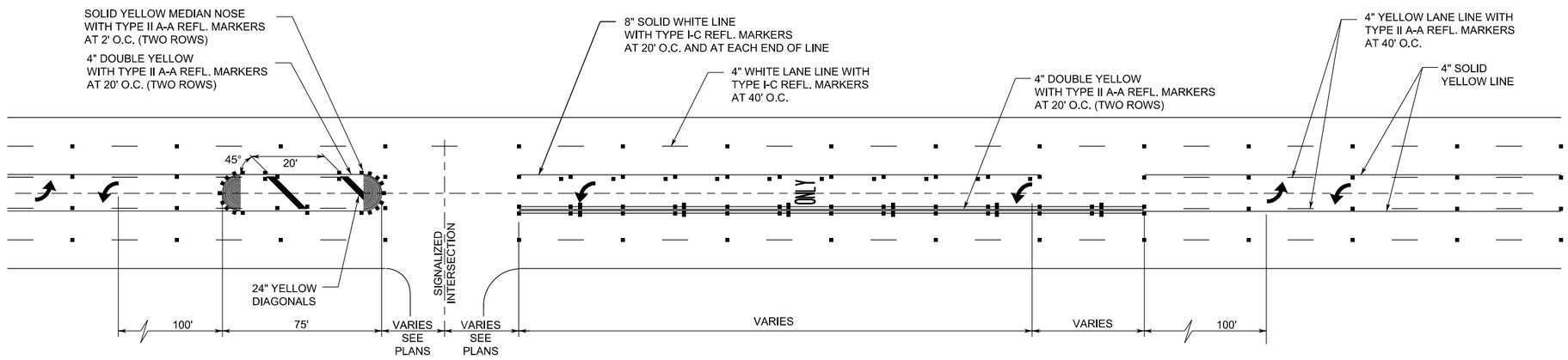
TYPICAL MEDIAN LEFT TURN BAY

SIGNALIZED AND NON-SIGNALIZED CROSS STREETS AT BEGINNING AND END OF TWO-WAY CENTER LEFT-TURN LANE



TYPICAL TWO-WAY LEFT-TURN LANE DETAILS

SIGNALIZED TEE INTERSECTION



NOTE:

1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.
2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.
3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

SEPTEMBER 2009

CITY OF SAN ANTONIO

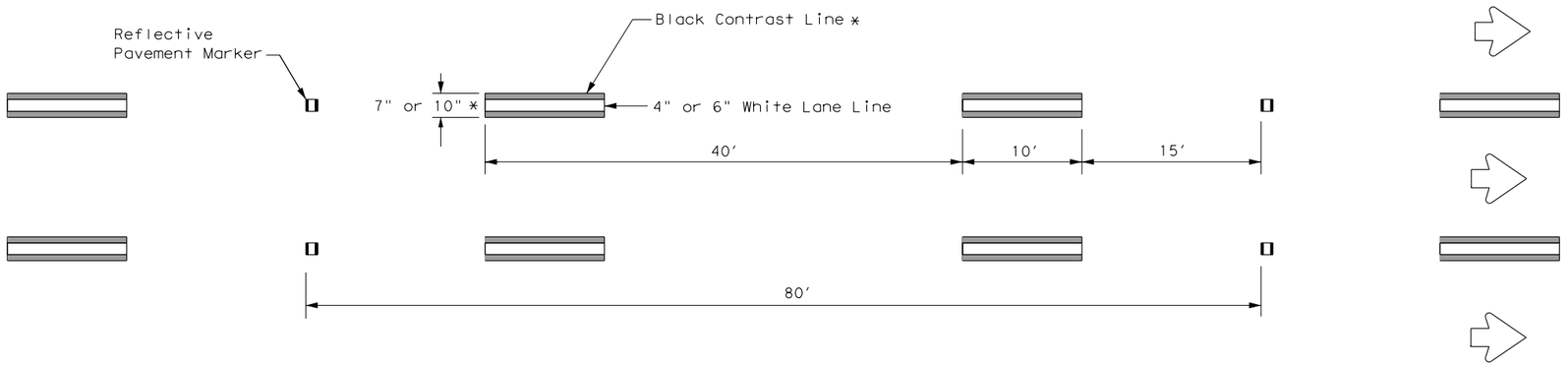
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

TWO-WAY LEFT-TURN LANE DETAILS 2

SHEET 13 OF 16

70 % SUBMITTAL	PROJECT NO.:		DATE: 1/20/2023
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 489 OF 521



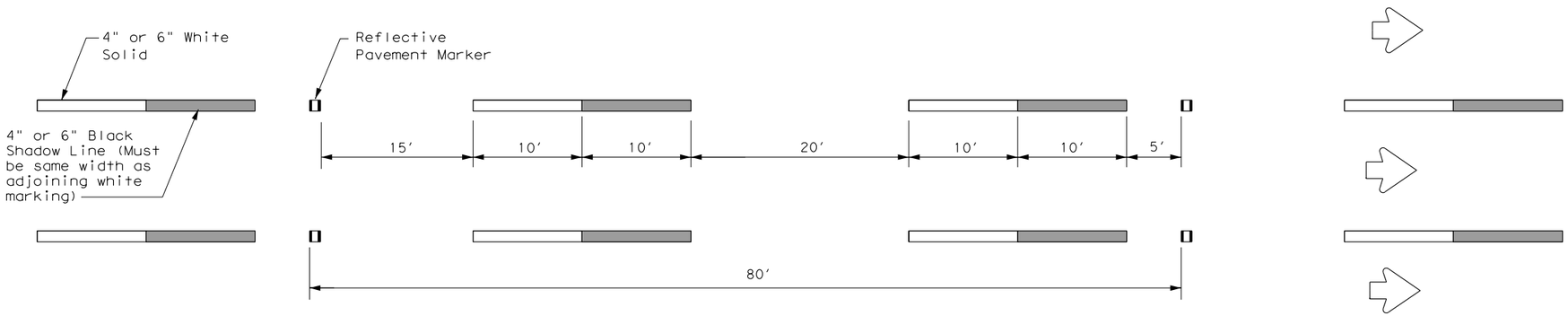
CONTRAST LANE LINE DESIGN

* See contrast line dimensions table for width of black line.

CONTRAST LINE DIMENSIONS		
White	Black (per side)	Total Width
4"	1.5"	7"
6"	2"	10"

GENERAL NOTES

1. Contrast and Shadow markings may only be used on concrete pavements.
2. Contrast and Shadow markings shall not be used on edge lines.
3. Contrast lane lines shall be permanent prefabricated pavement markings meeting DMS 8240.
4. Shadow lane line designs shall be a liquid markings system approved by TxDOT.
5. All raised reflective pavement markers placed in broken lines shall be placed in line with and midway between the white stripes.
6. See PM(2) for raised reflective pavement markings installation details.



SHADOW LANE LINE DESIGN

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

Texas Department of Transportation

Traffic Operations Division Standard

CONTRAST AND SHADOW PAVEMENT MARKINGS

CPM(1)-14

FILE: CPM(1)14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				COSA
	DIST	COUNTY		SHEET NO.
		BEXAR		490

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DATE: 1/20/2023 7:31:52 PM
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